

How do capital markets react to AI-related corporate announcements, as measured by abnormal stock returns around the announcement date?



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Surname, First Name	Seidenstücker Benjamin Marcel
Student ID	i6318977
Course Code	EBT0006
Tutor	Niels Kok
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Abstract

This thesis investigates the impact of AI-related corporate announcements on capital markets. An event-study methodology is used to analyse a sample of 29 announcements made by various technology firms related to AI. These announcements were made between January 2023 and January 2024. Specifically, Cumulative Abnormal Returns (CARs) are analysed over short-term and medium-term time periods to assess both immediate and continuing valuation effects. The analysis shows that in the short term there are statistically significant positive abnormal returns from AI-related announcements. The mean CAR for the return window from -1 to +1 days is +1.45% and +1.56% for the return window from 0 to +2 days, indicating a rapid revaluation of the shares following these announcements. However, when considering a medium-term timeframe of 0 to 20 days post-announcement, the CARs were also positive but not statistically significant, indicating that the persistence of these returns is limited and that there is a very high degree of variability in CARs across firms. The findings suggest that AI product announcements contain value-relevant information that is rapidly priced by markets, while more volatile medium-term effects depend on firm-specific and structural factors.

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1. Introduction

1.1 Background and Motivation

The technology sector has been significantly impacted by the rapid growth of AI activity in the past 2 years. At an increasingly rapid pace, both large platform providers and mid-sized tech companies are launching AI-enhanced products, features, and infrastructure. This includes the introduction of foundational models, cloud-based AI capabilities, and the introduction of dedicated applications that run on top of existing software platforms (Nishant et al., 2024).

AI-related news has an immediate and powerful influence on the capital markets. Typically, announcements containing such news result in substantial changes to company valuation, trading activity volumes, and implied volatilities through options pricing (Aharon & Demir, 2024). This indicates that as AI news becomes publicly available, investors re-evaluate their expectations for future growth based on their knowledge of prior AI activity (Shiller, 2003). In addition, the large volume of media attention and public interest generates further emotional responses that can also influence investment decisions (Shefrin, 2000; Shefrin & Statman, 2011).

Product introductions help to clarify the strategy of companies, their likelihood of being adopted by customers, and their potential future cash flow. In contrast to vague announcements of strategic intent, specific AI product launches may dramatically change investors' expectations about future revenue growth, profit margin performance, and market position, all in a quantifiable manner (Nishant et al., 2024). The stock market response to these events provides a clear way to measure whether the creation of new AI products by companies is perceived by investors as offering "real" prospects or simply as media hype (Aharon & Demir, 2024; Floridi, 2024).

1.2 Historical reference

Past technological innovations (e.g. "dot-com" boom and the Blockchain Era) have produced large price movements in capital markets based on speculative behaviour from technology-related announcements (Cooper et al., 2001; Ofek & Richardson, 2003; Pastor & Veronesi, 2004). Most price movements occurred based on a narrative rather than the tangible nature of the new products and their financial viability (Floridi, 2024; Tiwari, 2024). AI product

launches will provide insights into a company's readiness for technology adoption, business models, and revenue projections, thereby providing a better basis for evaluating price reactions associated with technology advancements (Aharon & Demir, 2024; Nishant et al., 2024).

1.3 Research Gap

While AI is seen as a prominent opportunity among many investors today, there is limited research regarding how investors respond to AI-related company announcements. Many prior studies have either focused on a broad narrative or general sentiment about the technology, few studies have isolated clearly identified announcement events to study their respective effects on capital markets or stock prices (Aharon & Demir, 2024). This research will assess, via product-release-defined events from multiple firms, if any statistically significant CAR for short-term event windows exist, then, the persistence of CAR beyond the initial announcement will also be examined. Finally, this research will utilize cross-section regression techniques to explore some explanations into what drives the differences in CAR across different firms, while taking into consideration that CAR for large companies and timing windows may each differ substantially (Aharon & Demir, 2024; Choi & Jung, 2024).

1.4 Research Question and Sub-Questions

The focus of this thesis is to quantify the stock price effects of announcements regarding AI product releases from companies as well as identifying if the effects differ between different types of companies, types of announcements and timeframes (Nishant et al., 2024).

RQ: How do capital markets react to AI-related corporate announcements, as measured by abnormal stock returns around the announcement date?

To answer this, the empirical analysis is guided by the following sub-questions:

SQ1: Do AI-related corporate announcements generate significant abnormal stock returns in the short-term?

SQ2: Do AI-related corporate announcements generate significant abnormal stock returns in the medium-term?

These questions will determine whether there is a general pattern of generating positive or negative CARs from AI-related announcements using multiple event windows (Aharon & Demir, 2024).

SQ3: Do firm or announcement characteristics explain variation in abnormal returns?

This question will include firm-level characteristics, such as size and the type of AI announcement itself, to allow for analysis of the impact on both direction and magnitude of CARs (Choi & Jung, 2024; Nishant et al., 2024).

1.5 Expected Contributions

Contributions to Academic Database: This thesis contributes to the growing body of literature on the use of artificial intelligence in Financial Markets by performing an event study analysis focused on AI-related product and strategy announcements (Aharon & Demir, 2024; Nishant et al., 2024).

Contributions to Methodological Database: An event study methodology and cross-sectional regressions are used to quantify the abnormal returns surrounding AI announcements and to examine the determinants of abnormal returns (MacKinlay, 1997; Shiller, 2003).

Contributions to Practical Database: The results will be useful to investors analysing AI-based announcements to determine whether they create an immediate opportunity to trade; and whether such announcements offer meaningful insight into the future viability of a company (Floridi, 2024; Tiwari, 2024).

1.6 Structure of the Thesis

This is how the rest of this thesis will proceed: Chapter 2 includes a literature review relevant to AI and Technology-Induced Market Reactions, and an event-study design, while Chapter 3 describes how data will be collected and how empirical analysis will occur. The outcomes of Abnormal Returns and Factors Influencing Abnormal Returns will be reported in Chapter 4; Chapter 5 describes the impact of this research on Investors and Market Efficiency, and Chapter 6 will conclude the findings.

2. Literature Review

2.1 Key Concepts

AI Product Releases:

Announcements of AI product releases are corporate announcements that introduce a new AI-based product, feature, or model capabilities. AI product release announcements typically include commercial rollout timelines, integration with other companies' existing solutions, and expected business applications (Nishant et al., 2024). In contrast to broader AI-related statements (i.e., "We are investing in AI"), AI product release announcements provide concrete information about a company's future saleable products, and therefore may change the way analysts perceive a company's ability to achieve revenue growth, cost savings, or increase competitive advantage (Choi & Jung, 2024). Because of their clearly defined nature, AI product releases are particularly useful candidates for event-study analysis, as they provide an unambiguous information shock to analysts (MacKinlay, 1997; Nishant et al., 2024).

Abnormal Returns and Cumulative Abnormal Returns (CARs):

An abnormal return (AR) quantifies the actual performance of a security relative to the performance of the market on that day. The overall cumulative abnormal return (CAR) for an event can be determined by adding up all the abnormal returns for each of the trading days surrounding the event date. CAR is a useful tool in identifying the systematic response of the stock market to new information, beyond what would probably happen in the absence of information, in technology-related sectors where investor expectations change rapidly (MacKinlay, 1997; Pastor & Veronesi, 2004).

Event-Study Concept:

Event studies provide a way of analysing how assets react to releases of clearly defined new information, in this case, AI product releases. Event studies compare the actual return observed to an expected benchmark (S&P 500) return and isolate the effect of one specific event or announcement on asset prices (MacKinlay, 1997). Event studies are frequently employed as a common method for measuring market efficiency and behavioural mispricing (Aharon & Demir, 2024; Cooper et al., 2001).

Market Efficiency and Information Effects:

Under the Efficient Market Hypothesis (EMH), stock prices reflect publicly available information almost instantaneously and without a systematic bias (Fama, 1970, as discussed in Shiller, 2003). However, in practice, new developments related to innovations are frequently met with under-reaction or over-reaction by investors, as well as reversals or gradual price movements (Barberis et al. 1998; Shiller, 2003). This demonstrates that the speed and accuracy of stock price adjustment is a function of investor perceptions, moods, and their attention limits (Shefrin, 2000; Shefrin & Statman, 2011). These elements are particularly important when assessing the impact of AI-related announcements on stock prices (Floridi, 2024; Tiwari, 2024).

2.2 Evidence from past technology waves

Dot-com Announcements:

During the dot-com boom, investors often reacted favourably to companies that digitised their operations or formed relationships with online technology companies. For instance, Cooper (2001) shows that when companies added “.com” to their name, they had large abnormal returns, even though there was little change in the underlying fundamentals. This suggests that the excitement surrounding new technologies outweighed the financial data associated with these companies (Ofek & Richardson, 2003; Pastor & Veronesi, 2004).

The effects (large abnormal returns) of dot-com-related naming announcements reached +74% over a CAR period of $[-5, +5]$ days and persisted (Cooper et al., 2001; Kryzanowski & Zhang, 2013). Interestingly, at the end of the dot-com hype, when the “bubble burst,” companies received almost the same amount of abnormal returns (+64%) for removing “dot-com” from their name and therefore exiting the bubble Cooper et al. (2005).

The dot-com era provides tie-ins to AI. Firstly, the literature demonstrates that markets can act irrationally due to new and untested technology (Ofek & Richardson, 2003; Pastor & Veronesi, 2004). Secondly, the dot-com era illustrates that not all returns associated with announcements are ultimately justified (Shiller, 2003; Sheinkman & Xiong, 2003). However, a crucial difference exists in the context of AI; most AI announcements and new products are tangible, whereas early-stage internet companies did not, in this case, have significant tangible products (e.g.: “dot-com” name change).

Blockchain Announcements:

Between 2013 and 2017, many of the announcements related to bitcoin technology “had a large, relative-to-revenue return” not only at the announcement date but also for several days thereafter (Ante et al., 2022; Lyandres et al., 2020). Other companies made announcements that included the implementation of bitcoin-based products or services, or merely expressed strategic interest in blockchain technologies, and their stock price jumped following these disclosures (Lyandres et al., 2020). For example, many companies announced partnerships with companies that developed and/or managed platforms utilizing bitcoin/blockchain technology, and their stock price jumped as well (Ante et al., 2022; Huynh, 2021). It should be noted that “hype” is one of the driving factors behind the immediate price jumps. For many organizations, the only relationship to bitcoin or blockchain was that of being associated with a buzzword that has gained traction and popularity with investors (Ante et al., 2022; Sharma et al., 2020). Thus, many organizations experienced higher market caps and valuations because of the hype surrounding the technology, rather than strong operational performance improvement or cash flow projections (Lyandres et al., 2020; Huynh, 2021).

It has been found through various studies that the stock market reaction to blockchain rapidly increased and then fell back to historical pricing levels for many projects, as the majority of all blockchain projects ultimately failed to deliver real, measurable value in terms of financial benefits and operational improvements (Huynh, 2021; Lyandres et al., 2020; Sharma et al., 2020). Similar short-lived market reactions have also been documented for other frontier technologies, such as metaverse-related disclosures, where firms experienced abnormal returns around announcement dates despite limited subsequent real economic impact (Aharon et al., 2022).

2.3 Evidence on AI

While AI-related corporate announcements are prevalent in current markets, there is a minimal number of studies analysing how stock prices react to these announcements (Aharon & Demir, 2024; Floridi, 2024; Tiwari, 2024). The contemporary literature primarily examines the broader categories of AI sentiment, AI announcement frequency, and the effect of AI on a company’s valuation over time (Nishant et al., 2024).

Most research has centred on case studies of specific companies (for example, NVIDIA and Meta) or a limited number of company-specific announcements (Aharon & Demir, 2024;

Tiwari, 2024). Therefore, the current academic literature is lacking a systematic examination of CARs through multi-firm analysis of AI announcements (Nishant et al., 2024).

2.4 Conceptual Framework and Hypotheses

Figure X:

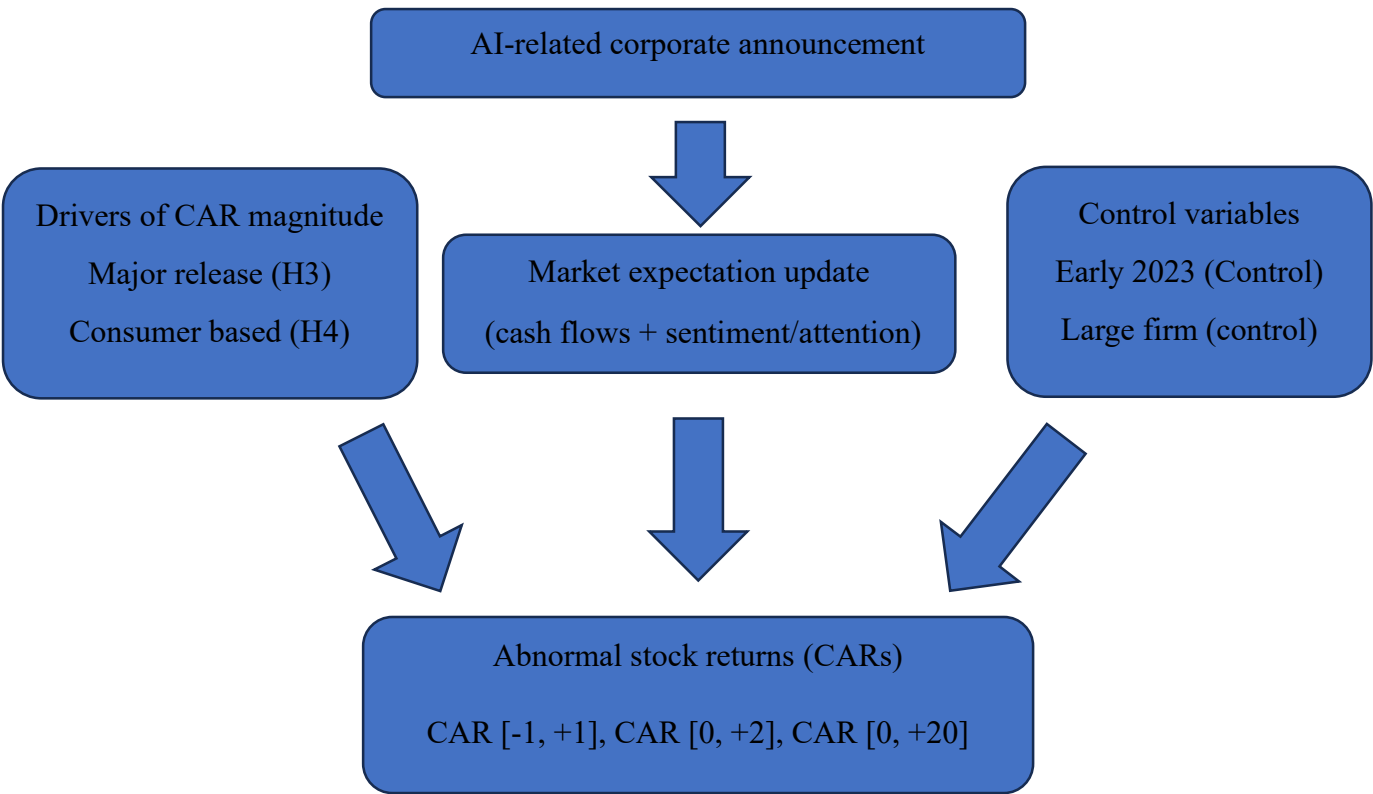


Figure X presents the conceptual framework of this study. AI-related corporate announcements are assumed to trigger updates in market expectations, reflecting both revised expectations about future cash flows and changes in investor sentiment and attention. These expectation updates are reflected in abnormal stock returns around the announcement date, measured using cumulative abnormal returns over short- and medium-term event windows. The magnitude of these abnormal returns is hypothesized to depend on specific announcement characteristics, including whether the announcement represents a major AI product release (Hypothesis 3) and whether the announced product is consumer-facing (Hypothesis 4). In addition, firm-level characteristics, such as firm size and the timing of the announcement in early 2023, are included as control variables to account for systematic differences in market reactions across firms and time.

From this conceptual framework, the following hypotheses have been developed:

H1: AI-related corporate announcements generate positive and statistically significant Cumulative Abnormal Returns (CARs) in the short run.

This hypothesis is grounded in an assumption that the market views AI innovations as adding value to the firm, because they allow greater efficiency and monetisation opportunity, and provide a means to additional growth (Nishant et al., 2024).

H2: Cumulative Abnormal Returns persist beyond the immediate event window.

Theoretically, if announcements contain information about real added value to the company, the short-term effects will persist into the medium run (Aharon & Demir, 2024; Pastor & Veronesi, 2004).

H3: Major AI releases produce larger Cumulative Abnormal Returns than minor announcements or incremental updates.

The announcement of foundational models, new categories of products, and major integration of platforms is expected to elicit a more positive response from the investing community than smaller updates to existing features (Choi & Jung, 2024; Nishant et al., 2024).

H4: Companies that release AI products targeted to consumers generate more Cumulative Abnormal Returns.

This hypothesis identifies if there is a difference in CARs between consumer (B2C) or enterprise (B2B) related AI product releases.

3. Data and Methodology

3.1 Research and Design

This research employs a conventional event study methodology to assess the impact of announcements regarding AI-related products or initiatives on stock prices. Event studies provide an excellent way to evaluate how quickly, and accurately financial markets respond to new information received by investors, especially in the technology sector, where innovation and product introduction are key drivers of stock market performance (Aharon & Demir, 2024; Cooper et al., 2001).

The research database consists of publicly traded companies engaged in the technology industry from January 2023 to January 2024, during which time there was an exponential increase in AI adoption, a large number of novel AI models and systems entering the market, and high levels of investor interest in the technology (Floridi, 2024; Nishant et al., 2024). The period sampled, January 2023 to January 2024, includes both early adopters and later stage companies that launched new generative AI systems.

The selected AI product announcements are related to specific product releases. While general announcements made by technology companies about their vision of the future impacts of AI on their business are usually vague, the specifics regarding product releases, what is expected to be available and when it will be available allow for the measurement of stock market reaction to AI product announcements as distinct from any general market movement (Aharon & Demir, 2024; Nishant et al., 2024).

To evaluate both short- and mid-term impacts on the CAR following (or prior to) an announcement about Artificial Intelligence (AI), three different CAR windows have been identified:

- CAR [-1, +1] - Represents the immediate interpretation by the market.
- CAR [0, +2] - Represents the immediate adjustment of the market to the announcement, and any potential delayed response.
- CAR [0, +20] - Represents the medium-term aspects of buyer behaviour, while allowing to separate it from the “hype” surrounding an announcement, thus potentially eliminating non-genuine success (Aharon & Demir, 2024; Huynh, 2021; MacKinlay, 1997).

The fact that the above CAR windows correspond with other research conducted by experts in the field regarding technological announcements, provides the ability to study how quickly (or slowly) AI information is incorporated into market behaviour (Aharon & Demir, 2024; Cooper et al., 2001; Huynh, 2021). This can be used to provide a systematic empirical framework to enhance understanding of the level of abnormal returns and the factors associated with them (MacKinlay, 1997; Pastor & Veronesi, 2004).

3.2 Event Definition

In this study, an event is defined as any public organization's written release of a launch, introduction, or major revision to an AI product, service, or capability (see full list in appendix 8.1) (Nishant et al., 2024). This definition would include announcements about the introduction of new AI models, the development of enterprise AI tools, the implementation of AI features into current products, announcements on the expansion of AI product offerings, or any announcement regarding an important update that had an immediate revenue impact (Aharon & Demir, 2024; Choi & Jung, 2024).

The events that were included in the study's analysis are:

- Announced products that have specific launch dates
- Major upgrades to AI models (such as new Generative AI)
- New AI tools that are targeted toward enterprise users and developers
- New hardware that directly supports the implementation of AI workloads (Aharon & Demir, 2024; Nishant et al., 2024)

Events that are not considered acceptable for inclusion in this study were events that comprised:

- An announcement by an organization regarding the "development of AI capabilities" without specific product references
- Statements made by one of an organization's executives regarding their earnings without any announcement of a new product
- Mergers and acquisitions (M&A) announcements and partnerships between organizations that were not directly related to the AI product.
- Research manuscripts and technical preview papers that do not lead to a commercial deployment of AI.
- Employee hires and training programs conducted to develop AI (Aharon & Demir, 2024; Nishant et al., 2024).

By clearly setting forth a definition for the events to be tested, the ability to concentrate on AI-related events and provide assurance that the abnormal returns associated with these

events have a high degree of reliability will increase the chances of finding significant relationships (MacKinlay, 1997; Shiller, 2003).

3.3 Data Collection Procedure

Data used in this research provides information about announcements through a combination of reliable, publicly available resources. These include corporate press releases, company blogs and product announcements posted on the companies' websites.

The process for verifying the announcements involves validating each announcement through sources of the companies themselves (News blog etc.), examining each announcement to determine if it is a true AI product announcement (beyond simply describing a business strategy or non-technical disclosure), and examining each announcement for duplicate announcements or speculation (Choi & Jung, 2024; Nishant et al., 2024).

Daily stock price information was obtained from standard financial data sources to calculate abnormal returns for each announcement. The S&P 500 Index was the benchmark for calculating the market return on that day and provides a strong representation of all AI-exposed companies, as well as allowing for comparison of investor performance against the S&P 500 index regarding announcement-related performance (Pastor & Veronesi, 2004).

3.4 Variable Operationalization

Dependent Variables: CARs

CAR [-1, +1]: Represents today's immediate return around the time of announcement.

CAR [0, +2]: Measures short-term adjustments resulting from market participants needing additional time to effectively process newly announced technology and products.

CAR [0, +20]: Represents medium-term effects and persistence of cumulative abnormal stock returns (Aharon & Demir, 2024; MacKinlay, 1997).

Independent variables:

Major Release Dummy: The major release dummy is categorized as a major release for AI product/service announcements (e.g. Initial launch of a new AI platform) and equals 1; Conversely it equals 0 when it contains any incremental updates/add-on features. Prior

evidence illustrates that major product releases will result in significant changes in investor expectations and, consequently, larger CARs when compared to less significant announcements (i.e. Routine announcements) as major product releases create new opportunities for cash flows as opposed to refining and enhancing them (Choi & Jung, 2024; Nishant et al., 2024).

Consumer-oriented Dummy: The Consumer-oriented dummy equals 1 if announcements target primarily end-users/consumers (e.g., AI assistants within productivity tool suites & mobile applications) or it equals 0 if it targets enterprise/developer customers. Generally, consumer-oriented AI products are far more visible and easily understood by investors which may lead to exaggerated positive sentiment and possibly mispricing over the shorter term; Conversely, enterprise tool pricing may factor into valuations gradually (Shiller, 2003).

Control variables:

Large Firm Dummy: The large firm dummy variable accounts for variations in firm size, which is reflected in its being assigned the value of 1 for firms that have a market capitalization greater than \$200 billion as measured in 2023 and 0 for smaller firms. Generally, large firms would exhibit less abnormal returns because the new cash flows represent a smaller percentage of the general valuation of the company (Pastor & Veronesi, 2004; Shiller, 2003).

Early 2023 Dummy: An early 2023 dummy variable will account for news announcements that were made until June of the year 2023, it is recorded as 1 for those announcements and 0 for any other period after that. The early 2023 dummy is also intended to capture potential timing impacts associated with the very beginning of the AI trend cycle. Prior increases in stock prices related to speculation or anticipation regarding potential new cash flow from AI were already priced and accounted for in the values of stock prices prior to the announcement (Aharon & Demir, 2024; Pastor & Veronesi, 2004).

3.5 CAR Calculation

This research calculates abnormal returns (ARs) for each event using the on-the-day difference in percentages between the returns of the company and the whole market:

$$AR_{\{i,t\}} = R_{\{i,t\}} - R_{\{m,t\}}$$

where $R_{i,t}$ is the daily stock return for firm i at time t , and $R_{m,t}$ is the return of the S&P 500 Index.

Cumulative abnormal returns (CARs) are computed by summing ARs across event windows:

$$CAR_{i(t_1, t_2)} = \sum_{\{t=t_1\}}^{\{t_2\}} AR_{\{i, t\}}$$

This method eliminates much of the forecasting error inherent in multi-factor models and permits not using a large estimation window, which is critical given the timeframe for collecting data on rapidly changing Artificial Intelligence news cycles. The market-adjusted return methodology has been widely used to identify innovation-related events and provides reliable and accurate results when the benchmark index is representative of the changing dynamics of a specific sector, as is the case for this study (Aharon & Demir, 2024; Cooper et al., 2001; Huynh, 2021).

3.6 Regression Specification

The explanatory variables and controls are chosen to capture heterogeneity in announcement characteristics (Major, Consumer) and structural differences across firms and time (LargeFirm, Early2023), as motivated in the variable operationalisation section. To explain cross-sectional variation in abnormal returns, the thesis estimates the following regression for each CAR window:

$$CAR_i = \beta_0 + \beta_1 Major_{dummy_i} + \beta_2 Early2023_{dummy_i} + \beta_3 Consumer_{dummy_i} + \beta_4 LargeFirm_{dummy_i} + \varepsilon_i$$

Rationale for Regression and Cross-Sectional Analysis

The OLS model with conventional standard errors is appropriate in analysing the factors affecting CARs in an event study as it provides a single measure of the impact on the firm's stock price and does not require time-series methods (MacKinlay, 1997). Using OLS cross-sectional analysis is the most descriptive method for relationships of these particular firm and announcement factors, i.e., Major, Consumer, Early-2023, and Large Firm. As discussed previously, the OLS model is a robust and parsimonious way of providing insight into how these AI product announcements are valued by the marketplace. Through the analysis of multiple CAR windows across different timeframes, additional insights can be gained as to how AI product announcements are valued in the marketplace. (Pastor & Veronesi, 2004; Shiller, 2003; Tiwari, 2024).

4. Results

4.1 Descriptive statistics

This subsection describes the data used for the event-study investigation. The sample incorporates 29 AI-related product announcements (28 df) by well-known technology companies (e.g.: NVIDIA, Microsoft, Google and Meta) made between January 2023 and January 2024. Each of the events contains an explicit list of product-related AI product launches that support the definition of an event outlined in Section 3.

Table 4.1

Statistics:	CAR (-1, +1)	CAR (0, +2)	CAR (0, +20)
Mean	1,45%	1,56%	1,69%
Median	0,78%	1,31%	3,00%
Std. Dev.	2,68%	3,66%	8,21%
Min.	-3,06%	-4,72%	-15,34%
Max.	8,50%	9,84%	21,02%

4.2 Short-Term Reaction

Short-term reactions are evaluated using CAR [-1, +1] and CAR [0, +2]. These windows capture immediate responses and slightly delayed adjustments as investors process the announcement. Out of these 29 observations, Salesforce (-3.06%) and AMD (-4,72%) had the lowest abnormal returns during the timeframes around the announcement, while Microsoft (+8,50%) and Google (9,84%) had the highest abnormal returns.

When looking at the overall results, we see means of 1,45% and 1,56% and standard deviations of 2,68% and 3,66%. To see if the average is significantly different from zero in these two windows a one-sample two-sided T-test was conducted, with the relevant number of observations, 29.

$$\text{CAR} [-1, +1]: \frac{(1,45\%-0)}{(2,68\%-\sqrt{29})} = 2,905$$

$$\text{CAR} [0, +2]: \frac{(1,56\%-0)}{(3,66\%-\sqrt{29})} = 2,299$$

Both values are significant at the 5% level ($t=2,905$; $t=2,299$; $df = 28$; $p < 0.05$). CAR [-1, +1] is also significant at the 1% level ($t=2,905$; $df = 28$; $p < 0.01$).

4.3 Medium-Term Persistence

The medium-term effect is captured using CAR [0, +20]. This window captures the short-term effect around the announcement and the other abnormal returns in the following 20-day period. Workday (-15,34%) had the lowest abnormal returns and Adobe (+21,02%) had the highest.

When looking at the overall results, we see a mean of 1,69%, a standard deviation of 8,21%. To see if the average is significantly different from zero in this window a one-sample two-sided T-test was conducted, with the relevant number of observations, 29.

$$\text{CAR [0, +20]: } \frac{(1,69\%-0)}{(8,21\%-\sqrt{29})} = 1,110$$

The result is higher and even more volatile; thus, this value is not significant at any level ($t=1,110$; $df = 28$; $p < 0.05$).

4.4 Regression Results

In this section, the results of the analysis of the three OLS regression models for each CAR window are presented (the full outputs can be seen in Appendix 8.2). Each of these models includes the same 29 observations (the same 28df), the same explanatory variables: the Major release Dummy and the Consumer Dummy and the same control variables: the Early2023 Dummy and the Large Firm Dummy. To check for multicollinearity a correlation matrix for all three timeframes was made and can be seen in appendix 8.3. No values exceed any important threshold, highest correlation is 0.51 (Consumer–LargeFirm), this lies below common concern thresholds.

Regression CAR [-1, +1]

The multiple regression analysis of the short-term CAR [-1, +1] window calculated a multiple R value of 0.2838. The R^2 value for the model was 0.0806, while the adjusted R^2 was -0.0727.

Variable	Coefficient	Standard Error	t-Statistic	p-Value
Intercept	0,00204	0,01190	0,17173	0,86509
Majordummy	0,00084	0,01091	0,07734	0,93899
Early2023dummy	0,00912	0,01076	0,84746	0,40511
Consumerdummy	0,00063	0,01264	0,04964	0,96082
LargeFirmdummy	0,01030	0,01257	0,81957	0,42053

Regression CAR [0, +2]

The multiple regression analysis of the short-term CAR [0, +2] window calculated a multiple R value of 0,4070. The R^2 value for the model is 0,1656, while the adjusted R^2 is 0,0266.

Variable	Coefficient	Standard Error	t-Statistic	p-Value
Intercept	-0,00018	0,01547	-0,01132	0,99106
Majordummy	-0,00607	0,01418	-0,42764	0,67272
Early2023dummy	0,02524	0,01399	1,80356	0,08387
Consumerdummy	-0,01122	0,01643	-0,68253	0,50144
LargeFirmdummy	0,01418	0,01635	0,86715	0,39445

Regression CAR [0, +20]

The multiple regression analysis of the short-term CAR [0, +20] window calculated a multiple R value of 0,5800. The R^2 value for the model is 0,3360, while the adjusted R^2 is 0,2253.

Variable	Coefficient	Standard Error	t-Statistic	p-Value
Intercept	-0,01364	0,03092	-0,44134	0,66292
Majordummy	-0,05061	0,02834	-1,78579	0,08678
Early2023dummy	0,03611	0,02797	1,29115	0,20895
Consumerdummy	-0,01076	0,03284	-0,32752	0,74611
LargeFirmdummy	0,06449	0,03267	1,97398	0,06000

5. Discussion

5.1 Short-Term Valuation Impact

The comprehensive average abnormal returns exhibited in CAR [-1, +1] and CAR [0, +2] demonstrate, on average, how market participants can quickly reassess and re-evaluate companies following the announcement of AI products by these companies. For instance, the results for CAR [-1, +1] indicated an average of 1.45%, and CAR [0, +2] revealed an average of 1.56%. Both response measures were significant at the 5% significance level. Therefore, these results are consistent with the assumption that investors quickly react and adjust their expectations about a company's value when an AI announcement is made. In valuation terms,

this implies that firm announcements concerning AI products contain information that will impact their future cash flow potential, cost efficiencies, or strategic differentiation. In addition, the significant t-statistic of the short-term CAR (2,905 and 2,299) indicates that the announcement of AI products is treated as a meaningful, credible indicator of a company's potential growth, and not just another routine corporate communication. In terms of pricing, the incremental abnormal return of 1-2% within 1-3 days suggests that the market can substantially revise its view of a company's future profitability in a very short time frame. The magnitude of this change is particularly notable since the events refer to large technology companies, many of whom are widely covered and followed by analysts. This aligns with Aharon & Demir (2024) short-term reaction evidence.

5.2 Medium-Term Implications

The CAR from (0 to +20) is representative of initial reactions towards product announcements, and whether they extend into the medium-term adjustment period. The results of the sample indicate a mean CAR of 1.69%, which may give the impression that short-term effects grow in the medium run. However, CAR values from 0 to +20 have a very broad range of numbers from -15.34% to a high of +21.02%. This indicates a large amount of diversity and therefore volatility in adjustments among the companies. Certain companies that possess strong ecosystem benefits or effective commercial channels continue to achieve positive abnormal returns. Other companies have negative CAR values, which likely indicates that a continued evaluation of these products will occur with the introduction of more information regarding factors including, but not limited to adoption of the product, competition, and feasibility. Since the results of the t-test are not significant, the effects of AI-related announcements on persistent abnormal returns cannot be proven.

The medium-term results show an increase in the R^2 values for the regression analysis compared to the short-term results. This increase shows that, the medium-term reaction will likely be driven by more structural or firm-specific changing factors, rather than, solely based on investor market sentiments immediately following the announcement.

5.3 Investor Implications

The results indicate several points for consideration by investors. Firstly, based on the magnitude and significance of the short-term CARs, AI announcements may may create short-lived pricing effects relevant for event-driven strategies. The rapid price change during the

first 1-2 days of trading implies that delays in the execution of these trading strategies reduce the potential for future returns.

Secondly, the relatively low statistical significance of medium-term CARs implies that there is potential for overreaction by the investor community. Therefore, investors employing trend-following or momentum-based trading strategies may want to acknowledge that reversal risks will be present for at least some companies, particularly if the AI announcement lacks clear commercial relevance.

Thirdly, since no variables of the regression turned out to be significant at the normal 5% level, investors should think twice about including these kinds of characteristics when choosing to invest in a company releasing AI products.

5.4 Firm Implications

Businesses should ensure that their AI product announcements are clearly communicated through well-defined communication strategies. Clear and detailed announcements generally create higher levels of reactions in the market compared to generic announcements. Therefore, businesses in competitive segments of AI should emphasize their unique value propositions and well-defined deployment (launch) timelines in their AI announcements when possible.

AI announcements also serve as signals related to future monetization for investors. Investors tend to positively react to AI announcements that are closely related to future revenue generation and/or an increase in the company's ecosystem. For companies looking to maximize the valuation impacts of their AI announcements, they may want to consider aligning their product communication with a more general strategy for growth or advancement, in terms of enterprise efficiencies gained, the number of users gained, and synergies created by an integrated platform made through AI. Doing so would provide investors with greater confidence and create a more positive expectation for growth into the future.

6. Conclusion

6.1 Summary of Findings

This research explored how markets respond to AI product releases from technology firms through 29 distinct event windows where companies made public announcements regarding their AI products. The data shows a statistically significant mean abnormal return of 1.45%

(CAR [-1, +1]) and 1.56% (CAR [0, +2]) during the short time frames before, during, and after the initial public announcement. This implies that, within a short time after a public statement concerning an AI-related product by a technology, the marketplace reacts favourably and quickly.

In contrast, the medium-term duration window (CAR [0, +20]) provided a positive but statistically insignificant mean abnormal return of 1.69%, signifying less of a long-lasting positive return and greater volatility with respect to the market reaction.

The results of the regression analyses for each of the three various duration windows, R^2 values ranged from 0.0806 to 0.3360, denoting a relatively low level of explanatory power for the regression models. The regression coefficients did not demonstrate consistency among the duration windows, and none of the explanatory variables revealed statistical significance at the conventional level of 5%, although two variables did reach marginal significance levels.

6.2 Answers to Sub-Questions

SQ1: Do AI-related corporate announcements generate significant abnormal stock returns in the short-term?

There is significant abnormal return evidence over the short time frame of CAR's. The overall CAR [-1, +1] ($t=2,905$) CAR [0, +2] ($t=2,299$) reject the null hypothesis of zero abnormal performance at the 5% level. Therefore, AI announcements have immediate effects on value creation in companies.

SQ2: Do AI-related corporate announcements generate significant abnormal stock returns in the medium-term?

In contrast CAR [0, +20] ($t=1,110$) does not demonstrate significance and suggest that the medium-term effect of announcements is more tenuous and likely influenced by either firm characteristics or characteristics of each specific announcement.

SQ3: Do firm or announcement characteristics explain variation in abnormal returns?

Partially, regression outputs reveal modest explanatory power, with R^2 values between 0.0806 and 0.3360. Two variables, the early 2023 dummy for (CAR [0, +2]) and the major dummy for (CAR [0, +20]), show positive coefficients in multiple windows, and the medium-term

model shows higher R^2 and lower significance F, suggesting potential structural relationships. With their p-values insignificant at the 5% level, we can conclude that, with weak evidence at the 10% level, that some kind of hype existed in 2023 and corporations making AI-related product announcements gained CAR from it. In the medium run, the size of the announcement does matter, major AI product releases create higher CAR than incremental updates.

6.3 Limitations

A key limitation is that there is low statistical power due to the small sample size of only 29 selected events. This means that our capacity to analyse the effects of these factors through regression analysis will be very restricted. Since the event dataset only includes large, well-established technology firms, it also cannot be generalised to smaller or less established firms. In addition, CARs were calculated using a market-adjusted return model rather than a full market model with estimated α and β parameters over a separate estimation window. This simplifies the state the market was in and does not consider all the various factors associated with a firm's performance and the various studied CARs.

6.4 Future Research

Future research may build upon the study's findings by expanding upon the existing dataset through subsequent AI-based announcements from other industry categories and/or geographic areas. Additionally, future research could incorporate different Returns Models (i.e., market model, Fama-French Factors, etc.), thereby significantly improving the accuracy of the measured announcements. Lastly, future researchers may consider investigating the relationships between announcement characteristics, sentiment indicators, and long-term firm performance.

7. References

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8. Appendix

8.1 Event List

Firm	Announcement Date	Source	Product	Major =1	Consumer = 1
NVIDIA	21.03.2023	NVIDIA IR press release	AI cloud service launch	1	0
Microsoft	07.02.2023	Official Microsoft Blog	Copilot launch	1	1
Google	06.02.2023	The Keyword	Bard launch	1	1
Meta	18.07.2023	Meta Takeaways	Llama 2 launch	1	0
AMD	13.06.2023	AMD Press Release	Release of MI300X GPU	1	0
IBM	09.05.2023	IBM Newsroom	IBM watsonx Launch	1	0
Salesforce	07.03.2023	salesforce news & insights	Einstein GPT launch	1	0
Adobe	21.03.2023	news Adobe	Adobe Firefly Generative AI launch	1	1
Oracle	23.01.2024	Oracle news	OCI generative AI service	1	0
Palantir	07.04.2023	Palantir newsroom	Palantir AIP Platform	1	0
workday	27.09.2023	Investor solutions	Workday AI Marketplace	1	0
Servicenow	13.06.2023	Servicenow newsroom	Servicenow Virtual Assistant	1	0
Microsoft	16.03.2023	Official Microsoft Blog	Microsoft 365 Copilot	0	1
Google	14.03.2023	Google Workspace Blog	Generative AI in Workspace	0	1
Meta	27.09.2023	Meta Takeaways	AI Stickers & Meta AI Assistant	0	1
Google	10.05.2023	Google Workspace Blog	Introduced PaLM 2	1	0
Salesforce	04.05.2023	salesforce news & insights	Slack GPT Features	0	0
IBM	26.10.2023	IBM Newsroom	Watsonx Code Assistant	0	0
Adobe	23.05.2023	news Adobe	Photoshop Generative Fill	0	1
Oracle	28.06.2023	Oracle news	Generative AI in Oracle HCM	0	0
Intuit	26.09.2023	Intuit Investor Relations	Intuit Assist	0	1
Cisco	28.03.2023	Cisco Investor Relations	AI Enhancements in Webex	0	0
Apple	16.05.2023	Apple Newsroom	Personal Voice (Accessibility)	0	1
Microsoft	23.05.2023	Windows Blog	Copilot for Windows 11	1	1
Salesforce	12.09.2023	Salesforce Press Release	Next Generation of Einstein AI	1	0
Microsoft	27.04.2023	Microsoft Blog	Microsoft Designer	0	1
Amazon	13.04.2023	AWS Release	Amazon CodeWhisperer	0	0
Google	19.09.2023	Google Blog	GA Expanded Bard	0	1
Amazon	26.07.2023	AWS Release	AWS HealthScribe	0	0

8.2 Regression Outputs

CAR [-1, +1]:

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0,283828573
R Square	0,080558659
	-
Adjusted R Square	0,072681565
Standard Error	0,027797309
Observations	29

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0,001624819	0,000406205	0,525701785	0,717839424
Residual	24	0,018544569	0,00077269		
Total	28	0,020169388			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0,002043	0,011896	0,171725	0,865093
Majordummy	0,000843	0,010906	0,077343	0,938992
Early2023dummy	0,009119	0,010761	0,847461	0,405111
Consumerdummy	0,000627	0,012637	0,049640	0,960820
LargeFirmdummy	0,010303	0,012571	0,819566	0,420528

	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95,0%</i>	<i>Upper 95,0%</i>
Intercept	-0,022509	0,026595	-0,022509	0,026595
Majordummy	-0,021665	0,023352	-0,021665	0,023352
Early2023dummy	-0,013090	0,031329	-0,013090	0,031329
Consumerdummy	-0,025453	0,026708	-0,025453	0,026708
LargeFirmdummy	-0,015642	0,036248	-0,015642	0,036248

CAR [0, +2]:

SUMMARY
OUTPUT

<i>Regression Statistics</i>	
Multiple R	0,406997223
R Square	0,16564674
Adjusted R Square	0,026587863
Standard Error	0,036150255
Observations	29

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0,006226828	0,001556707	1,191198604	0,340052086
Residual	24	0,031364182	0,001306841		
Total	28	0,03759101			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-0,000175154	0,015470639	0,011321699	0,991060373
Majordummy	-0,006065187	0,014182775	0,427644573	0,672722669
Early2023dummy	0,025239904	0,013994477	1,803561734	0,083868943
Consumerdummy	-0,011216516	0,016433723	-0,68253047	0,501438908
LargeFirmdummy	0,014176506	0,016348352	0,867151971	0,394446301

	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95,0%</i>	<i>Upper 95,0%</i>
Intercept	-0,032104984	0,031754676	0,032104984	0,031754676
Majordummy	-0,035336997	0,023206623	0,035336997	0,023206623
Early2023dummy	-0,003643278	0,054123085	0,003643278	0,054123085
Consumerdummy	-0,045134053	0,02270102	0,045134053	0,02270102
LargeFirmdummy	-0,019564835	0,047917846	0,019564835	0,047917846

CAR [0, +20]:

SUMMARY
OUTPUT

<i>Regression Statistics</i>	
Multiple R	0,579696828
R Square	0,336048412
Adjusted R Square	0,225389814
Standard Error	0,072241911
Observations	29

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0,063395018	0,015848754	3,036803449	0,036934118
Residual	24	0,12525345	0,005218894		
Total	28	0,188648468			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0,013644566	0,030916201	0,441340314	0,662917268
Majordummy	0,050613835	0,028342561	1,785789048	0,086776643
Early2023dummy	0,03610862	0,02796627	1,291148934	0,20895044
Consumerdummy	0,010756027	0,032840807	0,327520196	0,746114301
LargeFirmdummy	0,064490319	0,032670204	1,973979665	0,060001761

	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95,0%</i>	<i>Upper 95,0%</i>
Intercept	0,077452469	0,050163337	0,077452469	0,050163337
Majordummy	0,109110006	0,007882336	0,109110006	0,007882336
Early2023dummy	0,021610925	0,093828164	0,021610925	0,093828164
Consumerdummy	0,078536121	0,057024067	0,078536121	0,057024067
LargeFirmdummy	0,002937669	0,131918306	0,002937669	0,131918306

8.3 Correlation Matrices

CAR [-1, +1]:

	<i>CAR (-1, +1)</i>	<i>Majordummy</i>	<i>Early2023dummy</i>	<i>Consumerdummy</i>	<i>LargeFirmdummy</i>
CAR (-1, +1)	1				
Majordummy	-0,0180	1			
Early2023dummy	0,2120	0,0290	1		
Consumerdummy	0,1273	-0,3092	0,1373	1	
LargeFirmdummy	0,2282	-0,1864	0,2090	0,5125	1

CAR [0, +2]:

	<i>CAR (0, +2)</i>	<i>Majordummy</i>	<i>Early2023dummy</i>	<i>Consumerdummy</i>	<i>LargeFirmdummy</i>
CAR (0, +2)	1				
Majordummy	-0,0623	1			
Early2023dummy	0,3617	0,0290	1		
Consumerdummy	0,0179	-0,3092	0,1373	1	
LargeFirmdummy	0,2003	-0,1864	0,2090	0,5125	1

CAR [0, +20]:

	<i>CAR (0, +20)</i>	<i>Majordummy</i>	<i>Early2023dummy</i>	<i>Consumerdummy</i>	<i>LargeFirmdummy</i>
CAR (0, +20)	1				
Majordummy	-0,3592	1			
Early2023dummy	0,2835	0,0290	1		
Consumerdummy	0,2604	-0,3092	0,1373	1	
LargeFirmdummy	0,4588	-0,1864	0,2090	0,5125	1

8.4 Appendix A: Official Statement of Original Bachelor Thesis

By signing this statement, I hereby acknowledge the submitted thesis (hereafter mentioned as “product”), titled:

“How do capital markets react to AI-related corporate announcements, as measured by abnormal stock returns around the announcement date?”

to be produced independently by me, without external help.

Wherever I paraphrase or cite literally, a reference to the original source (journal, book, report, internet, etc.) is given.

By signing this statement, I explicitly declare that I am aware of the fraud sanctions as stated in the Education and Examination Regulations (EERs) of the SBE.

Place: Maastricht, Netherlands.....

Date: 18.12.2025.....

First and last name: Benjamin Seidenstücker.....

Study programme: Economics and Business Economics.....

EBT Code (i.e., code of the BSc thesis course you registered for):

EBT0006.....

ID number: i6318977.....

Signature: B. Seidenstücker

8.5 Appendix B: Official Statement on GenAI Use in the Bachelor Thesis

I hereby certify that I adhered to the SBE guidelines on the use of GenAI tools such as ChatGPT in my bachelor thesis. In the box below, I describe how, where, and for what purposes I used GenAI.

During the preparation of this work, I used GenAI for the following purposes:

- **Search engine:** ChatGPT as a search engine to find pertinent academic themes relating to AI announcement/event studies and technology-led market reactions, as well as provide suggestions for keywords and offer possible literature sources.
- **Ideation helper:** ChatGPT as an ideation helper to brainstorm research question(s), hypothesis/hypotheses, thesis structure, and to create new ways to examine the same ideas/sections.
- **Text summarizer:** ChatGPT as a text summary tool to summarise research articles and working papers to help understand existing literature and identify critical findings related to the thesis.
- **Explanation provider:** ChatGPT as an explanation provider for my understanding of econometric concepts, as well as to clarify event-study methodology and regression interpretation as I conduct my research.
- **Language assistant:** Not used.
- **Table editor:** Not used.
- **Translator:** Not used.
- **Other:** Not used.

After using any tool, I reviewed, quality-checked, and edited the content as needed and take full responsibility for the content of the thesis.

By signing this statement, I explicitly declare that I am aware of the fraud sanctions as stated in the Education and Examination Regulations (EERs) of the SBE.

Place: Maastricht, Netherlands.....

Date: 18.12.2025.....

First and last name: Benjamin Seidenstücker.....

Study programme: Economics and Business Economics.....

EBT Code (i.e., code of the BSc thesis course you registered for):

EBT0006.....

ID number: i6318977.....

Signature: B. Seidendücker