NVIDIA Earnings Analysis Dashboard

Case Study Summary (Candidate Name -Sunil Bhatia)

Approach

Methodology

I developed an interactive Streamlit dashboard to analyse NVIDIA's stock behaviour around quarterly earnings announcements over a 3-year period (September 2022 - September 2025). The analysis examines 12 earnings events using event study methodology with 40-day windows around each announcement, decomposing returns into systematic (factor-based) and idiosyncratic (company-specific) components.

The core analytical framework multiplies daily factor returns by NVDA's factor loadings to calculate factor-based returns. The difference between total returns and factor-based returns represents idiosyncratic alpha—the pure company-specific component driven by NVDA-specific news. Factor contributions are grouped into Market factors (Beta, Excess Beta, Market), Semiconductor sector exposure, and Style factors (Value, Growth, Momentum, Quality, Volatility, etc.), enabling precise attribution of price movements.

Dashboard Structure

The dashboard presents seven analytical perspectives:

Executive Brief: High-level KPIs with historical context for each earnings event, including annotations for major market events (AI inflection point, DeepSeek shock, etc.).

Alpha Decomposition: Waterfall charts showing contribution breakdown from market beta, semiconductor sector, style factors, and pure alpha.

Regime Analysis: Comparative analysis of NVDA's behaviour before and after the May 2023 AI era inflection point.

Event Study: Individual quarterly paths with cumulative return analysis, 95% confidence intervals, and full range visualization.

Factor Evolution: Time-series tracking of NVDA's factor exposures, showing how loadings evolved during the AI boom.

Trade Analytics: Interactive back tester with configurable entry/exit windows, calculating Sharpe ratio, maximum drawdown, win rate, and Kelly criterion.

Statistical Proof: One-sample t-tests across multiple windows and return components with heat-mapped p-values to validate pattern significance.

Key Insights

1. Idiosyncratic Alpha Dominates Earnings Reactions

Across all 12 earnings events, the average earnings day total return is +4.04%, with a median of +0.32% and standard deviation of 9.92%. The win rate is 58.3% (7 of 12 positive reactions). Critically, idiosyncratic returns average +3.24% while factor-based returns contribute only +0.80%—meaning company-specific news drives 80% of the earnings day move.

The average absolute idiosyncratic move is 5.22% per earnings event, significantly larger than the systematic component. This confirms that NVDA's earnings reactions are primarily driven by fundamental business performance (guidance, product announcements, margin trends) rather

than broad market or sector movements. Among factor groups, semiconductor sector and market beta contribute modestly, while style factors are largely negligible on earnings days.

2. Extreme Volatility Concentration on Earnings Day

Volatility analysis reveals dramatic concentration around the earnings announcement. The annualized volatility on T=0 (earnings day) is 157.5%, compared to a baseline of 55.6% in the T-40 to T-21 window—a 2.8x increase. This represents the highest volatility point in the event window, confirming that earnings announcements are the dominant volatility driver for NVDA.

Interestingly, volatility normalizes quickly after earnings. The T+1 to T+5 window shows 48.9% annualized volatility, just below baseline levels. This rapid mean reversion suggests that the market efficiently incorporates earnings information within a single day, with limited post-announcement drift or delayed price discovery.

3. Notable Outlier Events Drive Distribution

The distribution of earnings reactions is highly skewed by extreme events. The largest positive reaction was May 24, 2023 (+24.37%)—the famous 'AI Inflection Quarter' when NVDA shocked markets with guidance 50% above consensus, signalling the beginning of the AI infrastructure boom. This single event represents 6x the average move and significantly skews the mean.

On the downside, the largest negative reaction was February 26, 2025 (-8.48%), following concerns about AI spending slowdown. The wide range from -8.48% to +24.37% underscores the binary nature of NVDA's earnings—results either validate or challenge the AI growth narrative, leading to outsized reactions in both directions.

Individual event analysis reveals several other notable moves: February 21, 2024 (+16.40%) when NVDA was dubbed 'the most important stock on Earth,' and August 28, 2024 (-6.38%) when Blackwell delays emerged. These events demonstrate that NVDA's stock is highly sensitive to both execution risk and AI market sentiment.

4. No Evidence of Systematic Pre-Earnings Drift

Contrary to common narratives about information leakage, I find no statistically significant pre-earnings drift in this sample. The T-5 to T-1 window shows an average total return of +0.46% with a median of +0.33%, but this result is not statistically distinguishable from zero (t-statistic = 0.24, p-value = 0.82). The idiosyncratic component during this window averages +0.42% with 2.33% standard deviation.

This finding suggests either that information leakage is not systematic across all events, or that the small sample size (12 events) lacks statistical power to detect modest drift. While some individual quarters may exhibit pre-announcement positioning, it does not constitute a reliable, repeatable pattern in this dataset. Any trading strategy relying on pre-earnings momentum would lack statistical support.

5. Post-Earnings Mean Reversion

The T+1 to T+5 window exhibits an average return of -1.68% with a median of -0.45% and standard deviation of 5.82%. While not statistically significant due to the small sample, the negative mean suggests a tendency for partial reversal of the initial earnings reaction. This could reflect profit-taking after large moves, delayed analysis of guidance details, or market reassessment of initial reactions. The pattern suggests that momentum strategies that hold beyond the earnings day may face headwinds.

Notable Findings

Regime Analysis: Pre-AI vs. AI Era

I split the sample at May 24, 2023 to compare pre-AI era (2 events: Nov 2022, Feb 2023) versus AI era (10 events: May 2023 onwards). Interestingly, the pre-AI era shows higher average earnings day returns (+6.28%) compared to the AI era (+3.59%), though this is driven by small sample size and includes the strong Feb 2023 beat (+14.02%).

Standard deviation is comparable across regimes (10.95% pre-AI vs. 10.28% AI era), suggesting volatility levels were already elevated before the AI narrative took hold. The win rate improved modestly from 50% (1 of 2) to 60% (6 of 10) in the AI era. Average absolute idiosyncratic moves declined slightly from 6.17% to 5.03%.

These results should be interpreted cautiously given the tiny pre-AI sample size (n=2). The more meaningful insight is that AI-era volatility remains extremely high (10.28% standard deviation) with a mix of both massive beats and concerning misses, reflecting the market's ongoing debate about AI investment sustainability and competitive dynamics.

Factor Attribution Patterns

Examining individual events reveals interesting factor dynamics. The May 2023 AI inflection quarter (+24.37% total) split into +16.48% alpha and +7.89% factor-based return—the highest factor contribution of any event. This suggests the move had both idiosyncratic (NVDA-specific AI positioning) and systematic (broad tech/AI enthusiasm) components.

In contrast, August 2023 showed unusual divergence: +4.44% alpha but -4.34% factor return (net +0.10% total). This indicates NVDA-specific strength offset by sector/market headwinds. February 2025 exhibited the opposite pattern: -0.90% alpha with -7.58% factor return (net -8.48%), suggesting the selloff was primarily driven by systematic factors rather than company-specific disappointment.

Implications for Trading Strategies

The interactive back tester in the dashboard allows exploration of various entry/exit combinations. Given the findings—concentrated volatility on T=0, no pre-drift, slight post-drift reversal—the optimal strategy would theoretically capture T=0 entirely while avoiding post-announcement exposure.

However, practical challenges are significant. NVDA reports after market close (4:20pm ET. The reaction occurs overnight into T+1 opening. A simple long equity position entered before close captures limited T=0 appreciation but faces full overnight gap risk. This dynamic favors options strategies (long straddles/strangles) or futures positions that capture the complete overnight move.

The 58.3%-win rate is only modestly above 50%, suggesting directional bets are risky. The extreme outliers (May 2023 at +24.37%) drive the positive mean, but most quarters deliver modest moves. Risk management is critical—the -8.48% downside demonstrates meaningful tail risk. Position sizing using Kelly criterion or volatility-based methods would be essential to avoid ruin from adverse sequences.

Limitations

Sample size: With only 12 events, statistical power is severely limited. Many potentially interesting patterns fail to reach significance simply due to sample constraints.

Regime instability: The AI narrative is still evolving. Future earnings behavior may differ as the market matures and competition intensifies.

Transaction costs: Backtest results do not account for bid-ask spreads, slippage, or borrowing costs for short positions.

Timing challenges: After-hours reporting creates execution complexity. Capturing the full reaction requires after-hours access or derivatives.

Conclusion

This analysis reveals that NVDA's earnings behavior is characterized by extreme, alpha-driven volatility concentrated on the announcement day, with limited systematic pre- or post-drift. The average +4.04% earnings day move (median +0.32%) masks a wide distribution from -8.48% to +24.37%, driven primarily by idiosyncratic factors rather than systematic market or sector movements.

The 157.5% annualized volatility on earnings day—2.8x the baseline—creates both opportunity and risk. While the positive mean return suggests a long bias could be profitable over time, the 58.3%-win rate and presence of large negative outliers require careful risk management. The absence of statistically significant pre-drift eliminates one potential trading edge, while the slight post-drift reversal suggests momentum strategies face headwinds.