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M&A in times of crisis: an empirical study of COVID 19's impact

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Abstract

This dissertation examines whether the COVID-19 shock and its aftermath altered bid premiums paid for listed targets. Bid premiums measured 30 days before announcement (BP30) are analysed across three periods, which are Pre (2016-2019), Pandemic (2020-2021), and Post (2022-2024), and period effects are tested both unconditionally and conditionally on target fundamentals and market timing.

The models estimated are OLS regressions of winsorized BP30 with controls for size, leverage, profitability, and payment method, plus fixed effects for year, sector, and region. Robustness checks include alternative winsorisation thresholds, a leaner specification without payment dummies, an all-cash subsample, and period × sector interactions to test for sector differences.

The results indicate that, unconditionally, average premiums were higher post-pandemic than pre-pandemic, though medians remained broadly stable. Conditionally, Pandemic and Post indicators are small and statistically insignificant, while variation is captured instead by year effects, with a dip in 2020, a rebound in 2022, and renewed weakness in 2023. Firm-level variables and payment methods are not consistently significant across specifications, and sectoral analyses reveal no robust within-sector shifts. Regional interactions show limited divergence, with some evidence of higher North American premiums during the pandemic relative to Europe, but without persistence thereafter.

Overall, bid premiums in this period appear to have been shaped more by year-to-year market dynamics than by a persistent "pandemic regime," underscoring the importance of market timing over broad crisis labels in determining value distribution in M&A transactions.

Key Words: Mergers & Acquisitions; Bid Premium; COVID-19 pandemic; Deals

JEL-Codes: G01, G14, G32, G34

Resumo

Esta dissertação analisa se o choque da COVID-19 e as suas consequências alteraram os prémios de aquisição pagos por empresas cotadas. São analisados os prémios de aquisição medidos 30 dias antes do anúncio (BP30) em três períodos, que são Pré (2016-2019), Pandemia (2020-2021) e Pós (2022-2024), e testa-se a existência de efeitos de período, tanto de forma incondicional como após o controlo por métricas fundamentais das empresas-alvo e condições de mercado.

Os modelos estimados são regressões OLS dos BP30 winsorizados, com controlos para dimensão, alavancagem, rentabilidade e método de pagamento, bem como efeitos fixos de ano, setor e região. Os testes de robustez incluem diferentes limiares de winsorização, uma especificação mais simples sem variáveis de método de pagamento, uma subamostra apenas com transações em dinheiro, e interações período × setor para testar diferenças intra-setoriais.

Os resultados indicam que, incondicionalmente, os prémios médios foram mais elevados no período pós-pandemia do que no pré-pandemia, embora as medianas tenham permanecido estáveis. Condicionalmente, os indicadores de Pandemia e Pós são pequenos e estatisticamente insignificantes, enquanto a variação é captada pelos efeitos de ano, com uma queda em 2020, uma recuperação em 2022 e nova fraqueza em 2023. As variáveis ao nível da empresa e os métodos de pagamento não são consistentemente significativas entre especificações, e as análises setoriais não revelam mudanças robustas dentro dos setores. As interações regionais mostram divergências limitadas, com alguma evidência de prémios mais elevados na América do Norte durante a pandemia em comparação com a Europa, mas sem persistência no período posterior.

Em geral, os prémios de aquisição neste horizonte parecem ter sido determinados mais pelas dinâmicas de mercado específicas de cada ano do que por um "regime pandémico" persistente, sublinhando a importância do *market timing* face a rótulos de crise amplos na determinação da distribuição de valor nas transações de M&A.

Palavras-chave: Fusões e Aquisições; Prémio de oferta; Pandemia COVID-19; Transações

Códigos JEL: G01, G14, G32, G34

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1. Introduction

Mergers and acquisitions (M&A) are central to corporate strategy, enabling firms to expand scale, diversify portfolios, and enter new markets. These transactions are also important mechanisms to reallocating resources and reshaping industries, particularly in response to structural changes in the global economy. The terms of M&A transactions are not determined without considering several factors, they are negotiated against macroeconomic and financial conditions, which affect not only the overall volume of activity but also the distribution of value between acquirer and target. Crisis episodes have historically disrupted M&A patterns, with financial crises, sovereign debt shocks, and health emergencies influencing investor sentiment, access to financing, and the regulatory climate. Such shocks can alter not just whether deals are undertaken, but also the premiums acquirers are willing to pay and the likelihood of successful completion.

The COVID-19 pandemic represented a distinctive event due to its sudden and global reach. The combination of abrupt demand and supply disruptions, financial market volatility, and unprecedented monetary and fiscal interventions created an environment of heightened uncertainty. For dealmakers, this meant dealing with unstable earnings projections, volatile equity markets, and sectoral dynamics that were shifting quickly. Some industries, such as energy, transport, and traditional manufacturing, faced severe contractions, while others, especially technology and telecommunications, benefited from accelerated digitalisation and structural demand shifts. Against this background, a natural question arises: did the pandemic, and its immediate aftermath, reshape the premiums offered to listed targets?

This dissertation addresses that question by analysing bid premiums measured thirty days before deal announcements (BP30) across three periods: Pre (2016-2019), Pandemic (2020-2021), and Post (2022-2024). BP30 is chosen to mitigate distortions from price run-ups close to the announcement date and to provide a consistent benchmark for valuation comparisons. The empirical strategy assesses whether unconditional differences in premiums across these periods persist once target characteristics, payment structure, and unobserved heterogeneity are taken into account. Year, sector, and regional fixed effects are introduced to capture broad sources of variation, while robustness checks examine the influence of outliers, model simplifications, and a cash-only subsample. Sectoral and regional analyses test whether period effects were concentrated in particular industries or geographies.

The results indicate that bid premiums did not systematically decline during the pandemic. Although average premiums increased in the post-pandemic years, these differences were not statistically significant once year effects were included, underscoring that variation was driven more by year-to-year market conditions than by a structural "pandemic regime." Firm-level variables and payment methods were not robust predictors of premiums, and sectoral tests showed no consistent differences cross-period. Regional interactions revealed divergence that was limited, with some evidence of higher North American premiums during the pandemic compared to Europe, but these effects were not persistent.

This study contributes to the literature in three main ways. First, it extends the time frame of COVID-19 M&A research to cover both the pandemic and its immediate aftermath, offering a more complete picture of post-crisis dynamics. Second, it incorporates sectoral and regional perspectives that test whether shocks had heterogeneous effects across industries and geographies, providing a better view of asymmetries in deal pricing. Third, it highlights the importance of year-to-year market conditions over broad crisis labels in shaping M&A valuations, adding to ongoing debates on how unexpected events affect the distribution of value in transactions.

The remainder of this dissertation proceeds as follows. Section 2 reviews existing literature on M&A during crises and in the COVID-19 context, identifying the main gaps addressed by this study. Section 3 describes the dataset, variable construction, and methodological approach. Section 4 presents descriptive statistics, mean-difference tests, regression results, and sectoral and regional analyses. Section 5 concludes with implications for both practitioners and scholars, acknowledges limitations, and gives an outline for future research.

2. Literature Review

Despite the existence of some literature on the impact of crises in M&A, it is still considered to be scarce, thus, this thesis intends to address the need to fill in this gap. To this day, some authors have researched the matter, achieving various conclusions that are worth being tested on new crises, such as the most recent one, the one caused by the COVID-19 pandemic.

2.1. Mergers and Acquisitions (M&A) and crises

The relationship between mergers and acquisitions (M&A) activity and crisis periods has received increasing attention from the academic world, especially after global economic shocks, such as the global financial crisis of 2008. In general, financial crises affect not only M&A transactions volume, but also their nature, its participants' characteristics (both targets and acquirors), the abnormal returns associated with it and, naturally, the distribution of the value generated. This first section of the literature review, thus, intends to analyse critically those aspects, grouping the most relevant empirical and theoretical evidence of studies on M&A in the context of crises, with a focus on those that analyse its impact on volume, returns and the strategic component of the parties involved.

To begin with, several studies point out that, in financial crises, M&A global activity suffers a significant retraction. For instance, during the global financial crisis of 2008, a considerable drop was registered in the number and value of transactions, with an impact at a global level, which was especially visible in developed economies (Yılmaz, 2016; Reddy et al., 2014). Such retraction can be attributed, largely, to the scarcity of credit, to the deterioration of investors' trust and to the uncertainty on the valorisation of assets (Gaughan, 2009, as cited in Linssen, 2017).

At the same time, the nature of M&A transactions observed during financial crises also appears to shift. Evidence from past crises, such as the Asian crisis of 1997-1998 and the global financial crisis of 2008, shows that many companies in distress were acquired by better-capitalised firms, sometimes under conditions described as "fire-sale" transactions. For example, Aguiar and Gopinath (2005) and Acharya et al. (2011) document that, during crises, the frequency of cross-border acquisitions is higher in crises, as companies try to take advantage of reduced valuations, and this can only be done in a crisis when the acquirer is better-capitalised.

However, subsequent studies find mixed support for this trend. Alquist, Mukherjee and Tesar (2016) show that crisis-time foreign acquisitions are not fundamentally different from those in normal times in terms of industry composition or size of ownership stakes, questioning the pervasiveness of opportunistic or distressed acquisitions during crises.

Further empirical analysis by Linssen (2017) highlights that although financially distressed firms might be expected to be acquired at discounts, they often receive substantial premiums. Ang and Mauck (2011), for instance, find that such firms received acquisition premiums up to 30% higher than during normal periods. This indicates that not all crisis-time acquisitions are purely opportunistic or "rescue" in nature; rather, they may be driven by strategic motives or compressed negotiation periods that result in higher offered values.

On the other hand, studies such as those of Linssen (2017) and Yılmaz (2016) suggest that, despite the fall in the number of transactions, the mergers and acquisitions that occur during crisis periods tend to generate a higher aggregated value for most of the parties involved. Such a conclusion is particularly valid, according to the authors, when the target is in developed economies and/or shows signs of financial distress.

On another view in this topic, empirical evidence shows that cumulative abnormal returns (CARs) for the target's shareholders tend to be higher during periods of crisis, when compared to those in normal periods (Linssen, 2017; Yılmaz, 2016). For instance, Linssen (2017) found a 20% average increase in the CARs for US-based targets during the great financial crisis of 2008, which suggests that investors perceive acquisitions in these circumstances as generators of substantial value.

Yılmaz (2016) reinforces this point by documenting that, in crisis periods, value creation in M&A is significantly higher than that observed in normal periods, with combined CARs (target + acquirer) achieving on average 2.36% during the crisis, in comparison to 1.63% in normal periods. This trend is especially strong in developed countries such as the US and in the context of domestic transactions (as opposed to cross-border).

Besides looking solely at the effects on targets, it is also important to study the acquirers. The effects for acquirers of these transactions in periods of financial distress are, however, more ambiguous. While some studies report that CARs are slightly positive or even neutral (Yılmaz, 2016), others indicate that negative returns, particularly when the uncertainty levels are higher and the acquirer takes on significant risks to integrate and restructure problematic

assets (Ang & Mauck, 2011; Linssen, 2017). Nevertheless, it is important to note that the combination of returns (target + acquirer) remains statistically significant and positive in the majority of cases, suggesting synergy generation or inefficiency elimination.

The transactions that involve companies financially fragile, generally called distressed M&A, are emphasised in periods of crisis. Existing literature is relatively consensual in indicating that these companies tend to be acquired at significant discounts, which could represent an opportunity for acquirers to obtain high returns in the long-term (Ang & Mauck, 2011; Salaber & Nicholson, 2014). However, short-term results are not always favourable to the acquirer, which can face high costs of integration or operational challenges.

Mooradian and Hotchkis (1997), however, highlight that acquisitions of bankrupt companies could generate positive abnormal returns for both parties, especially when there exists complementarity between both industries. On the other hand, transactions with healthy companies, but non-synergy compatible, do not show the same returns.

Existing literature also reveals significant differences in the way crises affect M&A in developed economies versus emerging ones. Yılmaz (2016) reports that, during crises, target companies in developed countries tend to generate higher value than those located in emerging markets. In countries such as the US, combined CARs increased considerably during the crisis, whereas in emerging markets, the increases were more modest and statistically insignificant.

Reddy et al. (2014) show complementary evidence by observing that after the 2008 financial crisis, emerging countries took advantage of the devaluation in developed countries to increase their cross-border acquisitions, seeking to strategically reposition internationally. This behaviour was motivated by the expectation of recuperation and by the opportunity window to acquire such assets at reduced prices.

2.2. M&A and COVID-19

The COVID-19 pandemic had a considerable impact on global financial markets and, consequently, on M&A activity. Contrary to previous financial crises, such as the financial crisis of 2008, this pandemic introduced not only economic perturbations but also deep technological and social changes, which demanded a fast adaptation of companies' growth strategies (Webster, 2023).

In the first half of 2020, a significant drop in M&A activity was registered. BCG (2020) reported that, from February to March 2020, the main global indexes, including MSCI World, S&P 500, and STOXX Europe 600, lost between 30% and 35% of its value. This instability led to a freeze in several M&A transactions and the closure of IPO windows. The market for leveraged debt financing also suffered substantial interruptions, with several private equity firms suspending their acquisitions (BCG, 2020).

Data presented by BCG (2020) and confirmed by Kooli & Lock Son (2021) indicate that growing volatility and financing difficulties forced companies to postpone or cancel transactions, where others searched for strategic acquisition opportunities where companies had seen their valuations suffer a toll. The generalised uncertainty led to significant changes in the way companies assess risks, impacting directly due diligence processes and negotiations.

Financial valuations were also profoundly affected by the crisis's unpredictability. Cash flow projections became highly uncertain, forcing analysts and investors to rely on multiple scenarios with medium-term horizons, often extending up to four years, to capture the uneven speed of recovery across industries (Cleary & Hossain, 2020). The market's volatility and frequent changes in fiscal policy increased the complexity of estimating appropriate discount rates, highlighting the need to embed uncertainty explicitly in valuation models (Damodaran, 2020, as discussed in Cleary & Hossain, 2020).

Despite the sharp retraction in early 2020, the second half of the year saw a marked rebound in M&A, particularly in technology and telecommunications. Reports indicated a sharp increase in deal values compared with 2019, driven largely by megadeals above USD 5 billion, which were especially concentrated in these two sectors (Boston Consulting Group, 2020; McKinsey & Company, 2022).

This pattern confirmed that the pandemic's impact was highly uneven across industries. Traditional sectors such as energy and heavy industry contracted sharply, while technology firms used the disruption to consolidate their strategic positions and expand capabilities (Kooli & Lock Son, 2021; Webster, 2023).

The crisis also reshaped the motivations behind acquisitions. Firms increasingly deployed M&A to accelerate digital transformation, acquiring technological solutions and competencies that could strengthen resilience in hybrid and remote-operating environments

(Webster, 2023; Boston Consulting Group, 2020). In parallel, financing structures shifted: instead of relying exclusively on cash, acquirers displayed a greater preference for share-based consideration, preserving liquidity and mitigating risk. Mechanisms such as earnouts became more frequent, reflecting both heightened uncertainty and stronger demands for contingent pricing (Magnanelli, Nasta & Ramazio, 2022).

In a general view, the COVID-19 pandemic not only altered deal volumes but also reshaped the conditions under which transactions occurred, influencing valuations, premiums, sectoral dynamics, and payment structures.

One of the most complete studies in this regard is that of Magnanelli, Nasta and Ramazio (2022), in which a sample of 174 transactions with listed companies between January 2019 and March 2021 was analysed. The authors conclude that the average bid premium paid in transactions announced after 2020 increased relative to 2019, where the premium paid was 18% lower than in the former (Magnanelli et al., 2022). Such evolution is explained by target companies' shareholders maintaining pre-crisis valuation levels in their expectations, despite the sharp drop in the stock market (Magnanelli et al., 2022).

This effect is verified by regressions that show a positive relationship, which is statistically significant, between the variable "After 2020" and the bid premiums calculated based on stock prices 30 days before announcement (Magnanelli et al., 2022). Additionally, the COVID-19 severity index shows a positive correlation with premiums paid, which suggests that the more severe the health crisis at the time of the transaction, the greater the sellers' price expectations (Magnanelli et al., 2022).

However, this premium increase was not followed by short-term value creation. On the contrary, cumulative abnormal returns (CARs) for buyers were significantly negative after 2020. The regression conducted demonstrates a negative relationship between "After 2020" and CARs variables, suggesting an unfavourable market reaction to those transactions' announcements (Magnanelli et al., 2022). The CARs average sample value was -15%, with outliers reaching -180% (Magnanelli et al, 2022).

The potential explained proposed by the authors is that macroeconomic uncertainty and low investors' confidence influenced synergies' perception and transactions' future value, leading to a negative market reaction (Magnanelli et al., 2022). Thus, despite an increase in premiums, shareholders of the acquiring companies saw, on average, short-term value destruction.

2.3. Existing gap in literature

Despite the increasing number of articles and papers that study M&A in the context of crises, there are still quite a few gaps that ought to be filled in.

Firstly, due to the recent nature of the COVID-19 pandemic, the time window used in most studies fails to cover the post-pandemic period, which is as relevant as the pre-pandemic period. Most of them investigate 2019 until 2021, not capturing the follow-ups of the subsequent years. For instance, Magnanelli, Nasta and Ramazio analysed 174 transactions between January 2019 and March 2021. The issue comes with the lack of post-pandemic analysis to understand if the effects mentioned in the article are maintained or reversed. Even the authors mention that literature on health crises and variables such as bid premiums and CARs is scarce and that their study intends to fill in that gap.

In terms of sectors, there are also some gaps to be studied. The issue is that econometric analysis in terms of period and sector over premiums and returns remains limited.

Additionally, multiple 2020 accounts point to postponements or cancellations and regulatory delays, but academic evidence that links market conditions and deal terms to the probability of closing is still limited. Pre-COVID crisis studies (e.g., Linssen; Yılmaz) focus more on CARs and combined value; extrapolating to COVID is uncertain given the simultaneous supply- and demand-side shocks and regulatory interventions (e.g., FDI screening). There is, therefore, a gap on the determinants of completion under extreme uncertainty.

Finally, the combination of small N, multiple fixed effects (year, sector, country) and covariates reduces statistical power and pushes designs toward near-singularity. Many studies acknowledge the need for aggregation (regional/sector clusters) for degrees of freedom, which is useful for estimability but potentially end up hiding heterogeneity that is great. Also, missing pieces include specification standardisation, design-level robustness (e.g., period × sector interactions), and data sharing/reproducibility to enable meta-analysis.

3. Data & Methodology

3.1. Data

The database used in this dissertation was obtained from Orbis M&A, from where all relevant variables of M&A transactions were extracted, including relevant dates, transaction status, deal value, target's accounting variables (EBITDA, assets, liabilities, and revenues), payment method, target and acquiror's countries and sectors, and offer price.

The target and acquirers' stock prices on the announcement day, 1 day before the announcement day and 30 days before the announcement were collected from S&P Capital IQ Pro, as Orbis M&A does not provide such data. The ISIN numbers of both the target and acquirer were used to extract the correct stock prices.

The sample covers transactions announced between 2016 and 2025 in the European and North American markets. In terms of data cleaning, the pre-processing of the data was performed entirely in Python. The first part of the code script removes residual years (2014 and 2015) with sparse observations and 2025 due to a lack of observations. In the sample, only listed companies were considered, to ensure the existence of stock prices and trustworthiness on the financials for comparison, and all observations without an announcement date were removed, as they were needed for the stock prices extraction.

Additionally, all occurrences such as "n.a.", "-" and "None" were converted to NaN. Implausible values were also handled: total assets, EBITDA, revenues, liabilities, offer price, and target prices at T-30 and T-1 equal to or below zero were set to missing, as these likely reflect lack of reporting rather than actual values. After that, the *period* variable was built by assigning all years from 2016 to 2019 to the classification of Pre, 2020 and 2021 to Pandemic, and from 2022 until 2024 to Post. Building on this classification criteria, the dummies *pandemic_dummy* and *post_dummy* were created. Apart from these dummies, *payment_cash_dummy*, *payment_shares_dummy* and *payment_mixed_dummy* were also created.

In addition to these variables, sector information is taken from the CIQ target sector field (S&P Capital IQ Pro). To preserve degrees of freedom and comparability across deals, this label is mapped to a small set of broad, but still economically coherent clusters (Technology; Finance; Healthcare; Energy; Telecom/Media; Real Estate; Consumer & Retail; Manufacturing; Transport/Logistics; Other). The mapping is keyword-based and maintains robustness by considering common synonyms (e.g., "Information Technology," "Software,"

"IT" → Technology; "Capital Markets," "Bank," "Insurance" → Finance; "Utilities" → Energy; "Communication Services," "Telecom," "Media" → Telecom/Media). When CIQ sector information was missing, alternative fields (e.g., Target sector, Target industry, NACE classifications) were used. The resulting categorical variable is *Sector_group* and is used both for fixed effects and for the sector-by-period analyses described below.

Target countries were further grouped into broader regions (Europe, North America, Latin America, Asia, Africa, Oceania, Other) to preserve degrees of freedom and comparability across deals. The resulting categorical variable is *Target_region* and is used both for fixed effects and for the region-by-period analyses.

Regarding financial variables of the target, they were standardised by renaming and converting to numeric EBITDA, Total assets, Liabilities, Revenue, and Offer price (everything in euros). A control for outliers via 1-99% winsorization on these variables was applied and, separately, on the offer premium, which is consistent with common M&A practice (de Bodt, Cousin, and Roll, 2018). For prices and the premium, *Price_T_minus_30* was defined as the target's share price thirty calendar days before the announcement, and *Price_T_minus_1* as the share price one day before. The offer premium was computed as the percentage difference between the announced offer price per share and these benchmarks. In descriptive statistics, raw (unwinsorized) premiums were reported, while in regressions the winsorized versions at the 1st and 99th percentiles were used, with an additional robustness check at the 5^{th} and 95^{th} percentiles.

In the current run, the estimation sample for the baseline specification is around N ≈ 50-55 observations (the exact value is reported in each output table).

The formulas and definitions mentioned above are the following:

- *Bid_premium = (Offer_price – Price_T_minus_30) / Price_T_minus_30*
- *Bid_premium = (Offer_price – Price_T_minus_1) / Price_T_minus_1*
- *Bid_premium_wins = winsorize(Bid_premium, 1%, 99%)*
- *Bid_premium1_wins = winsorize(Bid_premium1, 1%, 99%)*
- *Bid_premium_wins_5_95 = winsorize(Bid_premium, 5%, 95%)*
- *size_ln_assets = ln(Total_assets), with Total_assets ≤0 set to NaN*
- *leverage = Liabilities / Total_assets*

- *profitability = EBITDA / Total_assets*

3.2. Sample description

The starting point is an extract with 327 announced transactions. As mentioned before, several data quality and design filters were implemented. First, observations without an announcement date (T0) are removed (-28). Second, a small number of records belonging to years outside our analysis window (2014, 2015 and 2025; -10) are excluded. Third, because bid premiums are benchmarked at T-30, deals without a target price thirty days before the announcement (-88) are dropped. Fourth, core accounting information (Total assets, Liabilities and EBITDA) is required to construct the control variables (-65). Finally, further completeness requirements, such as the availability of fixed-effects groupings and dummies, reduce the sample by 85 additional rows. The final estimation sample for the baseline OLS, therefore, contains 51 deals. These steps are summarised in Table 1.

Table 1 - Sample selection process

Step / Filter	**Count**
Announced M&A records in Orbis extract	327
Less: Missing Announced date (T0)	28
Less: Excluded years (2014, 2015, 2025)	10
Less: Missing target price at T−30	88
Less: Missing core financials (Assets, Liabilities, EBITDA)	65
Less: Other model requirements (FE/dummies/completeness)	85
Final estimation sample (baseline OLS)	51

Figure 1 plots the number of announcements by year in the usable dataset. This distribution underlies the period coding into Pre, Pandemic (2020-2021) and Post (2022 onward) and helps visually assess any time-clustering of deals around the pandemic shock.

Figure 1 - Announcement years distribution

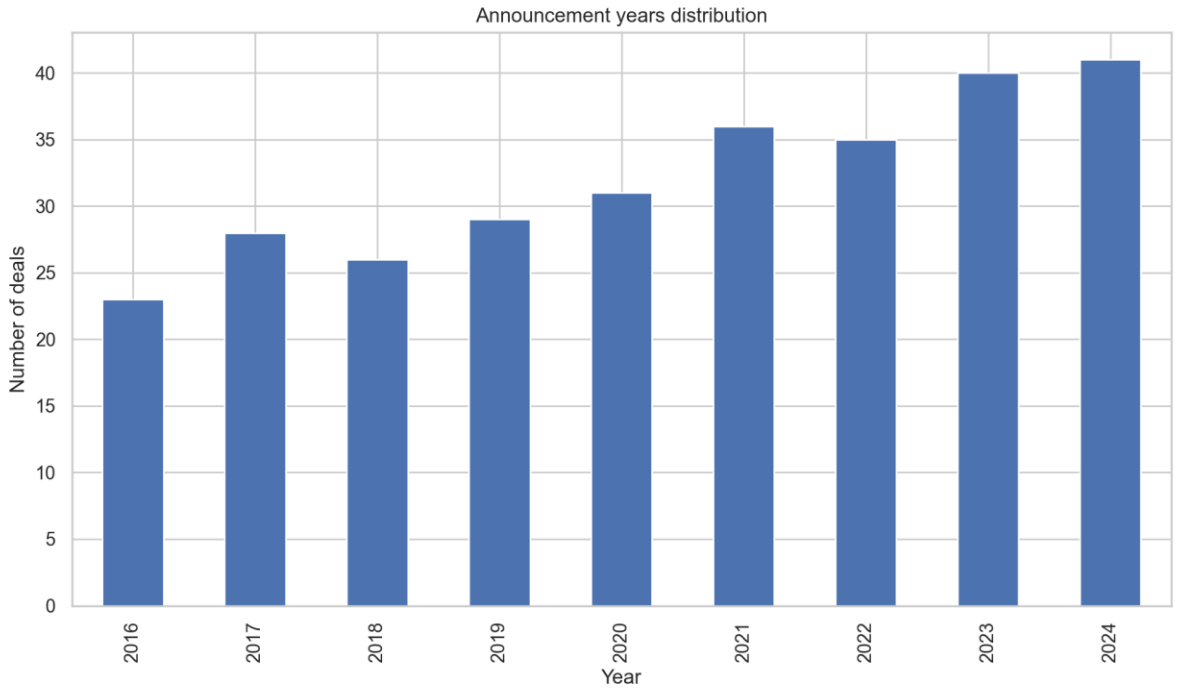

Table 2 reports descriptive statistics for the variables used in the analysis. The winsorized bid premium (BP30) averages 0.250 with a median of 0.096, and exhibits wide dispersion (s.d. 0.690; interquartile range from -0.004 to 0.347), consistent with substantial heterogeneity in offer terms. Using the raw (non-winsorized) premium keeps the centre similar (mean 0.643, median 0.096) but increases dispersion markedly (s.d. 4.627), which supports the use of winsorization at the 1st-99th percentiles in the regressions. Offer prices per share are highly right-skewed (mean €105.64, median €4.24, max €9,300), as are T-30 prices (mean €44.79, median €3.17, max €5,250), reflecting a mix of low-priced and very high-priced securities across targets. The log of total assets centres around 11.35 (median 11.45), pointing to a broad size distribution.

Balance-sheet ratios display the expected variability: Debt/Assets has a mean of 1.053 (median 0.191, s.d. 8.228, 25-75%: 0.067-0.385), and EBITDA/Assets averages 0.095 (median 0.059, s.d. 0.162, 25-75%: 0.024-0.110). Deal structure indicators show that completed deals account for about 55.7% of the observations, cash consideration appears in roughly 64.7%, stock consideration in 47.4%, and mixed structures in 15.2%.

Table 2 - Statistical summary of variables[1]

Variable	Obs.	Mean	Median	Std.Dev.	Min	Max	25pct	75pct
Bid Premium 30 (wins)	118	0.250	0.096	0.690	-0.746	3.538	-0.004	0.347
Bid Premium 30 (raw)	118	0.643	0.096	4.627	-0.872	50.025	-0.004	0.347
Offer (EUR)	138	105.636	4.241	795.832	0.001	9300.000	0.701	24.875
Target Price T-30	201	44.794	3.172	376.880	0.000	5250.000	0.596	11.780
ln(Assets)	262	11.349	11.451	3.124	1.326	19.124	9.294	13.868
Debt over Assets	239	1.053	0.191	8.228	0.000	125.369	0.067	0.385
EBITDA over Assets	98	0.095	0.059	0.162	0.000	1.311	0.024	0.110
Completed	289	0.557	1.000	0.498	0.000	1.000	0.000	1.000
Cash payment	289	0.647	1.000	0.479	0.000	1.000	0.000	1.000
Shares payment	289	0.474	0.000	0.500	0.000	1.000	0.000	1.000
Mixed payment	289	0.152	0.000	0.360	0.000	1.000	0.000	0.000

3.3. Methodology

Following up on the same rationale used by Magnanelli, Nasta, and Ramazio (2022), the pandemic's effect on the bid premiums was tested, by comparing the three periods mentioned previously (Pre, Pandemic, and Post).

The econometric models used in this dissertation are the following:

(i) Base model - Bid premium

Ordinary least squares (OLS) models with fixed effects and heteroskedasticity-robust (HC3) or clustered standard errors were estimated to assess how the pandemic period influences bid premiums 30 days before the announcement. The dependent variable is the winsorized offer premium (*Bid_premium_wins*, 1-99%). The key regressors are the indicators for the pandemic window (2020-2021) and the post-pandemic period (2022-2024). The control

[1] Statistics computed on non-missing observations. *Bid_premium_wins* is winsorized at 1st-99th percentiles

vector includes target size, leverage, profitability, and payment-method dummies (cash, shares, and mixed). To absorb broad market and technological heterogeneity, we include fixed effects for the target's region, the sector group, and the announcement year. Standard errors are clustered at the region level when possible (minimum group size rule); otherwise HC3 robust errors are used.

Because the main baseline absorbs year fixed effects, differences across periods (Pre vs Pandemic vs Post) are tested using Wald contrasts over the relevant year-dummy coefficients, rather than relying only on the period dummies.

$$BP_i = \alpha + \beta_1 Pandemic_i + \beta_2 Post_i + \gamma' X_i + \delta_{Region} + \delta_{Sector} + \delta_{Year} + \varepsilon_i$$

(ii) Sector and Region Heterogeneity

As a descriptive complement, I evaluate within-sector differences in BP30 across periods. For each *Sector_group*, I compute winsorized BP30 means by period and run two-sided Welch t-tests (unequal variances) for *Pandemic* vs. *Pre*, *Post* vs. *Pre*, and *Post* vs. *Pandemic*. To avoid inference that is irrelevant in sparse cells, comparisons are reported only when each group in the pair has at least a minimal number of observations (sector and region tables in the Results section mark cases with insufficient N).

I then estimate regressions with *Period* × *Sector_group* and *Period* × *Target_region* interactions to test whether the pandemic or post-pandemic shifts in BP30 are concentrated in specific subsamples. The specification controls for the same covariates and includes sector or region fixed effects, with year fixed effects absorbed as before.

$$BPi = \alpha + \beta_1 Pandemic_i + \beta_2 Post_i + \sum_s \theta_s \, 1\{s\} + \sum_s \pi_s \, (Pandemic_i \times 1\{s\}) + \sum_s \rho_s \, (Post_i \times 1\{s\}) + \gamma' X_i + \delta_{Year} + \varepsilon_i$$

Here X_i contains size, leverage, profitability, and payment-method dummies; $1\{s\}$ are sector or region indicators with one base category omitted, so interaction coefficients are interpreted as subgroup-specific shifts relative to the pre-period in the base group.

For robustness, several alternative specifications were estimated to assess the stability of the coefficients. First, a model without payment-method dummies was tested, in order to avoid potential overfitting in a relatively small sample. Second, the premium was winsorized at the

5th and 95th percentiles as an alternative treatment of outliers. Third, subsample analyses were conducted for all-cash deals, which represent a sizeable part of the sample and may display different dynamics than mixed or share-based transactions. All of it was estimated for bid premium regressions 1 day before the announcement for robustness check purposes. These alternative approaches consistently confirmed the baseline findings, showing that the results are not a result of modelling choices. Standard diagnostics were also conducted, including variance inflation factors (VIF) to assess multicollinearity and Cook's Distance to identify potentially influential observations. These checks ensured that the estimated coefficients were not driven by extreme or collinear observations.

Finally, it should be noted that the use of the T-30 share price to compute the premium was deliberately chosen to avoid leakage or speculative run-ups immediately before the announcement. This methodological choice ensures that the benchmark price reflects the target's value prior to any market anticipation of the deal. The adoption of time dummies alongside OLS with controls also follows the backbone of the original study by Magnanelli, Nasta, and Ramazio (2022). While that paper additionally incorporated a continuous index of COVID-19 severity, such data was not available for this dissertation. Nevertheless, the overall econometric design remains consistent with established approaches in the literature.

4. Results

4.1. Unconditional Period Comparisons

In this section are presented, firstly, the descriptive statistics for bid premiums and other deal characteristics across the three main periods of analysis, which are Pre (2016-2019), Pandemic (2020-2021), and Post (2022-2024), without conditioning on any controls. Bid premiums are reported primarily at 30 days before the announcement (BP30), with bid premiums at 1 day before (BP1) used as a robustness check. After presenting descriptive evidence, the analysis turns to formal mean-difference tests across periods, followed by a complementary year-by-year perspective to capture potential dynamics that may be obscured by broader groupings. All numbers presented are rounded to one or two decimals.

To begin with, Table 3 shows that across the three periods, the mean BP30 was 15.0% in the Pre period, 32.9% during the Pandemic, and 119.6% in the Post period. Median BP30 values are 8.7% (Pre), 16.8% (Pandemic), and 9.9% (Post). This indicates that, in unconditional terms, premiums did not fall during the pandemic. The very high Post-period mean appears to be driven by a small number of extreme observations (the median in Post is similar to Pre), suggesting a heavier right tail in the Post period.

The robustness check with BP1 paints a consistent picture. The mean BP1 was 9.1% (Pre), 18.0% (Pandemic), and 116.2% (Post), while medians were 2.9%, 6.7%, and 11.3%, respectively. Again, the Post-period mean reflects outliers, whereas the medians are comparatively stable.

Other deal characteristics mostly evolve gradually. The mean ln(Assets) rises from 10.7 (Pre) to 11.4 (Pandemic) and 11.9 (Post), consistent with larger targets being acquired more recently. Profitability (EBITDA/Assets) is 0.11 (Pre), 0.08 (Pandemic), and 0.09 (Post). Leverage is more variable (0.60, 0.31, 1.89, respectively), reflecting dispersion and some extreme values. The method of payment remains cash-heavy but declines somewhat over time: cash-only deals represent 71.7% (Pre), 64.2% (Pandemic), and 58.6% (Post). Completion rates remain high overall: 52.8% (Pre), 56.7% (Pandemic), and 57.8% (Post).

Table 3 - Descriptive statistics - Period: Pre

Variable	mean	median	std	count	min	max
Offer (EUR)	18.789	2.926	43.953	44.000	0.001	260.759

Target P T-30	9.288	1.604	18.613	66.000	0.002	106.892
Target P T-1	10.194	1.922	19.661	67.000	0.002	106.607
Bid premium 30d	15.041	8.700	61.945	4000.000	-69.068	336.724
Bid premium 1d	9.131	2.904	64.105	4100.000	-98.192	335.355
ln(Assets)	10.726	10.702	3.292	95.000	1.926	19.124
Leverage	0.600	0.206	1.558	84.000	0.002	11.700
Profitability	0.108	0.054	0.237	40.000	0.005	1.311
Cash	0.717	1.000	0.453	106.000	0.000	1.000
Shares	0.377	0.000	0.487	106.000	0.000	1.000
Mixed	0.142	0.000	0.350	106.000	0.000	1.000
Completed	0.528	1.000	0.502	106.000	0.000	1.000

Table 4 - Descriptive statistics - Period: Pandemic

Variable	**mean**	**median**	**std**	**count**	**min**	**max**
Offer (EUR)	43.620	11.590	85.374	32.000	0.067	380.970
Target P T-30	26.962	8.465	60.924	45.000	0.067	348.047
Target P T-1	27.613	8.333	64.234	47.000	0.066	378.802
Bid premium 30d	32.859	16.755	56.120	2700.000	-13.129	275.097
Bid premium 1d	18.043	6.749	31.519	2700.000	-36.880	105.905
ln(Assets)	11.432	11.527	2.487	59.000	4.731	16.542
Leverage	0.313	0.200	0.557	58.000	0.001	3.861
Profitability	0.077	0.063	0.063	24.000	0.000	0.233
Cash	0.642	1.000	0.483	67.000	0.000	1.000
Shares	0.537	1.000	0.502	67.000	0.000	1.000
Mixed	0.194	0.000	0.398	67.000	0.000	1.000
Completed	0.567	1.000	0.499	67.000	0.000	1.000

Table 5 - Descriptive statistics - Period: Post

Variable	**mean**	**median**	**std**	**count**	**min**	**max**
Offer (EUR)	199.279	3.513	1183.640	62.000	0.036	9300.000

Target P T-30	79.749	3.472	561.043	90.000	0.000	5250.000
Target P T-1	82.916	3.168	587.503	90.000	0.000	5500.000
Bid premium 30d	119.568	9.929	700.510	5100.000	-87.154	5002.501
Bid premium 1d	116.214	11.310	699.469	5100.000	-88.910	4994.580
ln(Assets)	11.851	11.816	3.214	108.000	1.326	19.032
Leverage	1.887	0.162	12.820	97.000	0.000	125.369
Profitability	0.093	0.076	0.088	34.000	0.000	0.425
Cash	0.586	1.000	0.495	116.000	0.000	1.000
Shares	0.526	1.000	0.501	116.000	0.000	1.000
Mixed	0.138	0.000	0.346	116.000	0.000	1.000
Completed	0.578	1.000	0.496	116.000	0.000	1.000

Overall, the unconditional descriptive evidence does not reveal a sharp drop in premiums during the pandemic. Instead, averages increase (especially in the post-period due to outliers), while medians suggest premiums were broadly stable with a modest run-up during the pandemic.

To then assess whether differences in mean bid premiums are statistically significant, Welch two-sample t-tests were conducted (Annexes Table A1). For BP30, the mean difference Pandemic vs Pre is not significant ($p = 0.227$). Post vs Pre is also not significant ($p = 0.364$), as is Post vs Pandemic ($p = 0.786$). The robustness results using BP1 are consistent: Pandemic vs Pre ($p = 0.462$), Post vs Pre ($p = 0.283$), and Post vs Pandemic ($p = 0.562$) are all insignificant (Anex Table A2). Taken together, these results indicate no statistically discernible period-level shifts in unconditional bid premiums.

The issue is that, while period-level comparisons provide a clean overview, they may mask year-specific dynamics. A year-by-year analysis reveals greater volatility in bid premiums around the pandemic years (Annexes Tables A3 to A11).

For BP30, the mean in 2019 is 6.6%, rising to 43.3% in 2020 and 21.6% in 2021. Relative to the pooled Pre period, 2020 vs Pre ($p = 0.215$) and 2021 vs Pre ($p = 0.588$) are not significant. Against 2019 alone, 2020 vs 2019 ($p = 0.119$) and 2021 vs 2019 ($p = 0.260$) are also not significant. In the Post period, 2022 averages 24.0% (vs 2019, $p = 0.311$), 2023 is roughly -0.1% (vs 2019, $p = 0.682$), and 2024 is elevated at 351.3% (vs 2019, $p = 0.102$), reflecting

outliers; these contrasts do not reach conventional significance thresholds (Annexes Tables A12 to A14).

The BP1 results mirror this pattern. Means are -5.5% (2019), 16.8% (2020), 19.4% (2021), 19.7% (2022), -3.3% (2023), and 348.9% (2024). Tests against the Pre pool and against 2019 are insignificant in each case (e.g., 2020 vs Pre p = 0.613; 2020 vs 2019 p = 0.194; 2021 vs 2019 p = 0.095; 2024 vs 2019 p = 0.062). Adjacent-year contrasts likewise fail to reach significance (Annexes Tables A15 to A17).

These results highlight that while bid premiums fluctuate year by year, especially around 2020 and in 2024 due to extreme observations, differences are not strong enough to be statistically validated at conventional levels. Grouping years into broader periods, therefore, does not conceal major statistically significant shifts, though it does smooth over some volatility that is visible in descriptive terms.

4.2. Conditional Period Comparisons

After the initial raw analysis, there is the need to study whether the period patterns documented above persist once deal and firm-level characteristics and fixed effects are taken into account. The main specification regresses the winsorized 30-day bid premium (BP30) on controls for the target's size (log assets), leverage, profitability, and payment method dummies, while absorbing fixed effects for announcement year, sector group, and target region. Heteroskedasticity-robust (HC3) standard errors are used throughout; with year fixed effects in place, the pandemic/post shifts are tested separately via Wald contrasts over the year dummies.

Table 6 - BP30 - Baseline (wins, FE by Year/Sector/Region)

Variable	Coef.	Std.Err.	t	p
Intercept	0.527	2.316	0.228	0.820
C(Target_region_fe)[T.North America]	0.004	0.602	0.007	0.995
C(Sector_group_fe)[T.Energy]	0.042	2.346	0.018	0.986
C(Sector_group_fe)[T.Finance]	0.000	0.000	0.538	0.591
C(Sector_group_fe)[T.Healthcare]	0.667	2.432	0.274	0.784
C(Sector_group_fe)[T.Manufacturing]	-0.031	2.363	-0.013	0.989
C(Sector_group_fe)[T.Other]	0.371	2.385	0.155	0.876
C(Sector_group_fe)[T.Real Estate]	0.233	2.417	0.097	0.923
C(Sector_group_fe)[T.Technology]	0.462	2.918	0.158	0.874
C(Sector_group_fe)[T.Telecom/Media]	-0.221	2.368	-0.093	0.926
C(Sector_group_fe)[T.Transport/Logistics]	-0.079	2.364	-0.033	0.973
C(Year)[T.2017]	-0.093	0.723	-0.128	0.898

C(Year)[T.2018]	0.338	0.830	0.408	0.684
C(Year)[T.2019]	0.062	0.831	0.075	0.940
C(Year)[T.2020]	-0.478	0.765	-0.625	0.532
C(Year)[T.2021]	-0.067	0.671	-0.099	0.921
C(Year)[T.2022]	-0.069	0.585	-0.118	0.906
C(Year)[T.2023]	-0.432	0.790	-0.546	0.585
C(Year)[T.2024]	0.224	1.207	0.185	0.853
size_ln_assets	-0.073	0.119	-0.615	0.538
leverage	0.666	1.644	0.405	0.685
profitability	3.023	3.677	0.822	0.411
payment_cash_dummy	0.248	0.806	0.308	0.758
payment_shares_dummy	0.079	0.969	0.081	0.935
payment_mixed_dummy	-0.200	0.805	-0.249	0.804
Variable	**Coef.**	**Std.Err.**	**t**	**p**
N	51.000	—	—	—
R-squared	0.372	—	—	—
Adj. R-squared	-0.122	—	—	—

In the baseline BP30 regression, the coefficient on firm size is -0.073 (p = 0.538), indicating a negative but statistically insignificant relationship between target size and premiums. Leverage is positive (0.666, p = 0.685), while profitability is also positive (3.023, p = 0.411) but imprecisely estimated. Payment composition does not appear to drive premiums: cash (0.248, p = 0.758), shares (0.079, p = 0.935), and mixed payments (-0.200, p = 0.804) are all insignificant. The model's R^2 is 0.372 with 51 observations; the adjusted R^2 is -0.122, which is expected given the small sample and large number of fixed effects. Overall, the estimates suggest no variable reaches conventional significance, though the negative sign on size is consistent with the expectation that larger firms attract smaller premiums.

Table 7 - BP30 - No payment controls

Variable	**Coef.**	**Std.Err.**	**t**	**p**
Intercept	1.018	1.709	0.596	0.551
C(Target_region_fe)[T.North America]	-0.006	0.579	-0.010	0.992
C(Sector_group_fe)[T.Energy]	-0.098	0.649	-0.150	0.880
C(Sector_group_fe)[T.Finance]	0.000	0.000	1.078	0.281
C(Sector_group_fe)[T.Healthcare]	0.471	0.604	0.779	0.436
C(Sector_group_fe)[T.Manufacturing]	-0.155	0.687	-0.225	0.822
C(Sector_group_fe)[T.Other]	0.226	0.545	0.416	0.678
C(Sector_group_fe)[T.Real Estate]	0.075	0.668	0.112	0.911
C(Sector_group_fe)[T.Technology]	0.207	0.986	0.209	0.834
C(Sector_group_fe)[T.Telecom/Media]	-0.351	0.770	-0.456	0.648
C(Sector_group_fe)[T.Transport/Logistics]	-0.165	0.742	-0.222	0.824
C(Year)[T.2017]	-0.064	0.680	-0.095	0.925

C(Year)[T.2018]	0.347	0.788	0.440	0.660
C(Year)[T.2019]	0.095	0.786	0.121	0.904
C(Year)[T.2020]	-0.513	0.707	-0.725	0.469
C(Year)[T.2021]	-0.053	0.570	-0.093	0.926
C(Year)[T.2022]	-0.089	0.512	-0.174	0.862
C(Year)[T.2023]	-0.464	0.652	-0.711	0.477
C(Year)[T.2024]	0.226	1.045	0.216	0.829
size_ln_assets	-0.084	0.103	-0.822	0.411
leverage	0.580	1.118	0.519	0.604
profitability	3.030	3.049	0.994	0.320
Variable	**Coef.**	**Std.Err.**	**t**	**p**
N	51.000	—	—	—
R-squared	0.366	—	—	—
Adj. R-squared	-0.057	—	—	—

Removing the payment dummies leaves the main pattern intact. The size effect remains negative (-0.084, p = 0.411), while leverage (0.580, p = 0.604) and profitability (3.030, p = 0.320) remain statistically weak. This shows that the baseline result does not depend on including payment indicators.

Table 8 - BP30 - Winsorized 5-95%

Variable	**Coef.**	**Std.Err.**	**t**	**p**
Intercept	0.215	1.158	0.186	0.853
C(Target_region_fe)[T.North America]	0.063	0.287	0.219	0.827
C(Sector_group_fe)[T.Energy]	0.041	1.197	0.034	0.973
C(Sector_group_fe)[T.Finance]	0.000	0.000	0.490	0.624
C(Sector_group_fe)[T.Healthcare]	0.361	1.243	0.290	0.772
C(Sector_group_fe)[T.Manufacturing]	-0.012	1.190	-0.010	0.992
C(Sector_group_fe)[T.Other]	0.129	1.214	0.106	0.916
C(Sector_group_fe)[T.Real Estate]	0.163	1.218	0.134	0.894
C(Sector_group_fe)[T.Technology]	0.048	1.432	0.034	0.973
C(Sector_group_fe)[T.Telecom/Media]	-0.044	1.207	-0.036	0.971
C(Sector_group_fe)[T.Transport/Logistics]	-0.078	1.203	-0.065	0.948
C(Year)[T.2017]	-0.141	0.361	-0.390	0.697
C(Year)[T.2018]	0.045	0.377	0.119	0.905
C(Year)[T.2019]	0.150	0.424	0.354	0.723
C(Year)[T.2020]	-0.278	0.407	-0.683	0.495
C(Year)[T.2021]	0.023	0.358	0.066	0.948
C(Year)[T.2022]	-0.104	0.305	-0.340	0.734
C(Year)[T.2023]	-0.406	0.402	-1.010	0.313
C(Year)[T.2024]	-0.081	0.542	-0.150	0.881
size_ln_assets	-0.025	0.058	-0.429	0.668
leverage	0.046	0.709	0.065	0.948
profitability	1.347	1.987	0.678	0.498

payment_cash_dummy	0.157	0.403	0.391	0.696
payment_shares_dummy	0.085	0.480	0.177	0.859
payment_mixed_dummy	0.027	0.395	0.070	0.945
Variable	**Coef.**	**Std.Err.**	**t**	**p**
N	51.000	—	—	—
R-squared	0.336	—	—	—
Adj. R-squared	-0.187	—	—	—

Tightening winsorization to 5-95% gives nearly identical conclusions. The size effect is still negative (-0.025, p = 0.668), leverage (0.046, p = 0.948) and profitability (1.347, p = 0.498) remain imprecise, and payment methods are again insignificant. This stability across alternative outlier treatments reduces concerns that results are driven by extreme deals.

Turning to robustness with BP1, the same specifications are re-estimated with BP1 as the dependent variable.

For BP1, the coefficient on size is -0.059 (p = 0.545), again negative but statistically insignificant. Leverage is positive (0.902, p = 0.537), while profitability is also positive (1.690, p = 0.554) but imprecisely estimated. Payment indicators, such as cash (0.179, p = 0.757), shares (-0.002, p = 0.998), and mixed (-0.248, p = 0.689) continue to be statistically unimportant. The R^2 is 0.423 with 51 observations (Annexes Table A18).

Dropping payment indicators for BP1 does not alter the picture: size remains negative (-0.073, p = 0.406), leverage (0.749, p = 0.472) and profitability (1.723, p = 0.478) remain insignificant (Annexes Table A19).

Using the tighter 5-95% winsorization for BP1 yields a size coefficient of -0.023 (p = 0.573), again negative and insignificant, with leverage (0.044, p = 0.926) and profitability (0.598, p = 0.681) also insignificant (Annexes Table A20).

Finally, because the regressions include year fixed effects rather than explicit period dummies, period-level differences were tested through Wald contrasts that average the coefficients of the relevant years, as shown in Table 9. The results show no meaningful evidence of shifts in premiums across periods. For BP30, the comparisons between the Pandemic and Pre periods, between the Post and Pre periods, and between the Post and Pandemic periods are all statistically insignificant. The same holds for BP1, where none of the contrasts reach significance either. Taken together, these results confirm that once year

effects are absorbed, bid premiums do not differ systematically across the Pre, Pandemic, and Post periods.

Table 9 - Wal Period Contrasts (from Year-FE baselines)

Spec	Contrast	F	p
BP30	Pandemic vs Pre	0.861	0.361
BP30	Post vs Pre	0.163	0.690
BP30	Post vs Pandemic	0.125	0.726
BP1	Pandemic vs Pre	0.671	0.420
BP1	Post vs Pre	0.104	0.750
BP1	Post vs Pandemic	0.141	0.710

Overall, conditioning on firm characteristics and fixed effects shows no evidence of statistically significant drivers of bid premiums in this sample. Size is consistently negative across specifications, but always insignificant. Robustness checks (dropping payment dummies, alternative winsorization, and alternative premium window) confirm that the findings are stable.

4.3. Heterogeneity across sectors, regions, and payment composition

This section explores whether the evolution of bid premiums differs across sectors, across broad regions, or depending on the method of payment. The aim is to assess whether the absence of strong period effects in the baseline regressions masks important heterogeneity in subsamples. The analysis combines descriptive summaries with interaction regressions that allow Pandemic and Post effects to vary by sector and region.

Starting with sectors, the regressions do not reveal any statistically significant differences in bid premiums across the Pre, Pandemic, and Post periods, as shown in Tables 10 and 11. Most pandemic and post coefficients are small, typically between 0.6 and 2.4, and all p-values are well above conventional thresholds. This indicates that sectoral patterns in premiums are not robustly identifiable in the sample. Qualitatively, Real Estate exhibits a negative coefficient during the pandemic and a positive one in the post period, while the "Other" category shows somewhat larger swings. However, the lack of statistical significance suggests these patterns are more likely driven by sampling variability than by systematic differences across sectors. It should also be noted that many sectors have too few observations per period to be included in the regressions, which limits the scope of inference.

Table 10 - Sector-specific effects - BP30 (Pandemic/Post)

Sector	Pandemic_effect	Pandemic_p	Post_effect	Post_p	N
Consumer & Retail	0.612	0.499	2.416	0.549	1.000
Energy	0.612	0.499	2.416	0.549	0.000
Finance	0.612	0.499	2.416	0.549	0.000
Healthcare	0.612	0.499	2.416	0.549	0.000
Manufacturing	0.612	0.499	2.416	0.549	0.000
Other	2.164	0.458	-0.805	0.565	12.000
Real Estate	-0.871	0.811	1.759	0.471	5.000
Technology	1.155	0.354	2.416	0.549	1.000
Telecom/Media	0.612	0.499	2.416	0.549	0.000
Transport/Logistics	0.612	0.499	2.416	0.549	0.000

Table 11 - Sector-specific effects - BP1 (Pandemic/Post)

Sector	Pandemic_effect	Pandemic_p	Post_effect	Post_p	N
Consumer & Retail	0.568	0.546	2.434	0.556	1.000
Energy	0.568	0.546	2.434	0.556	0.000
Finance	0.568	0.546	2.434	0.556	0.000
Healthcare	0.568	0.546	2.434	0.556	0.000
Manufacturing	0.568	0.546	2.434	0.556	0.000
Other	2.158	0.474	-0.676	0.638	12.000
Real Estate	-0.973	0.793	1.610	0.455	5.000
Technology	1.088	0.423	2.434	0.556	1.000
Telecom/Media	0.568	0.546	2.434	0.556	0.000
Transport/Logistics	0.568	0.546	2.434	0.556	0.000

Turning to regions, the interactions similarly show no significant differences in premiums across the three periods, shown in Tables 12 and 13. For Europe, coefficients are slightly negative in both the pandemic and post periods, while for North America the estimates are slightly positive. Nevertheless, the p-values remain high, confirming that no region-level effect reaches statistical significance. These results imply that the stability of bid premiums observed earlier holds across geographic subsamples, with no evidence that the pandemic or post-pandemic dynamics were concentrated in a specific region.

Table 12 - Region-specific effects - BP30 (Pandemic/Post)

Region	Pandemic_effect	Pandemic_p	Post_effect	Post_p	N
Europe	-0.435	0.383	-0.208	0.590	35.000
North America	0.299	0.480	0.189	0.647	16.000

Table 13 - Region-specific effects - BP1 (Pandemic/Post)

Region	Pandemic_effect	Pandemic_p	Post_effect	Post_p	N
Europe	-0.365	0.460	-0.118	0.751	35.000
North America	0.365	0.299	0.324	0.418	16.000

The final dimension of heterogeneity concerns the method of payment. Because payment structure can influence both pricing and selection into deals, it is useful to restrict the sample to all-cash transactions.

Re-estimating the baseline model on cash-only deals leads to the same overall picture for period differences. In the BP30 version, none of the period indicators become significant, and the economic magnitudes remain modest once controls and fixed effects are in place (Annexes Table A21). The BP1 cash-only regression tells a similar story, with wide intervals around the period terms and coefficients that are not distinguishable from zero (Annexes Table A22). Given the smaller sample and the larger number of parameters, these results should be interpreted with caution, but they do not point to a hidden effect that only shows up in cash transactions.

4.4. Robustness and Diagnostics

To assess the robustness of the regression specifications in section 4.2., two additional diagnostics were performed.

First, variance inflation factors (VIFs) were computed for the baseline control variables in the BP30 no-payment specification. All values are close to one, indicating that multicollinearity is not a concern. The highest VIF is for the (≈ 32.8), which is expected and does not affect inference on the covariates.

Second, potential influential observations were examined through Cook's distance rankings. The top 15 deals are reported separately for BP30, in Table X, and BP1, in Table X. A handful of transactions exert relatively higher leverage on the estimates, but even the largest

Cook's distances remain well below conventional cutoffs, suggesting that no single deal drives the main results.

Table 14 - Top influential deals - BP30

size_ln_assets	leverage	profitability	Year	Target_region_fe	Sector_group_fe	Bid_premium_wins	cookD
7.929	0.953	0.181	2024	Europe	Other	3.538	0.498
8.212	0.145	0.058	2018	Europe	Other	3.367	0.247
11.470	0.191	0.269	2022	Europe	Energy	1.804	0.095
11.125	0.066	0.098	2016	Europe	Other	0.015	0.048
13.857	0.002	0.007	2022	Europe	Telecom/ Media	0.305	0.045
10.583	0.245	0.077	2018	Europe	Other	0.091	0.038
14.775	0.025	0.028	2021	Europe	Real Estate	0.550	0.038
14.089	0.534	0.233	2021	Europe	Telecom/ Media	-0.033	0.031
7.243	0.111	0.043	2024	Europe	Telecom/ Media	-0.159	0.025
13.947	0.479	0.061	2022	Europe	Energy	-0.746	0.025
7.245	0.111	0.043	2024	Europe	Telecom/ Media	-0.156	0.025
15.833	0.043	0.010	2017	Europe	Energy	0.089	0.024
13.343	0.049	0.207	2017	North America	Real Estate	0.193	0.023
10.010	0.566	0.064	2021	Europe	Manufacturing	0.057	0.023
17.028	0.284	0.157	2022	North America	Consumer & Retail	0.129	0.022

Table 15 - Top influential deals - BP1

size_ln_assets	leverage	profitability	Year	Target_region_fe	Sector_group_fe	Bid_premium1_wins	cookD
7.929	0.953	0.181	2024	Europe	Other	3.592	0.537

8.212	0.145	0.058	2018	Europe	Other	3.354	0.276
10.583	0.245	0.077	2018	Europe	Other	0.042	0.056
13.857	0.002	0.007	2022	Europe	Telecom/ Media	0.250	0.041
14.775	0.025	0.028	2021	Europe	Real Estate	0.467	0.039
11.125	0.066	0.098	2016	Europe	Other	0.018	0.037
13.947	0.479	0.061	2022	Europe	Energy	-0.745	0.025
14.089	0.534	0.233	2021	Europe	Telecom/ Media	-0.039	0.024
14.506	0.076	0.135	2024	North America	Other	0.113	0.023
11.989	0.146	0.024	2017	Europe	Other	0.063	0.019
14.984	0.068	0.005	2022	Europe	Manufactu ring	0.025	0.019
7.243	0.111	0.043	2024	Europe	Telecom/ Media	0.073	0.019
7.245	0.111	0.043	2024	Europe	Telecom/ Media	0.076	0.019
12.794	0.629	0.118	2022	Europe	Other	0.228	0.017
11.470	0.191	0.269	2022	Europe	Energy	0.760	0.017

4.5. Comparison with existing study

A natural benchmark for these findings is the study of Magnanelli, Nasta, and Ramazio (2022), which also investigates the impact of the COVID-19 pandemic on bid premiums,

using a sample of 174 transactions announced between January 2019 and March 2021 across major developed economies. Their central result is that bid premiums, measured relative to the target's share price thirty days before announcement, increased significantly after 2020. Specifically, their "After 2020" dummy is positive and statistically significant for BP30, while shorter windows (BP1 and BP7) are not. They interpret this increase as a consequence of target shareholders anchoring to pre-crisis valuation levels despite market volatility, which forced acquirers to offer higher premiums. In parallel, they report that short-term cumulative abnormal returns (CARs) for acquirers were strongly negative after 2020, suggesting that higher premiums did not translate into immediate value creation.

Relative to those results, this dissertation reaches more cautious conclusions. Unconditionally, average BP30 is slightly higher in the Post period compared to Pre, consistent in sign with Magnanelli et al. (2022), but formal mean-difference tests do not confirm statistical significance. Once firm-level controls and fixed effects are introduced, Pandemic and Post indicators are consistently small and insignificant, with variation absorbed instead by specific years (a dip in 2020 and a rebound in 2022). In other words, while Magnanelli et al. find a broad premium uplift "after 2020," the present evidence suggests that premiums fluctuate more narrowly around year-specific conditions rather than a persistent pandemic/post regime.

Differences in sample design help explain these contrasting findings. Magnanelli et al. stop in early 2021, so their "After 2020" category pools 2020 and 2021 deals, whereas this dissertation extends the window through 2024, which reveals the rebound of 2022 and the subsequent moderation in 2023. Their design also includes a COVID Severity Index as a regressor, which captures contemporaneous health conditions, while the current analysis relies on fixed effects for year, sector, and region. Finally, the sample size here is smaller, limited to around 80 listed-target deals with complete price and financial information, which constrains statistical power but allows for richer sector and regional coding.

The contrast between the two studies underscores that inference on crisis-time M&A is highly sensitive to sample coverage and specification choices. Both studies agree that bid premiums did not collapse during the pandemic, contrary to what might be expected under fire-sale conditions. Where they diverge is on the persistence and statistical robustness of an "after-2020" premium increase: Magnanelli et al. document it clearly in a short horizon, while

the present analysis, with longer coverage and year effects, finds no robust evidence once annual variation is accounted for.

5. Conclusion

This dissertation analysed whether the COVID-19 pandemic and its aftermath altered the pricing of listed-target M&A transactions. The analysis focused on bid premiums measured thirty days before announcement (BP30) across three periods: Pre (2016-2019), Pandemic (2020-2021), and Post (2022-2024). A dataset was constructed by combining Orbis M&A deals information with target stock prices from S&P Capital IQ Pro. The final sample comprised listed companies in Europe and North America, cleaned and grouped into broad sector and regional clusters. Ordinary least squares regressions were estimated with firm-level controls (size, leverage, profitability), payment-method indicators, and fixed effects for year, sector, and region. Robustness checks applied alternative winsorisation thresholds, excluded payment-method dummies, and tested an all-cash subsample. Additional analyses explored sectoral and regional heterogeneity through Welch tests and interaction regressions.

The results show that bid premiums did not fall during the pandemic. Unconditionally, averages increased, in particular in the post-pandemic period, but medians remained broadly stable, indicating that extreme outliers drove much of the rise. Formal mean-difference tests confirm that the observed contrasts between Pre, Pandemic, and Post periods are statistically insignificant once year effects are considered. This suggests that premiums were shaped less by a structural "pandemic regime" and more by year-specific market conditions, such as the dip in 2020 and rebound in 2022.

In the regression analysis, period dummies were consistently small and insignificant, while annual effects captured meaningful variation in premiums. Firm characteristics such as size, leverage, and profitability did not yield statistically robust associations, and payment-method dummies were also insignificant. These results were stable under alternative outlier treatments, model simplifications, and the cash-only subsample. Sector-specific analyses revealed no systematic differences across industries, with period–sector interaction terms remaining small and imprecise. By contrast, regional interactions indicated some divergence, with North American deals displaying higher premiums during the pandemic relative to Europe, although this effect was not persistent in the post period.

All in all, the findings indicate that bid premiums were influenced primarily by year-to-year market dynamics rather than by the pandemic or post-pandemic phases. The absence of systematic shifts across sectors and the fragility of regional effects further support the view

that shocks such as COVID-19 alter M&A pricing mainly through transient macro-financial conditions rather than structural changes.

Limitations of the study include the small sample of listed transactions with complete data, the reliance on broad regional and sectoral groupings to preserve degrees of freedom, and the focus on BP30 as the sole premium measure. Future research could expand the dataset across geographies and years, incorporate additional deal- and market-level variables, and employ alternative econometric approaches such as quantile regressions or panel designs. These extensions would allow for a deeper understanding of how crisis episodes shape value distribution in M&A beyond the specific case of COVID-19.

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Annexes

Table A16 - Welch tests - BP30 (by period)

Variable	N1	N2	t	p
Pandemic vs Pre	27	40	1.222	0.2265
Post vs Pre	51	40	0.913	0.3635
Post vs Pandemic	51	27	-0.273	0.7856

Table 17 - Welch tests – BP1 (by period)

Variable	N1	N2	t	p
Pandemic vs Pre	27	41	0.741	0.4617
Post vs Pre	51	41	1.080	0.2832
Post vs Pandemic	51	27	0.583	0.5616

Table 18 - Descriptive statistics - Year: 2016

Variable	mean	median	std	count	min	max
Offer (EUR)	15.244	0.746	34.162	11.000	0.014	108.536
Target P T-30	11.151	0.770	27.063	17.000	0.020	106.892
Target P T-1	11.555	0.845	27.414	17.000	0.023	106.607
Bid premium 30d	3.628	1.706	39.456	1100.000	-45.055	94.863
Bid premium 1d	-2.629	0.547	38.324	1100.000	-73.152	67.069
ln(Assets)	10.930	10.495	3.471	19.000	1.926	15.875
Leverage	1.065	0.347	2.756	17.000	0.009	11.700
Profitability	0.266	0.053	0.516	6.000	0.008	1.311
Cash	0.696	1.000	0.470	23.000	0.000	1.000
Shares	0.435	0.000	0.507	23.000	0.000	1.000
Mixed	0.130	0.000	0.344	23.000	0.000	1.000
Completed	0.522	1.000	0.511	23.000	0.000	1.000

Table 19 - Descriptive statistics - Year: 2017

Variable	mean	median	std	count	min	max

Offer (EUR)	21.334	22.393	14.084	9.000	5.130	46.643
Target P T-30	11.558	6.969	12.083	16.000	0.027	39.415
Target P T-1	11.475	7.759	11.430	16.000	0.029	36.923
Bid premium 30d	9.567	6.611	9.441	800.000	-0.188	23.317
Bid premium 1d	7.532	4.173	11.715	800.000	-6.159	26.324
ln(Assets)	10.963	10.815	3.798	26.000	4.301	19.124
Leverage	0.417	0.131	0.674	24.000	0.014	3.147
Profitability	0.118	0.054	0.211	15.000	0.006	0.854
Cash	0.714	1.000	0.460	28.000	0.000	1.000
Shares	0.286	0.000	0.460	28.000	0.000	1.000
Mixed	0.143	0.000	0.356	28.000	0.000	1.000
Completed	0.571	1.000	0.504	28.000	0.000	1.000

Table 20 - Descriptive statistics - Year: 2018

Variable	**mean**	**median**	**std**	**count**	**min**	**max**
Offer (EUR)	39.376	3.927	78.358	11.000	0.001	260.759
Target P T-30	11.521	0.982	21.708	17.000	0.002	68.000
Target P T-1	11.523	0.910	21.896	17.000	0.002	70.000
Bid premium 30d	45.057	9.063	115.895	900.000	-69.068	336.724
Bid premium 1d	46.090	4.237	115.659	900.000	-69.734	335.355
ln(Assets)	10.967	11.878	2.875	24.000	4.178	15.360
Leverage	0.534	0.157	1.661	20.000	0.009	7.584
Profitability	0.058	0.057	0.021	12.000	0.024	0.103
Cash	0.731	1.000	0.452	26.000	0.000	1.000
Shares	0.385	0.000	0.496	26.000	0.000	1.000
Mixed	0.115	0.000	0.326	26.000	0.000	1.000
Completed	0.500	0.500	0.510	26.000	0.000	1.000

Table 21 - Descriptive statistics – Year: 2019

Variable	**mean**	**median**	**std**	**count**	**min**	**max**

Offer (EUR)	2.606	1.206	3.520	13.000	0.100	11.586
Target P T-30	2.665	1.170	3.071	16.000	0.111	8.709
Target P T-1	6.300	1.612	14.818	17.000	0.110	62.500
Bid premium 30d	6.641	12.226	37.389	1200.000	-66.667	47.076
Bid premium 1d	-5.523	2.904	45.724	1300.000	-98.192	58.991
ln(Assets)	10.118	10.319	3.083	26.000	4.920	14.915
Leverage	0.506	0.301	0.747	23.000	0.002	3.500
Profitability	0.039	0.013	0.038	7.000	0.005	0.097
Cash	0.724	1.000	0.455	29.000	0.000	1.000
Shares	0.414	0.000	0.501	29.000	0.000	1.000
Mixed	0.172	0.000	0.384	29.000	0.000	1.000
Completed	0.517	1.000	0.509	29.000	0.000	1.000

Table 22 - Descriptive statistics – Year: 2020

Variable	**mean**	**median**	**std**	**count**	**min**	**max**
Offer (EUR)	11.757	5.371	17.270	16.000	0.067	70.468
Target P T-30	27.982	2.864	75.067	22.000	0.067	348.047
Target P T-1	29.682	2.807	79.828	23.000	0.066	378.802
Bid premium 30d	43.270	26.619	73.835	1400.000	-13.129	275.097
Bid premium 1d	16.784	4.590	39.086	1400.000	-36.880	105.905
ln(Assets)	12.119	11.936	2.335	27.000	7.733	16.542
Leverage	0.222	0.203	0.169	27.000	0.001	0.578
Profitability	0.064	0.061	0.063	8.000	0.000	0.181
Cash	0.806	1.000	0.402	31.000	0.000	1.000
Shares	0.484	0.000	0.508	31.000	0.000	1.000
Mixed	0.290	0.000	0.461	31.000	0.000	1.000
Completed	0.581	1.000	0.502	31.000	0.000	1.000

Table 23 - Descriptive statistics – Year: 2021

Variable	**mean**	**median**	**std**	**count**	**min**	**max**

Offer (EUR)	75.483	20.134	112.246	16.000	0.506	380.970
Target P T-30	25.986	8.468	45.194	23.000	0.346	163.989
Target P T-1	25.631	8.411	46.348	24.000	0.197	179.682
Bid premium 30d	21.647	11.870	25.596	1300.000	-5.130	70.888
Bid premium 1d	19.399	14.997	22.217	1300.000	-5.115	56.944
ln(Assets)	10.853	11.039	2.499	32.000	4.731	14.775
Leverage	0.392	0.176	0.743	31.000	0.001	3.861
Profitability	0.083	0.063	0.064	16.000	0.004	0.233
Cash	0.500	0.500	0.507	36.000	0.000	1.000
Shares	0.583	1.000	0.500	36.000	0.000	1.000
Mixed	0.111	0.000	0.319	36.000	0.000	1.000
Completed	0.556	1.000	0.504	36.000	0.000	1.000

Table 24 - Descriptive statistics – Year: 2022

Variable	**mean**	**median**	**std**	**count**	**min**	**max**
Offer (EUR)	12.189	2.877	15.019	23.000	0.094	55.137
Target P T-30	45.411	9.247	182.847	29.000	0.047	994.156
Target P T-1	46.792	9.385	188.698	29.000	0.061	1025.652
Bid premium 30d	23.956	11.095	58.003	2000.000	-75.767	180.415
Bid premium 1d	19.670	14.161	44.251	2000.000	-74.466	110.916
ln(Assets)	11.895	12.299	3.453	35.000	1.326	17.557
Leverage	4.414	0.287	21.442	34.000	0.002	125.369
Profitability	0.091	0.117	0.082	13.000	0.000	0.269
Cash	0.543	1.000	0.505	35.000	0.000	1.000
Shares	0.571	1.000	0.502	35.000	0.000	1.000
Mixed	0.143	0.000	0.355	35.000	0.000	1.000
Completed	0.457	0.000	0.505	35.000	0.000	1.000

Table 25 - Descriptive statistics – Year: 2023

Variable	**mean**	**median**	**std**	**count**	**min**	**max**

Offer (EUR)	50.644	0.700	155.015	17.000	0.036	642.694
Target P T-30	9.838	2.835	18.258	31.000	0.038	71.930
Target P T-1	9.831	3.118	18.445	31.000	0.031	74.054
Bid premium 30d	-0.127	-0.508	38.355	1500.000	-87.154	70.014
Bid premium 1d	-3.275	-1.663	36.628	1500.000	-88.910	73.632
ln(Assets)	11.095	11.096	2.794	32.000	4.785	15.850
Leverage	0.768	0.142	2.995	30.000	0.001	16.553
Profitability	0.085	0.065	0.057	9.000	0.017	0.181
Cash	0.600	1.000	0.496	40.000	0.000	1.000
Shares	0.475	0.000	0.506	40.000	0.000	1.000
Mixed	0.100	0.000	0.304	40.000	0.000	1.000
Completed	0.650	1.000	0.483	40.000	0.000	1.000

Table 26 - Descriptive statistics – Year: 2024

Variable	**mean**	**median**	**std**	**count**	**min**	**max**
Offer (EUR)	509.727	21.000	1973.284	22.000	0.070	9300.000
Target P T-30	185.183	2.180	956.810	30.000	0.000	5250.000
Target P T-1	193.357	2.561	1002.458	30.000	0.000	5500.000
Bid premium 30d	351.296	23.579	1243.498	1600.000	-26.372	5002.501
Bid premium 1d	348.916	12.412	1242.038	1600.000	-13.386	4994.580
ln(Assets)	12.405	13.137	3.267	41.000	4.368	19.032
Leverage	0.300	0.123	0.484	33.000	0.000	2.537
Profitability	0.102	0.070	0.114	12.000	0.010	0.425
Cash	0.610	1.000	0.494	41.000	0.000	1.000
Shares	0.537	1.000	0.505	41.000	0.000	1.000
Mixed	0.171	0.000	0.381	41.000	0.000	1.000
Completed	0.610	1.000	0.494	41.000	0.000	1.000

Table 27 - Year-wise tests - BP30 vs Pre pool

Variable	**N(y)**	**N(base)**	**t**	**p**
2016	11	40	-0.741	0.4657

2017	8	40	-0.529	0.5994
2018	9	40	0.753	0.4705
2019	12	40	-0.576	0.5686
2020	14	40	1.281	0.2149
2021	13	40	0.546	0.5876
2022	20	40	0.553	0.5835
2023	15	40	-1.056	0.2970
2024	16	40	1.467	0.1594

Table 28 - Year-wise tests - BP30 vs 2019

Variable	N(y)	N(base)	t	P
2016	11	12	-0.188	0.8530
2017	8	12	0.259	0.7997
2018	9	12	0.958	0.3625
2019	12	12	0.000	1.000
2020	14	12	1.629	0.1192
2021	13	12	1.162	0.2596
2022	20	12	1.031	0.3110
2023	15	12	-0.415	0.6823
2024	16	12	1.719	0.1020

Table 29 - Year-wise tests - BP30 adjacent years

Variable	N0	N1	t	P
2017 vs 2016	11	8	-0.481	0.6397
2018 vs 2017	8	9	-0.915	0.3864
2019 vs 2018	9	12	0.958	0.3625
2020 vs 2019	12	14	-1.629	0.1192
2021 vs 2020	14	13	1.031	0.3176
2022 vs 2021	13	20	-0.160	0.8738
2023 vs 2022	20	15	1.457	0.1549
2024 vs 2023	15	16	-1.936	0.0687

Table 30 - Year-wise tests - BP1 vs Pre pool

Variable	N(y)	N(base)	t	P
2016	11	41	-0.791	0.4362

2017	8	41	-0.175	0.8616
2018	9	41	0.921	0.3808
2019	13	41	-0.894	0.3786
2020	14	41	0.511	0.6126
2021	13	41	0.853	0.3974
2022	20	41	0.731	0.4682
2023	15	41	-0.918	0.3637
2024	16	41	1.579	0.1313

Table 31 - Year-wise tests - BP1 vs 2019

Variable	N(y)	N(base)	t	P
2016	11	13	0.118	0.9070
2017	8	13	0.946	0.3595
2018	9	13	1.254	0.2394
2019	13	13	0.000	1.000
2020	14	13	1.335	0.1942
2021	13	13	1.763	0.0951
2022	20	13	1.550	0.1333
2023	15	13	0.098	0.9225
2024	16	13	1.979	0.0620

Table 32 - Year-wise tests - BP1 adjacent years

Variable	N0	N1	t	P
2017 vs 2016	11	8	-0.828	0.4234
2018 vs 2017	8	9	-0.994	0.3485
2019 vs 2018	9	12	1.254	0.2394
2020 vs 2019	13	14	-1.335	0.1942
2021 vs 2020	14	13	-0.216	0.8314
2022 vs 2021	13	20	-0.023	0.9816
2023 vs 2022	20	15	1.673	0.1039
2024 vs 2023	15	16	-1.991	0.0620

Table 33 - BP1 - Baseline (wins, FE by Year/Sector/Region)

Variable	Coef.	Std.Err.	t	p
Intercept	0.425	1.668	0.255	0.799

C(Target_region_fe)[T.North America]	-0.043	0.553	-0.078	0.938
C(Sector_group_fe)[T.Energy]	-0.118	1.433	-0.082	0.934
C(Sector_group_fe)[T.Finance]	0.000	0.000	0.353	0.724
C(Sector_group_fe)[T.Healthcare]	0.682	1.524	0.448	0.654
C(Sector_group_fe)[T.Manufacturing]	-0.104	1.442	-0.072	0.942
C(Sector_group_fe)[T.Other]	0.410	1.459	0.281	0.778
C(Sector_group_fe)[T.Real Estate]	0.090	1.514	0.060	0.953
C(Sector_group_fe)[T.Technology]	0.403	2.238	0.180	0.857
C(Sector_group_fe)[T.Telecom/Media]	-0.269	1.451	-0.186	0.853
C(Sector_group_fe)[T.Transport/Logistics]	-0.243	1.454	-0.167	0.867
C(Year)[T.2017]	0.076	0.632	0.121	0.904
C(Year)[T.2018]	0.445	0.767	0.581	0.561
C(Year)[T.2019]	0.161	0.759	0.212	0.832
C(Year)[T.2020]	-0.264	0.655	-0.402	0.687
C(Year)[T.2021]	0.065	0.584	0.112	0.911
C(Year)[T.2022]	0.032	0.502	0.063	0.950
C(Year)[T.2023]	-0.257	0.672	-0.382	0.702
C(Year)[T.2024]	0.461	1.071	0.430	0.667
size_ln_assets	-0.059	0.098	-0.605	0.545
leverage	0.902	1.459	0.618	0.537
profitability	1.690	2.858	0.591	0.554
payment_cash_dummy	0.179	0.580	0.309	0.757
payment_shares_dummy	-0.002	0.740	-0.002	0.998
payment_mixed_dummy	-0.248	0.619	-0.400	0.689
Variable	**Coef.**	**Std.Err.**	**t**	**p**
N	51.000	—	—	—
R-squared	0.423	—	—	—
Adj. R-squared	-0.030	—	—	—

Table 34 - BP1 - No payment controls

Variable	**Coef.**	**Std.Err.**	**t**	**p**
Intercept	0.946	1.478	0.640	0.522
C(Target_region_fe)[T.North America]	-0.070	0.533	-0.132	0.895
C(Sector_group_fe)[T.Energy]	-0.333	0.500	-0.665	0.506
C(Sector_group_fe)[T.Finance]	0.000	0.000	0.772	0.440
C(Sector_group_fe)[T.Healthcare]	0.442	0.473	0.935	0.350
C(Sector_group_fe)[T.Manufacturing]	-0.287	0.558	-0.515	0.607
C(Sector_group_fe)[T.Other]	0.172	0.425	0.404	0.686
C(Sector_group_fe)[T.Real Estate]	-0.165	0.530	-0.311	0.756
C(Sector_group_fe)[T.Technology]	0.091	0.912	0.100	0.920
C(Sector_group_fe)[T.Telecom/Media]	-0.455	0.661	-0.689	0.491
C(Sector_group_fe)[T.Transport/Logistics]	-0.382	0.617	-0.619	0.536
C(Year)[T.2017]	0.113	0.590	0.191	0.848
C(Year)[T.2018]	0.473	0.715	0.661	0.509
C(Year)[T.2019]	0.210	0.699	0.301	0.764
C(Year)[T.2020]	-0.280	0.573	-0.489	0.625

C(Year)[T.2021]	0.077	0.462	0.167	0.867
C(Year)[T.2022]	-0.021	0.432	-0.048	0.962
C(Year)[T.2023]	-0.303	0.545	-0.556	0.578
C(Year)[T.2024]	0.459	0.956	0.480	0.631
size_ln_assets	-0.073	0.087	-0.832	0.406
leverage	0.749	1.041	0.719	0.472
profitability	1.723	2.429	0.709	0.478
Variable	**Coef.**	**Std.Err.**	**t**	**p**
N	51.000	—	—	—
R-squared	0.411	—	—	—
Adj. R-squared	0.018	—	—	—

Table 35 - BP1 - Winsorized 5-95%

Variable	**Coef.**	**Std.Err.**	**t**	**p**
Intercept	0.239	0.709	0.337	0.736
C(Target_region_fe)[T.North America]	0.027	0.219	0.122	0.903
C(Sector_group_fe)[T.Energy]	-0.083	0.655	-0.127	0.899
C(Sector_group_fe)[T.Finance]	0.000	0.000	0.323	0.746
C(Sector_group_fe)[T.Healthcare]	0.344	0.674	0.510	0.610
C(Sector_group_fe)[T.Manufacturing]	-0.067	0.623	-0.107	0.915
C(Sector_group_fe)[T.Other]	0.055	0.650	0.084	0.933
C(Sector_group_fe)[T.Real Estate]	-0.044	0.670	-0.065	0.948
C(Sector_group_fe)[T.Technology]	-0.015	0.944	-0.016	0.987
C(Sector_group_fe)[T.Telecom/Media]	-0.069	0.650	-0.107	0.915
C(Sector_group_fe)[T.Transport/Logistics]	-0.174	0.666	-0.261	0.794
C(Year)[T.2017]	-0.045	0.268	-0.167	0.868
C(Year)[T.2018]	0.068	0.297	0.230	0.818
C(Year)[T.2019]	0.209	0.362	0.576	0.565
C(Year)[T.2020]	-0.123	0.281	-0.437	0.662
C(Year)[T.2021]	0.086	0.280	0.307	0.759
C(Year)[T.2022]	-0.050	0.260	-0.191	0.848
C(Year)[T.2023]	-0.296	0.314	-0.944	0.345
C(Year)[T.2024]	0.023	0.376	0.060	0.952
size_ln_assets	-0.023	0.041	-0.564	0.573
leverage	0.044	0.477	0.093	0.926
profitability	0.598	1.456	0.411	0.681
payment_cash_dummy	0.171	0.247	0.694	0.487
payment_shares_dummy	0.115	0.308	0.372	0.710
payment_mixed_dummy	0.047	0.264	0.180	0.857
Variable	**Coef.**	**Std.Err.**	**t**	**p**
N	51.000	—	—	—
R-squared	0.345	—	—	—
Adj. R-squared	-0.169	—	—	—

Table 36 - All-cash subsample - BP30 OLS

Variable	Coef.	Std.Err.	t	p
Intercept	0.430	1.702	0.253	0.801
C(Target_region_fe)[T.North America]	0.035	0.721	0.049	0.961
C(Sector_group_fe)[T.Energy]	0.162	2.593	0.063	0.950
C(Sector_group_fe)[T.Finance]	-0.000	0.000	-0.167	0.867
C(Sector_group_fe)[T.Healthcare]	0.000	0.000	0.016	0.987
C(Sector_group_fe)[T.Manufacturing]	-0.145	2.545	-0.057	0.955
C(Sector_group_fe)[T.Other]	0.559	2.509	0.223	0.824
C(Sector_group_fe)[T.Real Estate]	0.158	2.641	0.060	0.952
C(Sector_group_fe)[T.Technology]	0.000	0.000	0.339	0.735
C(Sector_group_fe)[T.Telecom/Media]	-0.265	2.451	-0.108	0.914
C(Sector_group_fe)[T.Transport/Logistics]	-0.031	2.489	-0.012	0.990
C(Year)[T.2017]	-0.034	0.980	-0.035	0.972
C(Year)[T.2018]	0.607	1.347	0.450	0.653
C(Year)[T.2019]	0.217	1.350	0.160	0.873
C(Year)[T.2020]	-0.227	1.307	-0.174	0.862
C(Year)[T.2021]	0.087	1.153	0.075	0.940
C(Year)[T.2022]	0.194	1.149	0.169	0.866
C(Year)[T.2023]	-0.609	1.233	-0.494	0.621
C(Year)[T.2024]	0.286	1.588	0.180	0.857
size_ln_assets	-0.092	0.145	-0.633	0.527
leverage	0.686	2.078	0.330	0.741
profitability	2.570	4.882	0.526	0.599
payment_cash_dummy	0.430	1.702	0.253	0.801
payment_shares_dummy	-0.072	0.566	-0.127	0.899
payment_mixed_dummy	-0.072	0.566	-0.127	0.899
Variable	**Coef.**	**Std.Err.**	**t**	**p**
N	38.000	—	—	—
R-squared	0.428	—	—	—
Adj. R-squared	-0.175	—	—	—

Table 37 - All-cash subsample - BP1 OLS

Variable	Coef.	Std.Err.	t	p
Intercept	0.370	1.255	0.295	0.768
C(Target_region_fe)[T.North America]	-0.004	0.673	-0.006	0.995
C(Sector_group_fe)[T.Energy]	-0.110	1.745	-0.063	0.950
C(Sector_group_fe)[T.Finance]	-0.000	0.000	-0.179	0.858
C(Sector_group_fe)[T.Healthcare]	-0.000	0.000	-0.067	0.946
C(Sector_group_fe)[T.Manufacturing]	-0.187	1.745	-0.107	0.915
C(Sector_group_fe)[T.Other]	0.540	1.661	0.325	0.745
C(Sector_group_fe)[T.Real Estate]	-0.011	1.840	-0.006	0.995
C(Sector_group_fe)[T.Technology]	0.000	0.000	0.186	0.852
C(Sector_group_fe)[T.Telecom/Media]	-0.342	1.621	-0.211	0.833
C(Sector_group_fe)[T.Transport/Logistics]	-0.223	1.666	-0.134	0.894
C(Year)[T.2017]	0.137	0.845	0.162	0.871
C(Year)[T.2018]	0.753	1.207	0.624	0.533

C(Year)[T.2019]	0.233	1.166	0.200	0.842
C(Year)[T.2020]	-0.169	1.289	-0.131	0.896
C(Year)[T.2021]	0.149	0.975	0.153	0.878
C(Year)[T.2022]	0.206	0.882	0.233	0.815
C(Year)[T.2023]	-0.413	1.061	-0.389	0.697
C(Year)[T.2024]	0.490	1.344	0.365	0.715
size_ln_assets	-0.077	0.117	-0.664	0.507
leverage	0.971	1.769	0.549	0.583
profitability	1.298	3.583	0.362	0.717
payment_cash_dummy	0.370	1.255	0.295	0.768
payment_shares_dummy	-0.126	0.475	-0.265	0.791
payment_mixed_dummy	-0.126	0.475	-0.265	0.791
Variable	**Coef.**	**Std.Err.**	**t**	**p**
N	38.000	—	—	—
R-squared	0.504	—	—	—
Adj. R-squared	-0.020	—	—	—

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