The Short-Run Stock Market Effects of the Brexit Referendum: Evidence from UK and EU-27 firms

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Abstract

This dissertation examines the short-run stock-market effects of the United Kingdom's referendum on European Union membership, focusing on differences between UK firms and firms headquartered in the EU-27. Using a standard event-study framework, the analysis measures abnormal returns around the unexpected Leave outcome of June 2016 and investigates how sectoral affiliation and firm characteristics shaped market responses. Normal returns are estimated using the market model, and inference is based on multiple parametric and non-parametric test statistics to ensure robustness.

The results reveal a pronounced asymmetry in market reactions. UK firms experienced large and immediate valuation losses following the referendum, whereas spillovers to EU-27 firms were substantially smaller. Sector-level analysis shows considerable heterogeneity, with particularly severe declines among UK Real Estate and Consumer Discretionary firms, while EU Real Estate firms recorded positive abnormal returns.

Cross-sectional regressions indicate that firm characteristics played an important role in explaining the distribution of stock-market responses. Firms with greater foreign revenue exposure experienced significantly smaller valuation losses, suggesting that international diversification mitigated exposure to domestic political shocks. In contrast, liquidity is negatively associated with abnormal returns, pointing to the role of balance-sheet characteristics as proxies for unobserved firm attributes. Overall, the findings highlight how markets rapidly price political uncertainty and how exposure and resilience vary across firms and sectors.

Keywords: Brexit; event-study; abnormal returns; political uncertainty; stock markets

Os Efeitos de Curto Prazo do Referendo do Brexit nos Mercados Acionistas:
Evidência de Empresas do Reino Unido e da UE-27

Rafael Figueiredo

Resumo

Esta dissertação analisa os efeitos de curto prazo do referendo do Reino Unido à União Europeia nos mercados acionistas, comparando as reações de empresas sediadas no Reino Unido e na UE-27. Através de uma metodologia de estudo de eventos padrão, são estimados retornos anormais em torno do resultado inesperado da vitória do Leave em junho de 2016, avaliando-se de que forma a pertença setorial e as características das empresas influenciaram as respostas do mercado. Os retornos normais são estimados com base no modelo de mercado, sendo utilizados testes paramétricos e não paramétricos para garantir a robustez estatística dos resultados.

Os resultados evidenciam uma forte assimetria nas reações do mercado. As empresas britânicas registaram perdas significativas e imediatas, enquanto os efeitos de contágio para as empresas da UE-27 foram substancialmente mais reduzidos. A análise setorial revela elevada heterogeneidade, com quedas particularmente acentuadas nos setores de Imobiliário e Consumo Discricionário no Reino Unido, ao passo que o setor imobiliário da UE apresentou retornos anormais positivos.

A análise transversal mostra que as características das empresas desempenharam um papel relevante na explicação dos resultados. Uma maior exposição a receitas externas está associada a perdas significativamente menores, sugerindo que a diversificação internacional atenuou os efeitos do choque político. Em contraste, a liquidez apresenta uma relação negativa com os retornos anormais. No seu conjunto, os resultados demonstram como os mercados incorporam rapidamente a incerteza política e como os seus efeitos variam entre empresas e setores.

Palavras-chave: Brexit; estudo de evento; retornos anormais; incerteza política; mercados acionistas

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Chapter 1

Introduction

On 24 June 2016, financial markets faced one of the most significant political shocks in post-war European history. In a referendum on continued European Union membership, the United Kingdom voted to leave the EU by 51.89% to 48.11%, defying widespread expectations of a Remain victory. Voter turnout reached 72.2%, the highest recorded in any UK ballot since the 1992 general election, with more than 33.5 million ballots cast (BBC News, 2016). The outcome represented a substantial surprise to financial markets. Pre-referendum indicators (polling and market commentary) suggested that a Remain victory was widely expected until late in the night, so the Leave outcome represented a surprise to financial markets.

Financial-market reactions were immediate and severe. Sterling depreciated by 8.1% against the US dollar and 5.8% against the euro on the day of the announcement, marking one of the largest single-day currency movements in recent decades (Breinlich et al., 2018). Equity markets experienced sharp declines and increased volatility across asset classes. Within hours of the result, Prime Minister David Cameron announced his resignation, reinforcing perceptions of political instability and intensifying market anxiety. The combination of unexpected political change, institutional uncertainty, and exchange-rate volatility created conditions under which financial markets rapidly reassessed both expected future cash flows and risk premia for firms exposed to the United Kingdom's evolving economic and regulatory environment.

Event-study evidence shows that stock markets reacted immediately to the unexpected outcome. Breinlich et al. (2018) document that initial reactions were primarily driven by sterling depreciation and fears of a cyclical downturn, with concerns about trade barriers and regulatory divergence emerging more prominently in subsequent policy announcements. Davies and Studnicka (2018) show that firms with greater exposure to the UK through global value chain structures experienced significantly larger stock-price declines. Bloom et al. (2019) provide evidence of economically significant longer-term effects of Brexit-related uncertainty on firm investment and productivity.

Pre-referendum assessments had anticipated substantial economic costs. HM Treasury (2016) warned of significant negative consequences, predicting a reduction in GDP of 3.6% after two years in a shock scenario, or up to 6.0% in a severe shock scenario. Academic analyses

suggested long-run welfare losses ranging from approximately 1.3% under a soft Brexit scenario to 2.7% under WTO terms (i.e., a hard Brexit) (Dhingra et al., 2017). Whilst the referendum process itself had been anticipated for months, the outcome was largely unexpected, making it almost a quasi-natural experiment in which an unforeseen political outcome generated a sudden and concentrated information shock. This setting provides an opportunity to examine how equity markets price political uncertainty and institutional change, as the timing of information arrival is clearly identifiable and the shock was largely unanticipated by market participants.

This dissertation examines how equity markets in the United Kingdom and the European Union responded to the Brexit referendum using an event-study framework. The analysis covers 443 UK firms from the FTSE All-Share index and 344 EU-27 firms from continental European markets. Three empirical investigations guide the analysis. First, how did equity markets in the UK and EU react to the Brexit referendum, and what was the magnitude and timing of this reaction? Second, did the market response differ systematically across industries, reflecting variation in exposure to international trade, regulation, and financial integration? Third, do observable firm characteristics, particularly international revenue exposure, firm size, profitability, leverage, and liquidity, help explain cross-sectional differences in abnormal returns?

The results reveal pronounced asymmetry in market reactions across the two regions. UK firms experienced substantial valuation losses over short event windows, with an event-day average abnormal return of approximately -2.9% and cumulative abnormal returns of -6.0% over the $[-1, +1]$ window. Spillovers to EU-27 firms were markedly smaller at -1.3%, indicating that markets perceived the referendum primarily as a UK-specific political-uncertainty shock rather than a symmetric European crisis.

Sectoral responses were highly heterogeneous. Within the United Kingdom, firms in Real Estate and Consumer Discretionary sectors were particularly affected, with cumulative abnormal returns of -15.5% and -15.0% respectively. Effects in the EU-27 were more contained and concentrated mainly in the Financials sector. Notably, UK Real Estate declined sharply whilst EU Real Estate posted positive returns, a pattern consistent with investor expectations of capital reallocation away from the United Kingdom toward continental Europe.

Cross-sectional analysis indicates that firm characteristics played an important role in shaping the distribution of stock-market responses. Firms with greater foreign revenue exposure experienced significantly smaller valuation losses, with a coefficient of 0.11 ($t = 5.99$, $p < 0.001$). A one-standard-deviation increase in foreign revenue share is associated with a 3.4 percentage point improvement in cumulative abnormal returns, economically substantial relative to the mean UK decline of -6.0%. This is consistent with the view that international diversification mitigated exposure to UK-specific economic and policy uncertainty. In contrast, liquidity displayed a counter-intuitive negative association with returns, with cash-rich firms experiencing more adverse reactions than their less liquid counterparts. This unexpected pattern suggests that balance sheet characteristics may proxy for unobserved firm attributes, such

as mature business models or limited growth opportunities, that were viewed unfavourably in the Brexit context.

This dissertation contributes to the literature on political uncertainty and financial markets in several ways. First, it provides a systematic comparison of stock-market reactions in the UK and the EU using a consistent event-study framework and matched sample windows. Prior studies focus either on UK firms (Breinlich et al., 2018) or on the largest firms only (Davies and Studnicka, 2018). This study examines 443 UK firms from the FTSE All-Share index and 344 EU-27 firms, documenting both domestic effects and cross-border spillovers within a unified empirical framework.

Second, by combining aggregate, sectoral, and firm-level analyses, the dissertation offers a detailed assessment of heterogeneity in market responses to a major political shock. Ramiah et al. (2017) examine UK sectoral effects and Schiereck et al. (2016) focus on banks, whereas this study provides comprehensive sectoral analysis across both UK and EU markets, revealing striking asymmetries.

Third, the findings complement existing research by demonstrating that international revenue diversification served as a meaningful hedge against Brexit-related uncertainty. Davies and Studnicka (2018) show that UK affiliate concentration increased vulnerability through production fragmentation i.e., where firms produce matters for exposure. This study demonstrates that foreign revenue diversification provided protection through demand geography i.e., where firms sell matters for resilience. The two perspectives are economically consistent and highlight different dimensions of international exposure.

The remainder of the dissertation is structured as follows. Section 2 reviews the theoretical and empirical literature on political uncertainty, trade shocks, and heterogeneous firm responses. Section 3 describes the data sources, sample construction, and event-study methodology. Section 4 presents the main results at the aggregate, sectoral, and firm levels. Section 5 discusses the findings and their economic interpretation. Section 6 concludes.

Chapter 2

Theoretical Background

2.1 Political Uncertainty and Asset Prices

Asset prices reflect investors' expectations about future cash flows and the discount rates applied to those flows. Political events can influence both components simultaneously: changes in policy affect expected profitability through taxation, regulation, and market access, whilst heightened uncertainty increases risk premia demanded by investors (Fama, 1970, 1991). Even without immediate changes in fundamentals, political events can generate sharp price adjustments.

Building on the efficient-market framework, Pástor and Veronesi (2013) develop a theoretical model in which political uncertainty constitutes a systematic risk factor that affects asset prices by increasing the compensation investors require for bearing policy-related risk. They demonstrate that heightened uncertainty surrounding government actions leads investors to demand higher expected returns, giving rise to a political risk premium that is particularly pronounced during economic downturns. Crucially, their model distinguishes between uncertainty about a policy's ultimate economic impact and uncertainty about the policy-making process itself, with the latter generating the largest risk premia and the greatest market volatility. Kelly et al. (2016) provide evidence that government policy uncertainty commands a significant risk premium in equity markets, with uncertainty spikes associated with substantial increases in expected returns.

The empirical measurement of political uncertainty has advanced through textual analysis. Baker et al. (2016) construct an Economic Policy Uncertainty index based on newspaper coverage, demonstrating that political events generate measurable uncertainty spikes that correlate with increased market volatility and reduced economic activity. The Brexit referendum represents a sharp uncertainty shock, combining a binary electoral outcome with sustained ambiguity about policy implementation.

Bloom (2009) shows that uncertainty spikes, often triggered by major political events, are accompanied by sharp volatility increases and temporary contractions in investment and

hiring. These episodes are characterised by wait-and-see behaviour amongst firms and investors, reflecting the value of postponing irreversible decisions when facing heightened uncertainty (Dixit and Pindyck, 1994). Referendum outcomes are particularly powerful uncertainty sources: they signal fundamental institutional changes whilst providing limited guidance about precise policy form and timing.

2.2 Trade Policy and Heterogeneous Firm Responses

Trade policy represents a central channel through which political decisions translate into firm-level economic outcomes. Changes in tariffs, non-tariff barriers, and regulatory alignment affect firms' costs, market access, and competitive positions. Importantly, the impact of such policy changes is rarely uniform across firms. Differences in size, productivity, export orientation, and integration into international value chains imply that exposure to trade policy shocks varies substantially, even within narrowly defined industries.

Modern trade theory provides a framework for understanding these differences. In heterogeneous-firm models, only the most productive firms bear the fixed costs associated with exporting and operating in foreign markets (Melitz, 2003). Melitz and Redding (2014) show that trade liberalisation and trade restrictions have asymmetric effects across firms, reshaping market shares, profitability, and survival probabilities. When trade barriers increase, exporters and firms integrated into cross-border supply chains may face higher costs and reduced market access, whilst more domestically oriented firms are comparatively insulated.

Handley and Limão (2015) demonstrate that trade policy uncertainty itself, distinct from actual tariff levels, significantly affects firm investment and entry decisions. Their framework predicts that firms delay irreversible investments when facing uncertain future trade costs. The Brexit context embodies precisely this type of uncertainty: whilst the referendum outcome determined that trade costs would rise, the magnitude and form of future barriers remained unclear. Bernard et al. (2007) provide a comprehensive survey of empirical evidence on firm heterogeneity in international trade, emphasising that only the most productive firms engage in exporting and that these firms are consequently most exposed to changes in trade policy.

Such mechanisms suggest that trade policy shocks generate pronounced cross-sectional variation in firm-level outcomes. However, empirical implementation is constrained by data availability. Whilst the Melitz-Redding framework emphasises total factor productivity as the key determinant of firms' export decisions, such measures are typically unavailable for publicly listed firms. The empirical analysis therefore relies on observable proxies such as foreign revenue shares and firm size, which capture international orientation and scale but do not directly measure total factor productivity.

From a financial-market perspective, differences in trade exposure imply that stock prices should respond heterogeneously to political events signalling changes in trade policy. Firms with greater reliance on international trade may experience larger valuation adjustments as in-

vestors reassess expected cash flows and risk. Conversely, firms with limited foreign exposure may be less affected. International revenue diversification may serve as a hedge against country-specific political shocks by reducing dependence on any single market.

2.3 Brexit as an Economic Shock

Brexit constitutes a major trade and policy shock with uneven implications across firms and sectors. Leaving the European Union was anticipated to increase both tariff and non-tariff trade barriers, reduce market integration depth, and alter the regulatory framework governing cross-border activity. Dhingra et al. (2017) estimate welfare losses for the average UK household of 1.3% under a soft Brexit scenario (similar to Norway) and 2.7% under WTO rules (hard Brexit), with substantially larger long-run income losses under more adverse Brexit scenarios when incorporating dynamic productivity adjustments. Sampson (2017) provides a comprehensive review of economic mechanisms through which Brexit affects trade, investment, and productivity, emphasising that impact magnitude depends critically on the form of the UK's future relationship with the EU. Graziano et al. (2021) demonstrate that Brexit's trade policy uncertainty generated spillover effects extending beyond Europe, highlighting the systemic importance of major political shocks.

Exposure to these channels is highly heterogeneous. Firms with strong international linkages, particularly exporters and those integrated into European value chains, face different risks than domestically oriented firms. Davies and Studnicka (2018) show that firms with greater UK affiliate exposure through global value chains experienced significantly worse stock-market outcomes following the referendum. Their findings identify vulnerability through production fragmentation, that is, the location of firms' production activities matters for exposure to Brexit-related disruption.

The economic channels through which Brexit operates suggest asymmetric exposure between UK and EU firms. UK firms faced direct institutional disruption affecting their domestic regulatory environment, market access, and macroeconomic conditions. In contrast, EU-27 firms experienced Brexit primarily as an external shock operating through reduced UK export demand, supply chain disruptions involving UK-based affiliates, and potential economic activity reallocation away from London. Whilst these spillover effects are economically meaningful, they do not constitute a fundamental change to the institutional environment in which continental European firms operate. This asymmetry suggests that UK firms may experience larger negative abnormal returns than EU firms.

2.4 Event-Study Methodology

Event-study methodology provides a natural framework for examining how financial markets respond to discrete information shocks such as the Brexit referendum. The approach, pioneered

by Fama et al. (1969) and systematically developed by Brown and Warner (1980, 1985), isolates abnormal returns attributable to a specific event by comparing realised returns to a benchmark representing normal expected returns. MacKinlay (1997) emphasises that short event windows around unanticipated announcements minimise contamination from confounding news whilst capturing immediate market response. Campbell et al. (1997) offer authoritative treatment of event-study econometrics, emphasising the importance of employing multiple test statistics to ensure robustness to alternative distributional assumptions.

The market model serves as the standard benchmark, relating individual security returns to a broad market index over a pre-event estimation period. This approach controls for market-wide movements whilst isolating firm-specific reactions. By focusing on narrow windows surrounding the referendum outcome, event studies exploit the assumption that markets process information efficiently.

Statistical inference requires careful attention to the properties of abnormal returns and potential violations of classical assumptions. Brown and Warner (1985) propose cross-sectional t-tests that aggregate abnormal returns across firms and compare the mean to zero under the null hypothesis of no event effect. However, these tests assume cross-sectional independence and homoskedasticity, which may be violated around major political events. Boehmer et al. (1991) develop standardised tests that address event-induced variance changes by scaling abnormal returns by firm-specific residual volatility estimated during the pre-event period. This standardisation accounts for heteroskedasticity and improves test power when events increase market volatility. The generalised sign test follows the non-parametric approach of Cowan (1992), comparing the proportion of positive abnormal returns around the event to the proportion observed during the estimation period without imposing distributional assumptions. Employing multiple complementary tests, as recommended by Kothari and Warner (2007), ensures findings are not driven by violations of specific statistical assumptions.

Chapter 3

Methodology

3.1 Data and Sample Construction

This section describes the construction of firm-level datasets used in the empirical analysis. The study relies on daily stock-market data retrieved from Refinitiv Datastream, including total return indices and industry classifications based on the Industry Classification Benchmark (ICB). Total return indices are used throughout to ensure that both price changes and dividend payments are incorporated into measured returns, providing a complete picture of shareholder wealth changes around the Brexit referendum.

The United Kingdom sample consists of firms domiciled in the UK that are constituents of the FTSE All-Share index. Firms are retained only if complete daily return data is available for the period from 15 June 2015 to 5 July 2016. This period accommodates the 230-trading-day estimation window, a 20-day buffer prior to the event, and the full event window surrounding the referendum outcome. The buffer period ensures that estimation of normal returns is not contaminated by anticipatory trading or information leakage in the immediate run-up to the referendum. Raw Datastream files were processed using Excel and VBA routines to merge datasets, remove duplicate observations, and ensure consistent industry classifications across firms. After applying these filters, the final UK sample comprises 443 firms, representing broad coverage of the UK equity market and spanning all major sectors including Financials, Industrials, Consumer Discretionary, Real Estate, and others.

For the European Union, the initial firm universe is drawn from the STOXX Europe Broad Index. This universe is subsequently filtered using Datastream ISO country codes to retain only firms domiciled in EU member states. Firms from the United Kingdom, Switzerland, Norway, Iceland, and other non-EU jurisdictions are excluded to ensure the sample captures only firms whose primary regulatory and institutional environment remained within the EU following Brexit. As with the UK sample, firms are required to have complete daily return histories over the same period and valid ICB classifications. After applying these criteria, the final EU-27

sample contains 344 firms drawn from major European economies including Germany, France, Italy, Spain, the Netherlands, and others.

Daily stock returns are computed as logarithmic changes in total return indices,

$$R_{i,t} = \ln\left(\frac{RI_{i,t}}{RI_{i,t-1}}\right), \tag{3.1}$$

where $RI_{i,t}$ denotes the total return index of firm i on trading day t. Datastream observations flagged as ERROR are discarded, and returns are computed only when consecutive index values are available.

3.2 Benchmark Specification and Event Definition

Estimation of abnormal returns requires an appropriate benchmark that captures the relevant market conditions faced by each firm. Benchmarks are selected to reflect domestic market dynamics as closely as possible, ensuring that estimated abnormal returns capture firm-specific reactions to the Brexit referendum rather than broader movements in international equity markets or global risk factors unrelated to the political shock.

For firms domiciled in the United Kingdom, expected returns are estimated relative to the FTSE All-Share index. This index provides broad and comprehensive representation of the UK equity market. The index's width ensures that the market model captures common movements in UK equity prices driven by macroeconomic conditions, interest rate expectations, and aggregate risk sentiment, allowing abnormal returns to isolate firm-specific deviations from these market-wide patterns.

For firms domiciled in the European Union, expected returns are estimated using country-specific broad market indices corresponding to each firm's country of incorporation. This approach accounts for cross-country differences in macroeconomic conditions, market structure, and institutional environments across European equity markets. For example, German firms are benchmarked against the DAX, French firms against the CAC 40, Spanish firms against the IBEX 35, and Italian firms against the FTSE MIB, with analogous broad domestic indices used for other EU member states. Using country-specific benchmarks avoids the loss of information inherent in relying on a single Eurozone or pan-European index, which would impose the assumption that all EU markets respond identically to common shocks. This approach is commonly used in multi-country event studies and controls for country-specific market movements that may differ across EU member states due to varying macroeconomic conditions, fiscal policies, or exposure to other economic developments unrelated to Brexit.

The event of interest is the outcome of the United Kingdom's referendum on membership of the European Union. Although the referendum was held on 23 June 2016, the result became public during the early hours of 24 June 2016, before European markets opened, making 24 June the first trading day on which prices could fully incorporate the outcome. Betting-market

evidence indicates that a Remain victory was widely expected until late in the night, with odds strongly favouring Remain as vote counting began. The unexpected Leave outcome therefore represented a genuine surprise to financial markets. Consistent with the established Brexit event-study literature (Breinlich et al., 2018), 24 June 2016 is designated as the event date ($t = 0$). This event definition ensures that estimated abnormal returns reflect the market's first opportunity to react to the unexpected referendum outcome.

3.3 Event-Study Framework and Abnormal Returns

The empirical analysis follows the classical event-study methodology developed by Brown and Warner (1985) and MacKinlay (1997). The framework compares firm-level returns around the event date to a counterfactual measure of normal returns expected in the absence of the event. By isolating abnormal returns, the methodology measures the market's assessment of how Brexit affected individual firms' future cash flows and risk profiles.

Normal returns are estimated using the market model, which relates the return of firm i on day t to the return of the relevant market benchmark:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t}, \tag{3.2}$$

where $R_{i,t}$ denotes the return on firm i, $R_{m,t}$ is the return on the corresponding market index, and $\varepsilon_{i,t}$ is an error term with zero mean. The parameters α_i and β_i are estimated using ordinary least squares over a pre-event estimation window.

The estimation window spans 230 trading days and runs from $t = -250$ to $t = -21$ relative to the event date. This length provides sufficient observations to obtain precise parameter estimates whilst remaining close enough to the event to ensure that estimated relationships remain relevant. A buffer period of 20 trading days is imposed between the end of the estimation window and the event date to reduce the risk that anticipatory trading or early information leakage contaminates estimation of normal returns. This buffer is particularly relevant in the Brexit context, as polling and media coverage intensified in the final weeks before the referendum, potentially influencing stock prices through shifting expectations about the likely outcome.

Firm-level abnormal returns are defined as the difference between realised returns and the expected returns implied by the market model:

$$AR_{i,t} = R_{i,t} - (\hat{\alpha}_i + \hat{\beta}_i R_{m,t}), \tag{3.3}$$

where $\hat{\alpha}_i$ and $\hat{\beta}_i$ denote the estimated market-model parameters. Abnormal returns capture the portion of stock-price movements that cannot be explained by general market fluctuations and are therefore attributed to firm-specific reactions to the event. A positive abnormal return indicates that a firm outperformed market expectations, whilst a negative abnormal return suggests

underperformance relative to what would have been predicted based on overall market conditions.

3.4 Event Windows and Cumulative Returns

The analysis focuses on short event windows surrounding the referendum outcome to capture the immediate stock-market response and minimise contamination from confounding news. The main event window spans from one trading day before the event to one trading day after, $t \in [-1, +1]$. This window captures potential anticipatory trading immediately prior to the announcement, the initial market reaction on the event day, and the first day of post-event adjustment. To analyse the timing of the market response and assess robustness across different horizons, cumulative abnormal returns are constructed over three intervals: $[-1, +1]$, $[-1, +3]$, and $[-1, +7]$.

The window $[-1, +1]$ serves as the primary specification because it captures the immediate market reaction whilst minimising contamination from post-event political developments. The window $[-1, +3]$ allows for delayed adjustment over the first few trading days, and $[-1, +7]$ captures the full short-run response over the subsequent trading week.

Firm-level cumulative abnormal returns (CARs) are computed by summing abnormal returns within each event window:

$$CAR_{i,[t_1,t_2]} = \sum_{t=t_1}^{t_2} AR_{i,t}. \tag{3.4}$$

Cumulative abnormal returns provide a summary measure of the total valuation impact of the Brexit shock on each firm over the specified window. Unlike daily abnormal returns, which may exhibit high volatility due to temporary market fluctuations or noise trading, CARs smooth out day-to-day variation and provide a clearer picture of the sustained impact. To assess the aggregate market response, daily average abnormal returns (AARs) are calculated as the cross-sectional means of firm-level abnormal returns, and cumulative average abnormal returns (CAARs) are obtained by averaging firm-level CARs across firms.

3.5 Statistical Inference

Statistical inference assesses whether observed abnormal returns around the referendum outcome are statistically different from zero. Because event studies involve cross-sectional dependence, heteroskedasticity, and potential event-induced volatility, relying on a single test statistic may be misleading. Following the event-study literature (Kothari and Warner, 2007; Campbell et al., 1997), this analysis employs three complementary inference procedures that differ in their underlying assumptions and robustness properties.

As a baseline, inference uses the cross-sectional t-test proposed by Brown and Warner (1985). This test evaluates whether the cross-sectional mean of abnormal returns differs from zero on a given day or over a specified event window. The test statistic is:

$$t_{BW} = \frac{\bar{X}}{s_X/\sqrt{N}}, \tag{3.5}$$

where $\bar{X}$ denotes either the daily average abnormal return (AAR_t) or a window-specific cumulative average abnormal return ($CAAR$), s_X is the cross-sectional standard deviation, and N is the number of firms. Whilst this test is simple and widely used, it assumes cross-sectional independence and homoskedasticity, which may be violated around major events such as the Brexit referendum.

To account for heteroskedasticity and event-induced increases in volatility, the analysis also employs the standardised tests of Boehmer et al. (1991). These tests standardise abnormal returns by firm-specific residual volatility estimated during the estimation window, thereby correcting for differences in return variance across firms. The standardisation builds on the framework developed by Patell (1976), who demonstrated that scaling abnormal returns by firm-specific volatility improves test power in the presence of heteroskedasticity. This correction is particularly relevant because UK firms vary substantially in size and liquidity, with smaller and less liquid firms typically exhibiting higher baseline volatility. Standardised abnormal returns are computed as:

$$SAR_{i,t} = \frac{AR_{i,t}}{\hat{\sigma}_{\varepsilon,i}}, \tag{3.6}$$

where $\hat{\sigma}_{\varepsilon,i}$ denotes the standard deviation of the residuals from the market-model regression for firm i. The corresponding test statistic for daily abnormal returns is:

$$t_{BMP,t} = \frac{\overline{SAR}_t}{s_{SAR,t}/\sqrt{N}}, \tag{3.7}$$

where $\overline{SAR}_t$ and $s_{SAR,t}$ denote the cross-sectional mean and standard deviation of standardised abnormal returns. By scaling each firm's abnormal return by its historical volatility, the BMP test effectively gives less weight to firms with naturally noisy returns and more weight to firms whose abnormal returns are large relative to their typical variation.

For cumulative abnormal returns, the BMP procedure adjusts for the length of the event window. The standardised cumulative abnormal return for firm i over a window of length L is:

$$SCAR_i = \frac{CAR_i}{\hat{\sigma}_{\varepsilon,i}\sqrt{L}}. \tag{3.8}$$

The $\sqrt{L}$ adjustment reflects the fact that cumulative returns naturally exhibit higher variance over longer windows, even in the absence of abnormal performance. By incorporating this

adjustment, the BMP test for cumulative returns maintains appropriate size properties regardless of event window length.

As an additional robustness check on the direction and pervasiveness of market reactions, a generalised sign test is employed at the level of daily abnormal returns. This non-parametric test evaluates whether the proportion of positive abnormal returns on a given day differs from the proportion observed during the estimation period (Cowan, 1992). The sign test is particularly valuable because it makes no assumptions about the distribution of abnormal returns and is therefore robust to extreme outliers or departures from normality. The test statistic is:

$$Z_{Sign,t} = \frac{N_t^+ - N_t\hat{p}}{\sqrt{N_t\hat{p}(1-\hat{p})}}, \tag{3.9}$$

where N_t^+ is the number of firms with positive abnormal returns on day t, $\hat{p}$ denotes the fraction of positive abnormal returns in the estimation window, and N_t denotes the number of available observations on day t. Because the sign test does not rely on distributional assumptions, it is robust to skewness, outliers, and differences in scale across firms. Whilst the Brown-Warner and BMP tests provide primary inference on the magnitude of cumulative abnormal returns, the sign test offers complementary evidence on the cross-sectional breadth and direction of daily market responses.

Although cross-sectional dependence may be present in market-wide events such as the Brexit referendum, the use of multiple complementary tests (Brown-Warner and BMP for magnitude, sign tests for direction and pervasiveness) provides confidence that results are not driven by violations of any single statistical assumption.

These complementary inference procedures allow robust assessment of statistical significance under alternative assumptions. Consistent results across tests strengthen confidence that observed effects reflect genuine market responses to the Brexit referendum rather than artefacts of model specification or distributional assumptions.

3.6 Sectoral and Cross-Sectional Analysis

Beyond aggregate market reactions, the analysis examines heterogeneity in stock-market responses at both the sectoral and firm level. Sectoral heterogeneity is analysed by grouping firms according to their ICB industry classifications and computing sector-specific average abnormal returns (AARs) and cumulative average abnormal returns (CAARs) using the same event-study procedures applied at the aggregate level. This identifies industries that were particularly sensitive to the Brexit referendum.

To investigate firm-level heterogeneity, cross-sectional regressions are conducted in which cumulative abnormal returns are regressed on firm characteristics capturing exposure

to Brexit-related economic channels. The baseline regression specification is:

$$CAR_i = \gamma_0 + \gamma_1 \ln(Size_i) + \gamma_2 ROA_i + \gamma_3 Leverage_i + \gamma_4 ForeignSales_i + \gamma_5 Liquidity_i + \delta' SectorDummies_i + \eta' CountryDummies_i + \varepsilon_i \tag{3.10}$$

where CAR_i denotes the cumulative abnormal return of firm i over the relevant event window. Firm size is measured as the natural logarithm of market capitalisation, profitability is proxied by return on assets (ROA), leverage is defined as total debt relative to total assets, $ForeignSales_i$ captures the share of revenue generated abroad, and $Liquidity_i$ is defined as the natural logarithm of cash and cash-equivalent holdings. Sector dummy variables control for industry-wide shocks, whilst country dummies capture institutional and macroeconomic differences across EU member states. For regressions estimated on the UK sample, country dummies are omitted.

The inclusion of these control variables reflects specific hypotheses about how firm characteristics mediate exposure to political uncertainty and trade shocks. Foreign sales exposure is hypothesised to mitigate losses, as firms with diversified revenue streams are less dependent on the UK domestic market and may benefit from sterling depreciation. Conversely, leverage may amplify losses if Brexit increases refinancing risk or raises concerns about debt sustainability in a more uncertain economic environment. Firm size may matter through several channels: larger firms typically have more diversified operations and better access to capital markets, but may also be more visible to investors and regulators. Liquidity captures financial flexibility and the ability to absorb shocks. Firms with higher cash holdings may be better positioned to weather periods of heightened uncertainty.

Firm-level characteristics are obtained from Refinitiv Datastream and measured prior to the event to avoid endogeneity concerns. Using pre-event values ensures that explanatory variables are not themselves influenced by the Brexit outcome, which would complicate causal interpretation. All regressions are estimated using ordinary least squares with heteroskedasticity-consistent (HC3) robust standard errors. HC3 standard errors are preferred because they provide better finite-sample performance when the sample size is moderate and heteroskedasticity is severe.

This combined sectoral and cross-sectional approach identifies not only whether the Brexit referendum affected equity markets on average, but also which types of firms and industries were most exposed to the underlying political and economic channels. By linking abnormal returns to observable firm characteristics, the cross-sectional analysis sheds light on the economic mechanisms through which the Brexit shock was transmitted and provides evidence on which dimensions of international exposure and financial structure mattered most for determining individual firm responses.

Chapter 4

Results

4.1 Sample Composition

Table 4.1 presents the sector composition of the UK and EU-27 samples. The UK index is heavily weighted towards Financials (44.02%), reflecting London's role as a major financial centre, followed by Industrials (16.48%) and Consumer Discretionary (13.54%). The EU-27 sample is more diversified, with Industrials (23.55%) and Financials (19.19%) as the largest categories, alongside substantial representation in Healthcare (9.59%) and Basic Materials (7.56%).

Table 4.1: Sample Composition by Sector

	United Kingdom		EU-27	
Sector	Firms	%	Firms	%
Financials	195	44.02	66	19.19
Industrials	73	16.48	81	23.55
Consumer Discretionary	60	13.54	39	11.34
Real Estate	35	7.90	16	4.65
Consumer Staples	24	5.42	19	5.52
Health Care	7	1.58	33	9.59
Basic Materials	19	4.29	26	7.56
Technology	9	2.03	18	5.23
Energy	10	2.26	17	4.94
Utilities	8	1.81	17	4.94
Telecommunications	3	0.68	12	3.49
Total	**443**	**100.00**	**344**	**100.00**

Notes: Sector classifications based on Industry Classification Benchmark (ICB). UK sample drawn from FTSE All-Share index. EU-27 sample drawn from STOXX Europe Broad index, filtered for EU member states only.

4.2 Aggregate Market Reaction

Table 4.2 reports cumulative average abnormal returns (CAAR) for event windows surrounding the referendum. The United Kingdom exhibits a pronounced negative reaction, with a CAAR

of -6.04% over the $[-1, +1]$ window. Both the Brown-Warner and BMP tests yield highly significant t-statistics ($t_{BW} = -13.23$, $t_{BMP} = -10.38$, both $p < 0.001$).

Table 4.2: Aggregate Cumulative Abnormal Returns

	United Kingdom ($N = 443$)			EU-27 ($N = 344$)		
Window	CAAR (%)	BW	BMP	CAAR (%)	BW	BMP
$[-1, +1]$	-6.04	-13.23	-10.38	-1.25	-3.84	-3.84
$[-1, +3]$	-5.10	-10.47	-10.18	-0.86	-2.68	-2.95
$[-1, +7]$	-7.04	-8.91	-9.82	-1.24	-2.20	-2.24
Event-day breakdown:						
Day -1 AAR	$+0.30$	1.13	3.40	$+0.12$	0.61	0.36
Day 0 AAR	-2.87	-10.88	-7.74	-0.18	-0.97	-0.49
Day $+1$ AAR	-3.47	-13.17	-11.43	-1.18	-6.29	-5.96

Notes: CAAR = Cumulative Average Abnormal Returns. AAR = Average Abnormal Return. BW = Brown-Warner (1985) t-statistic. BMP = Boehmer, Musumeci, and Poulsen (1991) standardised t-statistic. Event date $t = 0$ is 24 June 2016. BMP test adjusts for event-induced heteroskedasticity; results are reported alongside BW for robustness.

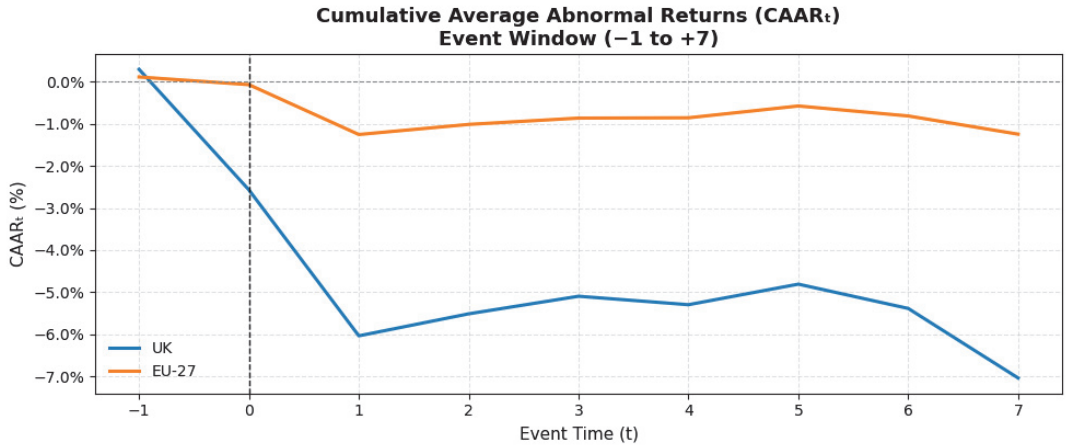

Figure 4.1: Cumulative Average Abnormal Returns: UK vs. EU-27

Notes: The figure plots cumulative average abnormal returns (CAAR) for UK firms (443 firms from FTSE All-Share) and EU-27 firms (344 firms from continental European markets) over the event window surrounding the Brexit referendum (24 June 2016, $t = 0$).

Losses concentrated on the event day (-2.87%) and day $+1$ (-3.47%), with modest pre-event gains quickly reversed. The breadth of the negative reaction is evident from the proportion of firms experiencing losses: on day $+1$, over two-thirds of UK firms posted negative abnormal returns, indicating that the market response was not driven by a small subset of firms but reflected widespread reassessment of UK equity valuations.

The EU-27 reaction is substantially more contained, with a CAAR of -1.25% ($t_{BW} = -3.84$, $t_{BMP} = -3.84$, both $p < 0.001$). Whilst statistically significant, the magnitude is roughly one-fifth that of the UK, consistent with Brexit representing primarily a UK-specific shock rather than a symmetric European crisis.

4.3 Sector-Level Effects

Tables 4.3 and 4.4 present sector-level cumulative abnormal returns for the $[-1, +1]$ window. Within the United Kingdom, the largest declines occur in Real Estate and Consumer Discretionary, with CAARs of -15.53% and -14.97%, respectively. Both results are highly significant ($t_{BMP} = -9.22$ and -7.99), indicating substantial negative reactions, particularly in sectors with high domestic exposure to UK economic conditions.

Table 4.3: UK Sector-Level Cumulative Abnormal Returns $[-1, +1]$

Sector	N	CAAR (%)	BMP	% Pos
Real Estate	35	-15.53	-9.22	5.7
Consumer Discretionary	60	-14.97	-7.99	16.7
Industrials	73	-8.72	-6.26	22.2
Financials	195	-2.45	-3.73	44.1

Notes: CAAR = Cumulative Average Abnormal Return over $[-1, +1]$ window. BMP = Boehmer, Musumeci, and Poulsen (1991) standardised t-statistic. % Pos = percentage of firms with positive CAR over the window. Selected major sectors shown. Sector N reflects firms with complete return data for the estimation and event windows.

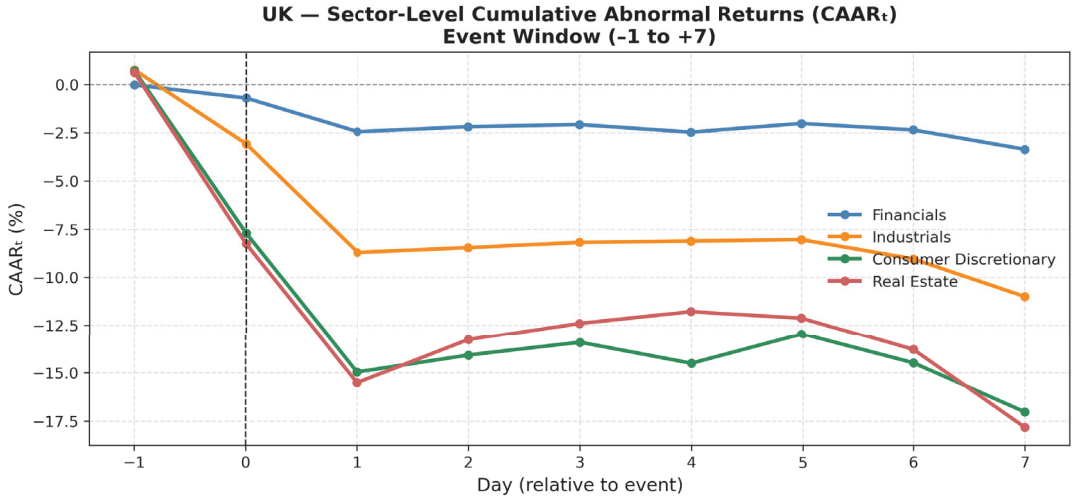

Figure 4.2: UK Sector-Level Cumulative Abnormal Returns

Notes: The figure plots cumulative average abnormal returns (CAAR) by sector for UK firms over the event window surrounding the Brexit referendum (24 June 2016, $t = 0$).

The proportion of firms posting positive cumulative returns reinforces the sectoral pattern. Only 5.7% of Real Estate firms and 16.7% of Consumer Discretionary firms experienced positive cumulative returns, indicating that losses were pervasive across these sectors. Industrials show a large negative reaction (-8.72%, $t_{BMP} = -6.26$), with fewer than one in four firms posting positive returns. Financials decline by -2.45% ($t_{BMP} = -3.73$), though 44.1% posted positive returns, suggesting considerable within-sector heterogeneity.

Table 4.4: EU-27 Sector-Level Cumulative Abnormal Returns $[-1, +1]$

Sector	N	CAAR (%)	BMP	% Pos
Financials	66	-4.52	-6.98	22.7
Industrials	81	-2.68	-3.70	28.4
Consumer Discretionary	39	-2.23	-2.16	38.5
Real Estate	16	$+1.46$	$+2.46$	81.3

Notes: CAAR = Cumulative Average Abnormal Return over $[-1, +1]$ window. BMP = Boehmer, Musumeci, and Poulsen (1991) standardised t-statistic. % Pos = percentage of firms with positive CAR over the window. Selected major sectors shown. Sector N reflects firms with complete return data for the estimation and event windows.

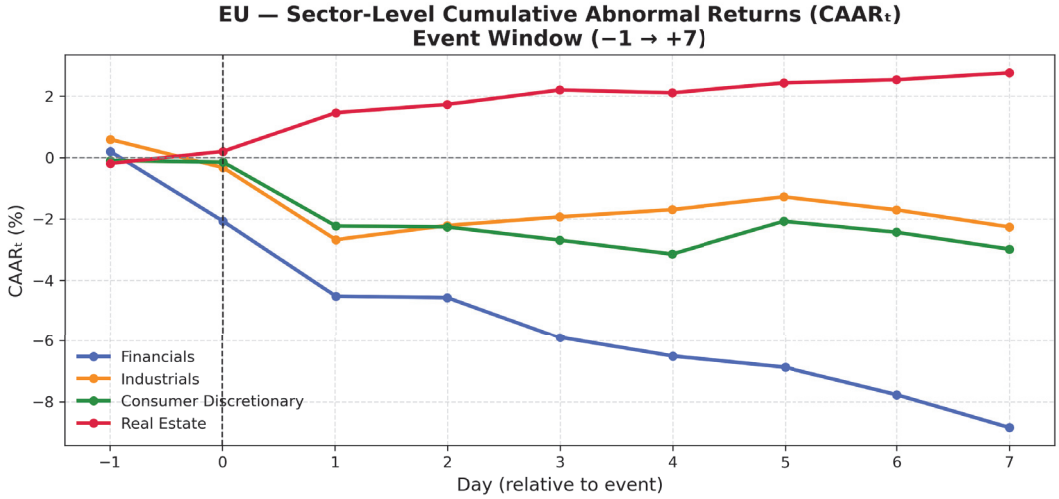

Figure 4.3: EU-27 Sector-Level Cumulative Abnormal Returns

Notes: The figure plots cumulative average abnormal returns (CAAR) by sector for EU-27 firms over the event window surrounding the Brexit referendum (24 June 2016, $t = 0$).

In the EU-27, Financials register a CAAR of -4.52% ($t_{BMP} = -6.98$, $p < 0.001$), larger in magnitude than UK Financials, consistent with spillovers through cross-border banking exposures and financial linkages. The pervasiveness of financial sector losses is evident, with fewer than one in four firms posting positive cumulative returns. Industrials and Consumer Discretionary show smaller but negative reactions (-2.68% and -2.23%). Notably, EU Real Estate records a positive CAAR of $+1.46\%$ ($t_{BMP} = +2.46$, $p = 0.014$), contrasting sharply with the -15.53% decline in UK Real Estate. Over 81% of EU Real Estate firms posted positive returns, consistent with expectations of capital reallocation from London to continental financial centres.

4.4 Cross-Sectional Determinants

Tables 4.5 and 4.6 present cross-sectional regressions examining whether firm characteristics explain variation in cumulative abnormal returns over the $[-1, +1]$ window.

Table 4.5: UK Cross-Sectional Regression: Determinants of CAR $[-1, +1]$

Variable	Coefficient	t-statistic	p-value	
Constant	0.0119	0.28	0.777	
ROA	0.0062	0.26	0.798	
Leverage	0.0660	1.55	0.122	
Foreign Sales	0.1134	5.99	0.000	***
Size (ln)	−0.0030	−0.59	0.558	
Liquidity	−0.0069	−2.07	0.039	**
Sector Fixed Effects (relative to Basic Materials):				
Consumer Discretionary	−0.1029	−2.69	0.007	***
Consumer Staples	−0.0127	−0.35	0.725	
Energy	0.0481	0.94	0.345	
Financials	0.0326	0.87	0.384	
Health Care	0.0037	0.07	0.948	
Industrials	−0.0766	−2.27	0.023	**
Real Estate	−0.1129	−2.76	0.006	***
Technology	−0.0977	−2.15	0.032	**
Telecommunications	−0.0171	−0.27	0.790	
Utilities	0.0688	1.69	0.090	*
N		443		
Adj. R^2		0.172		

Notes: Dependent variable: Cumulative abnormal return over $[-1, +1]$ window. All firm characteristics measured prior to event. Foreign Sales = share of revenue from foreign operations (ratio in $[0, 1]$).Liquidity = natural logarithm of cash and cash-equivalent holdings. Size = natural log of market capitalisation. ROA = return on assets. Leverage = total debt / total assets. Heteroskedasticity-consistent (HC3) robust standard errors. ***, **, * denote significance at 1%, 5%, and 10% levels.

For the United Kingdom, foreign revenue exposure is strongly associated with less negative cumulative abnormal returns, with a coefficient of 0.1134 ($t = 5.99$, $p < 0.001$). A one-standard-deviation increase in foreign revenue exposure (approximately 0.30) is associated with a 3.4 percentage point improvement in CAR, substantial relative to the mean UK CAAR of -6.04%. This is consistent with expectations that multinational firms with diversified revenue streams were partially shielded from domestic economic turbulence.

Liquidity displays a negative and significant association with cumulative abnormal returns (coefficient = -0.0069, $t = -2.07$, $p = 0.039$), indicating that firms with higher cash holdings experienced more negative abnormal returns. This counterintuitive result suggests that liquid assets did not provide a mechanical buffer, possibly reflecting that cash-rich firms were disproportionately concentrated in sectors particularly sensitive to Brexit-related risks.

Leverage carries a positive coefficient (0.0660, $t = 1.55$), though not statistically significant. ROA and firm size display weak explanatory power. Sector dummy coefficients reveal

significant variation, with Consumer Discretionary (-0.1029, $p = 0.007$), Industrials (-0.0766, $p = 0.023$), and Real Estate (-0.1129, $p = 0.006$) all exhibiting large negative effects.

Table 4.6: EU-27 Cross-Sectional Regression: Determinants of CAR $[-1, +1]$

Variable	Coefficient	t-statistic	p-value	
Constant	-0.0274	-0.66	0.508	
ROA	-0.0080	-0.27	0.790	
Leverage	0.0181	0.79	0.432	
Foreign Sales	0.0161	1.52	0.128	
Size (ln)	0.0060	1.65	0.100	*
Liquidity	-0.0020	-0.92	0.360	
Sector Fixed Effects (relative to Basic Materials):				
Consumer Discretionary	-0.0248	-1.77	0.077	*
Consumer Staples	0.0286	2.05	0.040	**
Energy	0.0212	1.48	0.138	
Financials	-0.0473	-3.75	0.000	***
Health Care	0.0162	1.44	0.150	
Industrials	-0.0277	-2.42	0.016	**
Real Estate	0.0064	0.42	0.672	
Technology	-0.0097	-0.63	0.532	
Telecommunications	0.0049	0.34	0.735	
Utilities	-0.0022	-0.15	0.879	
Country Fixed Effects: Included (13 countries, coefficients not reported)				
N		344		
Adj. R^2		0.170		

Notes: Dependent variable: Cumulative abnormal return over $[-1, +1]$ window. All firm characteristics measured prior to event. Foreign Sales, Liquidity, Size, ROA, and Leverage defined as in Table 4.5. Sector and country fixed effects included. Country dummies not reported for brevity but account for heterogeneity across EU member states. Heteroskedasticity-consistent (HC3) robust standard errors. ***, **, * denote significance at 1%, 5%, and 10% levels.

In the EU-27, foreign revenue exposure exhibits a positive but statistically weak association (0.0161, $t = 1.52$, $p = 0.128$), implying that international diversification matters far less for EU firms than for UK firms. This makes economic sense: EU firms faced an external shock that affected firms relatively uniformly regardless of revenue geography.

Firm size carries a positive and marginally significant coefficient (0.0060, $t = 1.65$, $p = 0.100$), suggesting larger EU firms experienced slightly less negative reactions. ROA, leverage, and liquidity remain economically small and statistically insignificant. Sector fixed effects reveal Financials with a large negative coefficient (-0.0473, $t = -3.75$, $p < 0.001$), confirming particular exposure through cross-border banking relationships. Industrials also show a significant negative effect (-0.0277, $t = -2.42$, $p = 0.016$).

Chapter 5

Discussion

This chapter interprets the empirical findings in light of existing theory and literature, contextualises the results within the broader Brexit debate, and addresses the study's limitations. The evidence presented in Chapter 4 reveals a coherent pattern of market responses consistent with theoretical predictions. UK firms experienced immediate and substantial revaluation following the unexpected Leave outcome, whilst EU firms faced a more contained, second-order shock transmitted primarily through trade and financial linkages.

5.1 Aggregate Patterns and Theoretical Interpretation

The aggregate market reaction provides strong support for the theoretical framework developed in Chapter 2. The UK's cumulative abnormal return of -6.04% over the $[-1, +1]$ window reflects abrupt reassessment of the UK's macroeconomic and institutional outlook. This magnitude is consistent with contemporaneous assessments that Brexit could entail economically meaningful costs (Dhingra et al., 2017) and with evidence that Brexit-related uncertainty affected firm investment and productivity in subsequent years (Bloom et al., 2019), suggesting investors rapidly priced in expectations of lower activity and higher uncertainty.

The day-by-day decomposition reveals that losses were concentrated on the event day (-2.87%) and the following trading session (-3.47%), with continuation over the first trading week reaching -7.04% over the $[-1, +7]$ window. The sharp and immediate adjustment on June 24 is consistent with a sudden repricing of assets in response to heightened political uncertainty, while the absence of rapid mean reversion suggests that markets incorporated a persistent political risk premium, as modeled by Pástor and Veronesi (2013). Statistical significance is robust across both Brown-Warner and Boehmer-Musumeci-Poulsen tests.

The EU-27 response of -1.25%, roughly one-fifth the magnitude of the UK decline, aligns with expectations of a UK-centred shock with spillover effects to continental markets. Belke et al. (2018) examine Brexit's impact on European financial markets using VAR analysis, finding significant but temporary spillovers to continental European equity and bond mar-

kets, qualitatively consistent with their evidence that spillovers to continental European markets were smaller than the UK reaction. Continental firms did not face the prospect of domestic institutional reconfiguration, and the primary transmission channels operated through anticipated reductions in UK demand, supply-chain adjustments, and elevated financial market volatility.

Steinberg (2019) estimates that trade policy uncertainty associated with Brexit would reduce real UK GDP by between 0.5% and 1.4%, depending on the scenario, through its effects on investment and productivity. These structural model estimates are directionally consistent with the market-based evidence presented here, suggesting that the -6.04% equity market decline plausibly reflected a reassessment of longer-run economic prospects in addition to an increase in political risk premia.

This marked differential between UK and EU responses supports the hypothesis that Brexit represented fundamentally different types of shocks for the two regions. For UK firms, the referendum triggered expectations of regulatory divergence, reduced market access, currency depreciation, and prolonged policy uncertainty. For EU firms, the shock operated primarily as an external demand disturbance with more limited implications for their domestic operating environment.

5.2 Sectoral Heterogeneity

The sector-level results reveal pronounced heterogeneity in how different industries processed the Brexit shock, consistent with variation in exposure to domestic demand conditions, trade intensity, and financial market access.

Within the United Kingdom, Real Estate and Consumer Discretionary experienced the largest declines (-15.53% and -14.97%), both statistically significant at the 1% level. These sectors are particularly sensitive to domestic macroeconomic conditions. The sharp fall in real estate stocks suggests expectations of tighter financing conditions, reduced foreign investment in UK property, and lower construction activity. The substantial decline in consumer discretionary firms indicates concerns over reduced household spending amid rising inflation from sterling depreciation and increased macroeconomic uncertainty.

The Industrial sector's -8.72% decline reflects anticipated disruptions to trade flows and supply-chain operations, consistent with models of trade uncertainty (Handley and Limão, 2015). UK manufacturing firms faced the prospect of new tariff and non-tariff barriers with their largest trading partner, as well as potential regulatory divergence affecting product standards and compliance costs.

The more moderate decline in Financials (-2.45%) warrants careful interpretation. Whilst this sector was widely expected to face significant challenges from potential loss of passporting rights and regulatory equivalence, the relatively muted immediate response may reflect several offsetting considerations. First, the referendum outcome did not provide clarity on the specific post-Brexit regulatory framework, leaving open the possibility of negotiated access arrange-

ments. Second, some UK financial firms may have anticipated benefits from reduced regulatory burden. The 44.1% of Financials posting positive CARs suggests considerable within-sector heterogeneity, likely reflecting differences in business models, geographic footprints, and exposure to EU markets.

In the EU-27, the sectoral pattern differs markedly. Financials show the largest decline (-4.52%), which is actually greater in magnitude than UK Financials, consistent with spillovers through banking relationships, cross-border exposures, and concerns about counterparty risk with UK institutions. Industrials and Consumer Discretionary show smaller negative reactions (-2.68% and -2.23%), suggesting concerns about export prospects and supply-chain frictions.

One striking sectoral result is the positive reaction in EU Real Estate ($+1.46\%$), which contrasts sharply with the -15.53% decline in UK Real Estate. The positive EU response suggests that markets viewed Brexit as potentially redistributing economic activity within Europe rather than merely creating aggregate losses. This sectoral asymmetry aligns with the theoretical prediction that firm-level exposure to trade, domestic demand, and financial conditions would shape responses to political uncertainty.

5.3 Firm-Level Mechanisms

The cross-sectional regressions identify specific firm characteristics that shaped responses to the Brexit shock, providing insight into the mechanisms through which political uncertainty affects equity valuations.

For UK firms, foreign revenue exposure emerges as the most economically and statistically significant determinant of abnormal returns. The coefficient of 0.1134 ($p < 0.001$) implies that a one-standard-deviation increase in foreign revenue share (approximately 0.30) is associated with a 3.4 percentage point improvement in CAR, substantial relative to the mean UK CAAR of -6.04%. This finding is consistent with the hypothesis that internationally diversified firms were partially shielded from domestic economic turbulence. Firms with substantial foreign revenues could offset anticipated UK losses with earnings generated abroad and may have benefited from sterling depreciation through valuation effects on foreign earnings and improved competitiveness for internationally exposed activities.

This result extends prior work by Davies and Studnicka (2018), who document negative effects of Brexit uncertainty on firms with concentrated UK production networks. Whilst their focus is on production geography and the vulnerability created by supply-chain concentration, the present study's foreign revenue measure captures demand geography. The combination of these findings suggests that both production and demand diversification served as hedges against Brexit-related uncertainty, consistent with insights from real options theory (Dixit and Pindyck, 1994) and models of export heterogeneity (Melitz, 2003).

Liquidity displays a negative association with abnormal returns (coefficient = -0.0069, $p = 0.039$), indicating that firms with higher cash holdings experienced more negative reac-

tions. This counter-intuitive result contrasts with the conventional expectation that liquid assets provide a buffer during periods of heightened uncertainty. Several explanations are plausible. First, the Brexit referendum may have disproportionately affected cash-rich firms if these tended to be concentrated in domestically oriented sectors or business models particularly sensitive to UK macroeconomic conditions. Second, cash holdings may proxy for other firm characteristics, such as limited investment opportunities or mature business models, that were viewed unfavourably in the Brexit context. Third, the coefficient is economically modest relative to foreign revenue exposure, suggesting that liquidity played a secondary role in shaping immediate market reactions.

Interestingly, firm size, profitability (ROA), and leverage do not display strong explanatory power for UK firms. The absence of a size effect suggests that the Brexit shock was sufficiently broad that it did not disproportionately affect small versus large firms once other characteristics were controlled for. The lack of a leverage effect may reflect offsetting forces: whilst higher leverage typically increases financial risk, the expectation of accommodative monetary policy following the referendum may have mitigated concerns about debt serviceability.

In the EU-27, firm-level characteristics display substantially weaker associations with abnormal returns. The foreign revenue coefficient is positive (0.0161) but statistically insignificant ($p = 0.128$), and liquidity shows no meaningful relationship. This pattern is consistent with the interpretation that Brexit represented an external, relatively uniform shock to EU firms. Without a direct threat to their domestic institutional framework, EU firms' responses were less differentiated by individual characteristics and more shaped by sectoral exposures and country-specific trade linkages.

The sector fixed effects in the EU-27 regression reveal important transmission channels, with Financials and Industrials showing significant negative coefficients even after controlling for firm characteristics. This suggests that sectoral affiliation captured exposures beyond those reflected in observable firm-level variables, such as cross-border banking relationships for financial institutions and supply-chain linkages for manufacturers. Consumer Staples, in contrast, display positive coefficients, consistent with a defensive sector flight-to-quality effect as investors sought stable revenue streams amid heightened uncertainty.

These findings collectively indicate that Brexit's firm-level impact operated through both fundamental channels (revenue geography) and financial market channels (risk premia, sector-specific exposures). The contrast between UK and EU cross-sectional patterns reinforces the differentiated nature of the shock.

5.4 Comparison with Prior Literature

The results align with and extend several strands of the Brexit and political uncertainty literature. The aggregate UK decline of -6.04% is directionally consistent with immediate post-referendum reactions documented in contemporaneous analyses (Breinlich et al., 2018; Belke

et al., 2018), though direct comparison is complicated by differences in sample composition, event window definitions, and benchmark specifications.

The sectoral heterogeneity documented here complements the industry-level findings of Davies and Studnicka (2018) and Born et al. (2019). Whilst those studies focus on output effects and the decomposition of uncertainty versus expectations channels, the present analysis captures immediate market expectations across a broad range of industries. The finding that Real Estate and Consumer Discretionary experienced the largest declines is consistent with these sectors' sensitivity to domestic demand and financing conditions, as emphasised in the theoretical framework of Pástor and Veronesi (2013).

The positive reaction in EU Real Estate provides novel evidence on capital reallocation expectations. Whilst prior studies have documented aggregate spillovers to EU markets (Belke et al., 2018), the present analysis reveals that some EU sectors anticipated gains from Brexit-induced restructuring. Recent work by Graziano et al. (2021) demonstrates that Brexit's trade policy uncertainty generated spillover effects extending beyond Europe, highlighting the systemic importance of major political shocks in interconnected global markets.

The foreign revenue protection effect extends the trade literature's focus on export intensity to the domain of political uncertainty. The present study's foreign revenue measure captures demand-side diversification as a distinct hedge, suggesting that Brexit's impact operated through both supply-chain disruptions and market access concerns. The finding that foreign revenue exposure serves as a protective factor for UK firms but not EU firms reinforces the interpretation that Brexit represented fundamentally different types of shocks for the two regions.

5.5 Limitations and Scope Conditions

Several limitations deserve explicit acknowledgment. First, the analysis captures only the immediate market reaction to the referendum outcome. Whilst this short-run response reflects investors' revised expectations, the subsequent evolution of Brexit negotiations, policy announcements, and implementation details may have altered these initial assessments.

Second, the study focuses exclusively on publicly listed firms, which tend to be larger, more internationally exposed, and more financially sophisticated than the broader population of UK and EU companies. The results may therefore understate Brexit's impact on small and medium-sized enterprises (SMEs), which typically have more limited access to international markets and financial resources.

Third, the firm-level variables employed (foreign revenue share, liquidity, size, leverage, ROA) are proxies for underlying economic exposures and financial constraints. These measures may not fully capture the complexity of firms' operational structures, supply-chain networks, or competitive positions. The counter-intuitive liquidity result suggests that cash holdings may proxy for unobserved firm characteristics or sector-specific exposures. More granular data on

trade relationships, production locations, investment opportunities, and customer bases could yield additional insights but are not consistently available across the full sample.

Fourth, the event-study methodology assumes that the referendum was the dominant information event during the estimation and event windows. Whilst 24 June 2016 was indeed a date of exceptional political and economic significance, other contemporaneous developments (monetary policy expectations, global economic conditions, industry-specific news) may have contributed to observed price movements. The standard event-study assumption is that other contemporaneous news is not systematically correlated with the referendum outcome, which is plausible for a three-day window but less defensible over longer horizons.

Fifth, the analysis does not examine later Brexit-related milestones (Article 50 invocation, negotiation updates, the eventual Withdrawal Agreement). Each of these events provided additional information about the likely form and timing of Brexit, and cumulative analysis across multiple events could offer a more complete picture of how uncertainty evolved over time.

Finally, the cross-sectional regressions identify associations between firm characteristics and abnormal returns but do not establish causality in the strict experimental sense. The results are consistent with a causal interpretation under the standard event-study identification assumption that the referendum outcome was exogenous to firm-level characteristics, but alternative explanations (omitted variables, measurement error in covariates) cannot be fully ruled out.

Despite these limitations, the findings provide robust evidence that financial markets rapidly incorporated the implications of the Brexit referendum, with reactions consistent with theoretical predictions regarding political uncertainty, trade disruptions, and institutional change.

Chapter 6

Conclusion

UK equity markets experienced substantial negative reactions to the Brexit referendum of 23 June 2016, with a cumulative abnormal return of -6.04% over the three-day window surrounding the announcement of the vote outcome. EU-27 firms experienced a more moderate decline of -1.25%, roughly one-fifth the UK magnitude. This asymmetry confirms that Brexit represented fundamentally different shocks for the two regions: direct institutional and macroeconomic disruption for the UK versus spillover effects transmitted through trade and financial linkages for the EU.

Sectoral responses varied substantially within both regions, reflecting differences in exposure to domestic demand conditions, trade intensity, and financial market access. UK Real Estate and Consumer Discretionary sectors experienced the largest declines (-15.53% and -14.97%), consistent with their sensitivity to domestic economic conditions. UK Industrials declined by -8.72%, reflecting anticipated trade disruptions and supply-chain frictions. In the EU-27, Financials experienced the largest decline (-4.52%), indicating cross-border banking spillovers, whilst EU Real Estate posted a significant positive return ($+1.46\%$), consistent with expectations of capital reallocation from London to continental financial centres.

Firm-level characteristics played an important role in shaping UK responses but mattered less for EU firms. Foreign revenue exposure emerged as a strong protective factor for UK firms, with a one-standard-deviation increase in foreign sales share associated with a 3.4 percentage point improvement in cumulative abnormal returns. This suggests that internationally diversified firms were partially shielded from domestic uncertainty through geographic revenue diversification. Interestingly, liquidity displayed a negative association with returns, with cash-rich UK firms experiencing more negative reactions than their less liquid counterparts. This counter-intuitive finding suggests that cash holdings may have proxied for unobserved characteristics, such as mature business models or limited growth opportunities, that were viewed unfavourably in the Brexit context. In contrast, EU firm-level characteristics displayed weak associations with abnormal returns, with sectoral affiliation playing a more prominent role.

The timing and persistence of market reactions provide insight into how uncertainty evolved. The concentration of losses on the event day and day $+1$, combined with continuation

over the first trading week, suggests that the referendum outcome did not resolve uncertainty but rather initiated a prolonged period of policy ambiguity, consistent with theoretical models of political uncertainty (Pástor and Veronesi, 2013).

This study contributes to several strands of literature. First, it provides systematic evidence on immediate market reactions to the Brexit referendum across a comprehensive sample of UK and EU firms, documenting cross-sectional heterogeneity and linking these patterns to theoretical predictions. Second, it reveals pronounced asymmetry between UK and EU responses, highlighting the importance of distinguishing between firms directly affected by institutional change and those exposed primarily through economic linkages. Third, it identifies foreign revenue exposure as a significant hedge against domestic political uncertainty, extending the trade policy literature by demonstrating that demand geography, not only production geography, serves as a buffer against country-specific shocks. Fourth, the unexpected negative association between liquidity and returns highlights the importance of examining heterogeneous firm responses to political uncertainty, suggesting that cash holdings may proxy for characteristics beyond simple financial flexibility.

The findings carry several implications. For policymakers, the results underscore that major political decisions affecting institutional frameworks generate substantial immediate costs to domestic firms, particularly those in domestically oriented sectors. The magnitude and persistence of the UK market decline suggest that referendum outcomes perceived as increasing uncertainty are rapidly incorporated into asset prices, with potential consequences for investment and economic activity. The sectoral heterogeneity indicates that policymakers should consider differential impacts across industries when evaluating major institutional changes. Real estate, consumer-facing industries, and manufacturing sectors with integrated supply chains appear particularly exposed, suggesting potential benefits from sector-specific transition support.

For firms, the protective effect of foreign revenue diversification highlights the value of international market access as a hedge against domestic political risk. Firms with geographically concentrated revenues face greater exposure to country-specific political developments, whilst multinational firms benefit from the option to reallocate resources across markets. The unexpected liquidity result suggests that balance sheet characteristics interact with political uncertainty in complex ways not fully captured by conventional measures of financial flexibility.

Several limitations suggest directions for future research. First, the analysis captures only the immediate market reaction. Future research could examine later Brexit-related milestones, Article 50 invocation, negotiation updates, the Withdrawal Agreement, to understand how uncertainty evolved over time. Second, the study focuses on publicly listed firms, which tend to be larger and more internationally exposed than the broader firm population. Future research incorporating data on privately held firms and SMEs could assess whether protective effects of foreign revenues extend to smaller, domestically oriented companies. Third, the firm-level variables employed are proxies for underlying economic exposures. The counter-intuitive liquidity result highlights the need for more granular data on cash usage intentions, investment

opportunities, and sector-specific exposures. Future research with detailed data on trade relationships, supply-chain networks, and production facilities could provide deeper insight into specific channels through which political uncertainty affects firm valuations. Fourth, the event-study methodology identifies associations but does not establish causality in the strict experimental sense. Future research employing alternative identification strategies, such as difference-in-differences designs comparing firms with differential Brexit exposure, could strengthen causal inference. Finally, the analysis does not examine longer-run outcomes such as investment decisions, employment adjustments, or productivity changes. Future research linking immediate market reactions to subsequent firm behaviour could assess whether initial price responses accurately predicted longer-run economic effects.

The Brexit referendum represented an exceptional quasi-natural experiment in political uncertainty. The unexpected Leave outcome triggered immediate and substantial revaluations of UK firms, whilst EU firms faced more moderate spillover effects. The magnitude, timing, and cross-sectional heterogeneity of these responses reveal that financial markets rapidly incorporated the referendum's implications, with reactions concentrated in sectors and firms most exposed to domestic demand conditions and trade disruptions. The findings underscore that major political decisions affecting institutional frameworks generate substantial economic costs immediately reflected in asset prices. The asymmetry between UK and EU responses highlights the differential nature of political shocks, whilst sectoral and firm-level heterogeneity demonstrates that political uncertainty does not affect all firms uniformly.

As governments and firms navigate an increasingly uncertain political environment, understanding how markets process and price political risk becomes ever more important. This study contributes to that understanding by documenting immediate reactions to one of the most significant political events of recent decades and identifying characteristics that shaped the distribution of economic impacts across firms and sectors. The protective effect of foreign revenue diversification reveals a specific mechanism through which firms can hedge against political uncertainty, with practical implications for corporate strategy and policy design in an era of heightened political risk.

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Appendix A

Descriptive Statistics

This appendix presents descriptive statistics for the variables employed in the cross-sectional regressions.

Table A.1: Descriptive Statistics: UK Sample ($N = 443$)

Variable	Mean	Std. Dev.	Min	Median	Max
CAR $[-1, +1]$ (%)	-6.04	10.32	-42.18	-4.87	28.56
CAR $[-1, +3]$ (%)	-5.10	11.48	-45.72	-4.25	32.14
CAR $[-1, +7]$ (%)	-7.04	15.92	-58.26	-5.64	41.58
Foreign Sales	0.42	0.31	0.00	0.38	1.00
Liquidity	11.05	2.55	0.00	11.03	18.79
Size (ln MV)	13.82	2.14	8.64	13.76	19.42
ROA	0.05	0.12	-0.58	0.06	0.35
Leverage	0.22	0.18	0.00	0.19	0.84

Notes: CAR = Cumulative abnormal return over specified window. Foreign Sales = share of revenue from foreign operations (ratio in $[0, 1]$). Liquidity = ln(Cash and cash equivalents). Size = ln(Market capitalisation). ROA = return on assets. Leverage = total debt / total assets. All firm characteristics measured as of end-2015. All financial values sourced from Datastream in US dollars.

Table A.2: Descriptive Statistics: EU-27 Sample ($N = 344$)

Variable	Mean	Std. Dev.	Min	Median	Max
CAR $[-1, +1]$ (%)	-1.25	8.74	-35.62	-0.83	24.18
CAR $[-1, +3]$ (%)	-0.86	9.52	-38.14	-0.44	26.73
CAR $[-1, +7]$ (%)	-1.24	13.68	-51.83	-0.92	35.29
Foreign Sales	0.48	0.29	0.00	0.47	1.00
Liquidity	10.89	2.72	0.00	11.05	17.38
Size (ln MV)	14.21	1.96	9.12	14.18	19.87
ROA	0.06	0.10	-0.42	0.06	0.38
Leverage	0.24	0.17	0.00	0.22	0.79

Notes: Variable definitions as in Table A.1. All firm characteristics measured as of end-2015.

Appendix B

Sample Composition

This appendix provides complete details on the composition of the UK and EU-27 samples by sector and country.

Table B.1: UK Sample - Sector Composition

Sector	Firms	Percentage
Financials	195	44.02
Industrials	73	16.48
Consumer Discretionary	60	13.54
Real Estate	35	7.90
Consumer Staples	24	5.42
Basic Materials	19	4.29
Energy	10	2.26
Technology	9	2.03
Utilities	8	1.81
Health Care	7	1.58
Telecommunications	3	0.68
Total	**443**	**100.00**

Notes: UK sample drawn from FTSE All-Share index constituents as of June 2016. Sector classifications based on Industry Classification Benchmark (ICB).

Table B.2: EU-27 Sample - Sector Composition

Sector	Firms	Percentage
Industrials	81	23.55
Financials	66	19.19
Consumer Discretionary	39	11.34
Health Care	33	9.59
Basic Materials	26	7.56
Consumer Staples	19	5.52
Technology	18	5.23
Utilities	17	4.94
Energy	17	4.94
Real Estate	16	4.65
Telecommunications	12	3.49
Total	**344**	**100.00**

Notes: EU-27 sample drawn from STOXX Europe Broad Index as of June 2016, filtered for EU member states only. Sector classifications based on Industry Classification Benchmark (ICB).

Table B.3: EU-27 Sample - Country Composition

Country	Firms	Percentage
France	64	18.60
Germany	58	16.86
Sweden	50	14.53
Italy	30	8.72
Netherlands	26	7.56
Spain	25	7.27
Denmark	24	6.98
Finland	18	5.23
Belgium	16	4.65
Ireland	9	2.62
Poland	9	2.62
Austria	7	2.03
Luxembourg	4	1.16
Portugal	4	1.16
Total	**344**	**100.00**

Notes: Country of domicile from Datastream ISO country codes. Sample includes firms from 14 EU member states.

Appendix C

Sector-Level Results - All Windows

C.1 UK Sector-Level Results

Table C.1: UK Sector-Level CAAR - Window $[-1, +1]$

Sector	N	CAAR (%)	t_{BMP}	% Pos
Financials	195	-2.45	-3.73	44.1
Industrials	73	-8.72	-6.26	22.2
Consumer Discretionary	60	-14.97	-7.99	16.7
Real Estate	35	-15.53	-9.22	5.7

Notes: Selected major sectors shown. CAAR = Cumulative Average Abnormal Return. t_{BMP} = Boehmer, Musumeci, and Poulsen (1991) standardised t-statistic. % Pos = percentage of firms with positive CAR over the window. Sector N reflects firms with complete return data for the estimation and event windows.

Table C.2: UK Sector-Level CAAR - Window $[-1, +3]$

Sector	N	CAAR (%)	t_{BMP}	% Pos
Financials	195	-2.07	-3.62	46.7
Industrials	73	-8.19	-6.04	20.8
Consumer Discretionary	60	-13.43	-7.94	13.3
Real Estate	35	-12.40	-8.30	5.7

Notes: Variable definitions as in Table C.1.

Table C.3: UK Sector-Level CAAR - Window $[-1, +7]$

Sector	N	CAAR (%)	t_{BMP}	% Pos
Financials	195	-3.36	-4.03	46.7
Industrials	73	-11.01	-6.29	20.8
Consumer Discretionary	60	-17.04	-7.51	16.7
Real Estate	35	-17.83	-9.52	8.6

Notes: Variable definitions as in Table C.1.

C.2 EU-27 Sector-Level Results

Table C.4: EU-27 Sector-Level CAAR - Window $[-1, +1]$

Sector	N	CAAR (%)	t_{BMP}	% Pos
Financials	66	-4.52	-6.98	22.7
Industrials	81	-2.68	-3.70	28.4
Consumer Discretionary	39	-2.23	-2.16	38.5
Real Estate	16	1.46	2.46	81.3

Notes: Selected major sectors shown. Variable definitions as in Table C.1.

Table C.5: EU-27 Sector-Level CAAR - Window $[-1, +3]$

Sector	N	CAAR (%)	t_{BMP}	% Pos
Financials	66	-5.89	-8.41	18.2
Industrials	81	-1.93	-2.96	37.0
Consumer Discretionary	39	-2.69	-2.81	33.3
Real Estate	16	2.20	4.35	81.3

Notes: Variable definitions as in Table C.1.

Table C.6: EU-27 Sector-Level CAAR - Window $[-1, +7]$

Sector	N	CAAR (%)	t_{BMP}	% Pos
Financials	66	-8.83	-9.72	12.1
Industrials	81	-2.26	-2.50	37.0
Consumer Discretionary	39	-2.99	-2.52	33.3
Real Estate	16	2.77	3.35	81.3

Notes: Variable definitions as in Table C.1.

Appendix D

Cross-Sectional Regressions - UK Complete Results

This appendix presents complete UK cross-sectional regression results with all sector dummy variables for alternative event windows.

Table D.1: UK Cross-Sectional Regression - Window $[-1, +1]$

Variable	Coefficient	t-stat	p-value	
Constant	0.0119	0.28	0.777	
Firm Characteristics:				
ROA	0.0062	0.26	0.798	
Leverage	0.0660	1.55	0.122	
Foreign Sales	0.1134	5.99	0.000	***
Size (ln Market Cap)	−0.0030	−0.59	0.558	
Liquidity	−0.0069	−2.07	0.039	**
Sector Dummies (Base: Basic Materials):				
Consumer Discretionary	−0.1029	−2.69	0.007	***
Consumer Staples	−0.0127	−0.35	0.725	
Energy	0.0481	0.94	0.345	
Financials	0.0326	0.87	0.384	
Health Care	0.0037	0.07	0.948	
Industrials	−0.0766	−2.27	0.023	**
Real Estate	−0.1129	−2.76	0.006	***
Technology	−0.0977	−2.15	0.032	**
Telecommunications	−0.0171	−0.27	0.790	
Utilities	0.0688	1.69	0.090	*
N		443		
Adj. R^2		0.172		

Notes: Dependent variable: Cumulative abnormal return over $[-1, +1]$ window. Foreign Sales = share of revenue from foreign operations (ratio in $[0, 1]$). Liquidity = ln(Cash and cash equivalents). Size = ln(Market capitalisation). ROA = return on assets. Leverage = total debt / total assets. All firm characteristics measured as of end-2015. Heteroskedasticity-consistent (HC3) robust standard errors. ***, **, * denote significance at 1%, 5%, and 10% levels.

Table D.2: UK Cross-Sectional Regression - Window $[-1, +3]$

Variable	Coefficient	t-stat	p-value	
Constant	0.0111	0.30	0.761	
Firm Characteristics:				
ROA	0.0015	0.05	0.960	
Leverage	0.0578	1.44	0.151	
Foreign Sales	0.1052	6.07	0.000	***
Size (ln Market Cap)	−0.0047	−1.08	0.281	
Liquidity	−0.0049	−1.68	0.093	*
Sector Dummies (Base: Basic Materials):				
Consumer Discretionary	−0.0925	−2.64	0.008	***
Consumer Staples	−0.0047	−0.14	0.887	
Energy	0.0452	1.00	0.318	
Financials	0.0316	0.93	0.351	
Health Care	0.0222	0.50	0.618	
Industrials	−0.0731	−2.37	0.018	**
Real Estate	−0.0780	−2.06	0.039	**
Technology	−0.0673	−1.63	0.104	
Telecommunications	−0.0107	−0.17	0.867	
Utilities	0.0869	2.24	0.025	**
N		443		
Adj. R^2		0.169		

Notes: Dependent variable: Cumulative abnormal return over $[-1, +3]$ window. Variable definitions as in Table D.1.

Table D.3: UK Cross-Sectional Regression - Window $[-1, +7]$

Variable	Coefficient	t-stat	p-value	
Constant	0.0650	1.23	0.218	
Firm Characteristics:				
ROA	-0.0125	-0.44	0.661	
Leverage	0.0526	0.97	0.334	
Foreign Sales	0.1491	6.09	0.000	***
Size (ln Market Cap)	-0.0079	-1.33	0.185	
Liquidity	-0.0079	-2.15	0.031	**
Sector Dummies (Base: Basic Materials):				
Consumer Discretionary	-0.1323	-2.59	0.010	***
Consumer Staples	-0.0154	-0.31	0.754	
Energy	-0.0198	-0.25	0.799	
Financials	0.0124	0.25	0.805	
Health Care	0.0094	0.15	0.885	
Industrials	-0.1212	-2.67	0.008	***
Real Estate	-0.1332	-2.45	0.014	**
Technology	-0.1189	-2.00	0.045	**
Telecommunications	-0.0175	-0.24	0.810	
Utilities	0.1079	1.84	0.066	*
N		443		
Adj. R^2		0.180		

Notes: Dependent variable: Cumulative abnormal return over $[-1, +7]$ window. Variable definitions as in Table D.1. Foreign Sales coefficient (0.1491) increases in magnitude over longer window, indicating sustained protective effect of international diversification.

Appendix E

Cross-Sectional Regressions - EU-27 Complete Results

This appendix presents complete EU-27 cross-sectional regression results with all sector and country dummy variables for alternative event windows.

Table E.1: EU-27 Cross-Sectional Regression - Window $[-1, +1]$ (Part 1: Firm Characteristics & Sector Dummies)

Variable	Coefficient	t-stat	p-value	
Constant	-0.0274	-0.66	0.508	
Firm Characteristics:				
ROA	-0.0080	-0.27	0.790	
Leverage	0.0181	0.79	0.432	
Foreign Sales	0.0161	1.52	0.128	
Size (ln Market Cap)	0.0060	1.65	0.100	*
Liquidity	-0.0020	-0.92	0.360	
Sector Dummies (Base: Basic Materials):				
Consumer Discretionary	-0.0248	-1.77	0.077	*
Consumer Staples	0.0286	2.05	0.040	**
Energy	0.0212	1.48	0.138	
Financials	-0.0473	-3.75	0.000	***
Health Care	0.0162	1.44	0.150	
Industrials	-0.0277	-2.42	0.016	**
Real Estate	0.0064	0.42	0.672	
Technology	-0.0097	-0.63	0.532	
Telecommunications	0.0049	0.34	0.735	
Utilities	-0.0022	-0.15	0.879	

Notes: Dependent variable: Cumulative abnormal return over $[-1, +1]$ window. All firm characteristics measured as of end-2015. Foreign Sales = share of revenue from foreign operations (ratio in $[0, 1]$). Liquidity = ln(Cash and cash equivalents). Size = ln(Market capitalisation). ROA = return on assets. Leverage = total debt / total assets. Table continued on next page with country fixed effects.

Table E.2: EU-27 Cross-Sectional Regression - Window $[-1, +1]$ (Part 2: Country Dummies)

Variable	Coefficient	t-stat	p-value
Country Dummies (Base: Austria):			
Belgium	−0.0001	−0.00	0.998
Denmark	−0.0353	−1.00	0.316
Finland	0.0014	0.04	0.968
France	−0.0217	−0.63	0.532
Germany	−0.0087	−0.26	0.798
Ireland	−0.0597	−1.03	0.301
Italy	−0.0184	−0.53	0.595
Luxembourg	−0.0331	−0.54	0.592
Netherlands	−0.0351	−0.98	0.326
Poland	0.0137	0.38	0.708
Portugal	−0.0048	−0.08	0.933
Spain	0.0014	0.04	0.966
Sweden	0.0060	0.17	0.865
N		344	
Adj. R^2		0.170	

Notes: Continuation of Table E.1. Country dummies capture institutional and macroeconomic heterogeneity across EU member states. Heteroskedasticity-consistent (HC3) robust standard errors. ***, **, * denote significance at 1%, 5%, and 10% levels.

Table E.3: EU-27 Cross-Sectional Regression - Window $[-1, +3]$ (Part 1: Firm Characteristics & Sector Dummies)

Variable	Coefficient	t-stat	p-value	
Constant	−0.0144	−0.38	0.705	
Firm Characteristics:				
ROA	0.0307	0.92	0.355	
Leverage	0.0271	1.34	0.180	
Foreign Sales	−0.0005	−0.06	0.955	
Size (ln Market Cap)	0.0058	1.58	0.114	
Liquidity	−0.0031	−1.30	0.192	
Sector Dummies (Base: Basic Materials):				
Consumer Discretionary	−0.0309	−2.24	0.025	**
Consumer Staples	0.0329	2.54	0.011	**
Energy	0.0400	2.74	0.006	***
Financials	−0.0587	−4.62	0.000	***
Health Care	0.0340	3.20	0.001	***
Industrials	−0.0181	−1.65	0.099	*
Real Estate	0.0012	0.09	0.930	
Technology	−0.0003	−0.02	0.987	
Telecommunications	0.0334	2.36	0.018	**
Utilities	0.0269	1.82	0.069	*

Notes: Dependent variable: Cumulative abnormal return over $[-1, +3]$ window. Variable definitions as in Table E.1. Table continued on next page with country fixed effects.

Table E.4: EU-27 Cross-Sectional Regression - Window $[-1, +3]$ (Part 2: Country Dummies)

Variable	Coefficient	t-stat	p-value
Country Dummies (Base: Austria):			
Belgium	0.0107	0.33	0.739
Denmark	−0.0227	−0.72	0.472
Finland	−0.0023	−0.08	0.940
France	−0.0067	−0.22	0.829
Germany	0.0016	0.05	0.958
Ireland	−0.0311	−0.62	0.536
Italy	−0.0258	−0.81	0.416
Luxembourg	−0.0024	−0.06	0.955
Netherlands	−0.0304	−0.95	0.340
Poland	0.0411	1.06	0.291
Portugal	0.0032	0.06	0.956
Spain	0.0085	0.28	0.782
Sweden	0.0159	0.51	0.611
N		344	
Adj. R^2		0.188	

Notes: Continuation of Table E.3. Heteroskedasticity-consistent (HC3) robust standard errors. ***, **, * denote significance at 1%, 5%, and 10% levels.

Table E.5: EU-27 Cross-Sectional Regression - Window $[-1, +7]$ (Part 1: Firm Characteristics & Sector Dummies)

Variable	Coefficient	t-stat	p-value	
Constant	−0.0019	−0.04	0.968	
Firm Characteristics:				
ROA	−0.0014	−0.03	0.978	
Leverage	0.0265	0.95	0.342	
Foreign Sales	−0.0052	−0.42	0.677	
Size (ln Market Cap)	0.0035	0.68	0.496	
Liquidity	−0.0006	−0.20	0.840	
Sector Dummies (Base: Basic Materials):				
Consumer Discretionary	−0.0462	−2.83	0.005	***
Consumer Staples	0.0428	2.61	0.009	***
Energy	0.0276	1.39	0.164	
Financials	−0.1047	−6.22	0.000	***
Health Care	0.0382	2.81	0.005	***
Industrials	−0.0366	−2.48	0.013	**
Real Estate	−0.0089	−0.49	0.621	
Technology	−0.0322	−1.58	0.114	
Telecommunications	0.0152	0.91	0.365	
Utilities	0.0307	1.44	0.150	

Notes: Dependent variable: Cumulative abnormal return over $[-1, +7]$ window. Variable definitions as in Table E.1. Financials coefficient strengthens to -0.1047 over longer window, indicating persistent negative spillover effects. Table continued on next page with country fixed effects.

Table E.6: EU-27 Cross-Sectional Regression - Window $[-1, +7]$ (Part 2: Country Dummies)

Variable	Coefficient	t-stat	p-value
Country Dummies (Base: Austria):			
Belgium	-0.0028	-0.07	0.944
Denmark	-0.0365	-0.96	0.337
Finland	-0.0106	-0.29	0.774
France	-0.0144	-0.38	0.702
Germany	-0.0027	-0.07	0.941
Ireland	-0.0302	-0.44	0.661
Italy	-0.0322	-0.85	0.395
Luxembourg	-0.0779	-1.61	0.107
Netherlands	-0.0561	-1.45	0.148
Poland	0.0499	0.96	0.337
Portugal	-0.0048	-0.08	0.940
Spain	0.0074	0.20	0.841
Sweden	0.0239	0.63	0.526
N		344	
Adj. R^2		0.234	

Notes: Continuation of Table E.5. Heteroskedasticity-consistent (HC3) robust standard errors. ***, **, * denote significance at 1%, 5%, and 10% levels.