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The Impact of SPAC Mergers on Financial Performance and Growth: Evidence from the Italian Market

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Abstract

This study examines the impact of SPAC mergers on the financial performance of Italian firms, focusing on profitability (ROE, ROI), sales growth, and workforce expansion. A sample of business combinations completed between 2015 and 2019 is analyzed using firm-level data from 2013 to 2022. A Propensity Score Matching (PSM) and Difference-in-Differences (DiD) methodology is applied to control for selection bias and assess the causal effects of SPAC mergers. Additionally, non-linear quantile regression is used to capture the heterogeneous effects across firms. The results show a significant decline in profitability post-merger, particularly in ROE and ROI, likely due to integration challenges. While sales growth improves overall, the non-linear analysis reveals that only a subset of firms experiences significant revenue growth. The findings highlight the importance of strategic planning and regulatory oversight in optimizing SPAC mergers, addressing a critical gap in the Italian market where research is limited. This analysis provides valuable insights for managers and policymakers navigating the evolving SPAC landscape in Italy.

Keywords: Spac Mergers, Financial Performance, Italian Market, Difference-in-Difference analysis, Propensity Score Matching, Quantile Regression

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Introduction

In recent years, Special Purpose Acquisition Companies (SPACs) have emerged as a popular alternative to traditional initial public offerings (IPOs), offering unique opportunities for both investors and firms. SPACs, often referred to as "blank check companies," raise capital through an IPO with the intent of acquiring or merging with an unidentified private company within a set period, typically two years. These companies have no operations or assets and their share price tends to decline over time (Floros & Sapp, 2011). Moreover, they provide greater flexibility and certainty for companies seeking public market access while offering investors a distinctive investment avenue (Chatterjee et al., 2016).

SPACs attract investors due to their risk-mitigating structure. Funds raised are held in trust until a merger is completed, minimizing downside risk for investors who can redeem their shares if they disapprove of the merger. Investors often receive warrants, allowing them to purchase additional shares at a set price post-merger, enhancing the upside potential (Hale, 2007; Berger, 2008). The reputation of the sponsor is critical, as SPACs led by experienced sponsors with successful M&A track records (Klausner & Ohlrogge, 2022) tend to secure higher investor confidence and are more likely to select high-quality targets (Jenkinson & Sousa, 2011; Lakicevic &Vulanovic, 2013).

The U.S. remains the most active SPAC market, supported by a regulatory environment conducive to innovation. In contrast, Europe's SPAC market has developed more slowly due to stricter regulatory frameworks and less familiarity with the SPAC model. Additionally, in spite of being listed on European stock exchanges, many SPACs do not have a European focus, neither in terms of investors nor in their choice of target companies (Cumming et al., 2014).

In Italy, the evolution of SPACs began in 2010 when Borsa Italiana and Consob introduced the SPAC structure, offering a new route for companies to access public markets. Initial growth was slow, with limited listings and lower investor familiarity compared to the U.S. market. However, between 2015 and 2019, SPAC activity in Italy increased significantly, targeting medium-sized, often family-owned businesses in technology, industrial and consumer sectors. This period marked the height of SPAC popularity in Italy, as they became a favored option for firms seeking faster access to public markets with fewer regulatory hurdles compared to traditional IPOs.

Since 2020, despite the challenges posed by the COVID-19 pandemic, Italian SPACs have continued to grow, particularly focusing on innovative sectors such as fintech and renewable energy. However, these SPACs still face unique challenges, including regulatory scrutiny, market skepticism, and a need for robust due diligence processes (Ignatyeva et al., 2013). The mixed

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performance outcomes observed in recent years highlight the need for careful evaluation and strategic alignment to maximize the benefits of SPAC mergers.

Current literature on SPACs predominantly focuses on the U.S. market and often examines market-based performance indicators such as stock price and market reaction (Barth et al., 2023). Studies exploring profitability and growth metrics before and after SPAC mergers are limited, particularly outside the U.S. (Kim, 2021). For Italy, research has primarily addressed descriptive and legal and financial aspects of SPACs due to the smaller sample size (Fumagalli, 2014; Riva & Provasi, 2019; Gigante et al. 2020;) and to our knowledge, no studies have specifically analyzed the evolution of profitability and growth performance metrics pre- and post-SPAC mergers.

This study makes significant contributions to the existing literature in two key areas. First, it shifts the analysis of SPAC mergers from the dominant focus on market-based performance metrics to accounting-based measures, including Return on Equity (ROE), Return on Investment (ROI), and growth rates in sales and employment. This shift is particularly novel, as the majority of prior studies on SPAC mergers concentrate on market reactions and stock price performance (Jenkinson & Sousa, 2011; Cumming et al., 2012). By examining critical financial performance indicators, this paper offers a more comprehensive view of how SPAC mergers impact firms' underlying operational performance, beyond market valuation alone.

Second, this study highlights the relevance of the Italian SPAC market, which, although underrepresented in academic literature, ranks as the second-largest SPAC market after the U.S. in terms of both deal volume and frequency (Boreiko & Lombardo, 2024). The Italian SPAC market is particularly interesting due to its unique composition, characterized by a strong presence of small and medium-sized enterprises (SMEs) (Riva & Provasi, 2019). Moreover, the ability of the Italian SPAC market to attract globally influential promoters, who have launched ventures across both Europe and the U.S., underscores its strategic importance. The market's relatively balanced distribution of SPACs over time, combined with a variety of promoter profiles, target industries and post-merger outcomes, provides fertile ground for research.

Focusing on a single-country analysis, specifically Italy, allows for a more coherent and context-specific examination of SPAC performance. By situating the findings within a uniform regulatory and market environment, this approach facilitates the identification of insightful managerial patterns and conclusions. Moreover, the Italian context serves as a useful model for applying similar research frameworks in other countries with comparable market structures.

In conclusion, this study contributes to the understanding of the financial impacts of SPAC mergers by emphasizing accounting measures of

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performance in an underexplored market. Its methodological novelty, combined with a focus on Italy's distinct SPAC market, offers valuable insights that enrich the broader SPAC literature and open avenues for future cross-country research.

The rest of the paper is organized as follows. Section 2 provides an overview of the existing literature and the development of study hypotheses. Section 3 presents the data sample and methodology. Section 4 reports the empirical results. Section 5 presents the main conclusions.

Literature review and hypotheses development

To provide a clearer and more structured overview of the existing research on SPACs, Table A1 (see Appendix) summarizes the main key contributions organized under four main topics: SPAC Market Structure and Regulatory Frameworks, SPAC Performance and Market Behavior, Agency Conflicts and Incentive Structures and Financial and Accounting Performance Metrics. This table offers a concise comparison of the diverse perspectives and findings from the current literature, setting the foundation for this study's focus on the Italian SPAC market and its unique accounting measures of performance. Building upon this background, the following section delves into the most relevant studies on SPACs, examining their structural, financial and market characteristics.

Special Purpose Acquisition Companies (SPACs) have gained significant traction, particularly in the United States, where they have been the subject of extensive academic research from various perspectives. Early studies examined SPACs as unique financial vehicles, highlighting their structural and legal nuances (Riemer, 2007; Hale, 2007; Lakicevic et al., 2014; Rodriguez & Stegemoller, 2014; Okutan Nilsson, 2018; D'Alvia, 2020; Boreico & Lombardo, 2024). Accounting-focused analyses have also emerged, examining SPACs' financial reporting and valuation methods (Min & Cha, 2017). Financial studies have primarily focused on SPAC performance and market behavior, revealing mixed outcomes compared to traditional IPOs (Kolb & Tykvová, 2016; Vulanovic, 2017; Banerjee & Sxydlawski, 2024). A limit in academic contributions is often due to challenges in obtaining comprehensive pre-merger data on target firms (Huang et al., 2023). Moreover, the evolving structures of SPACs, frequently modified to adapt to market conditions and regulatory changes, complicate consistent cross-study comparisons (Sjostrom, 2007).

Research highlights that the success of SPACs is influenced by multiple factors, including company size, the composition of the Board of Directors and the quality of the management team (Cumming et al., 2014; Cao & Lerner, 2009; Lin William et al., 2021). Agency conflicts have been particularly noted as critical, where sponsor incentives can misalign with those

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of investors, leading to rushed or suboptimal deals (Del Giudice & Signori, 2021). These conflicts stem from the typical SPAC structure, where sponsors retain a 20% promote, creating potential for conflicts of interest that can compromise the quality of acquisitions (Dimitrova, 2017).

SPACs differ fundamentally from traditional IPOs. Traditional IPOs involve lengthy roadshows, extensive regulatory scrutiny and market-driven valuations (AlShiab, 2018), whereas SPACs facilitate a faster path to the public market through private negotiations, often resulting in greater valuation control (Ritter, 2012; Jenkinson & Sousa, 2011). SPACs secure funding at inception, providing targets with greater certainty and mitigating the risks associated with market fluctuations during listing (Dimitrova, 2017; Blomkvist & Vulanovic, 2020). However, these advantages are counterbalanced by the potential for conflicts and rushed decisions, as sponsors prioritize deal completion due to their significant promotes (Jenkinson & Sousa, 2011; Ignatyeva et al., 2013).

Most existing literature on SPAC performance focuses on market-based indicators such as stock prices, investor reactions and market perceptions. Studies generally reveal that SPACs tend to experience lower first-day underpricing compared to traditional IPOs, attributed to their unique trust structures that reduce initial investor risk (Boyer & Baigent, 2008; Datar et al., 2012). Sector-specific factors, such as lower perceived risk in technology and healthcare, further moderate initial returns (Ignatyeva et al., 2013). Nevertheless, stock price reactions post-business combination are crucial indicators, with positive responses signaling investor confidence and negative reactions highlighting concerns about valuation and integration challenges (Berger, 2008; Barker & Rueda, 2008; Ridgway & Rueda, 2008; Kiesel et al., 2023).

Studies analyzing SPACs' post-merger performance show mixed results, often highlighting underperformance compared to traditional IPOs. Factors contributing to these outcomes include overvaluation pressures, integration difficulties, agency conflicts and target selection (Jog & Sun, 2007; Jenkinson & Sousa, 2011; Cumming et al., 2012). SPAC targets, particularly in capital-intensive sectors like energy, often face operational challenges that hinder their ability to meet projected growth (Renneboog & Vansteenkiste, 2017). Conversely, better outcomes are observed in high-growth industries such as technology and healthcare, where robust fundamentals and experienced management teams drive long-term success (Datar et al., 2012).

Although most studies emphasize market-based performance, limited research explores accounting metrics like Return on Equity (ROE), Return on Investment (ROI), and sales or employee growth rates. Dimitrova (2017) discusses the performance implications of SPACs but remains primarily focused on market metrics. Blankespoor et al. (2022) critique the often overly

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optimistic financial projections of SPACs compared to their actual post-merger performance, highlighting a gap between projected and realized accounting outcomes. This suggests the need for more rigorous evaluations of SPACs using detailed financial statements rather than market perceptions alone. PwC (2021) underscores the importance of comprehensive financial reporting in SPAC transactions, emphasizing the need for closer scrutiny of financial data during and after the merger process.

In Italy, SPACs primarily target SMEs with distinct governance structures, often characterized by family ownership and limited experience with public market operations. These unique market characteristics present both opportunities and challenges (Riva & Provasi, 2019). The smaller size and less diversified nature of Italian SPAC targets can lead to higher volatility and integration challenges post-merger (Boyer & Baigent, 2008). Cultural and operational differences amplify the difficulty of achieving expected synergies, often resulting in underperformance compared to more mature public companies.

Based on the observed underperformance of SPACs and the distinct challenges faced by Italian firms, this study hypothesizes that SPAC mergers in Italy will yield mixed results. The hypothesis is grounded in the particular characteristics of the Italian market, where SPACs often engage with smaller, less diversified firms that may struggle with public market demands and integration complexities. These factors, combined with entrenched management practices and limited public market experience, are likely to hinder the realization of expected financial improvements and synergies post-merger.

Sample and methodology

Methodology

In this study, Propensity Score Matching (PSM) combined with a Difference-in-Differences (DiD) approach was employed to estimate the causal effect of SPAC mergers on firm performance. This methodological approach allows for a robust comparison between treated firms (those that underwent a SPAC merger) and control firms (non-SPAC firms), addressing selection bias and isolating the treatment effect over time. PSM was used to match firms that received the treatment (SPAC merger) with control firms that exhibited similar observable characteristics prior to the treatment (Caliendo & Kopeinig, 2008). This technique mitigates selection bias by matching firms based on their propensity scores, which reflect the likelihood of receiving treatment given a set of observed covariates. Nearest neighbor matching with NN=3 was applied, meaning each treated firm was matched with the three closest control firms based on propensity scores. This choice strikes a balance between reducing bias and controlling variance, as using a single match can

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lead to higher variance, while increasing the number of matches can introduce more bias. NN=3 is widely accepted in empirical research as a reasonable compromise for achieving robust results (Austin, 2011).

The matching was based on key covariates theoretically and empirically associated with both the likelihood of receiving treatment and the outcome variables, including: 1) Net Financial Position to Earnings Before Interest, Taxes, Depreciation, and Amortization (NFP/EBITDA), 2) Sales per Employee (SPE), 3) Ratio of Financial Expenses to Debt (ROD), Liquidity Ratio (LIQ), Operating Cas Flow Ratio (OCF), Equity to Total Asset Ratio (EQ) and 4) Size.

Once the matched sample was constructed, the Difference-in-Differences (DiD) approach was employed to estimate the treatment effect. This method compares changes in the outcome variables two years before and three years after the business combination for the treatment group with corresponding changes for the control group. This approach isolates the effect of the SPAC merger while controlling for unobserved, time-invariant factors.

Formally, the DiD estimator is represented as (Angrist & Pischke, 2009):

$$\delta\hat{} = [E(Y1, t = 1 - Y1, t = 0 \mid D = 1) - E(Y0, t = 1 - Y0, t = 0 \mid D = 1)] - [E(Y1, t = 1 - Y1, t = 0 \mid D = 0) - E(Y0, t = 1 - Y0, t = 0 \mid D = 0)]$$

where:

$Y_{i,t}$ is the outcome variable for firm i at time t.

D is a binary indicator variable that equals 1 for the treatment group and 0 for the control group.

t=1 denotes the post-treatment period, and t=0 denotes the pre-treatment period.

The empirical specification for the DiD model is as follows:

$$Y_{i,t} = \alpha + \beta 1 Treatment_i + \beta 2 Post_t + \beta 3 (Treatment_i \, x \, Post_t) + \gamma X_{i,t} + \lambda t + \delta i + \epsilon it$$

where:

Y_{it} represents the dependent variable for firm i at time t.

$Treatment_i$ is a binary variable indicating whether firm i is in the treatment group.

$Post_t$ is a binary variable indicating the post-treatment period.

$Treatment_i \times Post_t$ is the interaction term capturing the DiD effect.

$X_{i,t}$ is a vector of control variables.

λ_t represents time fixed effects to control for common shocks.

δ_i represents firm fixed effects to control for time-invariant heterogeneity.

ϵ_{it} is the error term.

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The coefficient of interest, β_3, captures the average treatment effect on the treated (ATET), isolating the impact of the business combination on the dependent variables while controlling for other factors. This rigorous methodological framework ensures that this analysis yields robust and reliable insights into the effects of SPAC business combinations on various performance metrics.

Four key dependent variables were selected to capture various dimensions of firm performance:

1. Return on Equity (ROE): Measures profitability in relation to shareholders' equity, reflecting the firm's ability to generate profit from equity financing.
2. Return on Investment (ROI): Assesses the efficiency of capital allocation by comparing operating returns to total assets.
3. Sales Growth Rate (SGR): Represents revenue growth over time, indicating market expansion potential.
4. Employee Growth Rate (EGR): Indicates workforce changes, serving as a proxy for the firm's expansion and social responsibility.

As control factors the same variables used to build a matched sample were included to account for other factors influencing firm performance:

1. The Net Financial Position to EBITDA (NFP/EBITDA) ratio is a widely used metric for assessing the financial health and sustainability of a firm's debt. It provides insight into how many years it would take for a company to repay its debt using its operating cash flow, assuming EBITDA serves as a proxy for cash flow. This ratio is particularly valuable in gauging a company's ability to manage its debt burden without relying on external financing. From a liquidity and creditworthiness perspective, the NFP/EBITDA ratio is an essential measure for stakeholders, such as lenders and investors, as it indicates whether a firm can comfortably service its debt. The ratio helps assess whether a firm's current debt level is sustainable relative to its income-generating capacity, particularly in capital-intensive industries where debt plays a crucial role (Mule & Mukras, 2015; Goyal et al., 2021). Moreover, research shows that firms with high NFP/EBITDA ratios tend to have higher default risk, especially when EBITDA growth is stagnant or declining (López-Gracia & Sogorb-Mira, 2008).
2. Sales per Employee (SPE). It directly measures labor productivity, which reflects the efficiency with which employees contribute to the generation of sales. Higher SPE indicates that the workforce is operating efficiently, producing more revenue per unit of labor input (Syverson, 2011). Firms with higher productivity are often more

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competitive and profitable, highlighting the importance of this metric in operational efficiency analysis (Kumar & Anbanandam, 2020).

3. Ratio of Financial Expenses to Debt (ROD). It is a proxy of the cost of debt, representing the interest burden relative to total debt (Graham & Leary, 2011).
4. Liquidity ratio (LIQ) is a ratio between Working capital and total assets and provides a snapshot of a firm's short-term financial health and is widely used in financial analysis to assess solvency and operational efficiency (Gitman & Zutter, 2015). In the context of SPAC mergers, liquidity ratios offer valuable insights into the target firm's ability to manage its short-term financial obligations post-merger. It becomes especially relevant for evaluating how firms adjust to the demands of public markets and increased scrutiny, particularly in capital-intensive industries.
5. Operating Cash Flow to Sales Ratio (OCF) is critical for evaluating the financial sustainability of the target company post-merger. It ensures that the firm has enough cash flow from operations to support future growth, cover operational expenses and service any outstanding debt (Gitman & Zutter, 2015). This ratio becomes even more important when analyzing firms with high growth potential but limited profitability.
6. Equity to Total Assets Ratio (EQ), measures the proportion of a company's assets that are financed by shareholders' equity rather than debt. It is a key indicator of a firm's financial leverage and long-term solvency. For SPACs, the Equity to Total Assets Ratio is crucial in assessing the target company's long-term financial sustainability post-merger. It helps investors and sponsors understand how much of the firm's growth and operations can be supported by internal equity rather than external debt. This is particularly important for evaluating firms in capital-intensive industries, where reliance on debt financing may pose significant risks.
7. Firm Size (log of total sales) which is a proxy for market power and resource availability (Beck et al., 2005).

Sample

Since 2010, when Borsa Italiana and Consob allowed the introduction of SPACs in Italy, 28 SPACs have been listed as of December 2019. Of these, 9 were excluded from the analysis for the following reasons: a) five SPACs did not find a target company for a merger; b) data for two SPACs were unavailable for the two years preceding the Business Combination and c) two SPACs merged with financial intermediaries, whose balance sheet structures

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and management aspects differ significantly from non-financial firms. Including these would have resulted in a non-homogeneous comparison.

Therefore, the final analyzed sample consists of 19 SPACs that experienced a Business Combination (BC) between 2015 and 2019, as shown in Table 1.

Table 1: time to event distribution

Time to event	Freq.	Percent	Cum.
-6	4	2.11%	2.11%
-5	10	5.26%	7.37%
-4	15	7.89%	15.26%
-3	16	8.42%	23.68%
-2	**19**	**10.00%**	**33.68%**
-1	**19**	**10.00%**	**43.68%**
0	**19**	**10.00%**	**53.68%**
1	**19**	**10.00%**	**63.68%**
2	**19**	**10.00%**	**73.68%**
3	**19**	**10.00%**	**83.68%**
4	15	7.89%	91.57%
5	9	4.74%	96.31%
6	4	2.11%	98.42%
7	3	1.58%	100.00%

Table 2 shows the number of business combinations realized each year within the treatment range.

Table 2: Staggered Business Combinations (BC) Over Time

		year	of event			
	2015	2016	2017	2018	2019	Total
n. of BC	3	1	5	6	4	19

The research period was limited to 2019 to avoid distortions caused by the COVID-19 pandemic, which significantly affected corporate financial statements. Furthermore, the analysis required at least two years of pre-business combination and three years of post-business combination data, covering the period from 2013 to 2022.

In addition to the SPACs, it was necessary to construct a control group. The control group was built based on the industry code of the merged firms and a minimum sale threshold of over 50 million euros (as specified in EU Directive 2023/2775 for large firms) observed in 2022. The initial control group comprised 469 firms, but 53 were excluded due to incomplete or missing data, resulting in a final total of 416 control firms observed from 2013 to 2022.

Given the staggered nature of the business combinations, constructing a comparable control group posed a challenge. To address this, a fictitious treatment year was assigned to control firms, creating a variable representing

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the relative time to the treatment year for each firm. Random assignment of treatment years (2015–2019) ensured that the temporal distribution of control firms mirrored that of treated firms, allowing for consistent comparison across the pre- and post-business combination periods. Each SPAC was finally matched with control firms using PSM, as detailed in the methodology section.

Empirical results

Descriptive statistics

Table 3 presents an overview of the descriptive statistics for both the treated and control firms, comparing the two years prior to the Business Combination (pre-treatment) and the three years after (post-treatment). The table highlights key performance and control variables across the two groups.

Table 3: descriptive statistics

	Ante Business Combination			Post Business Combination			Total		
	Control	Treated	t-test	Control	Treated	t-test	Control	Treated	t-test
ROE	0.178	0.156	0.802	0.0465	0.06	0.761	0.0812	0.095	0.729
ROI	0.051	0.096	0.002***	0.0595	0.042	0.014**	0.057	0.063	0.276
SGR	0.485	0.218	0.215	0.5404	0.975	0.523	0.7039	0.554	0.721
EGR	0.168	0.403	0.472	1.1964	0.115	0.314	0.7174	0.216	0.377
NFP/EBITDA	2.662	2.329	0.631	1.6945	1.609	0.9573	2.1938	2.354	0.865
SPE	680	347.2	0.00***	994.76	293.4	0.00***	978.28	306.2	0.00***
ROD	4.611	4.633	0.9644	3.4961	3.596	0.769	3.9102	3.965	0.828
LIQ	1.304	1.144	0.089*	1.3528	1.403	0.584	1.3371	1.345	0.903
OCF	0.249	0.117	0.286	0.1191	0.171	0.557	0.1876	0.149	0.543
EQ	0.363	0.336	0.374	0.3753	0.425	0.036**	0.3694	0.395	0.141
SIZE	11.26	12.18	0.00***	11.564	12.34	0.00***	11.432	12.23	0.00***

The table presents the mean values of various variables for the two years preceding the Business Combination (pre-treatment) and the three years following it (post-treatment), distinguishing between the treated firms and the control group. The last three columns display the overall mean values, regardless of the pre- and post-treatment periods. The variable acronyms are as follows: ROE = Return on Equity; ROI = Return on Investment; SGR = Sales Growth Rate; EGR = Employee Growth Rate; NFP/EBITDA = Net Financial Position / Earnings Before Interest, Tax, Depreciation, and Amortization; SPE = Sales per Employee; ROD = Return on Debt; LIQ = Working Capital/Total Asset; OCF = Operating Cash Flow/Sales; EQ = Equity/Total Asste; SIZE = Ln of Sales. The t-test column shows the p-values, indicating the statistical significance of the differences between the treated and control firms. Statistical significance levels are indicated by *** for 1%, ** for 5%, and * for 10%.

As regard the dependent variables:

1. Return on Equity (ROE): Prior to the Business Combination, treated firms show a slightly lower ROE compared to control firms, while both groups exhibit a decline post-Combination. This indicates a general reduction in profitability following the event, with treated firms slightly outperforming controls after the merger.
2. Return on Investment (ROI): Treated firms initially display higher ROI compared to controls before the Business Combination. However,

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post-Combination, the control firms' ROI surpasses that of treated firms, suggesting that the efficiency of capital allocation deteriorated for treated firms after the merger.

3. Sales Growth Rate (SGR): Pre-treatment, treated firms lag behind in terms of sales growth. Post-treatment, however, they show a substantial improvement, outpacing the control group, which suggests that the Business Combination may have positively influenced their ability to expand revenues.
4. Employee Growth Rate (EGR): Before the Business Combination, treated firms expand their workforce more aggressively than controls. However, this trend reverses post-treatment, with control firms showing stronger employment growth, potentially indicating challenges for treated firms in scaling operations after the merger.

As regard the independent variables:

1. Net Financial Position to EBITDA (NFP/EBITDA): Treated firms exhibit stronger financial health before the Business Combination, as reflected by a more favorable debt sustainability. Post-treatment, they maintain stability, whereas control firms experience a liquidity creation.
2. Sales per Employee (SPE): Productivity, as measured by sales per employee, is consistently lower for treated firms across both periods, suggesting they may face structural productivity challenges compared to the control group.
3. Return on Debt (ROD): The cost of debt remains relatively stable for both treated and control firms before and after the Business Combination, indicating that the event did not significantly affect the firms' debt-servicing capacity.
4. Liquidity Ratio (LIQ): Treated firms show a significantly lower liquidity ratio before the Business Combination, although the difference becomes statistically insignificant post-BC, indicating some improvement in liquidity management after the merger.
5. Operating Cash Flow to Sales (OCF): While not statistically significant, treated firms exhibit marginally lower operating cash flow ratios than controls both pre- and post-treatment. This reflects potential inefficiencies in translating sales into cash post-merger.
6. Equity to Total Assets (EQ): The equity position of treated firms significantly improves post-Business Combination (p-value = 0.036**), suggesting better capital structure management compared to control firms which see little change.
7. Firm Size: Treated firms are consistently larger than control firms, both pre- and post-treatment, reflecting the tendency of larger firms to

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engage in SPAC mergers. Firm size likely plays a role in the decision to undergo a Business Combination.

While some metrics, such as ROI and SPE, show statistically significant differences between treated and control groups—suggesting that SPAC mergers can not enhance capital efficiency and labor productivity—other variables, including ROE, SGR and EGR do not present significant divergence between the two groups. This finding highlights the mixed effects of SPAC mergers, where certain financial and operational improvements are evident, but other metrics remain unchanged or experience slower growth. These results underscore the complexity of SPAC mergers, where the potential for growth must be weighed against ongoing challenges in maintaining stable profitability and efficiency.

Table 4 captures the dynamic evolution of key performance metrics over the three years following the Business Combination, distinguishing between treated firms and the control group. The t-test results indicate whether the differences in means between the treated and control firms are statistically significant.

Table 4: Temporal Evolution of Key Performance Metrics Following the Business Combination

	1 year after business combination			2 year after business combination			3 year after business combination		
	Control	Treated	T-test	Control	Treated	T-test	Control	Treated	T-test
ROE	0.05	0.117	0.249	0.0851	0.034	0.326	0.0032	0.027	0.828
ROI	0.06	0.062	0.835	0.0596	0.037	0.057*	0.0586	0.025	0.017**
SGR	0.313	1.511	0.403	0.2563	1.305	0.374	1.0692	0.062	0.267
EGR	3.286	0.15	0.323	0.1798	0.137	0.703	0.0729	0.055	0.831
NFP/EBITDA	0.042	2.606	0.056*	1.9914	0.663	0.494	3.1032	1.557	0.614
SPE	839.6	275.2	0.00***	1057.7	283.9	0.00***	1090.8	322.8	0.00***
ROD	3.676	3.463	0.661	3.4009	3.818	0.562	3.4033	3.507	0.857
LIQ	1.376	1.383	0.961	1.3336	1.454	0.507	1.3489	1.37	0.892
OCF	0.215	0.26	0.757	0.0187	0.131	0.605	0.1226	0.111	0.643
EQ	0.368	0.428	0.111	0.3736	0.433	0.199	0.3845	0.413	0.489
SIZE	11.47	12.16	0.007***	11.567	12.43	0.00***	11.663	12.43	0.00***

The table highlights the temporal evolution of various variables in the years following the Business Combination, distinguishing between the treated firms and the control group. The variable acronyms are as follows: ROE = Return on Equity; ROI = Return on Investment; SGR = Sales Growth Rate; EGR = Employee Growth Rate; NFP_EBITDA = Net Financial Position / Earnings Before Interest, Tax, Depreciation, and Amortization; SPE = Sales per Employee; ROD = Return on Debt; LIQ = Working Capital/Total Asset; OCF = Operating Cash Flow/Sales; EQ = Equity/Total Asste; SIZE = Ln of Sales. The t-test column shows the p-values, indicating the statistical significance of the differences between the treated and control firms. Statistical significance levels are indicated by *** for 1%, ** for 5%, and * for 10%.

Overall, Table 4 highlights several important trends in the performance metrics of treated firms compared to control firms over the three years following the Business Combination. Treated firms consistently show lower sales per employee (SPE), indicating persistent inefficiencies in their labor

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productivity. In addition, treated firms experience a statistically significant decline in ROI over time, which suggests a reduction in the effectiveness of their capital allocation post-merger. Furthermore, the NFP/EBITDA ratio deteriorates for treated firms, meaning they require more time to repay their debt, signaling increased financial strain. These results suggest that treated firms face long-term challenges in maintaining productivity and managing financial leverage, potentially impacting their overall financial stability and growth prospects.

The correlation matrix in Table 5 provides insight into the relationships between key financial variables used in the analysis.

Table 5: Correlation matrix among the variables

	ROE	ROI	SGR	EGR	NFP/EBITDA	SPE	ROD	LIQ	OCF	EQ	SIZE
ROE	1										
ROI	0.0950*	1									
SGR	0.0244	-0.0770*	1								
EGR	-0.0004	-0.0112	0.014	1							
NFP/EBITDA	-0.0282	-0.0116	0.026	-0.0007	1						
SPE	0.0008	-0.0093	0.0056	-0.0034	0.0072	1					
ROD	-0.0279	-0.0251	-0.0275	-0.0074	-0.0464	0.0246	1				
LIQ	0.0164	0.2156*	-0.0262	-0.0185	0.0432*	-0.0198	-0.0827*	1			
OCF	-0.0047	0.1382*	-0.0068	-0.0017	-0.0321	-0.0038	-0.0235	0.0189	1		
EQ	0.0207	0.3267*	-0.0133	-0.0021	-0.0114	-0.0288	-0.1492*	0.5289*	0.1405*	1	
SIZE	-0.0091	0.0430*	-0.0632*	0.0346	-0.0346	0.0319	0.0928*	-0.0424*	0.0604*	0.0898*	1

The correlation matrix provides reassurance that there is no severe multicollinearity among the explanatory variables, particularly the treatment variable, ensuring the robustness of the regression results. The significant yet moderate correlations, particularly between ROI and other variables, highlight the key factors influencing ROI, while the generally low correlations for other outcomes suggest that the explanatory variables provide independent contributions to the model.

The table 6 presents the balance of covariates between treated and control groups, assessing whether the matching process has successfully reduced selection bias. Specifically, the table compares mean values, standardized biases and statistical significance for key control variables.

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Table 6: Assessment of Covariate Balance Between Treated and Control Groups Post-Matching

	Mean			Test		V(T)/
Variable	Treated	Control	%bias	t	p>t	V(C)
NFP/EBITDA	2.8	4.983	-7.2	-0.99	0.324	0.08*
SPE	305.1	346.5	-2.4	-1.34	0.182	0.67*
ROD	3.966	4.063	-3.1	-0.22	0.829	0.38*
LIQ	1.305	1.265	5.9	0.36	0.722	0.46*
OCF	0.1457	0.095	14.2	1.05	0.295	0.35*
EQ	0.3862	0.363	13	0.91	0.365	0.64*
SIZE	12.274	12.24	4.2	0.29	0.768	0.83
If variance ratio outside (0.68; 1.46)						

Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
0.019	5.79	0.565	7.1	5.9	32.8*	0.42*	86
* if B>25%, R outside [0.5; 2]							

The balance statistics (Ps R2, LR Chi2 and bias measures) provide an overview of the matching quality. The overall Ps R2 is low (0.019), indicating minimal systematic differences between groups post-matching. However, the balance metric B is above the 25% threshold and the R value is slightly outside the optimal range (0.25), suggesting that while the matching procedure has substantially reduced selection bias, minor imbalances persist. These results highlight that while the matching process effectively aligns treated and control firms on key observed covariates, careful interpretation of the treatment effects is necessary due to potential residual imbalances.

Empirical analysis

An F-test was conducted for the interaction terms between the treatment and pre-treatment periods to verify the parallel trends assumption for each dependent variable. The results indicate that the parallel trends assumption holds for ROE, ROI, SGR and EGR (F-test: p-value = 0.2707, 0.113, 0.1791, 0.4402 respectively). These results validate the use of the Difference-in-Differences (DiD) approach for these variables.

Table 7 presents the Difference-in-Differences (DiD) analysis, estimating the Average Treatment Effect on the Treated (ATET) of the Business Combination on performance metrics, incorporating control variables and year fixed effects.

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Table 7: Estimation Results of Difference-in-Differences Analysis on Firm Performance Metrics

Dependent variable	ROE	ROI	SGR	EGR
Treatment effect (ATET)	-0,1501**	-0,0452***	0,7074*	-0,3127
	(0,0723)	(0,0112)	(0,4284)	(0,4307)
Controls				
NFP/EBITDA	-0,0021	0,0000	-0,0008	-0,0005
	(0,0028)	(0,0000)	(0,0005)	(0,0005)
SPE	0,0000	0,0000	0,0000	-0,0004*
	(0,0000)	(0,0000)	(0,0000)	(0,0002)
ROD	-0,0149	0,0005	-0,0035	-0,0110
	(0,0118)	(0,0007)	(0,0184)	(0,0172)
LIQ	-0,1696	-0,0080	0,0887	0,0835
	(0,1381)	(0,0053)	(0,1147)	(0,0914)
OCF	0,2125	0,0259**	-0,2190*	-0,0106
	(0,1516)	(0,0128)	(0,1315)	(0,0686)
EQ	1,3787	0,1473***	0,6263	0,3493
	(0,9951)	(0,0428)	(0,7496)	(0,6002)
SIZE	0,1306	0,0257***	1,2893***	0,4417
	(0,1476)	(0,0075)	(0,2618)	(0,2798)
_cons	-1,6616	-0,2770***	-13,8494***	-4.5326
	(1,6106)	(0,0878)	(3,004)	(3,0673)
Year fixed effect	yes	yes	yes	yes
N. Obs	1488	1488	1426	1420

This Table presents the estimation results based on the Difference-in-Differences (DiD) analysis. The "Treatment effect" represents the estimated impact of the business combination (e.g., SPAC merger) on each dependent variable and is obtained using the DiD approach. The Ordinary Least Squares (OLS) estimation method is employed, incorporating fixed effects at both the firm and time levels to analyze balanced panel data. The dependent variables are: ROE (Return on Equity), ROI (Return on Investment), SGR (Sales Growth Rate), and EGR (Employee Growth Rate). Control variables included in the models are: NFP/EBITDA (Net Financial Position/Earnings Before Interest, Taxes, Depreciation, and Amortization), SPE (Sales per Employee), ROD (Return on Debt), LIQ = Working Capital/Total Asset, OCF = Operating Cash Flow/Sales, EQ = Equity/Total Asste, SIZE = Ln of Sales. Standard errors are reported in parentheses. Statistical significance levels are indicated by *** for 1%, ** for 5%, and * for 10%.

The results reveal that the Business Combination has a negative impact on both ROE and ROI. Specifically, the ATET for ROE is -0.1501, statistically significant at the 5% level, indicating a reduction in profitability relative to equity. Similarly, ROI experiences a statistically significant decline of -0.0452 at the 1% level. These findings align with previous studies suggesting that SPAC mergers often struggle to enhance profitability metrics in the post-merger phase (Lakicevic & Vulanovic, 2013; Jenkinson & Sousa, 2011). The observed declines in ROE and ROI could be attributed to several factors, including integration challenges (Hitt et al., 2001), delayed synergy realization

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(King et al., 2004), overvaluation of target firms in SPAC mergers (Klausner & Ohlrogge, 2022), dilution effect (Gahng et al., 2023), limited due diligence (Jenkinson & Ramadorai, 2013), market sentiment and confidence (Lewellen, 2009), increased operational inefficiencies or costs associated with restructuring post-merger.

In line with the literature, the negative effects on ROE and ROI suggest that SPAC mergers do not consistently lead to improved financial performance for the acquiring firm. For instance, Dimitrova (2017) finds that post-merger profitability often deteriorates due to misaligned management incentives and market overvaluation at the time of the merger. Moreover, the lack of immediate positive returns questions the overall value creation capacity of SPACs, reflecting a broader skepticism noted in recent empirical analyses (Klausner & Ohlrogge; 2022).

Contrary to the trends observed in profitability metrics, the Business Combination positively influences sales growth, with an ATET of 0.7074, significant at the 10% level. This suggests that treated firms experience a substantial boost in sales expansion post-merger, likely driven by increased market access, enhanced brand presence or synergistic opportunities realized through the merger. These findings are consistent with empirical evidence indicating that SPAC mergers can be beneficial in driving top-line growth, even if profitability does not concurrently improve (Floros & Sapp, 2011). The increase in sales growth could reflect the strategic repositioning of firms post-merger, where market expansion and revenue growth are prioritized over immediate profit margins. However, this also highlights a potential risk where firms might engage in aggressive growth strategies that could strain operational capacities and financial health, as suggested by recent studies emphasizing the trade-offs inherent in SPAC mergers (Kim et al., 2021).

The results show a non-significant reduction in Employee Growth Rate, with an ATET of -0.3137. This finding suggests that while treated firms may grow their sales, they do not necessarily expand their workforce at a comparable rate. This pattern could reflect a focus on efficiency improvements or cost-cutting measures post-merger, aligning with trends observed in other merger scenarios where employment growth lags behind revenue growth (Maksimovic et al., 2013).

This outcome may also be driven by strategic restructuring efforts where firms prioritize integrating existing human capital rather than expanding the workforce, possibly due to uncertainties or operational constraints faced during the post-merger phase. These dynamics are consistent with broader evidence suggesting that while mergers can drive growth, they do not always translate into broader employment benefits (Renneboog & Vansteenkiste, 2017; Okafor, 2019).

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The control variables offer additional insights into the dynamics of firm performance: SPE (Sales per Employee) shows a small but significant negative impact on EGR, indicating that productivity might suffer as firms scale up their workforce; OCF (Operating Cash Flow) positively influences ROI, indicating that firms with healthier cash flow benefit more from efficient capital allocation ; EQ (Equity/Total Asset) shows a statistically significant positive effect on ROI and a substantial, though not statistically significant, positive impact on ROE and EGR. The positive influence of equity on ROI suggests that firms with a higher proportion of equity relative to their assets tend to allocate capital more efficiently post-merger. This result aligns with the findings of earlier studies, such as Goyal et al. (2021), which highlight the importance of a strong equity base in enhancing a firm's ability to weather financial risks and improve return efficiency; Firm Size (SIZE) has a positive and significant impact on ROI and SGR, indicating that larger firms are better equipped to handle post-merger integration challenges and take advantage of new market opportunities.

Robustness analysis

To ensure the robustness of the findings, additional analyses were conducted using different Propensity Score Matching (PSM) techniques beyond Nearest Neighbor Matching (NN=3), specifically Kernel Matching and Radius Matching. Kernel Matching utilizes weighted averages of all control firms to create a counterfactual for each treated firm, with higher weights assigned to firms with propensity scores closer to those of the treated firms. Radius Matching applies a caliper of 0.05, allowing only control firms within a specified distance of the treated firm's propensity score to be included, ensuring that only sufficiently similar control firms are used in the analysis. The results across these different PSM techniques (Kernel, Radius and NN=3) showed consistent patterns, with only minor variations in the magnitude of effects. This consistency reinforces confidence in the findings, indicating that the observed negative impact on profitability and the positive effect on sales growth are not artifacts of the specific matching method used, but rather reflect robust trend in post-SPAC performance.

To further validate that the treatment effects observed in the primary analysis are genuinely attributable to the business combination event rather than spurious correlations or pre-existing trend, a placebo test was conducted. The placebo test applies the same estimation method as the main analysis but with a "false" or fictitious treatment period or group where no actual treatment occurred. The results, presented in Table 8, show that the ATET (Average Treatment Effect on the Treated) estimates for the placebo test are all statistically insignificant, as indicated by the lack of significance across the coefficients and their standard errors.

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Table 8: Placebo test

	ROE	ROI	SGR	EGR
Treatment effect (ATET)	0,0781	0,0283	-0,4616	0,0241
SE	(0,0492)	(0,0101)	(0,3779)	(0,0932)
P_value	0.114	0.105	0.223	0.796

The results demonstrate that the significant effects observed in the main analysis are not present when the treatment is artificially manipulated, thus reinforcing the validity of the primary findings. This reduces concerns about confounding variables or unobserved heterogeneity influencing the treatment effect.

To explore whether the effects of SPAC mergers differ based on firm size, the sample was divided into large and small firms using the median of firm sales as the threshold. Firms with sales above this threshold were classified as "large firms," and those below as "small firms." A Difference-in-Differences (DiD) regression was conducted to estimate the treatment effect on the dependent variables, controlling for firm size and other covariates. The results, presented in Table 9, show that the overall treatment effect remains consistent with the main analysis.

Table 9: Treatment Effects of SPAC Mergers on Firm Performance by Firm Size

	ROE	ROI	SGR	EGR
Treatment effect	-0,1540**	-0,0543***	10,483	0,3087
	(0,1659)	(0,0140)	-16,978	(0,3984)
Large firm	-0,1654	-0,0060	-0,2606	10,251
	(0,1370)	(0,0067)	(0,2031)	-10,484
treatment effect * large firm	0,0388	-0,0032	-0,8101	-0,8203
	(0,1471)	(0,0136)	(1.8151)	(0,5234)
control variables	yes	yes	yes	yes
N	1488	1488	1426	1420
r2_a	0,0073	0,1028	0,0102	0,0195

The table presents the results of DiD regressions examining the heterogeneous effects based on firm size. The variable "Large firm" is a dummy variable that takes the value 1 for firms with size above the median sample revenue. Only the coefficients related to the treatment effect and its interaction with the "Large firm" dummy variable are reported in the table (full results are available upon request). Standard errors are reported in parentheses. Statistical significance levels are indicated by *** for 1%, ** for 5%, and * for 10%.

When an interaction term between the treatment effect and large firm was introduced to test for heterogeneous effects, the interaction term was not statistically significant. This suggests that the impact of SPAC mergers on the dependent variables does not differ significantly between large and small firms, indicating that the challenges posed by SPAC mergers may not be mitigated by firm size or resources.

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To further assess the robustness of the findings, a sensitivity analysis was conducted using different time windows before and after the SPAC treatment. Six windows were analyzed: (1) one year before and one year after the event, (2) one year before and two years after, (3) one year before and three years after, (4) two years before and one year after, (5) two years before and two years after, and (6) two years before and three years after.

The sensitivity analysis provides several insights:

1. ROE: The negative effect on ROE is generally more pronounced in the medium term (up to 2 years post-event), with a stronger effect observed in the two-year post-SPAC window. However, this effect diminishes over longer periods, potentially reflecting recovery or stabilization of firms post-SPAC.
2. ROI: Unlike ROE, the negative effect on ROI is robust and consistent across all windows, suggesting significant and persistent declines in investment returns post-SPAC merger. This aligns with literature highlighting challenges faced by SPAC-acquired firms in maintaining performance post-merger.
3. TSV and TSDIP: The lack of significant results for TSV and TSDIP across all windows indicates that SPAC mergers do not significantly impact sales volatility or total sales dip during the analyzed periods. These findings suggest that while profitability metrics are affected, sales-related performance metrics are less responsive to the treatment.

Overall, the sensitivity analysis indicates that SPAC mergers may offer limited long-term benefits to firm performance, particularly regarding profitability and efficiency. These findings underscore the need for careful evaluation of SPAC mergers as a strategic growth option, given the uncertain potential for sustained performance improvements.

Non-Linearity in the Analysis of Business Combination Impacts

The linear Difference-in-Differences (DiD) analysis provided valuable insights into the overall average treatment effect of SPAC mergers on firm performance. As demonstrated in Table 7, the treatment effect for ROE and ROI was negative and statistically significant, suggesting that, on average, SPAC mergers do not enhance profitability. This finding is consistent with prior literature indicating that SPAC mergers often struggle to generate positive post-merger returns (Lakicevic & Vulanovic, 2013; Jenkinson & Sousa, 2011). In contrast, the analysis revealed a significant positive effect of SPAC mergers on the Sales Growth Rate (SGR). This result suggested that firms undergoing SPAC mergers, on average, experience substantial sales growth post-merger. Such a positive impact aligns with theories suggesting

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that SPAC mergers can enhance firms' market access, increase resources and improve brand presence, thus driving sales expansion (Floros & Sapp, 2011).

However, while the linear model captures the overall trend, it assumes that all firms respond to the merger in a similar manner, potentially obscuring important differences across firms with varying characteristics. This limitation underscores the necessity of employing a non-linear approach, such as quantile regression, to better understand how the impact of SPAC mergers may vary across firms positioned at different points in the performance distribution.

The non-linear analysis, shown in Table 10, builds upon these initial findings by revealing heterogeneity in the treatment effect.

Table 10: Quantile Regression Results for the Impact of SPAC Mergers on dependent variables

Dependent variable	ROE			ROE			SGR		
	1° quantile	2°quantile	3° quantile	1° quantile	2°quantile	3° quantile	1° quantile	2°quantile	3° quantile
Treatment	0.0423*	0.0690**	0.0631	0.0561***	0.0490***	0.0351*	0.0352	0.0156	0.0268
	(0.0177)	(0.0230)	(0.0442)	(0.0083)	(0.0096)	(0.0173)	(0.0264)	(0.0290)	(0.0503)
Treatment effect	-0.0429*	-0.0744**	-0.0992	-0.0500***	-0.0459***	-0.036	-0.0391	0.00709	0.0142
	(0.0213)	(0.0278)	(0.0533)	(0.0101)	(0.0116)	(0.0209)	(0.0316)	(0.0347)	(0.0602)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES
N. Obs	1488	1488	1488	1488	1488	1488	1426	1426	1426

The table presents the results of quantile regressions that examine the heterogeneity in the treatment's impact across firms. The variable Treatment is a dummy variable that equals 1 for treated firms (SPAC mergers) and 0 for the control group. The **Treatment Effect (DiD)** is the interaction between the Treatment and After variables, where After is a dummy variable equal to 1 for the period after the SPAC merger and 0 before the merger. Due to multicollinearity, the After variable is excluded from the analysis. The results are controlled for variables such as NFP/EBITDA, SPE, ROD, LIQ, OCF, EQ, and SIZE. Standard errors are reported in parentheses, with statistical significance levels indicated by *** for 1%, ** for 5%, and * for 10%.

The treatment effect for ROE reveals a statistically significant negative effect at both the 25th and 50th quantiles, suggesting that SPAC mergers are associated with a decline in equity returns, particularly for firms in the lower to middle range of the ROE distribution. This negative effect may be attributed to post-merger integration challenges, which are likely more pronounced for firms that were stable or moderately performing before the merger.

A similar pattern emerges for ROI, where significant negative impacts are observed at the 25th and 50th quantiles. This indicates that SPAC mergers tend to reduce ROI, especially for firms in the lower and middle segments of the ROI distribution. Firms already facing challenges before the merger may experience further underperformance, suggesting that the integration process exacerbates their financial difficulties rather than improving their return on investments.

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When analyzed through the non-linear quantile regression model (Table 10), the previously observed positive and significant effect on SGR diminishes. The treatment effect for SGR across all quantiles is no longer statistically significant, indicating that the average effect of increased sales growth in the linear model does not translate into a consistent impact across different segments of firms. This discrepancy highlights a crucial distinction between average effects, as captured by the linear DiD model, and the distributional impacts revealed through quantile regression.

The lack of statistical significance in the quantile regression suggests that the positive sales growth observed in the linear model is likely driven by a subset of firms that experience outsized benefits post-merger. For instance, firms with stronger pre-merger conditions or better market positions may contribute disproportionately to the observed average sales growth, while the majority of firms may not witness significant improvements. This explanation is consistent with existing literature, which emphasizes that SPAC mergers can lead to highly variable post-merger outcomes, with some firms benefiting while others struggle to realize growth (Cumming et al., 2014).

For the dependent variable Employee Growth Rate (EGR), the results are omitted because the treatment effect is not statistically significant across any quantiles, indicating no consistent impact on employee growth from SPAC mergers. The absence of significant results implies that mergers may not meaningfully influence firms' growth rates in the short term. It is important to note that, even in the linear DiD analysis, the treatment effect for EGR was not statistically significant.

Thus, while the linear analysis highlights an overall negative impact of SPAC mergers, the non-linear analysis provides a deeper understanding by demonstrating that this effect is not uniform across all firms. The combination of these two approaches allows for a more nuanced interpretation of the results: although the general trend points to underperformance, the distributional effects uncovered by the non-linear model clarify that the degree of impact varies significantly depending on a firm's initial performance level.

By integrating both linear and non-linear approaches, the analysis supports the hypothesis of mixed outcomes for SPAC mergers in Italy. The linear treatment results confirm the overall trend of negative performance impacts, while the quantile regression further refines this finding by illustrating that the negative effects are concentrated among firms that were already struggling prior to the merger. This combination of methods reinforces the conclusion that SPAC mergers yield heterogeneous results, with both winners and losers depending on firm characteristics.

In summary, the non-linear analysis complements and enriches the linear findings, clarifying that SPAC mergers do not uniformly affect all firms. This insight is critical for policymakers and practitioners who should consider

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the firm-specific nature of SPAC mergers when evaluating their potential as a growth strategy.

Conclusions

The SPAC phenomenon has gained considerable attention globally, with the U.S. market being the focal point of most research. However, the Italian market has seen a notable rise in SPAC activity in recent years, especially targeting small and medium-sized enterprises (SMEs). Despite this, the Italian SPAC market remains underexplored, particularly concerning the financial and operational performance of firms post-merger. This study aims to fill this gap by addressing the question: Do SPAC mergers enhance the financial performance and growth of Italian firms? To this end, the paper focuses on profitability (ROE, ROI), sales growth (SGR) and workforce expansion (EGR), providing empirical evidence on the impact of SPAC mergers in Italy.

The dataset used in this analysis consists of 19 Italian SPACs that completed business combinations between 2015 and 2019. The study includes a comprehensive panel data sample covering the period from 2013 to 2022, which allowed for a pre- and post-merger analysis. The inclusion of a control group composed of 416 non-SPAC firms, matched based on key financial indicators through Propensity Score Matching (PSM), ensures the robustness of the analysis. Additionally, a Difference-in-Differences (DiD) approach is employed to measure the causal impact of SPAC mergers on the selected performance metrics, further strengthened by non-linear quantile regression to capture heterogeneities in the treatment effect across the performance distribution.

The empirical results reveal mixed outcomes for Italian SPAC mergers. SPAC mergers are associated with a significant decline in profitability metrics, as indicated by reductions in both ROE and ROI. These findings align with previous literature suggesting challenges related to integration, overvaluation and the dilution effects typical of SPAC transactions. However, SPAC mergers show a positive impact on sales growth (SGR), highlighting that while profitability may suffer, firms do experience notable market expansion post-merger. In contrast, employee growth (EGR) did not exhibit statistically significant changes, indicating that sales expansion did not translate into workforce growth. Moreover, the quantile regression reveals that the negative effects on profitability (ROE and ROI) are more pronounced among firms in the lower and middle quantiles of the distribution, suggesting that firms with weaker pre-merger performance are more likely to face post-merger challenges. On the other hand, the positive impact on sales growth observed in the linear model does not hold uniformly across all firms, suggesting that only a subset of firms—likely those better positioned pre-

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merger—experience significant revenue growth. These results underscore the heterogeneity in SPAC outcomes, with performance impacts varying significantly depending on firm characteristics.

The findings of this study carry important implications for policymakers, regulators, and corporate practitioners.

For Policymakers and Regulators, the heterogeneity in the treatment effect suggests that one-size-fits-all regulatory approaches may not be appropriate. Regulators should consider creating tailored guidelines or frameworks that differentiate between firms based on their pre-merger financial health and market position. For instance, stricter due diligence requirements could be applied to SPACs targeting firms in weaker financial positions to mitigate the risks of post-merger underperformance. Additionally, the findings support the idea of increased transparency and disclosure around SPAC mergers, particularly for firms that may be at greater risk of adverse outcomes. Enhanced reporting requirements could help investors better understand the potential risks and rewards associated with SPAC mergers.

For Corporate Managers and Practitioners, the results indicate the importance of conducting thorough pre-merger analysis to assess whether a SPAC merger aligns with the firm's strategic goals and operational capacities. Firms with weaker financial metrics prior to the merger should be cautious, as they are more likely to experience negative outcomes post-merger. This insight aligns with findings from Jenkinson & Susa (2011), who emphasize the need for better alignment between SPACs and target firms to ensure long-term success. Post-merger integration strategies should be tailored to the specific needs of firms, particularly for those at the lower end of the performance distribution. This could involve more focused efforts on financial restructuring, operational synergies and managerial realignment to mitigate the negative effects observed in the lower quantiles. The quantile approach also provides valuable information for investors, indicating that investments in SPAC mergers should be made with careful consideration of the target firm's pre-merger performance. Investors should be cautious when engaging with SPACs targeting firms in the lower quantiles of profitability or growth metrics, as these firms are more likely to struggle post-merger.

While this study provides significant insights, several limitations should be acknowledged. First, the relatively small sample of Italian SPACs (19 in total) constrains the generalizability of the findings. Nevertheless, by employing robust statistical techniques, including Propensity Score Matching and Difference-in-Differences and constructing a well-matched control group, the analysis offers reliable conclusions. However, the small sample size may limit the ability to detect more nuanced effects, particularly in relation to firm-specific characteristics or sectoral differences. The limited timeframe, which

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ends in 2019 to avoid distortions due to the COVID-19 pandemic, also restricts the analysis of more recent SPAC activity.

The growing SPAC market in Europe and particularly in Italy, offers ample opportunities for future research. Potential avenues include expanding the analysis to cover the post-2020 period, which has seen heightened SPAC activity, especially in innovative sectors like fintech and renewable energy. Additionally, future studies could explore sector-specific effects, assessing whether SPAC mergers perform differently in high-growth industries versus more mature sectors. Finally, cross-country comparisons would also be valuable in understanding how regional market conditions influence SPAC outcomes.

In conclusion, while SPAC mergers in Italy present a valuable alternative to traditional financing mechanisms, their mixed performance underscores the importance of strategic planning, regulatory oversight and market-specific considerations. Future research can build on this foundation to explore more granular aspects of SPAC transactions, providing deeper insights for investors, regulators and firms alike.

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Appendix

Table 1: Summary of key Research on SPACs

Topic	Authors	Summary of contribution
SPAC Market Structure and Regulatory Frameworks	Riemer (2007)	Discusses the structural and legal characteristics of SPACs, highlighting their impact on the IPO market.
	Hale (2007)	Reviews SPAC structures and characteristics, comparing them to traditional IPOs.
	Ritter (2012)	Explores valuation differences between SPACs and traditional IPOs, noting private negotiations in SPAC mergers as a key differentiator.
	Rodriguez & Stegemoller (2014)	Highlights how SPACs have evolved structurally, particularly in comparison to traditional private equity models.
	Okutan Nilsson (2018)	Provides an overview of SPAC practices in the U.S. market, focusing on regulatory aspects.
	Riva & Provasi (2019)	Discusses the evolution of SPACs in Italy from 2011 to 2018, providing insights into their lifecycle and regulatory context.
	D'Alvia (2020)	Reviews 20 years of regulatory changes affecting SPACs, especially in Europe.
	Boreico & Lombardo (2024)	Examines regulatory challenges within the Italian SPAC market and offers empirical insights.
SPAC Performance and Market Behavior	Jog & Sun (2007)	Evaluates SPAC profitability for sponsors and investors in the U.S. market, showing higher returns for sponsors.
	Boyer & Baigent (2008)	Examines lower first-day underpricing of SPACs compared to IPOs, linked to trust structures.
	Jenkinson & Sousa (2011)	Found significant negative returns after business combinations, especially in poorly performing SPACs.
	Floros & Sapp (2011)	Recognizes the strategic role of SPACs in facilitating the development of target companies.
	Ignatyeva et al. (2013)	Analyzes the stock performance of European SPACs, finding a high variance compared to U.S. SPACs.
	Kolb & Tykvová (2016)	Compares U.S. SPACs' post-merger performance to traditional IPOs, finding underperformance in leveraged and smaller firms.
	Blomkvist & Vulanovic (2020)	Analyzes how market volatility influences SPAC activity, noting declines in shares and volumes during high volatility.
	Kim et al. (2021)	Explores Korean SPACs and identifies factors influencing the choice between SPACs and traditional IPOs.
Agency Conflicts and Incentive Structures	Cao & Lerner (2009)	Analyzes the impact of management team quality on SPAC performance, finding that strong leadership correlates with improved outcomes.
	Cumming et al. (2014)	Investigates how Board composition affects SPAC outcomes, finding no consistent improvement from experienced boards.
	Dimitrova (2017)	Examines perverse incentives in SPACs, highlighting sponsor promotes and the conflicts they create.
	Del Giudice & Signori (2021)	Investigates agency conflicts in SPACs, noting that sponsor incentives often misalign with investor interests.

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	Klausner & Ohlrogge (2022)	Analyzes the cash extraction by sponsors and its impact on post-merger share value.
	Banerjee & Sxydlawski (2024)	Explores the role of overconfidence and agency conflicts in SPAC underperformance, showing how incentive structures can lead to suboptimal outcomes.
Financial and Accounting Performance Metrics	Lewellen (2009)	Explores whether SPACs can be considered a distinct asset class, analyzing their returns compared to traditional financing instruments.
	Kim (2010)	Focuses on the unique features and financial performance of Korean SPACs.
	Howe & O'Brien (2012)	Investigates the influence of governance factors like managerial and institutional ownership on SPAC performance.
	Datar et al. (2012)	Identifies differences between SPACs and IPOs, showing that SPACs often acquire lower-quality targets and experience negative returns.
	Jenkinson & Ramadorai (2013)	Examines regulatory differences between SPACs and IPOs across markets, highlighting SPACs' flexibility in navigating regulations.
	Vulanovic (2017)	Examines SPACs' post-merger survival rates and how operational challenges contribute to performance variability.
	Min & Cha (2017)	Investigates earnings management in SPACs, focusing on pre- and post-merger financial performance.
	Lin William et al. (2021)	Focuses on the impact of technological expertise in SPAC management on post-merger success, especially in tech and healthcare sectors.
	Blankespoor et al. (2022)	Highlights discrepancies between optimistic financial projections and post-merger performance.