The Influence of Intellectual Property Mergers and Acquisitions on Long-Term Financial Performance: Insights from Chinese Companies

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Abstract. This study examines the long-term financial effects of intellectual property-related M&As (IP M&As) in China, using ROIC as the main performance metric. Based on a panel of listed firms from 2000–2020, it first applies a DID model to compare IP M&As with regular deals, then extends to a DDD framework to assess directional heterogeneity (North-to-South, South-to-North, intra-regional). Results show IP M&As improve ROIC, especially in North-to-South transactions. Mechanism analysis confirms enhanced innovation output, though its financial conversion may face institutional or integration frictions. The study highlights the strategic value of IP M&As and the importance of regional context in post-deal performance.

Keywords: IP M&A; ROIC; China; Regional Heterogeneity; Innovation Mechanism; Triple Difference; M&A Direction

1 Introduction

As China's economy integrated into global markets, its M&A landscape evolved significantly. Unlike the West, which experienced M&A waves since the 19th century, China remained largely uninvolved until the late 20th century (Yang et al., 2022 [1-8]). Before 1949, M&A activity was limited and driven by foreign entities. Under the planned economy, mergers were state-led, aimed at nationalizing private capital, and lacked market characteristics. Reforms in the late 1970s marked a turning point, as M&A activity increased with market liberalization. After China joined the WTO in 2001, both domestic and foreign M&A surged, driven by strategic motives such as market expansion and technology acquisition. In recent years, China's M&A market has shown stronger trend. According to a M&A report by Deloitte in 2023, the total value of Chinese M&A deals reached about US$262 billion in 2023. Among these, a sizable proportion is in the technology, healthcare, and consumer goods sectors. Meanwhile, we can see more and more of these M&A deals involve IP assets. The growing importance of IP in M&A deals highlights the need for a more understanding of this trend. A range of regulations and policies in China are set for M&A activity. In 2008, the Anti-Monopoly Law was established to ensure fair competition and prevent

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monopolistic behavior. The Ministry of Commerce (MOFCOM) and the State Administration for Market Regulation (SAMR) are the two government departments that review and approve M&A transactions. In recent years, the government has also introduced a series of policies to encourage innovation and protect intellectual property, creating a more favorable environment for IP-driven M&A.

1.1 Research Motivation and Contribution

Intellectual property (IP) has become a key strategic asset. Firms increasingly pursue M&As to acquire valuable IP portfolios, aiming to enhance competitiveness and innovation. However, the long-term impact of IP-related M&A remains complex—especially in emerging markets like China. It argues that the benefits of IP M&A depend not just on the asset acquired, but also on whether the acquisition achieves effective cross-regional integration. The findings offer practical implications for firms pursuing IP M&A as a path to long-term growth in China's evolving economic landscape.

2 Literature Review and Hypothesis Development

2.1 Concept and Theory

This review examines the current literature on the long-term performance impact of IP M&As, with a focus on Chinese firms. It highlights three research areas: the general impact of IP M&A on ROIC, the effect of geographic direction, and the moderating role of R&D investment. Intellectual property has become central to M&A decisions, enabling firms to acquire technology and capabilities more efficiently than internal development (Li & Yuan, 2024 [1-3]). IP-rich firms are more likely to be acquisition targets (Wu & Chung, 2019[1-7]). Studies on Chinese firms show increased innovation output post-IP M&A, such as patent growth (Tang et al., 2024 [1-4]), although results vary depending on technological fit. According to Yang et al [1-8] in 2022 stated, geographic disparity across China affects firm behavior and policy implementation, yet its role in IP M&A performance remains underexplored. The Qinling-Huaihe line is often used to distinguish North and South China (Huang & Zhao, 2020 [1-2]). Some studies suggest regulatory, technological, and cultural factors influence the value realization of IP assets post-M&A, especially in IP-intensive sectors like pharmaceuticals (Wu et al., 2022[1-6]). In the research on IP mergers and acquisitions of Chinese enterprises, multiple empirical studies have adopted the DID or DDD methods to verify whether the innovation output (number of patents) after mergers and acquisitions is a mediating mechanism for improving ROIC. Bai and Zhang in 2024 [1-1] found based on the data of A-share mergers and acquisitions and patents from 2007 to 2020 that technology-based mergers and acquisitions significantly enhanced the subsequent patent applications of the acquirers. Another study (Wu et al., 2022 [1-6]) pointed out that the open innovation model based on overseas mergers and acquisitions significantly increased the number and quality of enterprise patents, and the effect lasted for two years.

2.2 Hypothesis Development

2.2.1 Research Questions.

1. How do intellectual property-related M&A transactions affect the long-term return on invested capital (ROIC) of acquiring firms in China?
2. Do post-acquisition performance outcomes vary based on the geographical direction of the IP M&A (e.g., North-Buy-South versus South-to-North)?
3. Is there evidence that post-M&A innovation output serves as a mechanism linking IP M&A to improved firm performance?

2.2.2 Hypothesis.

H1: Acquiring valuable intellectual property through M&A can enhance innovation, operational efficiency, and market power, thereby improving long-term financial performance.

Hypothesis: IP M&A has a positive impact on the long-term ROIC of acquiring firms in China.

H2: Regional disparities in China suggest that North-to-South acquisitions may yield better outcomes, as northern firms can access advanced technologies and skilled labor in the south.

Hypothesis: The positive effects of IP M&A are stronger in North-Buy-South deals due to regional complementarities.

H2a: This effect is particularly significant in high-tech and pharmaceutical industries.

H3: IP M&A enhances innovation output, which serves as a transmission channel for financial gains.

Hypothesis: IP-related M&A improves innovation (e.g., patent applications), which contributes to long-term ROIC growth.

2.3 Expected Results

For the first hypothesis, it is expected that IP-related M&A will exhibit a positive and statistically significant impact on firms' long-term financial performance, as measured by the three-year ROIC. The acquisition of intellectual property assets can strengthen the acquiring firm's innovation capabilities, improve operational efficiency, and enhance competitive advantage, thereby contributing to improved ROIC in the post-acquisition period.

For the second hypothesis, the geographical direction of the acquisition is anticipated to influence post-M&A outcomes. Specifically, North-buy-South IP acquisitions are expected to generate more pronounced improvements in ROIC compared to other directions (South-buy-North, North-buy-North, and South-buy-South). This effect may stem from the transfer of innovation resources and market access from the more economically advanced southern regions to northern acquirers, enabling better exploitation of the acquired IP.

For the industry heterogeneity sub-hypothesis, it is expected that the positive effects of IP M&A will be more significant in high-tech and pharmaceutical industries. These sectors rely heavily on intellectual property for sustaining competitive advantage and are characterized by rapid technological advancement, making them particularly responsive to the value created through strategic IP acquisition.

For the mechanism analysis, it is expected that IP-related M&A leads to a significant increase in the acquiring firm's innovation output, as measured by the number of patent applications after the deal. This suggests that improved innovation performance may serve as a transmission channel through which IP M&A enhances long-term ROIC. In other words, acquiring firms are likely to realize superior financial returns when the acquisition of intellectual property translates into concrete innovation outcomes.

3 Research Design and Data

3.1 Sample and Data

This study employs a firm-level panel dataset from the CSMAR database, covering M&A transactions by Chinese listed firms from 2000 to 2020. The timeframe ensures consistent data availability, captures a full 3-year post-M&A performance window, and avoids COVID-19 distortion. It also aligns with key institutional reforms like the 2008 Anti-Monopoly Law and the 2014 IP Court establishment. The dataset includes firm-level deal size, acquirer/target provincial location, and patent activity. It identifies whether M&As are IP-related, allowing treatment group construction for causal analysis. To classify M&A direction (e.g.,North-Buy-South, South-Buy-North), firms' provincial data were matched using Excel functions (VLOOKUP, Power Query) and verified manually. Over 95% of ~30,000 firm names were accurately geolocated, while unmatched entries (less than 5%) were excluded to ensure classification reliability.

3.2 Variable Construction.

3.2.1 Treatment and Control Group Construction.

Firms are divided into a treatment group and a control group based on the nature of the M&A.

Treatment Group: This group consists of firms that engaged in at least one domestic, completed, IP-related M&A during the sample period. Transactions classified as IP-related are identified based on CSMAR's keyword labeling system and include acquisitions explicitly related to patents, trademarks, proprietary technologies, or other intangible innovation assets. Only M&A deals where both the acquirer and the target are domestic entities are included.

Control Group: The control group is composed of firms that engaged in regular M&A activities during the same period but did not involve the acquisition of IP assets.

To improve comparability and reduce selection bias, this study implements Propensity Score Matching (PSM) prior to regression analysis. This results in a matched sample of approximately 10,500 observations, which serves as the base dataset for subsequent empirical analysis.

3.2.2 Variable Definition.

Dependent variable: ROIC measured over a 3-year post-acquisition period.

Independent variables: The treatment variable to demonstrate whether the M&A was IP-driven, a dummy to represent for post treatment period, 1 for period after company i's IP M&A, 0 for otherwise. Moderating variable is used to identify M&A direction, which include North to North, North to South, South to North (South to South is omitted term due to multicollinearity).

Control variables: Firm size which is measured by natural algorithm of total invested capital. Leverage is also used as another control variable measured by debt-to-invested capital ratio, to make sure the companies were experiencing similar risks. Liquidity is another variable since it will affect the investment decision of the company, this variable is measured by the current ratio. Growth opportunity is measured by Tobin's Q and R&D intensity, measured by R&D expense/Revenue will help classify as well.

4 Methodology

To investigate the impact of IP-related M&A on enterprise performance, this paper first constructs a DID model as the benchmark identification framework. By comparing the changes in ROIC before and after the merger and acquisition between the treatment group and the control group, the average effect of the merger and acquisition behavior was identified. On this basis, the DDD model is further introduced to investigate the moderating effect of the geographical heterogeneity of the merger and acquisition direction on the merger and acquisition performance. Specifically, this paper constructs the merger and acquisition direction variable based on the registered address information of the enterprises of both the merger and acquisition parties. It is classified into three categories: "Mergers and Acquisitions of Southern Enterprises by Northern Enterprises" (North-Buy-south), "Mergers and Acquisitions of Northern Enterprises by Southern Enterprises" (South-Buy-North), and "Mergers and Acquisitions within the Region" (South-Buy-South/North-Buy-North). And taking one of the types as the benchmark group, construct the interaction terms among processing status, time dimension and merger and acquisition direction, so as to capture the performance differences under different integration paths.

The form of the regression model is as follows:

$$ROIC_{it}=\alpha+\beta_1\cdot Treat_i+\beta_2\cdot Post_t+\beta_3\cdot(Treat_i\times Post_t)+X_{i,t}+\gamma_i+\delta_i+\theta_t+\varepsilon_{it} \quad (1)$$

For equation (1),The coefficient β3 is the focus of this model, which reflects the average degree of change in the performance of enterprises undergoing intellectual property-related mergers and acquisitions after the mergers and acquisitions, compared with the changes of ordinary mergers and acquisitions enterprises during the same period.

To further explore whether the performance of mergers and acquisitions has heterogeneous effects due to different merger and acquisition directions, this paper introduces a triple interaction term based on the benchmark DID model to construct the DDD

model. The direction variable (madirection_num) is classified according to the provinces where the enterprises of both the merger and acquisition parties are registered, and it includes a total of three categories: (1) Mergers and acquisitions of Southern enterprises by Northern enterprises (North-Buy-South), (2) Mergers and acquisitions of Northern enterprises by Southern enterprises (South-Buy-North), (3) Mergers and acquisitions within the region (North-Buy-North or South-Buy-South). To facilitate explanation and avoid the trap of dummy variables, in this paper, "Mergers and acquisitions within the region" is set as the benchmark group, and the corresponding double and triple interaction terms are introduced.

The form of the extended regression model is as follows:

$$ROIC_{it}=\alpha+\beta_1\cdot Treat_i\times Post_t+\beta_2\cdot Treat_i\times Post_t\times Direction_i+X_{i,t-1}'\gamma+\delta_i+\theta_t+\varepsilon_{it} \quad (2)$$

For equation (2), The coefficient β_2 is the focus of this model. If β_2 is significantly positive, it indicates that this merger and acquisition direction is more conducive to improving enterprise performance compared with mergers and acquisitions within the region. If it is significantly negative, it indicates that there may be resource misallocation or integration resistance in this integration path.

5 Empirical Result

5.1 DID Estimation

Table 1. DID regression result

Variable	(1)	(2)	(3)
Treat×Post	0.032***	0.032***	0.632***
	(3.127)	(3.151)	(3.665)
Control Variables	No	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes
Observations	10444	10442	10442
R^2	0.569	0.589	0.82
Adj. R^2	0.506	0.529	0.793
F	9.78	15.139	20.738

***p<0.01, **p<0.05, *p<0.10

Table 1 reports the benchmark regression results based on the DID model, examining performance differences between IP-related and regular M&A transactions.

Column (1) presents a baseline model controlling only for firm and year fixed effects. The coefficient on Treat × Post is 0.032 and significant at the 1% level (t = 3.127), indicating that firms involved in IP M&A experience, on average, a 3.2 percentage point increase in ROIC three years post-acquisition. This supports the hypothesis that IP M&As generate greater long-term financial returns due to patent integration and knowledge synergy. Column (2) adds firm-level covariates (size, liabilities, revenue, EBIT, liquidity, leverage) and controls for industry fixed effects. The coefficient

remains stable at 0.032 and gains significance (t = 3.151), suggesting the performance premium is not driven by observable financial traits, but reflects a net causal effect. To explore the underlying mechanism, Column (3) investigates whether IP M&A leads to greater innovation output. The dependent variable is log(1 + total_patents). The coefficient on Treat × Post is 0.632 and significant at the 1% level (t = 3.665), confirming that IP acquirers see stronger growth in patent applications post-M&A. This validates the first-stage mechanism: IP M&A → Innovation Output ↑ → ROIC ↑.

5.2 Mechanism Test

However, when patent output was further included as an explanatory variable in the main regression model to examine its impact on financial performance (ROIC), the results from Table 2 showed that the coefficient of log_patent was negative and significant, indicating that the innovation behavior itself failed to translate into financial gains and even depressed the return on capital of enterprises to a certain extent. This "reverse path" phenomenon may reflect the low structural quality of innovation output, insufficient integration efficiency, or a significant lag in the release of benefits.

To further examine the moderating role of innovation ability in the performance of mergers and acquisitions, this paper divides the samples into the high innovation group and the low innovation group based on the median of the patent output level (log_patent) before mergers and acquisitions and runs difference-in-differences regression respectively to test the heterogeneity of the treatment effect under different innovation levels. The results show that in both groups, the Treat × Post item was significantly negative, indicating that even with a strong innovation foundation, intellectual property mergers and acquisitions failed to effectively translate into financial performance in the short term.

Table 2. Mechanism result

Variables	(1)	(2)
log_patent_lag2	-0.003*	-0.004**
	(-1.723)	(-2.105)
Control Variables	Yes	Yes
Firm Fixed Effect	Yes	Yes
Year Fixed Effect	Yes	Yes
N	3067	3736
R^2	0.676	0.755
Adj. R^2	0.591	0.699
F	7.599	4.782

***p<0.01, **p<0.05, *p<0.10

This study confirms that IP-related M&As significantly enhance firms' innovation output, as evidenced by increased patent applications post-acquisition. However, when log_patent is included in the main regression, its negative and significant coefficient indicates that this innovation has not translated into financial returns in the short term. To explore this mismatch, the sample is divided into high and low innovation groups

based on pre-acquisition patent output. Results show that in both groups, Treat × Post remains significantly negative, suggesting that even firms with stronger innovation foundations may fail to convert innovation into performance gains immediately after IP M&A.

Several factors may explain this phenomenon. First, not all patents reflect high-quality or market-relevant innovation. Patent quantity often masks underlying quality issues. Second, the commercialization of innovation typically lags behind technical output, especially in cross-regional M&As with higher integration frictions. Third, technical and organizational integration failures are common. Misalignment in structure, R&D culture, or incentive mechanisms can dampen post-M&A synergy effects. For instance, in China's semiconductor sector, some North-South M&A deals saw increased patent filings but weakened short-term ROIC due to R&D team turnover and internal management conflicts. Similar issues are observed in pharma M&As, where integration difficulties in clinical research and certification standards reduce performance realization

5.3 DDD Estimation

Table 3. DDD regression result

Variables	(1)	(2)	(3)	
			Traditional Industry	High-tech Industry
Treat×Post×NorthBuyNorth	0.102***	0.090***	0.057**	0.107***
	(3.759)	(3.171)	(2.1)	(2.75)
Treat×Post×NorthBuySorth	0.108***	0.102***	0.085	-
	(3.444)	(3.23)	(0.82)	-
Treat×Post×SouthBuyNorth	0.116***	0.090**	0.138***	0.138***
	(3.33)	(2.349)	(5.05)	(3.73)
Control Variables	No	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Observations	2605	2605	1728	594
R^2	0.677	0.699	0.692	0.804
Adj. R^2	0.54	0.57	0.555	0.698
F	9.81	11.585	10.831	6.479

***p<0.01,**p<0.05,*p<0.10

To explore whether M&A outcomes vary by geographic direction, this study extends the DID model by introducing a triple interaction term (Treat × Post × Direction) within a Difference-in-Differences-in-Differences (DDD) framework. This allows the identification of structural heterogeneity in post-M&A performance, particularly relevant in China's institutionally diverse regions. Table 3 reports that North-Buy-South M&As show significantly positive effects on ROIC, suggesting northern acquirers benefit from absorbing southern firms' innovation and market resources. In contrast, South-Buy-

North and within-region M&As show no significant effects, implying possible integration frictions or limited synergy.

Once directional heterogeneity is accounted for, the Treat × Post coefficient becomes insignificant, indicating that earlier DID-identified average gains may obscure directional variation. Thus, M&A effectiveness depends more on integration paths and regional fit than the M&A act alone. Splitting the sample by industry (per China's 2017 High-Tech Classification), results show that Post × SouthBuyNorth yields significant positive effects in both traditional and high-tech sectors. In traditional industries, this likely stems from alleviating resource segmentation; in high-tech sectors, it reflects stronger absorptive capacity. NorthBuySouth is dropped in the high-tech sample due to insufficient observations.

These findings emphasize that IP M&A effectiveness is not uniform but conditional on merger direction and industry structure. Future studies may benefit from non-parametric methods or sparse models to enhance identification in segmented samples.

5.4 Robustness Check

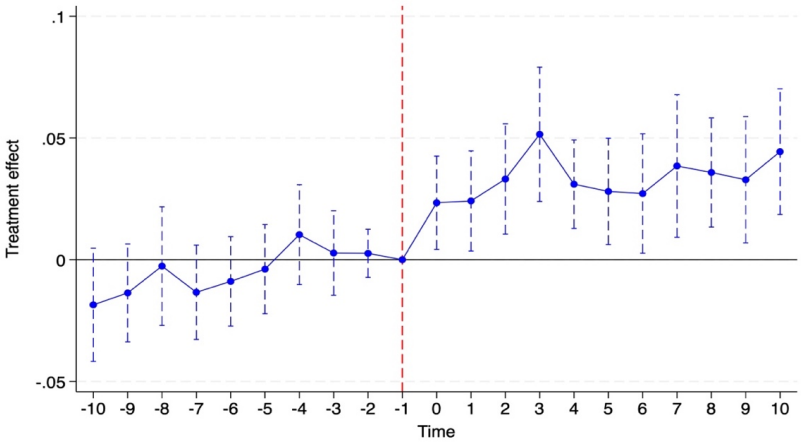

Fig. 1. Parallel trend test

This paper constructs a complete parallel trend test based on the event-time method that Wang et al. in 2024 [1-5] used in their paper. The specific formula is as follows:

$$Y_{it} = a_s + \beta_s^{precut}[D_i \times I(t - T_D \le -10)] + \sum_{s=-9}^{-9} \beta_s^{pre}[D_i \times (t - T_D = s)] + \beta_s^{current}[[D_i \times I(t - T_D = 0)] + \sum_{s=9}^{9} \beta_s^{las}[D_i \times I(t - T_D = s)] + \beta_s^{lascut}[D_i \times I(t - T_D \ge 10)] + \gamma X_{it} + u_i \quad (3)$$

These results of the parallel trend test are illustrated in the figure 1. This result indicates that there was no significant trend deviation between the merger and acquisition group and the control group before the event occurred, verifying the establishment of the parallel trend of the DID model.

6 Conclusion

This paper takes the merger and acquisition events of Chinese listed companies during the period from 2000 to 2020 as the research sample and conducts an empirical analysis around the core issue of "whether mergers and acquisitions related to intellectual property rights can bring about long-term performance improvement". By constructing the DID and DDD model and introducing the merger and acquisition direction as the third dimension, this paper identifies the performance heterogeneity of merger and acquisition behaviors in different regional and industry contexts. Meanwhile, the number of enterprise patent applications was further introduced as a mediating variable to examine whether innovation output constitutes a potential mechanism for the improvement of merger and acquisition performance.

6.1 Main Findings

The benchmark DID model indicates that IP mergers and acquisitions increase ROIC by an average of approximately 3.2 percentage points within 3 years after the merger and acquisition, with significant and robust results. The triple difference model reveals that "south-to-north" has the most significant performance improvement effect in high-tech industries; The sample size of "North Merging South" is relatively small, and the results are missing. The performance of mergers and acquisitions in the same region has not improved significantly. Mechanism regression shows that the patent applications of enterprises in the post-merger processing group have increased significantly, and log(1+patents) has a significant positive impact on ROIC, supporting the "innovation → financial performance" path. Meanwhile, heterogeneity regression indicates that performance improvement is mainly concentrated in industry-region combinations with technological synergy space, and there are significant differences in merger and acquisition effects between traditional industries and high-tech industries.

6.2 Policy & Practical Implications

This study highlights the importance of promoting "north-south integration" M&As with institutional and industrial complementarities. Policymakers should support post-M&A technological collaboration through policies that facilitate patent integration and innovation synergy, shifting focus from capital consolidation to capability absorption. In high-tech industries, a pre-merger technical assessment mechanism is recommended to prevent knowledge mismatch and redundant integration. Furthermore, enhancing patent disclosure and standardizing quality assessment can improve transparency and guide more effective M&A decisions.

6.3 Limitations

Despite methodological rigor, this study faces several limitations. Industry classification may not fully capture real-world distinctions, innovation is proxied solely by patent

quantity without accounting for quality, and the performance window is limited to three years post-M&A. Future research can incorporate patent citation data, extend the time horizon, and explore mechanisms such as ESG impact and regional sustainability to enrich contextual understanding.

Disclosure of Interests

The authors have no competing interests to declare that are relevant to the content of this article.

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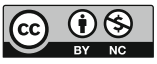
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