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UNIVERSITY OF VAASA

Henri Weck

# **M&A Value Creation and Derivatives Usage of Acquiring Firms**

Finnish evidence Q1/2010-Q2/2025

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| <b>Author:</b>              | Henri Weck  |               |    |
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**ABSTRACT:**

Mergers and acquisitions (M&A) are among the most significant investment decisions made by corporate management and are generally expected to create value through synergies, growth and more efficient use of capital. Success in these deals does not only depend on operational integration but more importantly on whether they lead to a positive development in return on invested capital relative to the required return on capital. In addition, M&A deals may increase financial risks, and when managing them derivatives hold an important role. Based on the described premise, this thesis examines the relationship between M&A activity, value creation and derivatives usage in Finnish listed firms during 2010–2025.

The empirical research focuses on firms listed in Nasdaq Helsinki, excluding companies in the investment and financial sectors, that completed at least one M&A deal during the observation period. Financial value creation is measured by using economic spread, also known as ROIC–WACC spread, by comparing changes in it before and after M&A deals. The spread describes the difference between return on invested capital and the cost of capital. The research data has been compiled by combining firm-specific M&A and financial statement data on a quarterly basis. Derivatives usage is defined based on financial statement disclosures and the research examines it as an independent firm-specific control and as well as together with M&A activity. The research models also include firm-specific control variables such as size, growth, leverage, profitability and asset tangibility. The empirical analysis is based on OLS regressions that use four different specifications of deal activity, including a comparison between individual deal quarters and no-deal quarters, a linear measure of the number of deals completed in a quarter, an indicator for quarters with multiple deals and a logarithmic transformation of deal intensity.

Based on the results, M&A activity is mostly associated with positive changes in the ROIC–WACC spread. This suggests that M&A deals can support financial value creation, particularly over shorter observation windows. However, the statistical evidence is not entirely consistent across different models and time periods. Derivatives usage has a relatively weakening effect on the benefits derived from M&A deals and the results therefore provide no clear evidence that derivative usage supports the value creation. The results highlight the usefulness of M&A deal making in value creation, while also indicating that related risk management through derivatives should be assessed individually in each case.

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**KEYWORDS:** corporate acquisitions, value creation, derivative securities, risk management, capital costs, capital investment

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**VAASAN YLIOPISTO****Laskentatoimen ja rahoituksen akateeminen yksikkö**

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| <b>Työn ohjaaja:</b>     | Sami Vähämaa   |                   |    |
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**TIIVISTELMÄ:**

Yrityskauppatransaktiot kuuluvat yritysjohdon merkittävimpiin investointipäätöksiin ja niiden odotetaan lähtökohtaisesti luovan arvoa synergioiden, kasvun sekä pääoman tehokkaamman käytön kautta. Tässä onnistuminen ei kuitenkaan riipu ainoastaan operatiivisesta integraatiosta vaan ennen kaikkea siitä, johtavatko ne sijoitetun pääoman tuoton myönteiseen kehitykseen suhteessa pääoman tuottovaatimukseen. Tämä on olennaista, koska strategisesti perusteltu transaktio ei välttämättä luo arvoa, mikäli sen tuotto ei ylitä pääoman kustannusta. Yrityskaupat voivat myös kasvattaa korko-, valuutta-, velka- ja kassavirtariskejä, joiden hallinnassa hyödynnetään usein johdannaisia. Näistä lähtökohdista tämä tutkielma tarkastelee yrityskauppa-aktiivisuuden, arvonluonnin ja johdannaisten käytön välistä yhteyttä suomalaisissa pörssiyrityksissä vuosina 2010–2025.

Empiirinen tutkimus keskittyy Nasdaq Helsingissä listattuihin yhtiöihin, poislukien sijoitus- ja rahoitusalan yhtiöt. Tutkimus koostuu yhtiöistä, jotka ovat toteuttaneet vähintään yhden yrityskauppatransaktion tarkastelujakson aikana. Taloudellista arvonluontia mitataan ROIC–WACC-eron muutoksella yrityskaupan jälkeen suhteessa sitä edeltävään aikaan ja se kuvaa sijoitetun pääoman tuoton ja pääoman kustannuksen välistä erotusta. Tutkimusaineisto koostuu yrityskohtaisista yrityskauppa- ja tilinpäätöstiedoista kvartaalitasolla. Johdannaisten käyttö määritellään tilinpäätöstietojen perusteella ja sitä tarkastellaan sekä itsenäisenä kontrollimuuttujana että yhdessä yrityskauppa-aktiivisuuden kanssa. Tutkimusmalleihin kuuluu myös kontrollimuuttujia, kuten koko, kasvu, velkaisuus, kannattavuus ja aineellisten hyödykkeiden osuus. Empiirinen analyysi perustuu OLS-regressioihin, joissa yrityskauppa-aktiivisuutta mitataan neljällä vaihtoehtoisella tavalla: yrityskauppakvartaalien ja yrityskaupattomien kvartaalien vertailulla, yrityskauppojen lineaarisella mittauksella, useita yrityskauppoja sisältävien kvartaalien mittauksella sekä yrityskauppojen intensiteetin logaritmisella mittauksella.

Tulosten perusteella yrityskauppa-aktiivisuus on enimmäkseen yhteydessä ROIC–WACC-eron myönteiseen muutokseen. Tämä viittaa siihen, että yrityskaupat voivat tukea taloudellista arvonluontia erityisesti lyhyemmillä tarkastelujaksoilla. Tilastollinen näyttö ei kuitenkaan ole täysin johdonmukaista eri mallien ja ajanjaksojen välillä. Tulosten perusteella johdannaisten käytöllä on suhteellisesti yrityskaupoista saatavia hyötyjä heikentävä vaikutus eivätkä tulokset tarjoa selvää näyttöä siitä, että johdannaisten käyttö tukisi arvonluontia yrityskaupoissa. Tulokset korostavat yrityskauppojen hyödyllisyyttä arvonluonnissa, mutta osoittavat, että niihin liittyvää johdannaisilla toteutettavaa riskienhallintaa tulisi arvioida tapauskohtaisesti.

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**AVAINSANAT:** corporate acquisitions, value creation, derivative securities, risk management, capital costs, capital investment

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Generative artificial intelligence has been used in this thesis to support the data structuring, analysis process and development of the visualisations. The language model used for these purposes is GPT-4. AI has not been used to generate research data, nor to formulate the conclusions. The author of the thesis retains full responsibility for the content and interpretations presented in the work.

## 1 Introduction

Mergers and acquisitions (M&A) are among the largest investments that firm managers make and they are often defended by claims about synergies to be achieved, needed strategic changes and better use of capital. In finance theory, the logic behind these deals is the idea that firm value equals the present value of expected cash flows discounted at a rate that investors want in return for their risk. The classic work of Modigliani and Miller (1958, p. 8) and Modigliani and Miller (1963, p. 8) built a basic framework for thinking about how financing conditions affect firm value and the required return on capital and later research and practice have used that logic to assess major corporate investment decisions such as M&A deals.

A common way to link post-deal performance to value creation is to test whether operating returns are higher than the return required by investors. This is often written as an economic spread, defined as return on invested capital (ROIC) minus weighted average cost of capital (WACC). When ROIC stays above WACC, the firm earns more than its cost of capital, which is in line with positive economic profit and value creation frameworks. In a deal setting, the spread is especially useful because a deal can change both the operating return profile and the cost of capital at the same time.

The period after deal closing is often the stage that decides whether spread changes positively or negatively. Integration requires firms to bring systems together, combine operations and align incentives, and these tasks can create heavy coordination costs and short-term disruptions in performance. Recent finance evidence suggests that value creation does not arise automatically from the deal announcement but depends heavily on managerial and governance quality during execution. Delis et al. (2022, p. 2) show that management practices are among the most important determinants of M&A value creation, while Lawrence et al. (2024, p. 3) find that acquirers with independent board leadership are more likely to avoid overpayment and achieve stronger post-merger

performance. This view fits the broader empirical finding that post-deal outcomes differ widely and that average results can hide large differences across acquirers and deal types.

Alongside operating challenges, deals can also cause large shifts in financial and market risk exposure. Cross-border deals can raise foreign exchange exposure through foreign currency revenues, foreign currency costs, and balance sheet positions. Debt-financed deals can increase sensitivity to interest rates through higher leverage, refinancing needs and changes in the mix of rate exposures. Changes in industry scope can raise sensitivity to commodity prices when the target's cost base depends on raw materials and energy. These exposures can affect operating margins during integration if adverse price moves hit at a time when the firm's ability to respond is already weakened by integration complexity. They can also affect the cost of capital if higher volatility, leverage or distress increase the return demanded by debt and equity investors. Recent M&A evidence also shows that uncertainty about risk and financing frictions can influence how these exposures are priced and managed in deals. Betton et al. (2022, p. 2) argue that higher uncertainty about risk can push bidders toward stock or mixed offers rather than cash offers, while de Bodt et al. (2022, p. 4) show that financially constrained acquirers are more likely to include stock as part of the payment package.

Corporate risk management with financial derivatives is often presented as a way to manage these exposures and make cash flows more stable during periods of change. Theory suggests that hedging can add value when capital markets are imperfect and when real investment can be limited by volatile internal funds or costly outside finance. Smith and Stulz (1985, p. 13) argue that firms may hedge because of taxes, costs of financial distress and managerial risk aversion, while Froot et al. (1993, p. 3) stress that risk management can improve investment outcomes when costly external finance interacts with valuable investment opportunities. These channels are especially relevant during integration because deals can raise leverage and integration spending needs at the same time that operating uncertainty increases.

Empirical research shows that derivatives use by non-financial firms is systematically related to exposure and firm characteristics and that derivatives can be linked to differences in measured risk outcomes. Allayannis and Ofek (2001, p. 3) provide evidence that foreign currency derivatives use is associated with lower exchange rate exposure for firms with foreign operations. Géczy et al. (1997, p. 2) document key drivers of currency derivatives use and show that firms use derivatives in ways that fit hedging motives. Purnanandam (2008, p. 3) links corporate risk management to financial distress concerns, which supports the view that hedging may matter most when downside risks are costly when they realize. Even with this broad literature, there is still a clear gap in high-frequency post-deal evidence that connects derivatives use to an economically clear measure of value creation such as the economic spread. Much of the M&A literature focuses on announcement period returns or on lower-frequency operating outcomes while much of the hedging literature looks at cross-sectional comparisons outside the specific integration setting. Andrade et al. (2001, p. 8) review evidence on mergers and report that combined announcement returns are positive on average even though targets capture much of the gain and Moeller et al. (2005, p. 1) show that acquirer shareholder outcomes can be strongly negative in some samples, which underlines that value creation is far from being certain. Altogether, these findings motivate a focused study of whether derivatives use is linked to a different post-deal path of the economic spread during integration period.

## **1.1 Research questions**

This thesis examines whether the use of financial derivatives by a non-financial acquiring company is associated with changes in its economic spread after an M&A deal. The economic spread is measured as the difference between return on invested capital (ROIC) and weighted average cost of capital (WACC). This outcome matters because it links operating performance to the return required by capital providers which fits valuation frameworks in which value is created when returns on capital stay above the required return over time. Ohlson (1995, p. 4) gives a theoretical basis for focusing on earnings

above the cost of capital, which makes the economic spread a useful way to connect post-deal operating performance to value.

The main question is centered on the post-closing integration period. Announcement period stock returns reflect market expectations about synergies and risks but they do not directly measure what happens in operations and finance once integration starts. In the integration period margins can get under pressure from coordination costs, working capital needs can shift and capital spending and restructuring costs can rise. At the same time financing conditions can change through new debt issuance, refinancing and changes in perceived risk. The combined firm's ability to keep returns above its cost of capital is therefore a useful way to assess whether managerial policies that stabilize risk exposure are associated with stronger value creation during the integration window.

A major challenge in answering this question is that derivatives users are not a random group of acquirers. Earlier research shows that derivatives use is related to foreign exposure, leverage, size, growth opportunities and financing conditions, which are also factors that can shape post-deal performance. Géczy et al. (1997, p. 2) and Allayannis and Ofek (2001, p. 3) show that derivatives use is closely tied to exposure and firm characteristics while Smith and Stulz (1985, p. 13) and Froot et al. (1993, p. 3) offer theoretical reasons why risk management choices may be shape by investment and financing conditions. The thesis therefore frames the issue as a comparative post-closing analysis between derivatives users and otherwise similar acquirers that do not use derivatives, with the goal of isolating whether derivatives use is associated with a different path of the economic spread.

**Research questions (RQs):**

**RQ1.** Is there a positive change in the ROIC minus WACC spread for firms after executing an M&A deal, and how does derivatives usage affect it?

This question tests directly whether derivatives use is associated with a wider spread during integration. A wider spread could come from higher operating returns if hedging lowers volatility in margins and supports execution, from a lower cost of capital if hedging improves perceived risk and financing terms or from both channels together. Theoretical predictions for these effects are in line with the risk management arguments of Froot et al. (1993, p. 3) and Smith and Stulz (1985, p. 13), while the mixed deal outcomes reported by Andrade et al. (2001, p. 8) and Moeller et al. (2005, p. 1) support testing whether risk management is one source of this variation.

**RQ2.** In which period of time is the impact the highest on ROIC-WACC spread?

Integration is a process that changes over time and both synergy capture and financing repricing can unfold across several quarters. Recent finance evidence suggests that deal outcomes depend on how managerial and governance quality shape execution after closing rather than at the announcement alone. As referred in the first part of this section, Lawrence et al. (2024, p. 3) and Delis et al. (2022, p. 2) find that operative and strategic governance practices are key determinants of M&A success. This research question therefore focuses on timing and persistence and seeks to identify when differences in the economic spread between users and non-users become most visible.

## 1.2 Motivation

The motivation for this study arises from two strands of evidence that converge on the same underlying question: “under what conditions do deals create value for acquiring firms?”. First, the M&A literature shows that acquirer performance is not totally positive and that average outcomes conceal substantial heterogeneity across firms, industries and deal types. Healy et al. (1992, p. 2) find evidence of post-merger operating improvement in some cases, suggesting that deals can create value when integration is successful and efficiencies are realized. At the same time, Andrade et al. (2001, p. 8) show that merger gains are not distributed evenly between bidders and targets, while Moeller et al. (2005, p. 1) document that some deal settings are associated with very large shareholder wealth losses for acquirers.

Second, the corporate hedging literature provides strong theoretical reasons to expect that risk management should matter most when firms are exposed to costly downside risks that may impair investment and financing decisions. Smith and Stulz (1985, p. 13) identify taxes, financial distress costs and managerial incentives as reasons why firms may hedge, and Froot et al. (1993, p. 3) argue that stabilizing internal funds can improve real investment decisions when external finance is costly. Purnanandam (2008, p. 3) strengthens the relevance of distress considerations by linking hedging behavior to financial distress risk. These channels are likely to become even more important after deals, because the post-closing period often requires substantial investment in systems, restructuring and working capital at the same time that uncertainty rises and leverage may be higher. A hedging policy that reduces sensitivity to exchange rates, interest rates or input prices could therefore help preserve operating margins and limit unfavorable financing outcomes during a period when managerial attention and organizational capacity are already under pressure.

The clearest empirical bridge between these two literatures is provided by Chen et al. (2017, p. 1), who show that firms using derivatives in cross-border deals earn higher announcement returns, have higher deal completion probabilities and exhibit better

long-term post-deal performance. This finding is especially relevant for the present study because it suggests that hedging may matter not only for short-window market reactions, but also for realized performance after the deal has closed. In other words, Chen et al. (2017) provide direct evidence that risk management may improve deal outcomes in settings where exchange-rate exposure, financing risk and integration challenges occur simultaneously. Their results therefore motivate a closer examination of the specific mechanism through which this effect may operate. If derivatives usage improves deal performance, an important unanswered question is whether this occurs because hedging helps preserve the economic spread between return on invested capital and the cost of capital during the integration period.

Despite these theoretical and empirical foundations, there remains relatively limited research that directly links derivatives usage to changes in the ROIC–WACC spread after deals, particularly with high-frequency deal data. Many empirical M&A studies focus on announcement period returns which capture expectations rather than realized integration outcomes. Other studies examine operating performance over multi-year windows, which may obscure the timing of integration frictions and the period in which hedging is likely to matter most. In the hedging literature, many studies rely on broad samples of firms and analyse the determinants of derivatives use or changes in risk exposure, rather than focusing on the deal setting where exposure can change sharply at closing. Although Allayannis and Ofek (2001, p. 3) and Géczy et al. (1997, p. 2) show how derivatives relate to exposure, they do not place the post-deal integration period at the centre of the analysis as a distinct setting for value creation.

Studying the economic spread around deal closing offers a way to connect risk management choices to value creation through a measure that incorporates both operating and financing outcomes. If derivatives usage is associated with a higher or more resilient ROIC–WACC spread after closing, this would suggest that hedging contributes not only by smoothing cash-flow volatility but also by protecting the level of value creation during integration. Such a finding would also extend the implications of

Chen et al. (2017) by identifying a more specific channel through which hedging may improve deal outcomes. Conversely, if no association is found, the results would still contribute to the debate on whether corporate hedging primarily reallocates risk without materially affecting underlying value creation, at least in the deal setting.

This question is also relevant in practical terms. Boards and financial executives often approve deals on the basis of synergy plans that assume timely integration and reasonably stable financing conditions, yet integration takes place under uncertainty and adverse macroeconomic movements may coincide with a period of heightened internal disruption. A clearer understanding of whether derivatives use is associated with better preservation of the economic spread can therefore inform post-closing planning, including the design of hedging policies that are better aligned with the exposure profile of the combined firm. By focusing on realized post-deal performance, the present study seeks to contribute evidence that is both observable in practice and theoretically linked to the investment and financing mechanisms emphasized in the existing literature.

## 2 Literature review

Three areas of research are tied together in the review: M&A performance, derivatives usage and the ROIC–WACC spread also known as economic spread. Rather than only listing prior findings, the review evaluates how these studies define value creation and what each contributes to the equation. A recurring challenge across all three literatures is that the question of value creation is not methodologically consistent. Event-study returns capture market expectations at a single point in time while accounting-based measures may be slow to reflect changes in competitive position or capital efficiency. Andrade et al. (2001, p. 8) studies mergers over a 25-year period and find that the combined announcement period returns to acquirers and targets are positively aligned, yet the distribution of those returns and deal characteristics such as means of payment and industry relatedness, varies considerably. This variation matters because it implies that average figures can conceal a wide range of value-creating and value-destroying deals.

The theoretical connection between the hedging and investment literatures is established most directly by Froot et al. (1993, p. 1), who argue that hedging adds value primarily by ensuring that a firm retains sufficient internal funds to pursue attractive investment opportunities even when external financing becomes expensive. This framework makes derivatives use directly relevant to deals because post-deal integration frequently places simultaneous pressure on operating cash-flows and financing capacity. In that framework, hedging is not an individual treasury function but a strategic input to capital allocation and its relevance depends on the investment decisions it is aimed to protect. The three literatures therefore form a connected framework about capital efficiency rather than three isolated empirical streams.

Methodologically, the review also highlights that these three streams have been difficult to connect in past work because each relies on different performance measures at different time horizons. Event-study evidence captures market expectations over days

surrounding an announcement, accounting-based studies examine realized performance over multi-year post-deal windows and derivatives studies often rely on variation in hedging status to identify valuation effects. The ROIC–WACC framework provides a common metric that accommodates evidence from all three measurement traditions, since the spread can be evaluated at both short and long horizons and captures the interaction between operating returns and financing costs that neither announcement returns nor operating margins alone can fully represent.

## **2.1 M&A operating and value effects**

The M&A literature is most useful when the measurement problem is concrete and explicit because studies often examine different stages of the deal process even when they appear to address the same question. Healy et al. (1992, p. 4) analyse realized post-merger operating performance whereas Moeller et al. (2004, p. 1) focus on market reactions at the announcement stage, so the two papers should be read as addressing different dimensions of deal outcomes rather than as offering directly competing tests. That distinction is especially important here because a firm can simultaneously improve its post-deal operating performance and destroy value for its own shareholders if the deal premium exceeds the present value of the operating gains.

Healy et al. (1992, p. 2) offer one of the more constructive assessments in the merger literature, as they report significant improvements in asset productivity and industry-adjusted operating cash-flow returns after mergers. The methodology applied is important for the interpretation of their results. By benchmarking acquiring firms against industry peers rather than against their own pre-merger levels, the authors control for the possibility that economy-wide or sector-wide trends are driving the performance improvement. The interpretation is not limited to a short-term efficiency story because they also stress that the firms in their sample do not cut long-term investment, which strengthens the argument that the observed gains reflect genuine operating improvements rather than temporary underinvestment (Healy et al., 1992, p. 2). This

finding has remained influential in the literature because it establishes that, at least in a subsample of large deals, deals can generate real economic gains that survive industry-adjusted benchmarking.

Andrade et al. (2001, p. 8) extend the reach of that positive assessment by documenting from a period between 1973 and 1998, that combined bidder and target announcement returns are consistently positive across each decade they study. Their paper also identifies deregulation as a primary driver of mergers in the sample period which adds an important reason to what might otherwise appear to be a purely financial phenomenon. The operating performance evidence in Andrade et al. (2001) is consistent with Healy et al. (1992), showing improvements relative to industry peers though caution is necessary as the outcome distribution is wide and the average findings do not apply equally to all deal types. Their evidence on means of payment is particularly relevant: stock-financed deals are associated with weaker announcement returns and weaker long-run performance than cash-financed deals, which connects to the broader question of whether deal premiums can realistically be recovered through post-deal operations.

Moeller et al. (2004, p. 2) present a much more critical view of bidder outcomes at the announcement stage, showing in a sample of 12 023 deals that acquiring-firm shareholders lose 25,2 million dollars on average when the deals are announced. Their contribution is particularly important because the paper does not stop at the average effect but shows that announcement returns are about two percentage points higher for small acquirers, which makes bidder size central to any serious reading of deal performance (Moeller et al., 2004, p. 1). The size effect is analytically significant because it suggests that the market's skepticism about deal returns is concentrated among large, often publicly visible deals in which agency problems and managerial overconfidence may be more concrete.

Roll (1986, p. 1) provides a behavioural explanation for this pattern through the overconfidence hypothesis which argues that acquiring managers systematically overestimate the value they can extract from a target and therefore overbid even when the market price of the target already reflects its standalone value. Under this statement, positive announcement returns to targets and negative returns to bidders are both consistent with a single underlying mechanism: managers are paying a premium that transfers wealth from their own shareholders to target shareholders without creating net value. Roll's (1986) argument is important for this review because it provides a theoretical foundation for the Moeller et al. (2004) findings and because it suggests that the key variable distinguishing value-creating from value-destroying deals is not operating capability but price discipline. A bidder with strong post-deal integration skills that pays too much still destroys value, which is why the ROIC–WACC spread provides a stricter test than either announcement returns or post-deal operating margins considered separately.

The later merger-wave evidence deepens this critique by showing that bidder shareholders lost 12 cents for every dollar spent on deals from 1998 to 2001, with an estimated loss of \$240 billion over that period (Moeller et al., 2005, p. 3). This study is especially valuable for the subject's review because it redirects attention from the question of whether deals are beneficial on average to the more demanding question of which deals destroy the greatest amount of value. The concentration of losses in the late 1990's (Moeller et al., 2005, p. 3) technology and telecommunications boom also connects to Roll's (1986) overconfidence argument because periods of elevated market valuations provide both the currency for expensive stock-financed bids and the psychological conditions in which managerial overconfidence is likely to be most present.

Taken together, these merger studies do not cancel one another out but they do require a more careful interpretation of what constitutes success in deals. Andrade et al. (2001, p. 15) reinforce this point by showing that the positive combined returns in their sample mask a significant transfer from bidders to targets, which means that the aggregate

calculation depends on how one weighs the interests of each party. Damodaran (2007, p. 3) provides a clear connection between merger outcomes and value creation by arguing that returns only matter when they are assessed relative to the cost of capital. From that perspective, post-deal operating improvement is economically meaningful only if the combined firm's return on invested capital remains above the financing and risk burden implied by its cost of capital (Damodaran, 2007, p. 3). This distinction is particularly consequential in light of the Moeller et al. (2004) findings because a deal that shows operating improvement but was purchased at a large premium may generate a post-deal ROIC that perpetually trails the WACC, meaning that the firm is technically profitable while still destroying value.

Gokkaya et al. (2023, p. 1) add an important organizational dimension to this literature by showing that specialized M&A staff is among the economically important determinants of deal performance (Gokkaya et al., 2023, p. 2). Their findings suggest that deal making capability are different across firms and that the internal processes of deal origination, evaluated and executed are measurable predictors of outcome. Their study also adds a useful qualification because these staff advantages do not improve outcomes in firms with increased agency conflicts, which suggests that execution capabilities are valuable but not independent of governance quality (Gokkaya et al., 2023, p. 2). The governance interaction is important for this review because it implies that process improvements and risk management practices are complements rather than substitutes. Firms that hedge their exposures but lack disciplined capital allocation processes do not necessarily produce better outcomes than those that do neither.

A key strength of the merger literature is that it discourages conclusions based on single metrics about deal success. Moeller et al. (2004, p. 1) provide important information on this point because their evidence shows that bidders can destroy substantial shareholder value even when managers may later point to operating improvements, which is why a value-based interpretation cannot rest on accounting gains alone. Roll's (1986) hypothesis adds to this by showing that overpayment does not reflect ignorance or

incompetence on the part of acquirers but may instead be a predictable consequence of the systematic overconfidence that governs managerial valuations of deal targets. This combination of findings is precisely what the ROIC–WACC framework is designed to control. In overall, the literature on mergers and acquisitions supports a balanced conclusion since it contains evidence of post-deal operating gains alongside equally clear evidence of overpayment and weak capital allocation by bidders. For the present study that tension is useful because it points directly to the ROIC–WACC spread as a stricter criterion for distinguishing deals that only improve reported operations from those that create value after the cost of capital is considered (Damodaran, 2007, p. 3).

Long run evidence makes answering the performance question more difficult than the announcement period studies suggest. A study by Tuch and O’Sullivan (2007, p. 27) reports that short run wealth effects for bidders are often weak while long run share returns are mostly negative and accounting results remain mixed. This pattern weakens any simple claim that deals are either clearly successful or clearly unsuccessful. It also supports a broader reading in which results depend on horizon, benchmark choice and deal type. More focused long run studies point in the same direction. Raghavendra Rau and Vermaelen (1998, p. 3) show that merger bidders underperform their matched firms over three years after completion. This suggests that poor long run performance is not only a product of broad review methods, it also keeps overpayment and bidder quality at the center of the discussion.

Country-based evidence shows that outcomes also change across research settings and samples. Powell and Stark (2005, p. 14) find modest operating improvements after UK takeovers when performance is benchmarked carefully, which suggests that real gains exist but are usually not large. The research still point that claims regarding success in mergers need to be stated with caution. Other studies shift attention from average deal effects to the quality and characteristics of the acquirer. Alhenawi and Stilwell (2017, p. 2) argue that long run value creation depends partly on the acquiring firm's prior position

compared to the target, not only on the target's condition before the deal. This means that the same target may produce different outcomes under different owners.

Cross-border deal formation is shaped by country level financial and governance conditions. Erel et al. (2012, p. 2) show that mergers between countries become more likely when the acquirer's currency has strengthened and when its stock market has performed better. This indicates that valuation and macro conditions influence which firms are able to buy abroad. Financing conditions add another layer to this picture. Chen et al. (2020, p. 2) report that, in their Chinese sample, equity-financed deals perform better than debt-financed deals, however the effect differs between state-owned and privately owned firms. The finding suggests that funding structure can shape results after completion and supports a view of mergers in which balance sheet capacity matters alongside strategy and execution.

## **2.2 Derivatives, risk and firm value**

Smith and Stulz (1985, p. 2) remain the theoretical starting point for the derivatives literature because they explain hedging in terms of taxes, contracting costs and the effect of hedging on investment policy rather than as a general preference for lower volatility. This makes their article valuable for a review connected to corporate strategy since it frames derivatives as potentially relevant for value creation when frictions in the market interfere with financing or investment choices. The theoretical contribution is important because it provides a test for empirical work: if hedging should matter primarily when it prevents under investing or reduces expected financial distress costs, then studies that cannot locate those conditions in their sample are less likely to find a value effects.

Froot et al. (1993, p. 1) extend the Smith and Stulz (1985) framework to an important direction by developing a model in which hedging adds value when firms' investment opportunities are sensitive to internal cash-flows and when external financing is costly. Their key result is that a firm facing this combination should hedge the investment inputs

rather than simply minimising the variance of its earnings. This has a practical implication which is that the optimal hedge ratio does not depend on the volatility of revenues or profits themselves but on the covariance between cash-flow shocks and investment needs. Therefore, Froot et al. (1993, p. 11) suggest that the most value-relevant hedging occurs when the economic exposure to be managed, threatens a firm's ability to fund its planned capital expenditures. This type of situation can arise during the post-deal integration period when cash demand is higher and financial flexibility is reduced.

For the purpose of this review, the investment channel in Smith and Stulz (1985, p. 1) is more important than the general theory alone because it implies that hedging can influence whether firms continue funding valuable projects when external conditions weaken (Smith & Stulz, 1985, p. 1). This point is directly relevant to deals where post-deal integration can place pressure on cash-flows and financing capacity at the same time that managers must continue investing in the combined business. Froot et al. (1993, p. 11) make this mechanism more precise by showing that the value contribution of hedging is not the largest when risk is the highest in an absolute sense but when room for error is at its lowest. This creates a direct empirical prediction for acquirers which is that the value of derivatives use should be most evident in deals that place the greatest demands on internal funding capacity during integration.

Bartram et al. (2011, p. 6) provide the broadest cross-country empirical evidence in this area by showing that derivative usage reduces both total risk and systematic risk among non-financial firms from 47 countries. The geographic scope of their sample is methodologically important because it reduces the possibility that the results reflect institutional features specific to a certain country, such as particular tax treatments or disclosure requirements and it increases the usability of conclusions about derivatives and risk reduction.

The systematic-risk result in Bartram et al. (2011, p. 6) is particularly important for a ROIC–WACC framework because the cost of capital depends on the risk investors believe

they are bearing, not only on the volatility managers observe internally. A reduction in systematic and idiosyncratic risk lowers the equity risk premium that investors require and therefore reduces the WACC rather than just the variance of reported earnings. Damodaran's framework reinforces that point by showing that returns create value only after they are evaluated against the capital cost required by investors and lenders (Damodaran, 2007, p. 3).

Allayannis and Weston (2001, p. 1) offer a more direct valuation result by stating a positive relation between firm value and the use of foreign currency derivatives and by estimating a hedging premium of about 4,87 percent for firms with exchange rate exposure. Their study is particularly useful because it makes the value argument more convincing when the underlying exposure is economically visible rather than only assumed in the background. The premium they estimate is significant suggesting that for firms with genuine foreign currency risk, the decision to hedge is not neutral and may represent a material input to value Allayannis and Weston (2001, p. 2). Their conditioning on the presence of real economic exposure is also important methodologically because it implies that the relevant population for testing hedging's value effect is not all firms but those that face identifiable and economically significant risks. Allayannis and Ofek (2001, p. 1) strengthen the interpretation of those valuation results by showing that foreign currency derivatives significantly reduce the exchange-rate exposure faced by firms (Allayannis & Ofek, 2001, p. 1). This matters since it links derivatives use to an observable hedging effect and therefore provides a clearer mechanism through which value may be affected. Without evidence that derivatives actually change a firm's economic exposure, the Allayannis and Weston (2001) premium could reflect omitted firm characteristics rather than a genuine hedging benefit. The contribution of Allayannis and Ofek (2001) is therefore to close a potential gap in the causal chain, confirming that the instrument in question does what it is supposed to do before asking whether doing it, is associated with higher value. Allayannis et al. (2012, p. 1) add an important governance condition to the derivatives literature by arguing that well-governed firms are more likely to use derivatives for hedging and by finding that

derivatives usage is associated with a significant value premium when governance is stronger (Allayannis et al., 2012, p. 12). Their paper improves the debate by showing that the same instrument can have different implications across firms, which means the value of hedging does not depend only on exposure but also on whether investors believe managers are using derivatives in shareholders' interests (Allayannis et al., 2012, p. 1). This finding has a natural connection to the principal-agent considerations raised by Gokkaya et al. (2023) in the M&A context. In both the hedging literature and the deals literature, governance quality appears to be a precondition for specialized capabilities, whether in derivatives management or deal execution, to translate into better outcomes for shareholders.

Jin and Jorion provide (2006, p. 1) one of the clearest cautions in this literature by finding that hedging reduces stock-price sensitivity in the U.S. oil and gas sector, while also concluding that hedging does not appear to affect market values in the industry. Their study is important because it prevents an overly mechanical interpretation of earlier work and shows that reduction in exposure alone does not guarantee a valuation gain in every setting (Jin & Jorion, 2006, p. 1). The oil and gas context is particularly instructive because investors in that sector may prefer to hold commodity price exposure as part of a deliberate portfolio allocation strategy, in which case a firm that hedges away that exposure is not reducing a cost but removing an attribute that investors are actively seeking for. This possibility underlines the point from Smith and Stulz (1985) that hedging is most likely to be value-relevant when it prevents a specific underinvestment problem or reduces a genuine expected distress cost, rather than simply changing the risk profile of a firm whose investors can already diversify at low cost. The implication for deal research is that the identity of the exposure being managed, whether it is an exchange-rate risk on deal consideration, commodity costs affecting post-deal margins or interest rate risk on deal financing, matters as much as the hedging decision itself and empirical designs that fail to differentiate across exposure types may systematically hide the conditions under which derivatives usage contributes most reliably to value creation. Taken together, the derivatives literature is better read as a layered argument about

mechanics and context than as a single statement on whether hedging always raises value. Bartram et al. (2011, p. 1) strengthen the case for the risk consideration while leaving more room for debate on the size and consistency of valuation effects. The foreign currency studies add a further layer by showing that valuation effects are most convincing when the literature can identify a meaningful exposure to look at as well as a governance environment that supports disciplined derivatives use (Allayannis & Weston, 2001). Allayannis et al. (2012) make the governance point especially clearly and their contribution is useful because it explains why the same hedging policy may be rewarded in one firm yet discounted in another.

For a study organized around the ROIC–WACC spread, the main finding is not that derivatives always raise value but that they can matter through both sides of the spread under certain conditions. Froot et al. (1993) explain how hedging protects the returns by preserving firms' ability to invest in high-return projects even when cash flows are under pressure, while Bartram et al. (2011) systematic risk evidence explains how hedging may also lower the cost of capital. Jin and Jorion (2006) show why that conclusion must remain qualified since a reduction in economically relevant exposure is not by itself, enough to produce a valuation gain.

International evidence suggests that derivatives use does not follow one simple pattern across firms. A large cross country study shows that standard firm characteristics do not clearly explain when firms should use derivatives and that derivative use is tied to other financing and operating choices within the firm (Bartram et al., 2009, p. 2). This weakens any attempt to treat all derivatives programs as the same policy choice and helps to explain why the literature in general provides mixed results. However, evidence on interest rate swaps adds an important to the discussion. Chernenko and Faulkender (2011, p. 2) present that persistent usage is more consistent with hedging, while more temporary use is related to speculation. This means that simple comparisons between users and non-users can hide important differences in behavior. Valuation evidence is also conditional to consistency as Lee (2019, p. 2) finds that greater derivatives intensity

is associated with higher market to book values in an Asian sample and links that pattern to lower earnings volatility, more capital spending and lower debt costs. In the contrary, Ayadi et al. (2024, p. 4) report that derivatives usage is associated with lower Tobin's Q in a sample of developed countries. The result does not cancel the earlier positive findings since the studies differ in sample period, countries and measurement but it does show that value effects should be treated on a case by case basis.

A study by Jankensgård and Moursli (2020) clarifies the channels through which hedging may affect value after the hedge is in place. Derivative cash flows can directly support capital spending, especially when outside financing becomes more expensive (Jankensgård & Moursli, 2020, p. 1), showing that hedging can matter through the firm's capacity to keep investing under pressure. Research on cash policy, points in a similar direction as Sun et al. (2022, p. 2) show that firms with hedging programs hold less cash but obtain a higher value from each dollar on their balance sheet. This suggests that hedging affects internal liquidity but also how effectively the liquidity is used, confirming positive effects derivatives usage may have.

### **2.3 Derivatives and M&A**

Chen et al. (2017, p. 1) provide the most direct link between the M&A and hedging literatures by studying 1 369 cross-border deals and finding that hedging firms earn higher announcement returns, have higher deal completion probabilities and exhibit better long-term post-deal performance. Their study is especially important for this literature review because it moves the discussion from general hedging theory to a setting in which financing risk, exchange-rate exposure and integration pressure are present at the same time. The combination of better announcement returns and better long-run performance is particularly significant because it suggests that the market's positive reaction to hedging acquirers at announcement is validated by the realized post-deal outcomes rather than corrected away over time, which could be the result if the initial reaction simply reflected investor optimism.

The cross-border focus in Chen et al. (2017, p. 3) is systematically important rather than only a sampling choice because it places foreign exchange exposure in a context where the economic significance of hedging is easier to observe than in purely domestic deals. This feature also makes the study easier to connect to Allayannis and Ofek (2001), whose evidence that foreign currency derivatives significantly reduce exchange-rate exposure, provides a credible mechanism behind the positive deal outcomes that Chen et al. (2017, p. 3) report. In cross-border deals, the acquirer faces exchange-rate risk not only on the deal consideration itself but also on the future earnings of the acquired entity, on the servicing costs of any foreign currency debt raised to fund the deal and on the cash-flows that must flow between parent and subsidiary during the integration period. Each of these channels gives derivatives a potentially important role that would not exist in a purely domestic deal.

The theoretical framework connecting Smith and Stulz (1985) to Chen et al. (2017) is reinforced by Froot et al. (1993), whose investment-based rationale for hedging is directly applicable to the post-deal period. If integration requires sustained capital expenditure at a time when the acquirer's cash flows are temporarily weakened by deal costs and restructuring charges, the presence of a hedging programme that smoothens internal cash-flows may make the difference between completing the integration strategy as planned and being forced to postpone or abandon investment projects that would otherwise have positive net present value. Bartram et al. (2011) provide empirical support for a lower risk setting which makes the positive deal evidence easier to interpret as a financing and execution effect rather than as a random association. Taken together, these theoretical and empirical contributions suggest that hedging's contribution to cross-border M&A outcomes is unlikely to arise from any single channel but instead, more likely to be the product of several reinforcing factors.

The research of Chen et al. (2017) is also valuable when read against the traditional merger-performance literature because their long-term post-deal results suggest that

hedging may help preserve realized operating outcomes during the integration period after a cross-border deal closes. This possibility matters in light of Healy et al. (1992), whose earlier evidence of improved asset productivity and operating cash-flow returns raises the prospect that risk control can support the operating gains that later appear in post-deal figures. The Healy et al. (1992, p. 2) finding that merging firms do not cut long-term investment is particularly relevant here because Froot et al. (1993, p. 1) model implies that one of the ways hedging should be present in observable data is through the maintenance of investment levels in the face of cash-flow pressure. If hedging firms in cross-border deals are better able to sustain post-deal capital expenditure during the integration period, the eventual operating performance gains documented by Healy et al. (1992, p. 2) in their general sample should be even more noticeable in that cross-border subsample.

Governance remains an important condition in the M&A setting, because Allayannis et al. (2012, p. 1) show that derivative usage is more likely to be associated with a value premium when governance is stronger. Gokkaya et al. (2023, p. 2) make a parallel argument on the merger side by showing that specialized M&A capabilities do not improve deal performance in firms with increased agency conflicts, which then indicates that neither derivatives nor deal experience substitutes for managerial discipline. Taken together, these findings suggest that observed links between hedging and deal performance are likely to be conditional on governance quality since weakly governed firms may simultaneously underuse derivatives and undertake poorly disciplined deals.

This governance point becomes even more important once the announcement-return evidence is brought into the discussion because Moeller et al. (2004, p. 2) show that acquirer shareholders lose money on average and that some of the value destruction comes from especially costly deals. In that setting, the likely role of hedging is not to rescue a weak deal but to support execution when the underlying capital-allocation decision is already disciplined, which is consistent with the governance-dependent value premium reported by Allayannis et al. (2012, p. 1).

The literature also cautions against overstating the role of derivatives in deals because Chen et al. (2017, p. 1) provide positive evidence in cross-border M&A but do not establish that hedging improves outcomes for every type of acquirer in every context. This caution also affects the interpretation of performance measures because Chen et al. (2017, p. 1) indicate that part of hedging's contribution may appear through deal completion and long-term post-deal performance rather than only through short-window announcement returns. From a ROIC–WACC perspective, the importance of the Chen et al. (2017, p. 1) evidence is that it suggests a route through which derivatives may influence both realized returns and the hurdle rate at the same time. Damodaran's (Damodaran, 2007, p. 3) framework gives that interpretation analytical discipline by asking whether post-deal returns on capital remain above the cost of capital after the deal has been completed and integrated.

## **2.4 Summary**

The literature reviewed indicates that value creation in deals is a multidimensional phenomenon that cannot be completely assessed through any single performance measure. Research on M&A shows that deals may generate meaningful operating improvements, including higher asset productivity and stronger post-deal cash-flow performance, yet these gains do not necessarily imply value creation for acquiring shareholders. A consistent finding across the M&A literature is that overpayment, weak bidder discipline and agency-related problems may offset operating benefits. At the same time the derivatives literature suggests that hedging may contribute to firm value when it reduces financing frictions, lowers exposure to economically significant risks and preserves a firm's ability to continue investing under conditions of cash-flow pressure or costly external finance. However, this literature also demonstrates that the value effects are conditional on each situation, and depend on the nature of the exposure, the consistency of derivatives usage and the quality of corporate governance.

The studies that link derivatives directly to deals, especially in cross-border settings, provide the clearest integration of these two research streams by showing that hedging can support announcement period valuation, deal completion and long-run post-deal performance when firms face exchange-rate, financing and integration risks simultaneously. Taken together, these sectors of the literature support the approach that deal success should not be only evaluated in terms of observed operating gains and market reactions but in terms of whether post-deal returns are sufficient to exceed the required cost of capital. On this basis, the ROIC–WACC spread provides the most appropriate analytical framework for the present study, as it captures both the return generated by the combined firm and the financing burden that ultimately determines whether a deal creates or destroys value.

### **3 Data, methodology and empirical design**

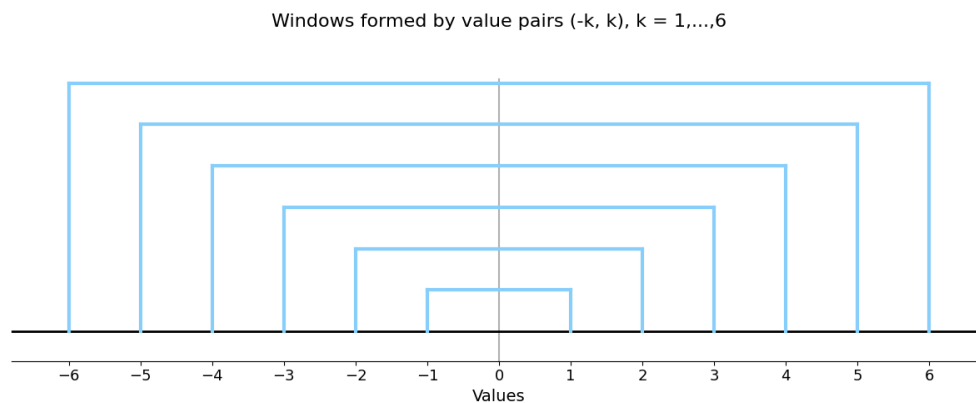
The empirical setting consists of non-financial firms listed on Nasdaq Helsinki that completed at least one qualifying merger or deal (M&A) deal between the first quarter (Q1) of 2010 and the second quarter (Q2) of 2025. The analysis is conducted at the firm-quarter level and integrates deal data, quarterly accounting data, market data and derivatives disclosures obtained from annual financial statements.

The empirical methodology consists of four core components. First, qualifying deals are identified from public releases, financial statements and other disclosures. Second, quarterly measures of return on invested capital (ROIC) and weighted average cost of capital (WACC) are constructed for each acquirer. Third, firm-level control variables are compiled from accounting and market data. Fourth, derivatives usage is classified based on audited financial statement disclosures, consistent with prior literature that relies on reported hedging activity (Bartram et al., 2011).

#### **3.1 Sample definition and event timing**

The baseline sample includes all non-financial Nasdaq Helsinki firms that completed at least one qualifying deal during the sample period. Deals are included if four criteria are satisfied: (i) the acquirer is listed on Nasdaq Helsinki at the time of deal closing, (ii) the deal is completed rather than merely announced, (iii) the acquired ownership stake is at least 50 percent and (iv) the disclosed enterprise value of the deal is at least EUR 5 million for the deals with disclosed enterprise value. Deals with non-disclosed enterprise value have been included as well as they are deemed significant enough for the purpose of the research. Deals with a disclosed enterprise value of less than EUR 5 million have been excluded.

Event time is defined at the deal level. For each qualifying deal, quarter 0 corresponds to the closing quarter, and symmetric event windows from -6 to +6 quarters are constructed, as presented in Figure 1. The pre-deal window is used to set the baseline, while the post-deal window captures both the immediate integration phase and subsequent medium-term performance adjustments.



**Figure 1.** Event-windows  $(-k, k)$ ,  $k = 1, \dots, 6$ ; used in the pre and post-deal comparison.

When firms complete multiple qualifying deals, each one is treated as a separate event in the baseline and firm-quarter observations are indexed relative to each closing quarter. This event-time structure allows the analysis to exploit all available deals while maintaining a consistent temporal framework. Because a given firm may appear in multiple observations and outcomes are likely to be persistent over time, inference accounts for within-firm dependence. Deal data is collected from annual reports, public announcements and Bloomberg Terminal, case by case. Financial statement data is obtained from public financial statements and Orbis database. Stock price data is collected from Nasdaq, Google Finance and Investing.com. The risk-free rate is sourced from Investing.com confirmed by the time series data of Bank of Finland. Derivatives usage is identified from firms' annual financial statements.

The dataset is assembled through a multi-step process. First, deal records are cleaned and mapped to firm identifiers and closing quarters. Second, a firm-quarter panel is constructed for all acquirers. Third, quarterly accounting and market data are merged to

compute ROIC, WACC and control variables. Fourth, deals are aggregated at the firm-quarter level to measure deal intensity. Fifth, derivatives usage information is merged based on annual report disclosures in a manner that derivatives usage taken place in any year of sample period counts the firm as a derivatives user. This is executed through selected search words and the mechanics have been presented in Appendix 7. Data validation procedures include checks for duplicate deals, inconsistencies in ownership stakes and missing or inconsistent closing dates. Firm-quarters lacking sufficient information to compute ROIC or WACC are excluded from outcome construction and no imputation is applied to the dependent variable.

### **3.2 Research methods**

The central performance metric, ROIC–WACC spread, is defined as the difference between return on invested capital and the weighted average cost of capital. This measure captures whether operating returns exceed the firm’s cost of capital and thus reflects realized value creation during the post-deal integration period. The research focuses on post-deal operating and financing outcomes rather than stock returns within the announcement period. This choice aligns with the objective to evaluate performance after deal completion and assess whether derivatives usage contributes to operating performance and financing conditions during a deal’s integration period. As quarter-level events are defined whenever at least one qualifying deal occurs, for each event the dependent variable is constructed as the change in the ROIC–WACC spread from a pre-deal window to a post-deal window, excluding the deal quarter itself. The empirical design includes both deal and no-deal quarters allowing direct comparison between the periods within a unified framework.

Deal activity is captured using four alternative treatment definitions: (i) an indicator for occurrence of any deal, (ii) a linear count of deals, (iii) an indicator for multiple deals and (iv) a logarithmic transformation of deal intensity. These alternative specifications allow the analysis to capture both extensive and intensive margins of deal activity. The

empirical models are estimated using ordinary least squares (OLS), standard errors are clustered at the firm level to account for repeated observations and potential dependence arising from overlapping deal windows. This approach follows guidance in corporate finance panels and event-style settings (Cameron & Miller, 2015) and it is complemented by sensitivity checks that are motivated by concerns regarding serial correlation in within-unit comparisons (Bertrand et al., 2004).

### 3.3 Construction of variables and analytical procedures

This section describes the construction of the key variables used in the empirical analysis and outlines the analytical procedures applied to the data. It defines the dependent, explanatory and control variables, as well as the methods used to measure operating performance and deal activity. In addition, the section presents the empirical model specifications used to examine the relationship between deals, derivatives usage and post-deal performance.

Definitions of key components of variables:

- $ROIC_{i,t}$  (quarterly):  $NOPAT_{i,t} / \text{Invested Capital}_{i,t}$ 
  - NOPAT is  $EBIT \times (1 - \text{effective tax rate})$  and invested capital includes total equity and interest-bearing debt
- $WACC_{i,t}: w_e r_e + w_d r_d (1 - T)$ 
  - Cost of equity via CAPM:  $r_e = r_f + \beta \times ERP$ 
    - $r_f$ : quarter average of 10-year Finnish government obligation rate
    - ERP: equity risk premium determined based on the 30-year total return of Helsinki Stock Exchange (OMXHGI)
    - $\beta$ : quarterly beta of each company in question
  - Cost of debt:  $r_d = \text{annualized quarterly interest expense} / \text{interest-bearing debt}$

- Weights:  $w_e$  = market value of equity / (market value of equity + book value of debt);  $w_d$  = book value of debt / (market value of equity + book value of debt)
- Controls: Book size, growth, tangibility, enterprise value, profitability, leverage and derivatives usage
- Derivatives user indicator: 1 if a firm states to use derivatives in its annual financial statement; 0 otherwise

In determining cost of equity, firm-quarters are excluded if the firm does not have a complete four-quarter return history for beta estimation or if the estimated beta is negative. Cost of equity observations are also excluded if they are below the relevant quarterly risk-free rate plus two percentage points. For WACC, cost of debt observations below 1% or above 50% are excluded. WACC observations below the corresponding quarterly risk-free rate are also excluded. All firm-quarters with missing inputs are excluded as well and for ROIC, observations below -50% or above 50% are excluded. The final ROIC-minus-WACC sample therefore includes only firm-quarters with both valid ROIC and valid WACC observations after these filters.

### **3.3.1 Dependent variable and measurement of operating performance**

The dependent variable is meant to capture changes in operating performance around deal events. Operating performance is measured using the ROIC–WACC spread, which reflects the difference between a firm’s return on invested capital and its cost of capital. This measure directly captures whether a firm generates returns above its cost of capital and therefore provides a meaningful indicator of economic value creation. It is particularly suitable in M&A analysis because it focuses on realized post-deal performance instead of market expectations and allows to assess whether deals lead to sustainable improvements on operational efficiency and capital allocation. The variable is as follows:

$$Spread_{i,q} = ROIC_{i,q} - WACC_{i,q}$$

To evaluate performance changes associated with deal events, symmetric pre- and post-deal windows are formed around each deal quarter, excluding the deal quarter itself. The dependent variable is defined as the change from the pre-deal window to the post-deal window:

$$\Delta Spread_{i,q} = Spread_{i,q}^{post} - Spread_{i,q}^{pre}$$

Because the baseline performance of firms may differ significantly, the change in the spread is scaled to improve comparability across firms:

$$Y_{i,q} = \frac{Spread_{i,q}^{post} - Spread_{i,q}^{pre}}{|Spread_{i,q}^{pre}| + c}$$

where  $c$  is a small constant (0,000001) included to avoid division by zero and to stabilize the measure when pre-deal performance is close to zero. Only observations with complete data for all quarters in both the pre- and post-deal windows are retained, ensuring consistency in the measurement of performance changes across firms.

Return on invested capital (ROIC) is calculated quarterly as:

$$ROIC = \frac{NOPAT}{Invested\ Capital}$$

where net operating profit after taxes (NOPAT) is defined as:

$$NOPAT = EBIT \times (1 - \text{effective tax rate})$$

Invested capital consists of total equity and interest-bearing debt. This definition aligns operating profitability with the capital tied in the business and ensures consistency across firms. To enhance comparability differences in publishing accounting figures are harmonized by transforming all financial data to calendar quarters.

The weighted average cost of capital (WACC) is computed as:

$$WACC = \frac{E}{E + D} R_e + \frac{D}{E + D} R_d (1 - T)$$

### 3.3.2 Explanatory and control variables

Deal activity is measured using four alternative specifications based on the number of deals completed within a firm-quarter. These alternative definitions allow the analysis to capture both the occurrence and the intensity of deal activity, as well as potential nonlinear effects. Specifically, deal activity is defined using: an any-deal indicator  $1(N_{i,q} \geq 1)$ , which captures whether at least one deal occurs; a linear deal count  $N_{i,q}$ , which reflects the total number of deals; a multi-deal indicator  $1\{N_{i,q_s} \geq 2 \vee (q_e > q_s \wedge N_{i,q_s} > 0 \forall q \in [q_e, q_s])\}$ , which isolates periods of more intensive deal activity and a log-transformed measure  $\log(1 + N_{i,q})$ , which allows for diminishing marginal effects of additional deals. These alternative specifications provide a flexible framework for evaluating how both the presence and scale of deal activity relates to performance outcomes. Derivatives usage is captured by a firm-level dummy variable equal to one if the firm reports derivatives usage in any of its M&A years, and zero otherwise. This definition reflects derivatives usage as a characteristic of certain approach and firm processes rather than a deal-specific decision and it thereby captures broader risk management practices that may influence both behavior around deals and performance after them.

In addition to the main explanatory variables, the research controls for a set of firm-level characteristics that may influence both deal activity and operating performance. These control variables include firm size, leverage, growth, tangibility, enterprise value and profitability, all measured at the quarterly level. Including these controls supports in mitigation of variable bias by accounting for differences in firm scale, financial structure, growth opportunities, asset composition and performance.

The control variables are defined as following:

$$\ln(\text{Assets})_{i,q_0} = \ln(\text{Total Assets}_{i,q_0}),$$

$$\text{Growth}_{i,q_0} = \frac{\text{Revenue}_{i,q_0}}{\text{Revenue}_{i,q_0-4}} - 1,$$

$$\text{Tangibility}_{i,q_0} = \frac{\text{PPE}_{i,q_0}}{\text{Total Assets}_{i,q_0}},$$

$$\ln(\text{TEV})_{i,q_0} = \ln(\text{Total Enterprise Value}_{i,q_0}),$$

$$\text{Profitability}_{i,q_0} = \frac{\text{EBIT}_{i,q_0}}{\text{Revenue}_{i,q_0}},$$

$$\text{Leverage}_{i,q_0} = \frac{\text{Interest-bearing Debt}_{i,q_0}}{\text{Total Assets}_{i,q_0}}.$$

In the baseline implementation, controls are measured at the deal quarter which provides a consistent picture of firm characteristics at the time around which the deal window is built on. Because the baseline regressions include both deal quarters and no-deal quarters, a relative deal-size measure that would consider the deal's size to the acquirer's size, is not included in the specifications.

### 3.3.3 Empirical model specification

The baseline estimating equation is

$$y_{i,q_0} = \alpha + \beta T_{i,q_0} + \gamma^\top X_{i,q_0} + u_{i,q_0},$$

where  $T_{i,q_0}$  is a quarter-level measure of deal activity and  $X_{i,q_0}$  is the control vector. To test whether derivatives usage changes the deal effect itself, the extended specification is:

$$y_{i,q_0} = \alpha + \beta T_{i,q_0} + \delta D_{i,q_0} + \phi(T_{i,q_0} \times D_{i,q_0}) + \gamma^\top X_{i,q_0} + u_{i,q_0},$$

where  $D_{i,q_0}$  is the derivatives usage dummy. Coefficient  $\delta$  captures baseline differences in the post-minus-pre spread change between derivatives users and non-users when  $T_{i,q_0} = 0$ , while the coefficient  $\phi$  captures whether the association between deal activity and performance differs between derivatives users and non-users. For non-users, the marginal association of deal activity is  $\beta$ ; for users, it is  $\beta + \phi$ . The exact formats of the alternative specifications as part of the regressions are:

SPEC0 (any-deal indicator):

$$T_{i,q_0} \equiv \text{any\_deal}_{i,q_0} = 1\{N_{i,q_0} \geq 1\},$$

SPEC1 (linear deal count):

$$T_{i,q_0} \equiv \text{deals\_n}_{i,q_0} = N_{i,q_0},$$

SPEC2 (multi-deal indicator):

$$T_{i,q_0} \equiv \text{multi\_spree}_{i,q_0} = 1\{N_{i,q_s} \geq 2 \vee (q_e > q_s \wedge N_{i,q} > 0 \forall q \in [q_s, q_e])\},$$

SPEC3 (log-transformed intensity):

$$T_{i,q_0} \equiv \text{log1p\_deals\_n}_{i,q_0} = \log(1 + N_{i,q_0}).$$

Here  $N_{i,q_0}$  denotes the number of marked deals in firm  $i$  during quarter  $q_0$ . In SPEC2, for firm  $i$ , event starts in quarter  $q_s$  and ends in quarter  $q_e$ . Because the sample includes no-deal quarters as well as deal quarters, SPEC0 provides a direct comparison between deal and no-deal quarters, while SPEC1–SPEC3 capture variations of deal intensity relative to the no-deal baseline. The final regression sample consists of all firm-quarters that satisfy the balanced-window requirement for the dependent variable and for which the variables required in the relevant specification are observed. Observations are not dropped from the full dataset unless they are missing variables needed for the specification in question. As a result, sample size may vary across specifications depending on the specification, the control variables included and the window length. The approach preserves as much information as possible but also ensures that each reported regression is estimated on a sample with complete data.

### 3.4 Reliability, validity and identification

The identification strategy relies on conditional mean independence, which requires that unobserved shocks to performance are unrelated to deal activity, derivatives usage and the included controls:

$$E[u_{i,q_0} \mid T_{i,q_0}, D_{i,q_0}, T_{i,q_0} \times D_{i,q_0}, X_{i,q_0}] = 0.$$

Under this assumption, the estimated coefficients capture conditional associations between deal intensity, derivatives utilization and changes in the ROIC–WACC spread. Interpreting the results together is more informative because similar patterns across the alternative specifications strengthen confidence that the findings are not driven by one particular coding choice. The same implementation logic is applied across the alternative design choices considered in the study including different deal-window lengths, alternative within-window aggregation rules and winsorization thresholds. The role of these variations is to test whether the key findings remain stable when empirical choices are changed without changing the underlying research question.

The validity of the deal-window design depends on several assumptions and potential limitations:

- **Baseline validity:** the pre-deal window must provide a meaningful opposite for post-deal performance. This may be weakened by anticipation effects, early integration actions, financing arrangements or market expectations that influence performance before the recorded deal quarter.
- **Timing measurement error:** if the designated deal quarter does not align with the true onset of performance effects, the timing error reduces precision.
- **Overlapping event windows:** firms engaging in multiple deals in close to each other generate dependent observations. This limits strict single-event interpretation and motivates the use of firm-clustered standard errors.
- **Balanced-window sample selection:** requiring complete pre-post-window improves comparability but may introduce selection bias between firms that report twice a year and firms that report four times a year.
- **Potential overcontrol:** control variables measured in the event quarter may themselves respond to deal activity, creating the possibility of overcontrol bias.
- **Data reliability and measurement validity:** the research relies on audited financial statement figures that are made comparable in calendar quarters.

### **3.5 Empirical design features**

Based on the variable definitions and model specifications, a key commentary regarding the four deal specifications is that they are treated as complementary rather than competing. As noted in Section 3.4, the core identifying assumption is conditional mean independence given the included controls. Under this assumption, the estimated coefficients summarize associations between deal activity, derivatives usage and the event-window change in the ROIC–WACC spread. However, because the analysis does not rely on a quasi-experimental research design, the coefficients should not be interpreted as causal treatment effects. The validity of the deal-window comparison

depends on the pre-deal window providing a meaningful baseline for the post-deal outcome. This condition may be weakened if firms adjust financing, integration planning or operating policies already before the recorded closing quarter. In addition, any mismatch between the recorded deal quarter and the true onset of performance effects can shift part of the response into the wrong side of the deal window. These timing issues do not invalidate the design but they do affect how precisely the coefficients can be interpreted. Taken together, the empirical design still makes it possible to assess whether deal activity is systematically associated with changes in operating value creation and whether this association differs between derivatives users and non-users. The resulting evidence is informative for the study period and sample considered but its scope remains associational and context-specific. The findings therefore support cautious inference about patterns in post-deal performance rather than broad causal claims regarding the effectiveness of M&A and derivatives usage.

## 4 Results

Results are reported as regression coefficients that indicate the effect of M&A deals and different factors to ROIC–WACC spread by comparing equal quarter windows before and after deals, excluding the deal quarter itself. This section focuses on preferred interaction specifications using the deal year derivatives classification, baseline deal-mark definition “xx\_nv\_only” which includes deals with a reported target enterprise value of at least €5 million, “xx” and deals with non-disclosed enterprise value, “nv”, as well as winsorization at 2,5 percent level. Alternative deal-mark definitions, winsorization thresholds and the overall derivatives classification are reported as robustness checks in the Appendices.

**Table 1.** Descriptive statistics of the data sample, mean and median.

|   | Derivatives                         |                                   | Derivatives x M&A                     |                                   |
|---|-------------------------------------|-----------------------------------|---------------------------------------|-----------------------------------|
| <i>*thousand euros</i>                              | 1                                   | 0                                 | 1                                     | 0                                 |
| <b>Revenue*</b>                                     | <b>455 821,37;<br/>145 200,00</b>   | <b>156 947,17;<br/>27 677,00</b>  | <b>628 939,12;<br/>324 500,00</b>     | <b>132 993,58;<br/>31 586,00</b>  |
| <i>N before filtering - Revenue</i>                 | 3 316                               | 3 534                             | 2 408                                 | 4 442                             |
| <i>N after filtering - Revenue</i>                  | 3 150                               | 3 357                             | 2 286                                 | 4 218                             |
| <b>EBIT-%</b>                                       | <b>6,14; 5,54</b>                   | <b>1,71; 4,75</b>                 | <b>7,02; 6,26</b>                     | <b>2,44; 4,38</b>                 |
| <i>N before filtering - EBIT-%</i>                  | 3 267                               | 3 487                             | 2 370                                 | 4 384                             |
| <i>N after filtering - EBIT-%</i>                   | 3 104                               | 3 312                             | 2 250                                 | 4 165                             |
| <b>ROIC</b>   | <b>9,28; 8,30</b>                   | <b>6,52; 6,65</b>                 | <b>9,20; 8,40</b>                     | <b>7,18; 6,97</b>                 |
| <i>N before filtering - ROIC</i>                    | 1 947                               | 1 519                             | 1 511                                 | 1 955                             |
| <i>N after filtering - ROIC</i>                     | 1 849                               | 1 443                             | 1 435                                 | 1 857                             |
| <b>WACC</b>   | <b>6,67; 6,37</b>                   | <b>6,69; 6,30</b>                 | <b>6,96; 6,66</b>                     | <b>6,45; 6,04</b>                 |
| <i>N before filtering - WACC</i>                    | 1 947                               | 1 519                             | 1 511                                 | 1 955                             |
| <i>N after filtering - WACC</i>                     | 1 849                               | 1 443                             | 1 435                                 | 1 857                             |
| <b>Interest-recurring debt*</b>                     | <b>274 036,27;<br/>39 013,00</b>    | <b>83 804,72;<br/>1 772,50</b>    | <b>385 685,10;<br/>60 400,00</b>      | <b>73 375,83;<br/>2 743,00</b>    |
| <i>N before filtering - Interest-recurring debt</i> | 4 402                               | 5 270                             | 3 286                                 | 6 386                             |
| <i>N after filtering - Interest-recurring debt</i>  | 4 291                               | 5 138                             | 3 203                                 | 6 226                             |
| <b>Total assets*</b>                                | <b>2 121 964,66;<br/>511 276,50</b> | <b>763 939,10;<br/>122 400,00</b> | <b>3 055 532,90;<br/>1 244 150,00</b> | <b>603 726,73;<br/>142 901,00</b> |
| <i>N before filtering - Total assets</i>            | 3 232                               | 3 427                             | 2 340                                 | 4 319                             |
| <i>N after filtering - Total assets</i>             | 3 070                               | 3 255                             | 2 222                                 | 4 103                             |

Note: [mean; median], Derivatives: 1 = uses derivatives, 0 = does not use derivatives, Derivatives x M&A: 1 = uses derivatives and has done at least two deals in 2010-2025, 0 = the opposite of 1. N = numbers of observations. “Filtering” refers to exclusions explained in Section 3.3. Mean and median values have been derived from the sample described as “N after filtering”.

#### 4.1 Effects of M&A and derivatives usage to ROIC-WACC-spread

Table 1 reports the coefficient estimates for regression specifications 0 and 1 (SPEC0-1) across six symmetric pre and post-deal windows. A positive coefficient indicates an increase in the ROIC–WACC spread after the deal relative to before, whereas a negative coefficient indicates a deterioration in that spread. Across both specifications, the estimated association between deal activity and the change in the ROIC–WACC spread is generally positive, but only weakly supported by statistical significance. In SPEC0, where deal activity is measured with the “any\_deal” indicator, the coefficient is positive in all six windows, but reaches only weak significance in window 4. A similar pattern is observed in SPEC1, where deal activity is measured by the number of deals (“deals\_n”): the coefficient remains positive throughout, but is only weakly significant in window 4. Together, these results suggest that deal activity is associated with an improvement in the post-minus-pre ROIC–WACC spread, although the evidence is limited and not consistently statistically significant across the alternative window definitions.

The interaction terms between deal activity and derivatives usage are negative in all windows in both specifications, however none of the estimates are statistically significant. Given the model setup, this implies that while the estimated deal effect is somewhat smaller for derivatives users than for non-users, there is no robust evidence that derivatives usage materially alters the relationship between deal activity and changes in the ROIC–WACC spread. Similarly, the main effect of derivatives usage is positive in most windows but only weakly significant around the middle specification window, indicating at most limited evidence that derivatives users experience a more favorable spread development than non-users.

Among the control variables, the most stable results are obtained for the size-related measures. “ln\_assets” is negative and statistically significant in every window in both specifications, while ln\_tev is positive and statistically significant throughout. This suggests that, holding other factors constant, firms with larger asset bases tend to exhibit smaller improvements in the ROIC–WACC spread, whereas firms with higher

enterprise values are associated with larger improvements in the spread. By contrast, growth is positive across all windows but only weakly significant in window 4, while leverage and tangibility remain statistically insignificant throughout. Profitability is positive and significant only in window 2, which points to an isolated rather than systematic effect.

**Table 2.** Regression variable coefficients for SPEC0 and SPEC1 with respective t-values in all measured windows (1-6).

| Coefficients            | SPEC0              |                    |                     |                    |                    |                   | SPEC1              |                    |                     |                    |                    |                   |
|-------------------------|--------------------|--------------------|---------------------|--------------------|--------------------|-------------------|--------------------|--------------------|---------------------|--------------------|--------------------|-------------------|
|                         | w1                 | w2                 | w3                  | w4                 | w5                 | w6                | w1                 | w2                 | w3                  | w4                 | w5                 | w6                |
| any_deal                | 0,08***<br>(2,85)  | 0,11***<br>(3,35)  | 0,09*<br>(1,87)     | 0,07<br>(1,34)     | 0,08<br>(1,15)     | 0,08<br>(1,25)    |                    |                    |                     |                    |                    |                   |
| any_deal_x_<br>deriv    | -0,07**<br>(-2,44) | -0,09**<br>(-2,43) | -0,06<br>(-1,11)    | -0,05<br>(-0,90)   | -0,07<br>(-1,05)   | -0,08<br>(-1,19)  |                    |                    |                     |                    |                    |                   |
| deals_n                 |                    |                    |                     |                    |                    |                   | 0,06**<br>(2,37)   | 0,07**<br>(2,43)   | 0,07<br>(1,48)      | 0,05<br>(0,77)     | 0,04<br>(0,66)     | 0,08<br>(1,24)    |
| deals_n_x_<br>deriv     |                    |                    |                     |                    |                    |                   | -0,05**<br>(-2,06) | -0,05*<br>(-1,79)  | -0,05<br>(-0,94)    | -0,04<br>(-0,64)   | -0,05<br>(-0,71)   | -0,09<br>(-1,36)  |
| deriv_overall           | 0,01<br>(1,01)     | 0,01<br>(0,80)     | 0,01<br>(0,64)      | 0,00<br>(0,11)     | 0,01<br>(0,30)     | 0,01<br>(0,24)    | 0,01<br>(0,94)     | 0,01<br>(0,75)     | 0,01<br>(0,67)      | 0,00<br>(0,15)     | 0,01<br>(0,30)     | 0,01<br>(0,28)    |
| growth                  | 0,03**<br>(1,97)   | 0,04**<br>(1,99)   | 0,07**<br>(2,00)    | 0,22***<br>(4,98)  | 0,22***<br>(4,77)  | 0,23***<br>(3,74) | 0,03**<br>(1,97)   | 0,04**<br>(1,98)   | 0,07**<br>(1,99)    | 0,23***<br>(4,98)  | 0,22***<br>(4,77)  | 0,23***<br>(3,75) |
| leverage                | 0,10***<br>(3,14)  | 0,06<br>(1,41)     | 0,04<br>(0,65)      | 0,03<br>(0,37)     | 0,05<br>(0,81)     | -0,02<br>(-0,25)  | 0,10***<br>(3,17)  | 0,06<br>(1,37)     | 0,04<br>(0,62)      | 0,02<br>(0,34)     | 0,05<br>(0,77)     | -0,02<br>(-0,28)  |
| ln_assets               | -0,01*<br>(-1,69)  | -0,02**<br>(-2,40) | -0,03***<br>(-2,80) | -0,03**<br>(-2,56) | -0,04**<br>(-2,31) | -0,05*<br>(-1,76) | -0,01*<br>(-1,68)  | -0,02**<br>(-2,39) | -0,03***<br>(-2,77) | -0,03**<br>(-2,55) | -0,04**<br>(-2,30) | -0,05*<br>(-1,79) |
| ln_tev                  | 0,01*<br>(1,66)    | 0,02***<br>(2,94)  | 0,04***<br>(3,61)   | 0,05***<br>(4,13)  | 0,06***<br>(3,91)  | 0,07***<br>(3,05) | 0,01*<br>(1,65)    | 0,03***<br>(2,93)  | 0,04***<br>(3,56)   | 0,05***<br>(4,09)  | 0,06***<br>(3,88)  | 0,08***<br>(3,12) |
| profitability           | 0,01**<br>(2,55)   | -0,00<br>(-0,09)   | 0,01<br>(0,83)      | -0,01**<br>(-2,17) | 0,04**<br>(2,35)   | 0,10<br>(0,90)    | 0,01**<br>(2,57)   | -0,00<br>(-0,10)   | 0,01<br>(0,82)      | -0,01**<br>(-2,20) | 0,04**<br>(2,33)   | 0,10<br>(0,89)    |
| tangibility             | -0,04**<br>(-2,13) | -0,04<br>(-1,01)   | -0,03<br>(-0,49)    | -0,03<br>(-0,41)   | -0,02<br>(-0,28)   | -0,06<br>(-0,58)  | -0,04**<br>(-2,13) | -0,04<br>(-1,05)   | -0,03<br>(-0,50)    | -0,03<br>(-0,44)   | -0,03<br>(-0,30)   | -0,06<br>(-0,60)  |
| Adjusted R <sup>2</sup> | 0,05               | 0,09               | 0,12                | 0,21               | 0,23               | 0,25              | 0,04               | 0,08               | 0,12                | 0,21               | 0,22               | 0,25              |
| N                       | 1867               | 1231               | 921                 | 723                | 563                | 456               | 1867               | 1231               | 921                 | 723                | 563                | 456               |

Note: statistical significance indicated by the following: "\*\*\*\*" if p-value <= 0,01; "\*\*\*\*" if <= 0,05 and "\*" if <= 0,10.

Table 3 reports the regression results for SPEC2 and SPEC3 across the same six measurement windows, the most stable effects are again observed for the size-related control variables. The main difference in Table 2 concerns the deal activity measures used in SPEC2 and SPEC3. In SPEC2, the coefficient on “multi\_spree” is positive but non-significant in all six windows while the “log1p\_deals\_n” coefficient is also positive and statistically significant in the first two windows. The interaction term “multi\_spree × deriv” is negative in every window except the second but remains also statistically insignificant. The results for the interaction term of SPEC3 are in line with the main term when considering the statistical significance across windows, however the signs are the opposite as the interaction term “log1p\_deals\_n × deriv” is negative throughout the windows similarly to “multi\_spree × deriv”.

The control variables in Table 3 largely mirror the patterns observed in Table 2. “ln\_assets” remains negative and statistically significant in every window in both specifications, while “ln\_tev” is positive and also statistically significant throughout, more or less. Thus, firms with larger asset bases tend to experience smaller improvements in the ROIC–WACC spread, whereas larger firm enterprise values are consistently associated with higher improvements. Growth is positive and statistically significant across all windows, while leverage and tangibility are statistically significant only in the first window. Profitability is statistically significant in windows 1, 4 and 5 but changes sign across these windows, also suggesting a less systematic effect. The main effect of “derivatives” is generally small and statistically insignificant across all specifications.

**Table 3.** Regression variable coefficients for SPEC2 and SPEC3 with respective t-values in all measured windows (1-6).

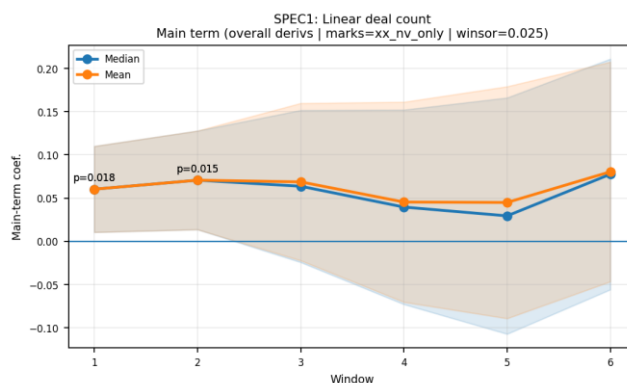
| Coefficients                  | SPEC2              |                    |                     |                     |                    |                   | SPEC3              |                    |                     |                    |                    |                   |
|-------------------------------|--------------------|--------------------|---------------------|---------------------|--------------------|-------------------|--------------------|--------------------|---------------------|--------------------|--------------------|-------------------|
|                               | w1                 | w2                 | w3                  | w4                  | w5                 | w6                | w1                 | w2                 | w3                  | w4                 | w5                 | w6                |
| multi_spre                    | 0,06<br>(0,96)     | 0,03<br>(0,65)     | 0,08<br>(0,98)      | 0,05<br>(0,58)      | 0,04<br>(0,46)     | 0,10<br>(1,08)    |                    |                    |                     |                    |                    |                   |
| multi_spree_x_<br>deriv       | -0,02<br>(-0,34)   | 0,02<br>(0,33)     | -0,00<br>(-0,01)    | -0,04<br>(-0,48)    | -0,04<br>(-0,43)   | -0,13<br>(-1,44)  |                    |                    |                     |                    |                    |                   |
| log1p_deals_n                 |                    |                    |                     |                     |                    |                   | 0,10***<br>(2,58)  | 0,12***<br>(2,78)  | 0,11<br>(1,62)      | 0,08<br>(0,96)     | 0,08<br>(0,82)     | 0,12<br>(1,24)    |
| log1p_deals_n_<br>x_<br>deriv |                    |                    |                     |                     |                    |                   | -0,09**<br>(-2,20) | -0,10**<br>(-2,01) | -0,07<br>(-0,99)    | -0,06<br>(-0,73)   | -0,09<br>(-0,83)   | -0,13<br>(-1,31)  |
| deriv_overall                 | 0,00<br>(0,61)     | 0,01<br>(0,56)     | 0,01<br>(0,63)      | 0,00<br>(0,09)      | 0,00<br>(0,17)     | 0,00<br>(0,15)    | 0,01<br>(0,96)     | 0,01<br>(0,76)     | 0,01<br>(0,65)      | 0,00<br>(0,14)     | 0,01<br>(0,30)     | 0,01<br>(0,27)    |
| growth                        | 0,03**<br>(1,96)   | 0,04**<br>(1,97)   | 0,08**<br>(1,99)    | 0,23***<br>(5,03)   | 0,22***<br>(4,85)  | 0,22***<br>(3,63) | 0,03**<br>(1,97)   | 0,04**<br>(1,98)   | 0,07**<br>(2,00)    | 0,23***<br>(4,98)  | 0,22***<br>(4,77)  | 0,23***<br>(3,75) |
| leverage                      | 0,10***<br>(3,35)  | 0,05<br>(1,24)     | 0,03<br>(0,56)      | 0,02<br>(0,25)      | 0,04<br>(0,62)     | -0,03<br>(-0,45)  | 0,10***<br>(3,15)  | 0,06<br>(1,39)     | 0,04<br>(0,63)      | 0,02<br>(0,35)     | 0,05<br>(0,78)     | -0,02<br>(-0,27)  |
| ln_assets                     | -0,01**<br>(-1,96) | -0,02**<br>(-2,45) | -0,03***<br>(-2,77) | -0,04***<br>(-2,63) | -0,04**<br>(-2,35) | -0,05*<br>(-1,94) | -0,01*<br>(-1,68)  | -0,02**<br>(-2,39) | -0,03***<br>(-2,78) | -0,03**<br>(-2,55) | -0,04**<br>(-2,30) | -0,05*<br>(-1,78) |
| ln_tev                        | 0,01**<br>(1,99)   | 0,03***<br>(2,94)  | 0,04***<br>(3,48)   | 0,05***<br>(4,12)   | 0,06***<br>(3,95)  | 0,08***<br>(3,36) | 0,01*<br>(1,65)    | 0,02***<br>(2,93)  | 0,04***<br>(3,57)   | 0,05***<br>(4,10)  | 0,06***<br>(3,89)  | 0,08***<br>(3,09) |
| profitability                 | 0,01***<br>(2,67)  | -0,00<br>(-0,06)   | 0,01<br>(0,81)      | -0,02**<br>(-2,22)  | 0,04**<br>(2,23)   | 0,08<br>(0,73)    | 0,01**<br>(2,56)   | -0,00<br>(-0,10)   | 0,01<br>(0,83)      | -0,01**<br>(-2,19) | 0,04**<br>(2,34)   | 0,10<br>(0,89)    |
| tangibility                   | -0,04**<br>(-2,13) | -0,04<br>(-1,04)   | -0,03<br>(-0,56)    | -0,03<br>(-0,45)    | -0,03<br>(-0,32)   | -0,06<br>(-0,58)  | -0,04**<br>(-2,12) | -0,04<br>(-1,03)   | -0,03<br>(-0,49)    | -0,03<br>(-0,43)   | -0,02<br>(-0,29)   | -0,06<br>(-0,59)  |
| Adjusted R <sup>2</sup>       | 0,04               | 0,07               | 0,12                | 0,21                | 0,22               | 0,24              | 0,04               | 0,08               | 0,12                | 0,21               | 0,23               | 0,25              |
| N                             | 1827               | 1202               | 901                 | 708                 | 549                | 443               | 1867               | 1231               | 921                 | 723                | 563                | 456               |

Note: statistical significance indicated by the following: "\*\*\*\*" if p-value <= 0,01; "\*\*\*\*" if <= 0,05 and "\*" if <= 0,10.

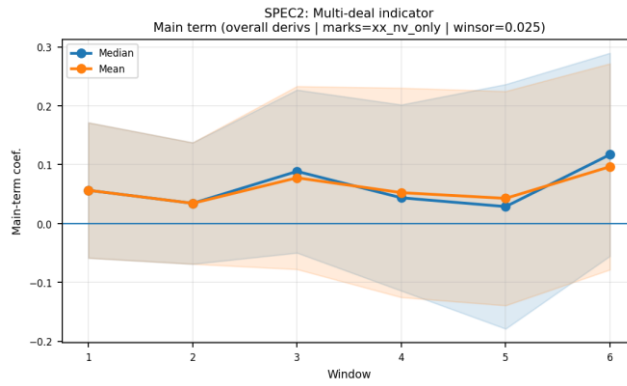
Figures 1-5 complement the regression tables by visualising the main-term coefficients across specifications and event-window lengths. The figures also provide a visual distinction between mean and median values. In overall, they show that the positive deal-activity pattern is most consistent for SPEC0, SPEC1 and SPEC3, while SPEC2 is less

stable across windows. Figures 6-10 provide the corresponding graphical summary of the interaction terms between deal activity and derivatives usage.

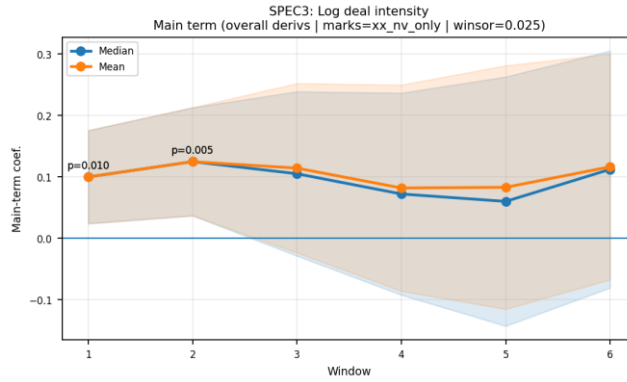
The mark-up “xx” refers to deals of at least EUR 5 million in enterprise value, “nv” refers to deals with no published enterprise value and “sv” to deals less than 5 million. All results and graphs in this section are “xx\_nv\_only”, indicating that the deal data used consists of “xx” and “nv” classified deals. In the Appendices, when treating all mark-ups in isolation, the results for SPEC2 are limited due to the lack of applicable events regarding deals classified as “xx” or “sv”.



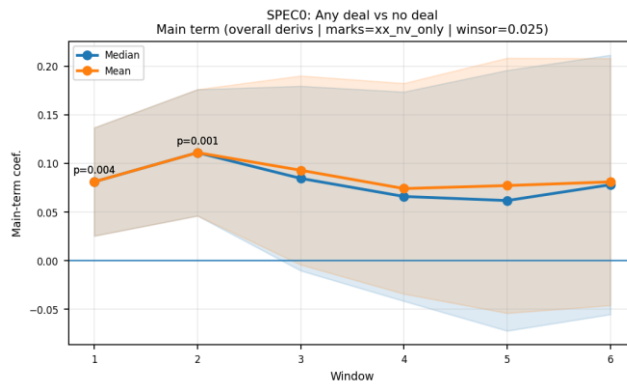
**Figure 2.** Mean and median of SPEC1 main term coefficient across all measured quarter windows.



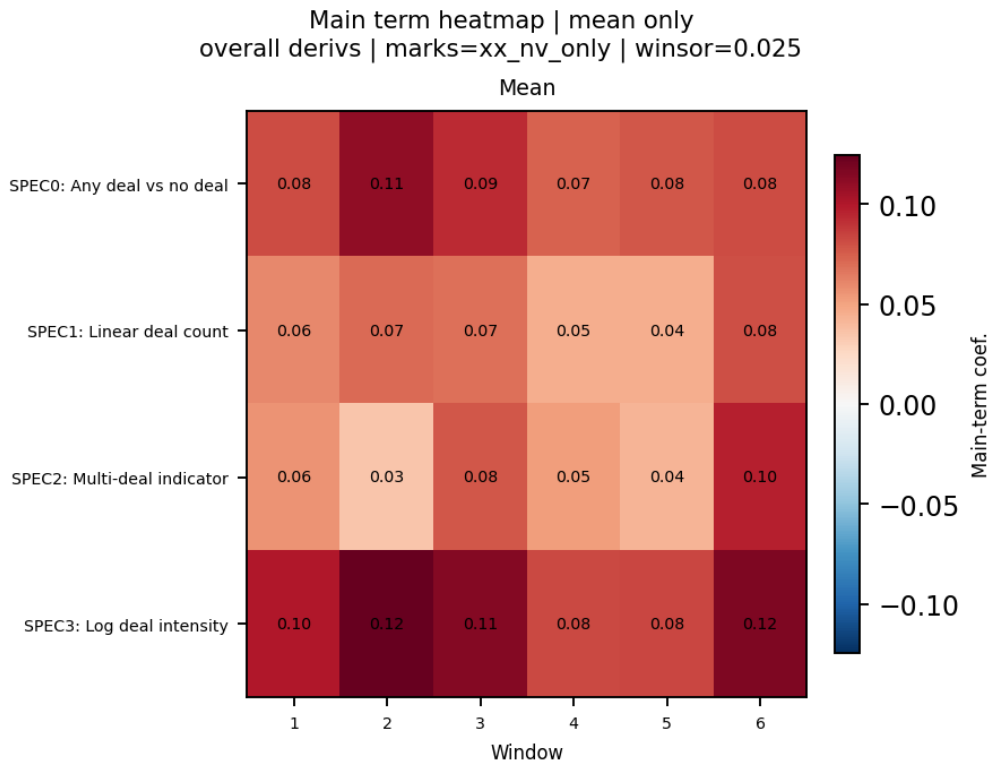
**Figure 3.** Mean and median of SPEC2 main term coefficient across all measured quarter windows.



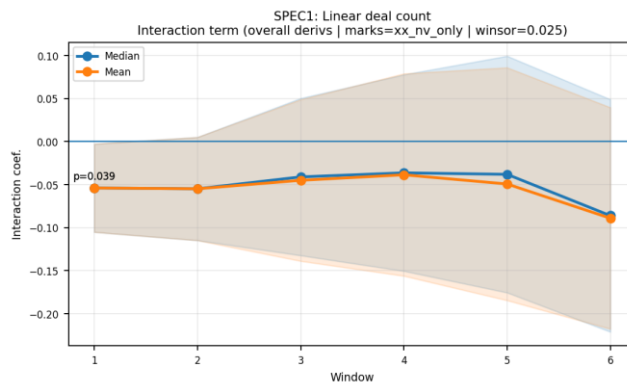
**Figure 4.** Mean and median of SPEC3 main term coefficient across all measured quarter windows.



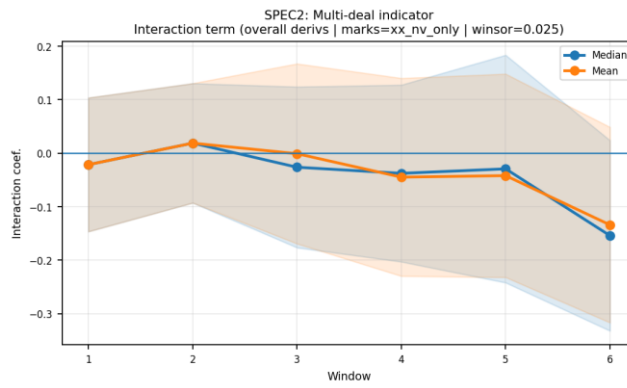
**Figure 5.** Mean and median of SPEC0 main term coefficient across all measured quarter windows.



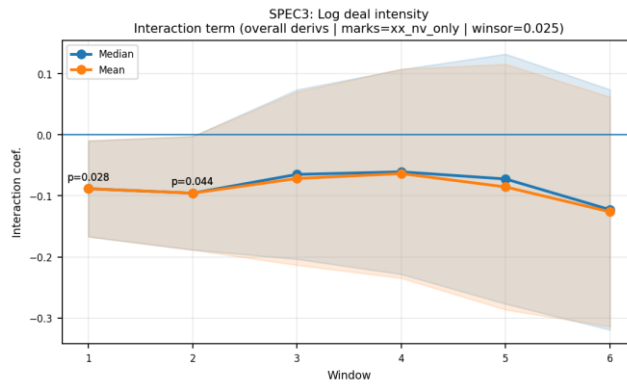
**Figure 6.** Heatmap summary of main-term coefficients in all specifications (SPEC) and quarter-window lengths.



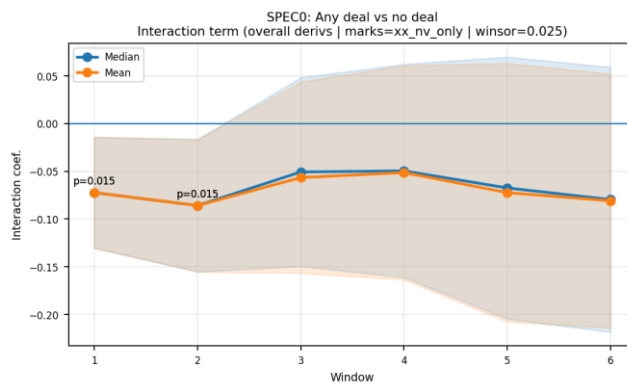
**Figure 7.** Mean and median of SPEC1 interaction coefficient across all measured quarter windows.



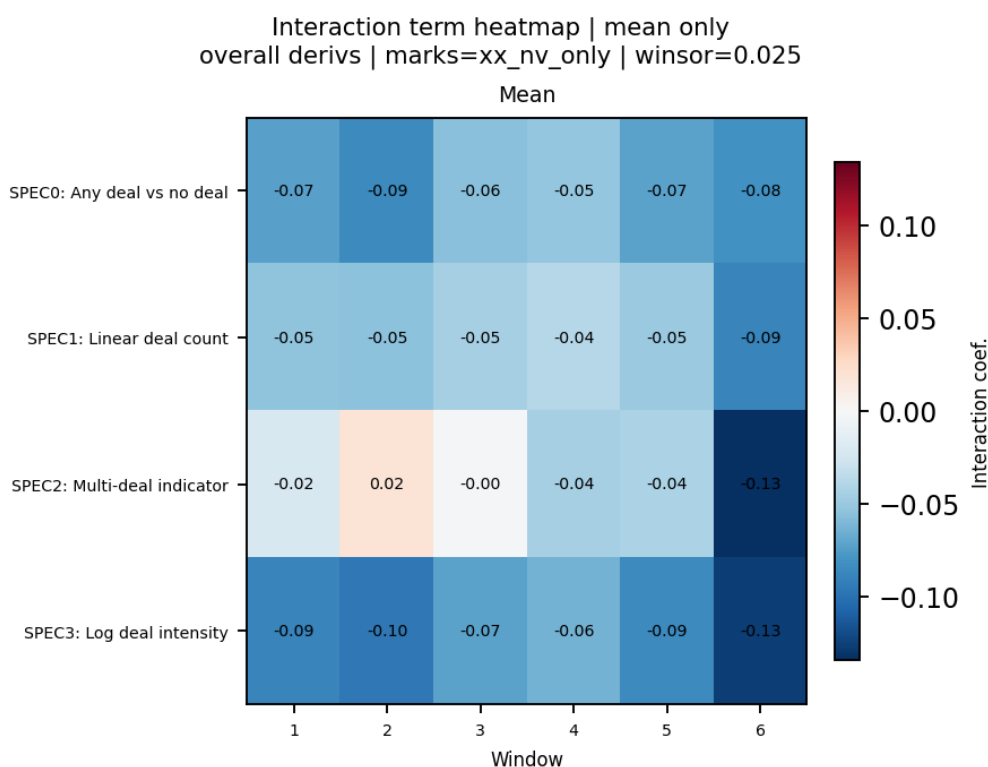
**Figure 8.** Mean and median of SPEC2 interaction coefficient across all measured quarter windows.



**Figure 9.** Mean and median of SPEC3 interaction coefficient across all measured quarter windows.



**Figure 10.** Mean and median of SPEC0 interaction coefficient across all measured quarter windows.



**Figure 11.** Heatmap summary of interaction term coefficients between derivatives usage and deal activity across specifications and quarter-window lengths.

## 4.2 Summary

The results generally present that M&A deals have positive coefficients when determining ROIC-WACC spreads. These positive effects are statistically strongest in the shorter windows for the any-deal, linear deal-count and log deal-intensity measures, while the multi-deal specification lacks statistical significance. The interaction coefficients of M&A deals and derivatives usage are consistently negative although lack of statistical support as well after the first two quarter-windows.

## **5 Discussion of limitations**

Discussing the limitations of the selected empirical approach is material considering the structure of this research that includes multiple choices regarding research methods and factors. Although the chosen design is intended to capture differences in the ROIC–WACC spread around deals in a systematic and transparent manner, the estimates may still be influenced by methodological choices related to outcome construction, sample selection and variable measurement. In addition to acknowledging potential weaknesses of the selected empirical approach, the discussion also clarifies the conditions under which the findings should be interpreted.

### **5.1 Outcome construction sensitivities**

Since the dependent variable is built from multi-quarter pre and post-windows, the estimated coefficients may depend on the horizon used to evaluate post-deal performance. Varying the window length makes it possible to assess whether the results are concentrated in short-term adjustment periods or remain visible over longer horizons. Greater confidence can be placed on findings that remain similar across several window lengths rather than those that appear only in certain lengths.

The regressions are also estimated using both mean and median aggregation of the ROIC–WACC spread within the pre and post-windows. This is useful because the mean is more sensitive to unusually large quarterly movements, whereas the median gives less weight to extreme values. Consistency across these two aggregation rules strengthens the interpretation that the results reflect broader patterns rather than a small number of outlying observations. A further sensitivity analysis concerns the treatment of extreme dependent-variable values. Re-estimating the models under different winsorization thresholds makes it possible to assess whether the main conclusions are driven by tail outcomes. In the same way, alternative specifications of the event-window

outcome can be used to evaluate whether the sign and relative magnitude of the estimates depend strongly on the specified choices made.

## **5.2 Sample construction and overlap sensitivities**

The balanced-window requirement ensures that each observation is evaluated over a common horizon but it may also affect sample composition if complete spread coverage is not random. The inclusion of repeated quarters also creates the possibility that nearby observations overlap in their pre and post-windows. Overlap can link adjacent outcomes and may place greater weight on firms with more frequent deal activity. This issue is addressed in the baseline inference through clustered standard errors. Additional sensitivity analysis could impose spacing rules between quarters and limit the influence of repeat-deal firms. Since the full-sample design includes both deal quarters and no-deal quarters, it is also important to assess whether the estimated interaction effects remain stable when the deal-mark definition is varied. For this reason, the analysis is estimated using the deal-marks separately in the robustness analysis presented in the Appendices. Result consistency across these definitions would indicate that the effect is real and only magnitude varies by the deal characteristics.

## **5.3 Covariate timing, definition and missing value sensitivities**

Robustness checks could also consider whether the estimates are sensitive to timing and definition of control variables. In the baseline implementation, controls are measured at the deal quarter. However some firm characteristics, especially valuation-related variables, may respond contemporaneously to deal activity. Re-estimating the models using alternative timing rules such as pre-window averages, would help to assess whether the results depend on measuring controls at the same time as the treatment variable. A related issue concerns sample comparability across specifications. Since missing values may differ across controls and derivatives classifications, the usable

sample can also change across regressions. This is especially relevant when comparing interaction effects between SPEC0–SPEC3. The derivatives variable itself could also be defined in more than one way. The main analysis emphasizes the overall classification because it links derivatives usage more closely to timing of deal activity. However, a derivatives classification based on yearly definitions would tie derivatives usage more precisely to the deals. Regardless of this, this classification method has not been included due to the general nature and motivation behind the used classification.

## **6 Managerial implications and policy discussion**

The empirical findings have implications beyond estimating coefficients and interpreting the results. This is because they identify which forms of deal activity and derivatives usage are the most plausibly associated with improvement in the ROIC–WACC spread, which is a key subject of interest from a managerial perspective. The discussion below therefore focuses on what these patterns imply for deal pacing, financial policy, risk management and disclosure.

### **6.1 Implications for deal pacing and integration capacity**

The empirical framework has direct managerial relevance because it evaluates ROIC–WACC spread, a direct measure of value creation. As managers should have criteria for evaluating decisions that increase their firms' long-term market values (Jensen, 2001, p. 3), following the ROIC–WACC spread should be at the top of the evaluation. From a managerial perspective, the pattern of the results points to disciplined transaction selection and integration capacity rather than deal activity per se, as the results do not support a strong conclusion that any deal or any clustered deal period automatically improves the ROIC–WACC spread. Instead, the findings suggest that spread improvements are more visible in selected specifications and mainly in shorter windows, while the effect depends on how deal intensity is measured. Managers should therefore view deal pacing as a capacity and timing question. When integration resources, operating coordination and post-merger governance are strong, deal programs may support spread improvement but the empirical evidence does not justify assuming that higher deal volume alone is sufficient.

## 6.2 Financial policy, valuation effects and governance

Since the dependent variable is based on the ROIC-WACC spread, the estimated relationships combine operating performance with changes in the cost of capital. This is important in light of the results which show recurring but not uniformly significant deal effects, and stable effects for the size-related control variables 'ln\_assets' and 'ln\_tev'. The findings therefore suggest that post-deal value creation is shaped not only by whether a firm executes a deal but also by firm characteristics and financing conditions surrounding the deal.

For boards and investment committees, this implies that deal decisions should be evaluated in an integrated framework linking strategic fit, integration execution and financing policy. The coefficients for general deal activity are mostly positive but their statistical support is concentrated in the shorter windows and is not stable across all specifications. At the same time, the mixed SPEC2 results indicate that clustered deal activity should be approached carefully. Governance processes should therefore test whether a firm has the balance-sheet flexibility, treasury capacity and integration capabilities needed to translate acquisitive growth into a stronger ROIC-WACC spread, rather than relying on deal intensity itself as evidence of value creation.

The results also underline the value of internal reporting systems that connect post-merger integration metrics to economic value creation. Given that 'ln\_assets' and 'ln\_tev' are highly significant across specifications, firms should follow how their size affects deal outcomes rather than focusing only on immediate synergies. A broader reporting framework that links integration progress, capital costs and post-deal returns would make it easier to identify whether value creation arises from the deal strategy itself, from the underlying firm characteristics or from broader financing conditions.

### **6.3 Derivatives utilization and risk management considerations**

The derivatives-related findings are managerially relevant since the interaction terms test whether risk management changes the deal effect itself rather than only capturing average differences between users and non-users. From a managerial standpoint, the results in Section 5 caution against assuming that derivatives usage is automatically beneficial. Accordingly, treasury policy should not be evaluated in isolation or treated as a simple enhancer of deal outcomes. Instead, managers should focus on whether hedging policies are aligned with the specific risks created by deal-based growth such as refinancing pressure, interest-rate exposure and integration-related cash-flow volatility. At the same time, derivatives usage should not be interpreted purely as a mechanical hedging choice. As it may proxy for broader differences in financing structure, complexity, international exposure or treasury sophistication, managerial interpretation should therefore focus on the quality and fit of their risk management designs that are implemented through derivatives, not on the derivatives usage itself.

### **6.4 Policy discussion**

The policy implications follow directly from the empirical pattern documented in the results section. Because the deal coefficients are mostly positive but their statistical reliability is concentrated in selected shorter windows and because the multi-specification is mixed rather than clear to interpret, consistent disclosure of deal timing, deal clustering and deal size is essential for interpreting post-deal performance. Higher comparability between firms' disclosures would help investors and boards see if observed improvements in ROIC-WACC spread actually stem from deal intensity, firm scale, deal scale, timing or other firm characteristics. The results also support more systematic disclosure of treasury policy and financial management in the post-deal period. Since the interaction terms between deal intensity and derivatives usage are mostly negative but not clearly robust, and since the SPEC2 interaction pattern depends on the selected window, outside observers need more transparent information on

hedging objectives, exposure profiles and financing choices to better understand differences in deal outcomes. Standardized reporting on these dimensions would improve market's interpretation of whether risk management complements or limits post-deal value creation. More broadly, the evidence suggests that deal policy debates should move beyond simple deal counts, announced synergy narratives and single hedging choices, and achieve a higher level that combines strategic acquisition plans with M&A-tailored risk management. Comparing one-off deals and hedges to consistent combinations would potentially provide real answers regarding optimal ways of value creation.

## 7 Conclusions

Three subconclusions follow from the results, finalized with an overall conclusion. First, across the full-sample event-window regressions, the estimated coefficients on deal activity are generally positive. This suggests that M&A activity is associated with an improvement in the ROIC-WACC spread and confirms the general value creation rationale of M&A deals. Second, the interaction results do not provide clear evidence that derivatives usage combined with M&A deals contributes a distinct positive effect to the ROIC-WACC spread. This indicates that the estimated deal-related improvement of the spread in the sample is generally smaller for derivatives users than for non-users and mandates a question on whether paying for derivatives usage yields a sufficient return. This does not imply that derivatives destroy value in deals but rather suggests that derivatives users do not achieve systematically stronger relative deal-related improvements in the ROIC-WACC spread than non-users. Third, the results show that concluding on the timing of the strongest impact for ROIC-WACC spread, is out of reach which then facilitates a conclusion that synergy-related effects cannot be identified from the data and may not be achieved after concluding multiple deals.

Considering these three subconclusions, the overall conclusion is that executing M&A deals is a suitable and confirmed path to generate added value to shareholders, while managing risks through derivatives has the potential to diminish this achieved value creation. This is in line with the literature, which indicates that certain effects regarding M&A and derivatives can be identified but multiple individual factors may influence the final outcomes, limiting the ability to make full generalized conclusions.

Further research could examine how these patterns differ by financing structure, deal type, cross-border exposure or the purpose of derivatives usage, in order to identify more precisely how deal intensity affects value outcomes and why derivatives usage does not translate into consistently stronger post-deal value creation. It could also examine whether the observed effects vary according to the strategic context of the deal, such as cross-border versus domestic deals, method of payment, industry and the

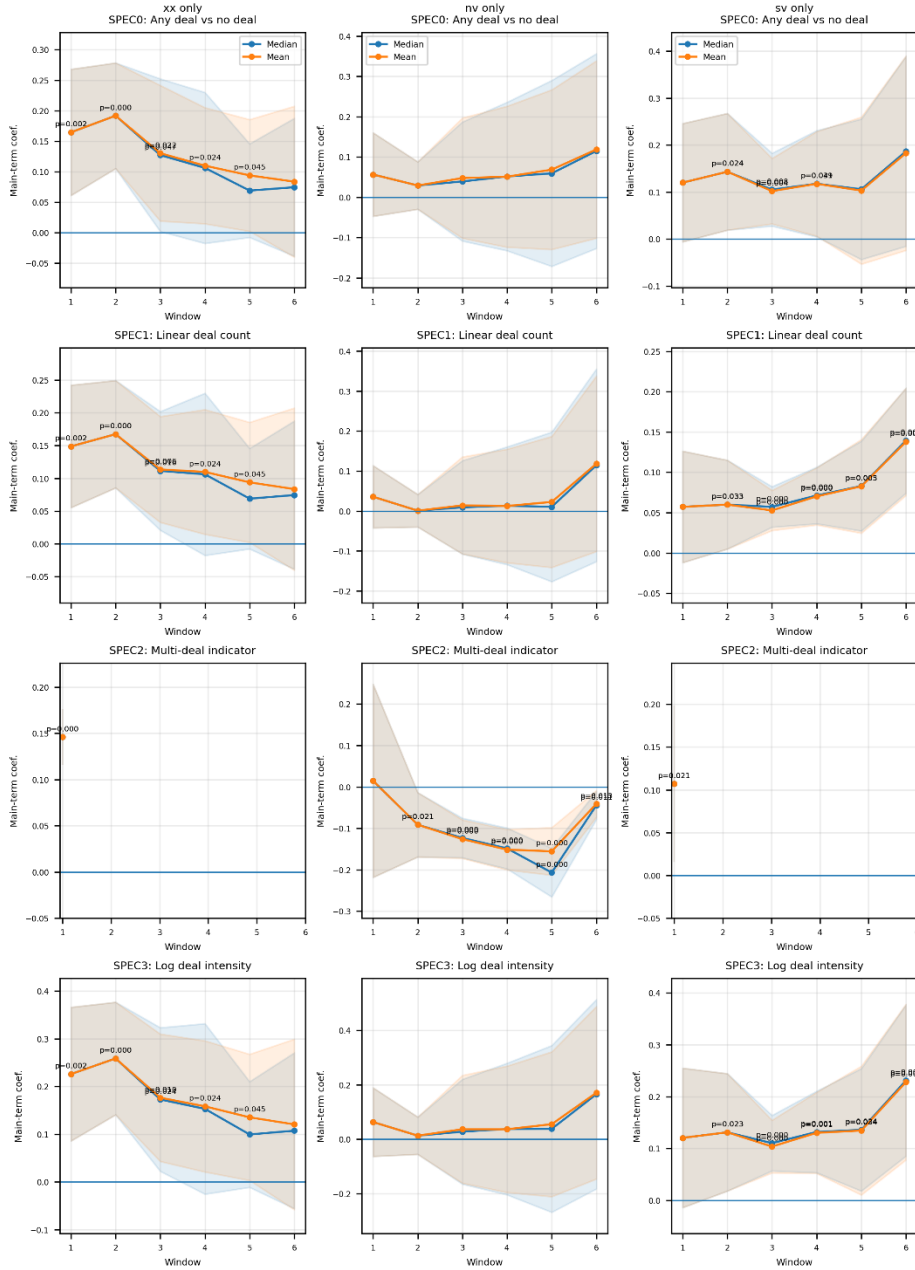
acquirer's prior M&A experience. In addition, more detailed data on the type, scale and purpose of derivatives usage would help clarify whether risk management matters differently in financing-related hedging than in operational hedging. A useful extension would also be to separate the ROIC and WACC channels in order to identify whether post-deal changes are driven primarily by operating performance, capital costs or both. Such analyses would deepen the understanding of why deal intensity appears to matter more consistently than derivatives usage in explaining post-deal economic spread outcomes.

# Appendices

The mark-ups “xx”, “nv” and “sv” and limited results of SPEC2 explained in Section 4.1.

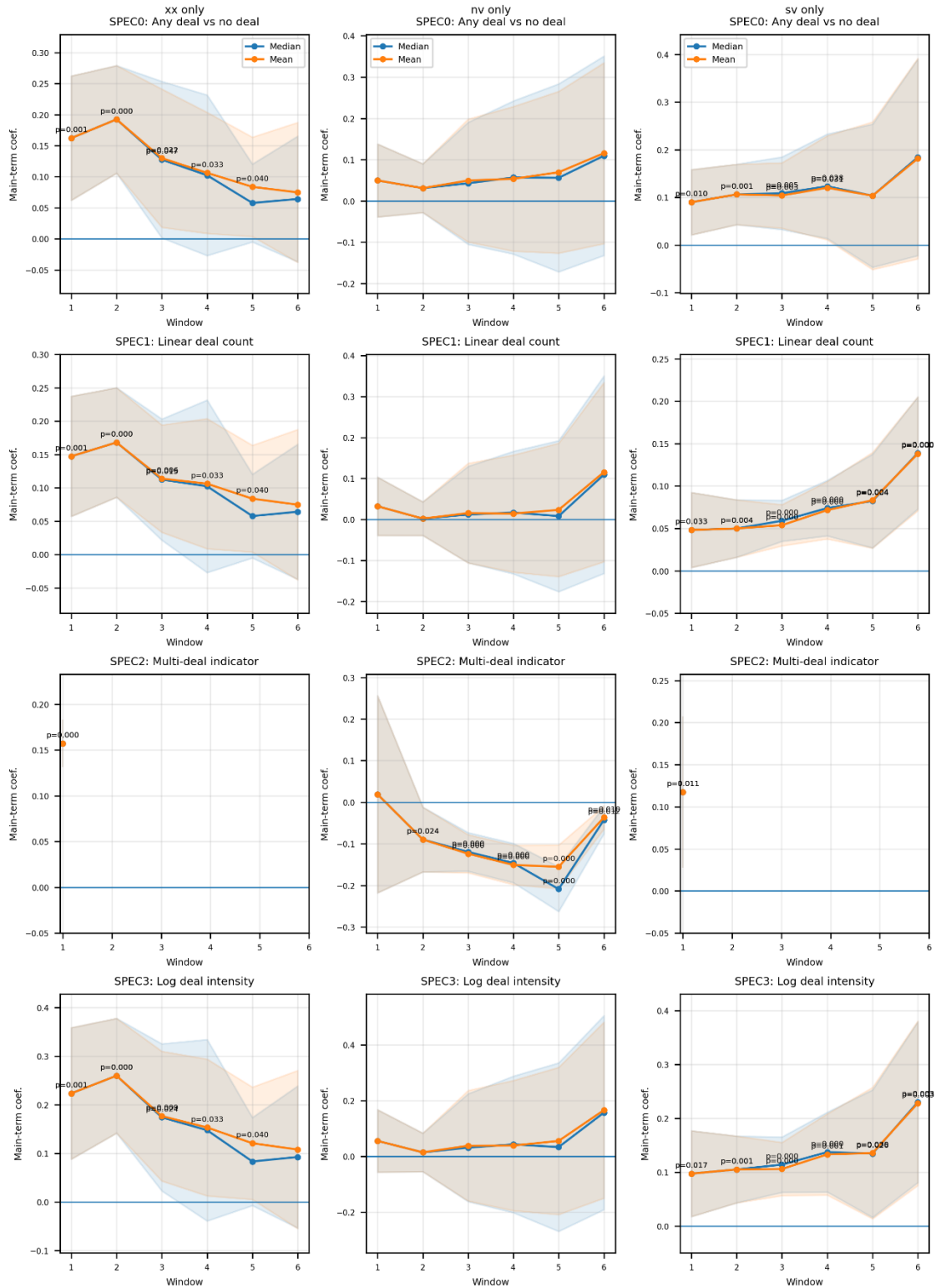
## Appendix 1. Robustness analysis, main term, winsorization = 0,0 %

Overall derivatives usage | Main term | xx only vs nv only vs sv only | winsor=0.00



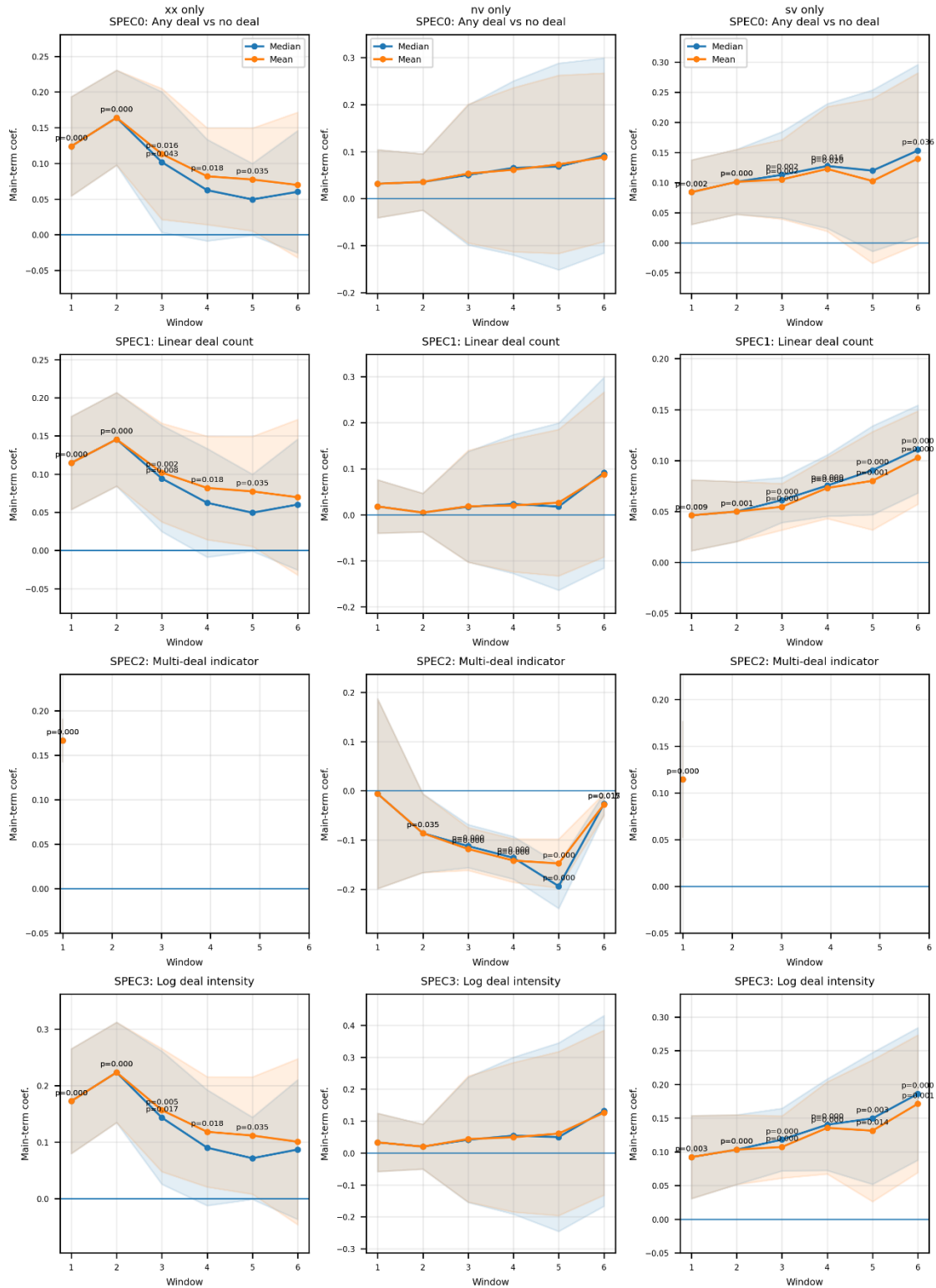
## Appendix 2. Robustness analysis, main term, winsorization = 1,0 %

Overall derivatives usage | Main term | xx only vs nv only vs sv only | winsor=0.01



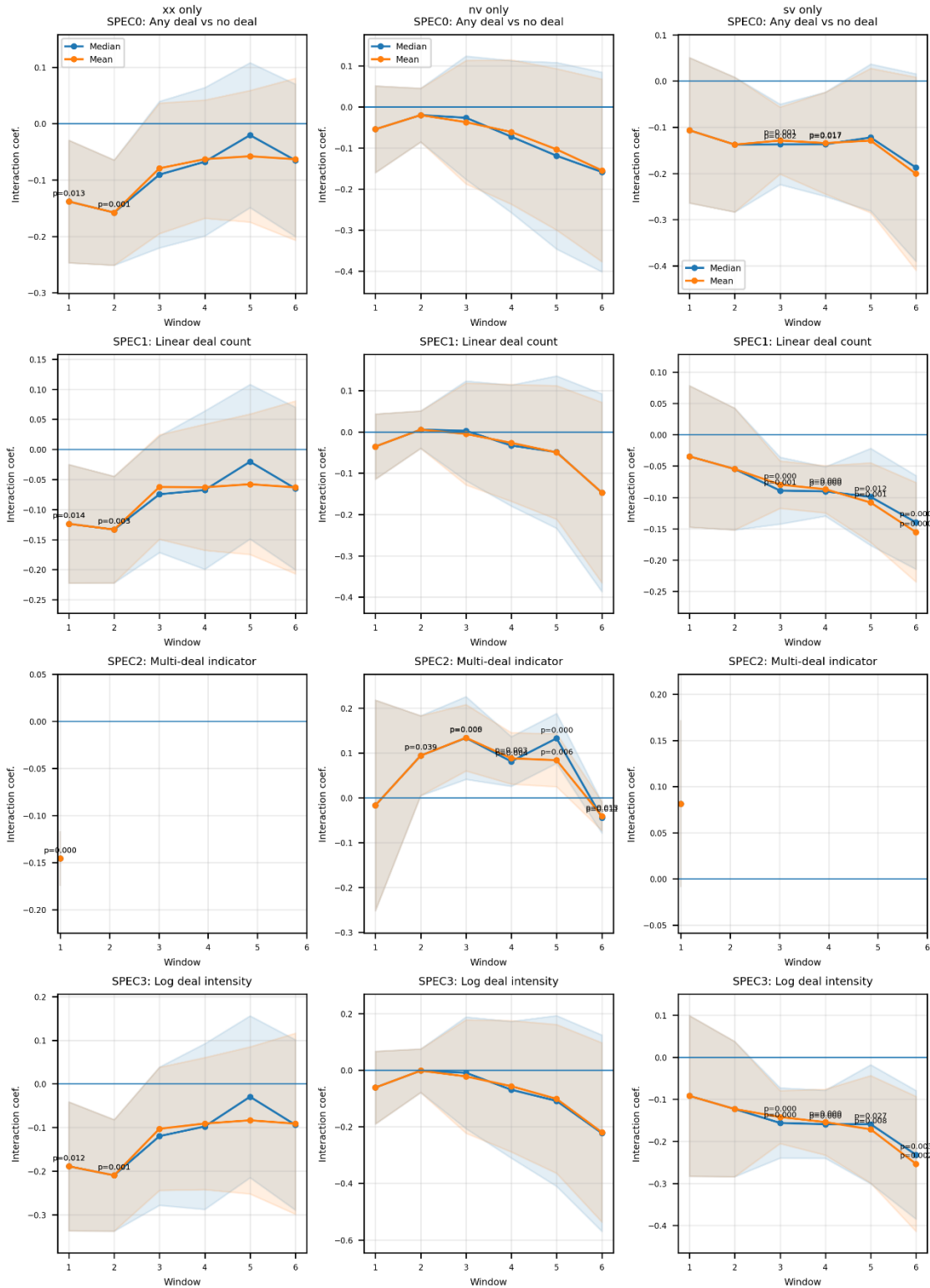
### Appendix 3. Robustness analysis, main term, winsorization = 2,5 %

Overall derivatives usage | Main term | xx only vs nv only vs sv only | winsor=0.025



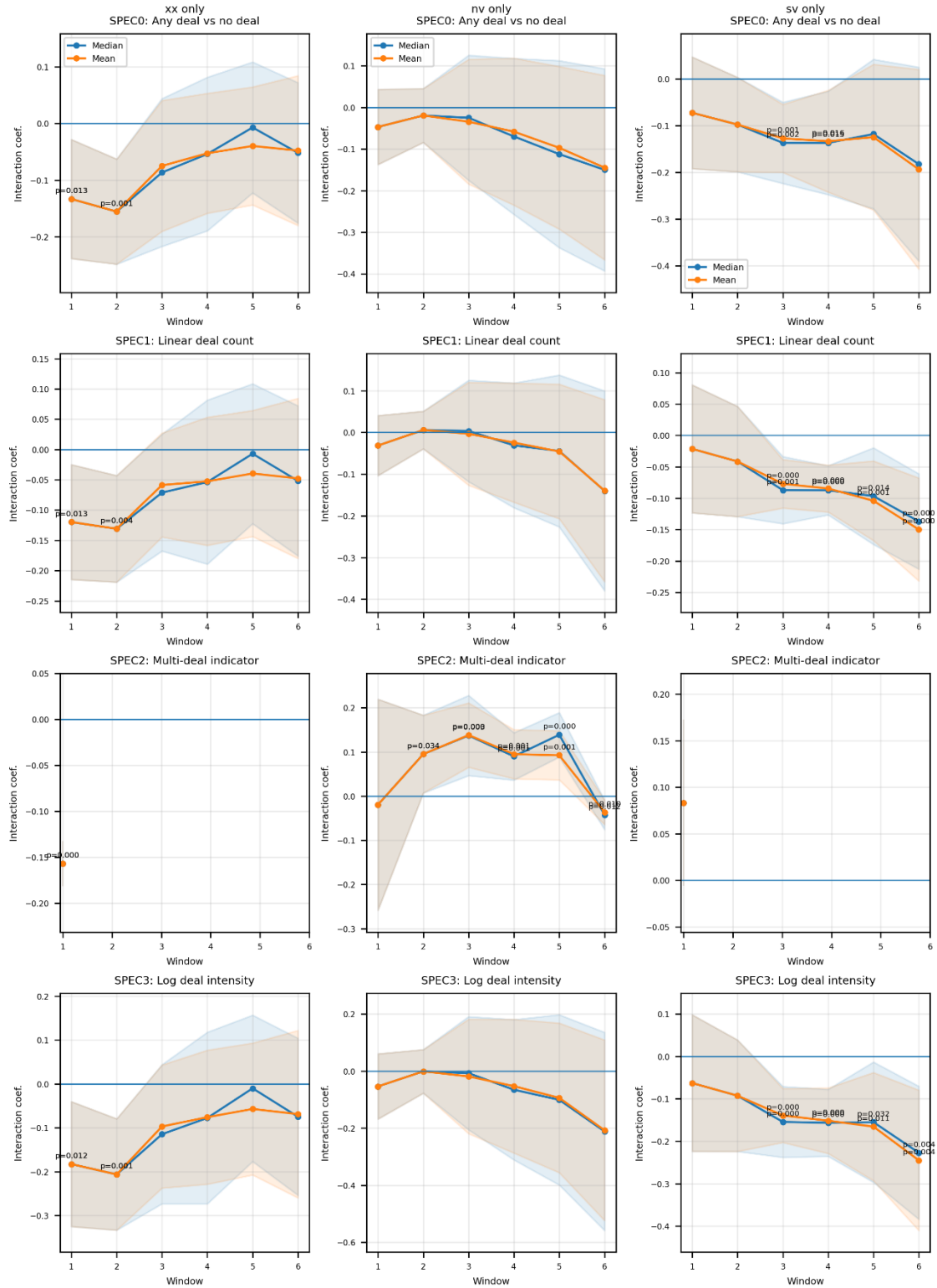
### Appendix 4. Robustness analysis, interaction term, winsorization = 0,0 %

Overall derivatives usage | Interaction term | xx only vs nv only vs sv only | winsor=0.00



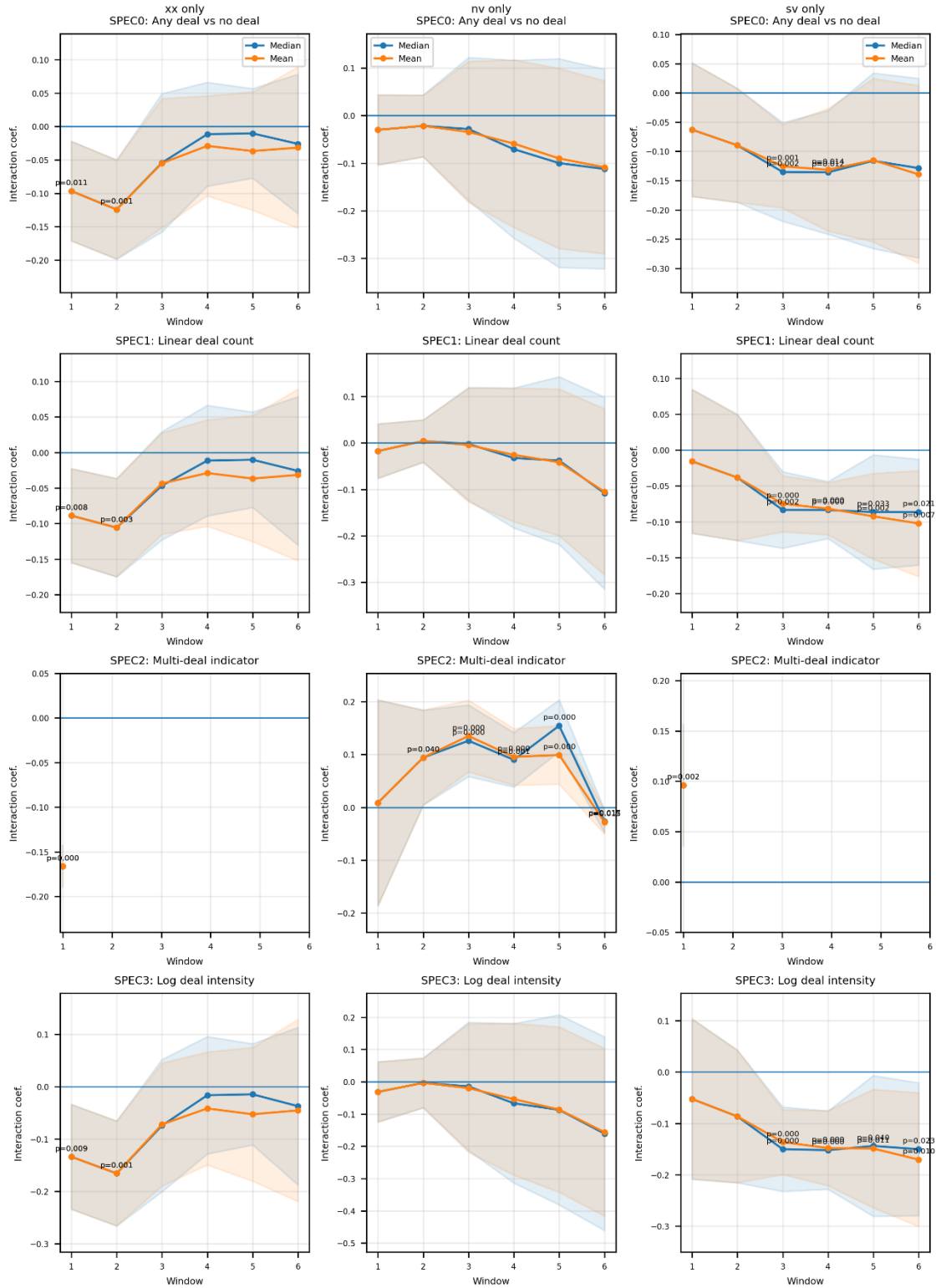
## Appendix 5. Robustness analysis, interaction term, winsorization = 1,0 %

Overall derivatives usage | Interaction term | xx only vs nv only vs sv only | winsor=0.01



## Appendix 6. Robustness analysis, interaction term, winsorization = 2,5 %

Overall derivatives usage | Interaction term | xx only vs nv only vs sv only | winsor=0.025



## **Appendix 7. Derivatives usage classification**

The following terms have been searched from all financial statement releases (Q4) of a firm in Q1/2010-Q2/2025 and if found, the firm has been classified as a derivative user, if not, vice versa:

- "derivative",
- "forward contract",
- "future contract",
- "johdannainen",
- "johdannai",
- "futuuri",
- "termiin"

## **Appendix 8. Financial firms excluded from the research sample**

The following firms with deal activity during the selected period are defined as financial and excluded from the research sample:

- Aktia Pankki Oyj
- Alisa Pankki Oyj
- CapMan Oyj
- eQ Oyj
- Evli Oyj
- Investor's House Oyj
- Nordea Bank Oyj
- Oma Säästöpankki Oyj
- Ovaro Kiinteistösijoitus Oyj
- Sampo Oyj

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