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Market Reactions to Old Innovation News: Evidence From Patent Disclosures in China

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ABSTRACT

This paper examines how investors' past inattention affects market reactions to corporate innovation announcements, leveraging a unique setting in China where many publicly listed firms voluntarily disclose patent grants—information already public via the *Patent Gazette*. Using a hand-collected dataset of 2086 announcements from 2010 to 2018, we find a significant market reaction on the corporate news announcement day. Our analysis shows that this market reaction to stale patent news is positively related to investors' past limited attention, rather than to attention-driven overreaction or other factors influencing returns. Subsample analyses further show that this relationship is more pronounced among firms with low institutional ownership and opaque information environments, and is stronger for announcements preceded by the same type of innovation disclosure within the prior 3 months. In addition, we find that retail investors drive this relationship. Our evidence also indicates that managers take proactive actions to mitigate investors' attention constraints, thereby enhancing the market's pricing of innovation news.

JEL Classification: D22, G12, G14

1 | Introduction

There are alternative views on how the market reacts to stale corporate news. The traditional efficient markets view posits that capital markets price relevant information efficiently, leading to no measurable reaction to stale news. However, one line of studies suggests that investors overestimate the novelty of information, leading the market to overreact to stale news (Tetlock 2011; Gilbert et al. 2012). In contrast, another view contends that stale corporate news may capture the attention of inattentive investors, causing a correction for the market's prior underreaction to the original information (e.g., Huberman and Regev 2001; Nekrasov et al. 2023). Our study seeks to shed light on this question by exploiting a unique institutional setting in China, where many publicly traded firms have regularly announced stale news about patent grants since 2005.

Our research context has several features. First, the Chinese stock market is dominated by retail investors (Leippold et al. 2022). According to the 2024 Shanghai Stock Exchange Yearbook, there are 346.7 million investors in China, with 345.6 million being individual investors and 1.1 million institutional investors. Individual investors hold 99.68% of all stock accounts. This characteristic provides a powerful setting where we can investigate how the market reacts to stale news from the lens of investors' behavioral limitations or biases. Second, the initial patent grant news is publicly available in the *Patent Gazette*, and companies later announce certificates of patent grants, which are stale and merely repeat patent granting news. Investors, particularly retail investors, are expected to pay more attention to corporate announcements than to the *Patent Gazette*, as the National Intellectual Property Administration (CNIPA, China's patent office) publishes thousands of patent grants periodically

(i.e., every Tuesday and Friday) for all inventors. In contrast, investors can easily follow a public firm's announcements with greater attention from any financial media outlets or the company's investor relations website, with such channels commanding greater investor attention (Liu et al. 2023). Thus, these two information channels with different levels of investors' attention allow us to examine how the interaction between investor's past limited attention and information staleness affects the market pricing of corporate information, such as patent news.

We manually collect 2086 announcements of patent grant certificate receipts from the China Securities Information Disclosure Platform (CNINFO)[1] between 2010 and 2018. Using an event study approach, we document a significantly positive market reaction to these announcements. The abnormal stock return on the event day is 22.24 basis points, which is statistically significant at the 1% level. Because these announcements contain no new material information, this finding contradicts the prediction of the efficient market hypothesis. We also rule out the alternative explanation that investors overestimate the novelty of these announcements, leading to a market overreaction, by examining whether returns reverse following the corporate news announcement. In the absence of evidence for such reversals, our findings align with the view that the market reaction to corporate patent grant disclosures represents a correction for the market's prior underreaction to CNIPA's original patent grant publications.

If the market reaction to the stale corporate patent news stems from a correction for the market's prior underreaction to patent news overlooked by inattentive investors, we expect that the magnitude of this reaction should be more pronounced for firms that receive less attention in the past than for firms that are covered by attentive investors prior to the news announcements. Following existing literature (Loh 2010; Huang et al. 2019; Liu et al. 2023; Li et al. 2024), we construct three measures of investor attention using the average value of trading volume, stock turnover, and the Baidu Search Index over the 3 months preceding the announcement date. Additionally, we extract the first principal component of these three measures as a comprehensive proxy for investors' past inattention. On the event day, the abnormal return is 34.33 basis points for firms with low prior investor attention, whereas no statistically significant market reaction is observed for firms that received high prior investor attention. The difference between these two sub-groups is statistically significant at the 5% level, indicating that correcting investors' past inattention explains our results. Extending the event window to the post-announcement period amplifies this return difference further.

Next, we perform a multivariate regression analysis to control for potential confounding factors. All estimated coefficients for the four measures of investors' past inattention are positive and statistically significant, suggesting that the information value of overlooked patent grants increases with the proportion of inattentive investors holding the firm's equity securities. Economically, a one-standard-deviation increase in investors' past inattention, as measured by the Baidu Search Index (0.64), is associated with a 57.92 basis points increase in the three-day cumulative abnormal returns surrounding the event day. Furthermore, we find similar results when the dependent variable is replaced with the cumulative abnormal returns over a nine-trading-day post-announcement period. Our results are also robust to alternative specifications, including substituting the dependent variable with cumulative abnormal trading volume and using a multi-keyword Baidu Search Index as an alternative measure of investor attention.

Prior studies suggest that institutional investors are less susceptible to behavioral biases and cognitive constraints than their retail counterparts (Barber and Odean 2008; Ben-Rephael et al. 2017). Although retail investors dominate the Chinese stock markets (Leippold et al. 2022), institutional participants may still influence stock price reactions to patent announcements, even in the absence of attention constraints. However, our subsample analysis based on shareholding size shows that the positive relationship between investors' past limited attention and stock price reactions exists only in firms predominantly held by retail investors, consistent with the premise that retail investors' limited attention drives market reactions to old innovation news.

According to the theory of rational inattention (Sims 2003; Blankespoor et al. 2020; Maćkowiak et al. 2023), salient corporate news grabs more attention from investors in opaque information environment, because processing such news in this environment yields greater informational value. In line with this prediction, we examine the relation between the market reaction to the stale corporate patent news and investors' past inattention conditional on information environment. We proxy for the information environment using analyst coverage (i.e., the number of analysts following the firm). Consistent with expectations, the relationship between the market reaction to the news and investors' past limited attention is more pronounced among firms with low analyst coverage.

Research on investor attention suggests that information accessibility in memory affects attention allocation, leading investors to pay more attention to disclosures of a type they have recently encountered for a particular firm (Kahneman and Tversky 1973; Hirshleifer and Teoh 2003). Empirical analysis of corporate patent announcements shows that the relationship between the market reaction and investors' past limited attention is more pronounced for corporate patent announcements preceded by the same type of disclosures within the past 3 months. The findings suggest that prior patent announcements activate investors' categorical attention toward innovation, causing subsequent announcements to generate stronger market reactions due to enhanced information processing through an established attention channel.

In our additional tests, we examine the market reaction to patent grant news on the *Patent Gazette*. We find that the market reaction to initial patent grants by CNIPA is negatively associated with limited investor attention. This suggests that patent grant news on the *Patent Gazette* does not receive much attention among inattentive investors. Moreover, we examine the purchase and sale of stocks around the corporate patent announcement day by using high-frequency trading data from the CSMAR Trade & Quote Research Database. We find that small and medium traders actively buy (sell) target stocks in the periods around the corporate patent announcements made by firms

receiving low (high) past investor attention, whereas large traders do not exhibit this behavior. These findings are consistent with the view that retail investors have low attention capacity. Furthermore, we subject our baseline results to two alternative explanations. Nonetheless, the empirical evidence fails to support the hypotheses of strategic timing or signaling via boilerplate statements. In addition, since the benefit from disclosing the receipt of patent certificates hinges on investor attention, we expect announcers are more susceptible to investors' past inattention. Our analysis confirms this proposition, revealing that firms proactively take action to attract investors through voluntary disclosures.

Our study contributes to the literature in two ways. First, we contribute to the literature on investors' inattention by investigating the market reaction to stale innovation news that was overlooked by inattentive investors. Previous literature suggests that investors may be inattentive to either past news (e.g., Tetlock 2011; Gilbert et al. 2012) or current news (e.g., DellaVigna and Pollet 2009; Hirshleifer et al. 2009; Liu et al. 2023; Nekrasov et al. 2023). Drawing on rational inattention theory (e.g., Sims 2003; Blankespoor et al. 2020; Maćkowiak et al. 2023), we find that when firms announce stale innovation information that grabs attention from previously inattentive investors, there is a market correction for previously underreacted innovation news. This delayed reaction is positively associated with past inattention level of investors. Our findings suggest that market reaction to stale information depends on investors' attention levels at different time points and that the way the market prices information can be more nuanced. Compared to Huberman and Regev's (2001) case study, we not only cover a large sample but also pinpoint the relationship between past investor inattention and the market reaction to stale news. Moreover, we focus on retail investors' attention and trading in China's setting where retail investors dominate. Our findings suggest that retail investors with constraints on their attention capability are likely to ignore news that is costly to process and pay more attention to the corporate news that is easy to follow. This implies that securities regulators need to consider the attention capacity of retail investors when regulating corporate disclosures.

Second, we contribute to the literature on innovation. Hirshleifer et al. (2013, 2018) document that firm innovation can predict future returns. They show that innovative efficiency and innovative originality, both measures built on existing information from granted patents, predict stock returns after controlling for firm characteristics and risk factors, which they attribute to investors' limited attention. Lee et al. (2019) argue that investors do not attend to technological links in patents across public firms. Chemmanur et al. (2026) document a post-announcement return drift following patent grants by the United States Patent and Trademark Office (USPTO). However, it is unclear how innovation information is eventually incorporated into prices. Our findings provide direct evidence that inattentive investors can incorporate underreacted innovation information in later attention-grabbing events, such as voluntary corporate disclosures in our setting.

The remainder of this paper proceeds as follows. Section 2 reviews the literature, describes the institutional background, and then develops our empirical hypothesis. Section 3 introduces the data and descriptive statistics. Section 4 presents the main empirical results. Section 5 investigates the cross-sectional variations. Section 6 conducts a series of extensions. Section 7 concludes the paper.

2 | Background and Hypothesis Development

2.1 | Literature Review

Our study relates to three lines of research. The first stream of studies is about how investors' limited attention affects how they process current news. For example, Hirshleifer et al. (2009) argue that the number of same-day earnings announcements made by other firms affects investors' attention paid to a focal firm's earnings announcement. Therefore, investors' limited attention leads to underreaction to corporate news, causing the post-earnings announcement drift. DellaVigna and Pollet (2009) argue that investor attention is lower on Fridays than on other weekdays, and they find less immediate response and more drift to earnings announcements on Fridays. Huang et al. (2019) exploit lottery jackpots, which attract investors' attention away from the stock market. Their findings support the theoretical predictions that distracted investors delay the incorporation of firm-specific information into stock prices, and thus stock returns co-move more with market and industry returns. These studies suggest that publicly available information may predict future returns. Existing research indicates that investors are inattentive to demographic shifts (DellaVigna and Pollet 2007), customer-supplier linkages (Cohen and Frazzini 2008), and various other market relationships. Recently, patent information in the public domain has been revealed as a valuable source of return predictors, attributed to investors' limited attention (e.g., Hirshleifer et al. 2013, 2018; Lee et al. 2019; Chemmanur et al. 2026).

The second line of studies investigates how the market reacts to old news. Prior studies document that investors overreact to stale media reports (Tetlock 2011), outdated macroeconomic announcements (Gilbert et al. 2012), and recombination of old information (Fedyk and Hodson 2023). In such settings, investors essentially overestimate the novelty of old news, leading to temporary rises and subsequent reversals of firms' stock prices. The third line of studies concerns how the rational inattention of investors explains the market reaction to corporate news (Sims 2003; Blankespoor et al. 2020; Maćkowiak et al. 2023). For example, Liu et al. (2023) find that macro news crowds out retail investor attention to firms' earnings. Thus, for stocks with high retail ownership, macro news dampens earnings announcement returns and substantially increases post-earnings announcement drift. Fedyk (2024) documents that attention-grabbing front-page news prompts quicker market responses and no subsequent reversals after publication compared to equally important non-front-page news, an effect due to investors' inattention to less salient presentations of news.

2.2 | Institutional Background

The National Intellectual Property Administration (CNIPA) is China's primary patent regulatory authority. Like its

TABLE 1 | Keyword frequency of corporate patent announcements.

Field	Frequency (percentage)	Frequency (count)	Total announcements
(21) Application number/patent number	99.95%	2085	2086
(54) Patent name	98.71%	2059	2086
(22) Application date	83.32%	1738	2086
(73) Patentee/address	82.12%	1713	2086
(45) Grant publication date	50.62%	1056	2086
(72) Inventor(s)	16.49%	344	2086
(10) Grant publication number	2.97%	62	2086
(57) Abstract	2.25%	47	2086
(51) Int.CI. (international patent classification)	0.00%	0	2086
(65) Published document number of the same application	0.00%	0	2086
(43) Application publication date	0.00%	0	2086
(74) Patent agency/patent attorney	0.00%	0	2086

Note: This table reports the frequency of specific data items extracted from 2086 corporate patent announcements, cross-referenced against the 12 standard data fields consistently published by the China National Intellectual Property Administration (CNIPA) in the *Patent Gazette*. The percentage represents the ratio of announcements containing a specific field to the total sample size ($N = 2086$), while the count indicates the absolute number of occurrence. Items are ordered by descending frequency.

counterparts in other jurisdictions, CNIPA operates under the Patent Law, which has been effective since April 1, 1985. Several provisions of the Patent Law Implementation Rules are critical for understanding our empirical setting.[2] First, pursuant to Article 54 of the Rules, CNIPA issues an advance notification of intent to grant a patent right. A patent right is granted, publicly announced, and a patent certificate issued only after the applicant completes registration formalities within 2 months of receiving the notification. This administrative process allows patentees to learn of impending patent grants prior to public disclosure. We document that a subset of listed firms disclose these notifications to capital markets. However, patentees often engage patent agencies to manage application procedures. Article 4 of the Rules requires CNIPA to transmit all relevant documents directly to the appointed patent agency or, in the absence thereof, to the designated liaison.

Second, Article 90 of the Rules requires CNIPA to publish the *Patent Gazette* periodically. Historically issued every Tuesday, the Gazette has included an additional Friday publication since June 2017. Its content includes all granted patent rights and their associated bibliographic data. Article 91 requires the patent administration department to provide the *Patent Gazette* for public inspection free of charge. CNIPA currently publishes the *Patent Gazette* in PDF format on its official website, enabling easy download, search, and dissemination of this information. Additionally, the Patent Law mandates that all personnel involved in patent administration—including CNIPA staff—maintain the confidentiality of patent applications until official publication. Since 2005, numerous Chinese listed companies have adopted the practice of issuing announcements upon the receipt of patent certificates; by 2018, the annual volume of such announcements exceeded 600. Figure C1 presents the distribution of these announcements and the percentage of firms making them during the sample period.

Although these announcements are considered stale, as the underlying patent grants were previously published in the *Patent Gazette*, we conduct a textual analysis to quantify their informational similarity. We begin by examining the keyword frequency within corporate patent announcements. CNIPA consistently includes 12 data fields for each patent grant in the *Patent Gazette*, though the number of fields varies by patent type. These fields are inherently linked via unique identifiers, such as the application number and patent name. Consequently, when firms disclose patent grants, they typically include these specific identifiers rather than generic information. We search for each data field in the corporate announcements to calculate its frequency and appearance rate. The results are presented in Table 1. Consistent with our expectations, nearly all disclosures include the application number and patent name. However, the application date and patentee information are referenced less frequently, whereas International Patent Classification (IPC) codes and patent agent details are consistently omitted.

We further compute similarity indices between the corporate announcement text and corresponding entries from *Patent Gazette* using two distinct methodologies. The first method employs TF-IDF-weighted cosine similarity, which models each document as a vector in a high-dimensional feature space. The second method employs a Large Language Model (LLM)-based semantic similarity. Unlike cosine similarity, LLM embeddings are pre-trained on vast corpora, enabling the detection of semantic equivalences—such as varied date formats

(e.g., '2008.12.29' vs. 'Dec 29, 2008') and irregular patent ID spacing. This semantic-level matching ensures that narrative language in corporate announcements is accurately mapped to the structured entries in the *Patent Gazette*. Figure C2 plots the cumulative distributions of these two similarity metrics. The results indicate that almost every LLM-based similarity index exceeds 0.9, suggesting substantial lexical and semantic overlap. Even when employing the more traditional TF-IDF-weighted cosine similarity, over 80% of the values remain above 0.5. Collectively, these findings confirm that corporate announcements largely reiterate information previously disclosed in the *Patent Gazette*.

2.3 | Hypothesis Development

We investigate how the market reacts to stale corporate news announcements. Although the classical market efficiency view posits that equity markets efficiently price public patent information (e.g., Kogan et al. 2017; Chen et al. 2019; Glaeser and Lang 2024), several studies argue that investors may overestimate the novelty of stale information and overreact to corporate news (e.g., Tetlock 2011; Gilbert et al. 2012; Fedyk and Hodson 2023).

Our empirical setting is more nuanced, however, due to China's unique market characteristics. According to the studies on limited attention, the market does not fully incorporate new relevant information, especially when that information is less salient (e.g., Hirshleifer et al. 2013, 2018; Lee et al. 2019; Chemmanur et al. 2026). Since the Chinese patent office announces thousands of patent grants periodically (i.e., every Tuesday and Friday) for all inventors via the *Patent Gazette*, investors with limited information-processing capacity may fail to attend to these grants. This is especially true in China, which is dominated by retail investors who likely have more constraints on their attention capacity. This means that the market is expected to underreact to the initial patent grant information published by CNIPA.

In contrast, when firms themselves announce patent news, investors' attention is expected to increase significantly because investors can easily follow a public firm's announcements with high attention from any financial media outlet or the company's investor relations website with high attention (Liu et al. 2023). Thus, when firms disclose the seemingly "first-hand" information about patent grants, inattentive investors are more likely to pay attention to the corporate patent news. Importantly, rational inattention theory posits that this capital market reaction reflects a correction for the market's prior delayed response to the original patent grant information (Sims 2003; Blankespoor et al. 2020; Maćkowiak et al. 2023). Drawing on these two streams of literature, we propose the following hypothesis:

H1. *There is a significantly positive market reaction to the stale news about patent grants.*

Given that competing interpretations of the market reaction are present in the above discussion, our empirical analysis will test the post-announcement market reactions to determine which explanation aligns with the observed evidence.

3 | Data and Descriptive Statistics

3.1 | Sample and Data Sources

Our sample covers the period from 2010 to 2018. On January 6, 2010, the method of accessing news about patent grants changed with the launch of the online *Patent Gazette*. This change simplified access to and acquisition of patent grant information.[3] We manually collect all relevant announcements from CNINFO[4] through the end of 2018. In total, we obtain 3811 announcements related to the receipt of patent certificates, notifications to grant the patent right, or patent grants by foreign patent offices.

We apply several screening criteria to construct the baseline sample. First, we restrict the sample to announcements disclosing the receipt of patent certificates from CNIPA, as these qualify as stale news. Second, we exclude firms with Special Treatment (ST) status and financial firms, as the former face delisting risks and the latter adhere to distinct accounting standards. Third, following prior literature (e.g., Bailey et al. 2011),

TABLE 2 | Sample selection procedures.

Step	Process	# of obs.	# of firms
1	Initial sample of announcements regarding patent certificates, notifications of patent rights, or foreign patent grants (2005–2018).	3840	511
2	Exclude announcements regarding the receipt of patent certificates prior to 2010.	3811	506
3	Exclude notifications of patent rights and grants by foreign patent offices.	3620	490
4	Exclude announcements with confounding corporate events within the [t-3, t + 3] window, including stock or cash dividends, financial reporting, mergers and acquisitions, CEO turnover, and lawsuits.	3248	481
5	Exclude announcements made by firms with ST (Special Treatment) status and those in the financial industry.	3240	478
6	Exclude announcements with missing dependent or independent variables.	2202	379
7	Exclude firms with only a single announcement during the sample period.	2086	263

Note: This table outlines the sample selection procedures, criteria, the number of observations, and the number of unique listed firms. The selection criteria align with established literature and standard empirical practices. This final sample serves as the basis for the empirical analysis conducted throughout this study.

TABLE 3 | Summary statistics and correlation matrix.

Panel A: Summary statistics

Variables	*N*	Mean	S.D.	P25	P50	P75
CAR (−1, 1)	2086	18.34	439.00	−213.20	10.24	228.90
CAR (2, 10)	2086	−4.93	792.80	−416.60	−31.74	355.00
CAV (−1, 1)	2045	−0.04	2.17	−1.56	−0.15	1.25
CAV (2, 10)	2045	−0.18	6.20	−4.47	−0.52	3.72
LimAtt_Turnover	2086	−3.33	2.66	−4.48	−2.52	−1.42
LimAtt_Volume	2086	−1.12	1.53	−1.25	−0.58	−0.28
LimAtt_Index	1937	−6.18	0.64	−6.57	−6.09	−5.72
LimAtt_Common	1937	−0.01	1.25	−0.50	0.32	0.84
BHR	2086	0.02	6.40	−3.74	−0.10	3.57
Size	2086	0.61	0.76	0.00	0.55	1.13
BTM	2086	0.30	0.16	0.18	0.27	0.41
Leverage	2086	0.28	0.16	0.15	0.26	0.40
ROA	2086	0.06	0.04	0.04	0.06	0.09
SOE	2086	0.031	0.172	0	0	0
Firm age	2086	3.46	0.86	2.95	3.59	4.15
Patent	2086	0.64	0.84	0	0	1.10
Shareholding size	2086	214.25	301.01	79.50	133.98	235.52
Analyst coverage	2086	6.63	7.95	0	4	10
Announcement recency	2086	0.60	0.49	0	1	1

Panel B: Correlation matrix

	CAR (−1, 1)	CAR (2, 10)	CAV (−1, 1)	CAV (2, 10)	LimAtt_ Turnover	LimAtt_ Volume	LimAtt_ Index	LimAtt_ Common	BHR	Size	BTM	Leverage	ROA	SOE	Firm age
CAR (−1, 1)	1														
CAR (2, 10)	**0.08**	1													
CAV (−1, 1)	**0.17**	0.03	1												

(Continues)

TABLE 3 | (Continued)

Panel B: Correlation matrix

	CAR (−1, 1)	CAR (2, 10)	CAV (−1, 1)	CAV (2, 10)	LimAtt_ Turnover	LimAtt_ Volume	LimAtt_ Index	LimAtt_ Common	BHR	Size	BTM	Leverage	ROA	SOE	Firm age
CAV (2, 10)	**0.21**	**0.28**	**0.78**	1											
LimAtt_ Turnover	*0.04*	**0.10**	*0.02*	**0.08**	1										
LimAtt_Volume	**0.06**	**0.08**	**0.07**	**0.10**	**0.42**	1									
LimAtt_Index	*0.03*	*0.04*	**0.09**	**0.11**	**0.30**	**0.74**	1								
LimAtt_ Common	**0.05**	**0.09**	**0.08**	**0.12**	**0.66**	**0.91**	**0.86**	1							
BHR	*−0.01*	*0.01*	**0.29**	**0.28**	*−0.01*	*0.00*	*0.00*	*0.01*	1						
Size	*0.00*	*0.04*	**−0.06**	*−0.03*	**0.31**	**−0.37**	**−0.52**	**−0.29**	*−0.02*	1					
BTM	**0.04**	**0.10**	**0.13**	**0.16**	**0.12**	**0.27**	**0.25**	**0.26**	*0.02*	**0.10**	1				
Leverage	*0.03*	*0.02*	**−0.06**	*−0.04*	**0.05**	**−0.17**	**−0.25**	**−0.17**	*−0.03*	**0.54**	**−0.05**	1			
ROA	*−0.01*	*−0.03*	*0.00*	*−0.02*	**0.06**	**−0.12**	**−0.06**	**−0.06**	*0.01*	*−0.04*	**−0.39**	**−0.32**	1		
SOE	*0.00*	*0.00*	*−0.03*	*−0.02*	*0.00*	*−0.03*	*−0.04*	*−0.03*	*−0.02*	*0.03*	**0.08**	**0.06**	**−0.08**	1	
Firm age	*−0.01*	*0.03*	*0.01*	*0.02*	**0.31**	**−0.29**	**−0.39**	**−0.19**	*0.03*	**0.52**	*0.01*	**0.26**	**−0.19**	**0.07**	1

Note: Panel A presents summary statistics for variables in the baseline analysis. The sample comprises 2086 unique announcements issued between 2010 and 2018. Variable definitions are provided in Appendix B. To mitigate the influence of outliers, all continuous independent variables are winsorized at the 1st and 99th percentiles. Panel B presents the pairwise correlation coefficients between each pair of variables. Variables definitions are provided in Appendix B. All firm characteristics are lagged by 1 year. Bold values denote coefficients that are statistically significant at the 5% level ($p < 0.05$), while italicized values represents coefficients that are statistically insignificant.

we exclude announcements with other major corporate events occurring within a seven-day window (i.e., [−3, +3] days); these events include stock or cash dividends, financial reporting, mergers and acquisitions, chief executive officer turnover, and lawsuits.[5] Fourth, we drop observations with missing trading or financial data required to construct the dependent and explanatory variables. Fifth, we exclude firms with only one disclosure during the sample period. Table 2 summarizes the sample selection process and the number of excluded observations. The final sample comprises 2086 announcements from 263 unique firms.

We retrieve all patent grants disclosed in these announcements and cross-validate them against archival data from the Patent Search and Analysis System of CNIPA. In total, we identify 6713 patents, consisting of 2443 invention patents, 3500 utility model patents, and 770 design patents. This composition indicates that firms do not selectively disclose only high-value patents.[6] We source stock trading and financial data from the China Stock Market & Accounting Research Database (CSMAR) and supplementary patent data from the Incopat Database.

3.2 | Proxies for Investor Attention

Our first proxy for investor attention is trading volume. Gervais et al. (2001) show that unusually high (low) daily or weekly trading volume can predict price appreciation (depreciation) over the subsequent month, or the so-called "high-volume return premium," which they attribute to increased stock visibility from volume shocks. Barber and Odean's (2008) empirical work on investor trading behavior provides direct evidence of the association between trading volume and buying activity. They find that investors at a large discount brokerage purchase nearly twice as many shares as they sell when the stock experiences high abnormal trading volume on the prior day.

The second proxy for investor attention is stock turnover, computed as daily trading volume divided by shares outstanding. Several studies have applied this proxy to calibrate investor attention across different time periods and regions. For example, Loh (2010) measures investor attention using prior stock turnover and finds that investor inattention influences market reactions to stock recommendation changes. Using trading data from the Taiwan Stock Exchange for 2002–2015, Huang et al. (2019) proxy for investor attention with stock turnover and find that large jackpot lotteries divert investor attention from the stock market. Gargano and Rossi (2018) provide compelling evidence of the association between investor attention and stock turnover. They exploit a brokerage account dataset containing logs of all browsing details for nearly 11,000 accounts. By directly measuring attention as the time investors spend on each stock, they find that stock turnover is the most economically and statistically significant characteristic associated with investor attention.

The third proxy is the Baidu Search Index, the Chinese equivalent of Google's Search Volume Index. Online search frequency reflect the extent to which individuals pay attention to specific topics. Aggregate Google search frequency for stock tickers or stock name abbreviations is a validated proxy for retail investor attention (e.g., Da et al. 2011; Huang et al. 2019; Liu et al. 2023). In China, Chen et al. (2016) find a concurrent relationship between unusually high Baidu Search Index of Consumer Price Index (CPI) and abnormal trading activity of CSI 300 index futures around macroeconomic announcements on CPI. Li et al. (2024) employ the Baidu search volume index as a measure of attention from individual retail investors in the A-share market.

Finally, we implement principal component analysis (PCA) to extract the first principal components of these three measures. Although the stock turnover and trading volume are commonly used to measure liquidity, the principal component is designed to capture the common variation in investor attention reflected in these three proxies. This approach yields one component with an eigenvalue greater than one (1.83), which explains 61.48% of the total variation in the three proxies.

We collect daily stock turnover and dollar trading volume from CSMAR, along with the consolidated Search Index of stock name abbreviations in Chinese from Baidu. We take the natural logarithm of the Baidu index plus one to approximate a normal distribution. To capture cross-sectional variation in investor attention across firms, we first calculate the average of each measure in the prior 3 months ($[t-66, t-2]$) relative to the announcement day, requiring at least 42 non-missing observations; our findings are robust to this window choice. Next, we generate three variables by multiplying each mean value by −1, such that lower trading volume (turnover, Baidu Search Index) indicates higher investor limited attention. Finally, we extract the first principal component of these variables using the PCA approach.

3.3 | Descriptive Statistics

In the baseline analysis, we use abnormal stock returns to measure market reactions surrounding announcements of patent certificates receipts. Specifically, abnormal stock returns are calculated as raw returns minus expected returns, which are estimated by a market model of regressing daily stock returns on value-weighted market returns over the period $[t-200, t-11]$, with a minimum length of 160 trading days. In robustness tests, we replace abnormal stock returns with abnormal trading volume. Variable definitions are provided in Appendix B. All continuous independent variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers.

Several interesting observations arise from the descriptive statistics for the baseline sample in panel A of Table 3. Sample firms are relatively small and young, given that the average listing duration is around 31 (= exp.(3.463)) months, and total assets amount to 1.8 billion yuan (worth approximately US$250 million). Moreover, most of them are non-SOEs and mainly rely on equity financing. Panel B of Table 3 presents the correlation matrix. The four measures of investors' limited attention are significantly and positively correlated with the cumulative abnormal stock returns (cumulative abnormal trading volume). Consistent with the notion that larger and older firms attract more investor attention, the correlation coefficients between firm size (age) and investors' limited attention, as measured by Baidu Search Index, are −0.52 (−0.39), and are both statistically significant.

4 | Main Empirical Results

4.1 | Univariate Tests

To test our hypothesis, we conduct a univariate test of abnormal stock returns around the announcement day. As shown in Panel A of Table 4, the abnormal stock return on the event day is 22.24 basis points and is statistically different from zero (t-statistic = 3.97). We find no significant abnormal returns in the pre- or post-announcement periods. The cumulative abnormal stock returns in Panel B exhibit a similar pattern. For example, the CAR (0, 1) is 17.37 basis points and is significant at the 5% level. For comparison, Kogan et al. (2017) document that the average three-day cumulative abnormal returns (CAR (0, 2)) following patent grants are 7 basis points in the U.S., whereas the filtered component related to patent grants is 32 basis points.

In a perfectly efficient market, redundant information should not affect stock prices; however, our findings suggest that either investors' inattention or overestimation of news novelty may explain the observed price movements. We first examine how investors' past inattention plays a role in explaining event-day returns. Using a proxy for prior investor attention based on trading volume, we sort the full sample into two subsamples annually. In Panel A of Table 4, we find substantial variation in abnormal stock returns between these two groups around the announcement days. Specifically, the event-day abnormal return is 34.33 basis points in the sub-group with low past attention, compared to only 10.23 basis points in the sub-group with high past attention. Following the announcement, the price continues to rise after the initial run-up for the low attention group. Figure C3 visually illustrates these results.

One line of studies argues that the market response to old information is due to individual investors' overreaction (e.g., Tetlock 2011) because they overestimate the novelty of news announcements. As a result, stock returns will reverse following the event day. Since all announcements in our sample disclose stale news about patent grants, it is intriguing to examine whether the abnormal returns eventually reverse in the post-announcement period. We compute and test the cumulative abnormal returns (CARs) before and after the announcement dates and, to highlight the effect of investors' past limited attention, we partition the whole sample into two groups by the proxy derived from trading volume every year. The results are presented in Panel B of Table 4.

Overall, there are no significant market reactions prior to the announcement dates (CAR (−3, −2)), nor are there significant differences in market responses between the low- and high-attention groups. However, the disparity in CAR between these two groups becomes statistically greater once the announcement dates are included (ranging from CAR (−1, 1) to CAR (−3, 3)). Moreover, the event-day abnormal returns persist even 2 weeks after the announcement. Specifically, the CAR (0, 1) is 17.37 basis points, whereas the CAR (2, 10) is merely −4.93 basis points and is statistically insignificant. Tetlock (2011) and Fedyk and Hodson (2023) show that the initial market reaction to stale information is materially rectified within 1 week or 2 weeks, but this is not the case in our study. In summary, our hypothesis is supported because the market reacts to the corporate announcements of stale innovation news, and the price movements vary in tandem with investors' past limited attention.

4.2 | Multivariate Analysis

The univariate tests demonstrate that market response to old innovation news differs across firms. Although we find that investor attention is one of the firm characteristics that affect the response, it is impossible to draw a concrete conclusion without controlling for other factors (e.g., DellaVigna and Pollet 2009; Loh 2010). In addition, trading volume, stock turnover, and Baidu Search Index may capture other firm attributes, such as size and book-to-market ratio. In such cases, the relationship observed in the univariate analyses might be an artifact of the well-known size or value premium. To address these concerns, we estimate a multivariate regression with the following specification.

$$\mathrm{CAR}_{ijt} = \alpha + \beta \mathrm{LimAtt}_{ijt} + \gamma \mathrm{BHR}_{ijt} + \delta X'_{jt-1} + \eta_j + \mu_t + \epsilon_{ijt}, \tag{1}$$

where i denotes the announcement, j denotes a firm, and t denotes the year, month, and weekday of the announcement, respectively. CAR_{ijt} is our measure of market reactions and equals CAR (−1, 1) (CAR (2, 10)) for tests in the announcement interval (post-announcement interval). Our variable of interest is LimAtt_{ijt}, a proxy for investors' past limited attention. We predict its coefficient β to be significantly positive because a valuable signal is more likely to be overlooked when it receives less investor attention, thus leading to a stronger market reaction to its recurrence. To minimize the confounding effects of speculative trading and short-term return reversal, we incorporate BHR_{ijt}, the buy-and-hold return from 2 weeks to 1 week before the announcement, into the regression. X_{jt-1} is a vector of firm-specific control variables at the end of year $t-1$, which includes size, book-to-market ratio, leverage, return on assets, an indicator of SOEs, and firm age. We include firm fixed effects to control for time-invariant firm characteristics and time fixed effects to account for common trends that may correlate capital market reactions with investor attention.

The estimated results are presented in Table 5, where the dependent variable is CAR (−1, 1) in Panel A and CAR (2, 10) in Panel B. During the announcement interval, we find a significantly positive relationship between cumulative abnormal stock returns and proxies for investors' past limited attention. This relationship holds across all regressions in Columns 1–4. Coefficients of other variables, however, are not statistically different from zero and thus cannot explain the market reaction, which further confirms that limited attention is the dominant driver of market responses. Beyond statistical significance, investors' past limited attention is also economically significant. For example, in the model in Column 3, a one-standard-deviation increase in limited attention measured by Baidu Search Index (0.64) is associated with a 58 basis point (= 0.64 × 0.905) increase in cumulative abnormal stock returns (CAR (−1, 1)). Relative to the average returns of 18 basis points, this economic impact is nearly threefold.

TABLE 4 | Market reactions around announcement days.

Panel A: Abnormal stock returns around announcement days

			Investor attention			
Day	**Mean**	***t*-statistics**	**High**	**Low**	**High-Low**	***N***
−3	7.24	1.27	−0.58	15.11	−15.69	2086
−2	−2.83	−0.51	−5.93	0.29	−6.21	2086
−1	0.98	0.18	−8.14	10.14	−18.28*	2086
0	22.24***	3.97	10.23	34.33	−24.10**	2086
1	−4.88	−0.9	−13.14	3.44	−16.58	2086
2	−4.97	−0.92	−15.35	5.47	−20.82*	2086
3	−8.4	−1.59	−23.47	6.77	−30.24***	2086
4	−0.07	−0.01	−12.70	12.63	−25.33**	2086
5	6.27	1.14	−2.09	14.68	−16.78	2086
6	4.85	0.89	−4.06	13.80	−17.86	2086
7	8.45	1.5	1.11	15.83	−14.72	2086
8	6.03	1.11	−0.74	12.84	−13.58	2086
9	−11.35**	−2.07	−11.75	−10.95	−0.799	2086
10	−5.74	−1.01	−5.05	−6.43	1.375	2086

Panel B: Cumulative abnormal stock returns around announcement days

			Investor attention			
Event window	**Mean**	***t*-statistics**	**High**	**Low**	**High-Low**	***N***
−3, −2	−1.85	−0.23	−14.06	10.43	−24.49	2086
−3, 3	9.39	0.62	−56.38	75.54	−131.92***	2086
−2, 2	10.54	0.83	−32.33	53.66	−85.99***	2086
−1, 1	18.34*	1.91	−11.05	47.90	−58.95***	2086
0, 1	17.37**	2.24	−2.91	37.76	−40.67***	2086
1, 10	−9.81	−0.53	−87.25	68.08	−155.33***	2086
2, 10	−4.93	−0.28	−74.11	64.64	−138.75***	2086
3, 10	0.04	0.00	−58.76	59.17	−117.93***	2086

Note: The following two panels present the result of univariate tests of market reactions surrounding the announcement dates ($[t-3, t+10]$). The 2086 announcements sample is split into high- and low-attention groups based on investor attention derived from trading volume. Panel A displays the daily abnormal stock returns (in basis points). Panel B presents the cumulative abnormal returns and their mean differences between the two groups. Statistical significance is determined via *t*-test, where *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Previous studies suggest that the abnormal stock returns disappear in susequent days due to either price overreaction to redundant news (e.g., Tetlock 2011; Fedyk and Hodson 2023) or buying pressure (e.g., Barber and Odean 2008). Nonetheless, if the market reaction to corporate patent news reflects a delayed correction of a prior underreaction caused by investor inattention, the cumulative abnormal returns should persist and be more pronounced for events associated with low past investor attention. To distinguish between these alternative interpretations, we re-estimate the regression using CARs over the nine-day post-announcement window as the dependent variable. Panel B reports the results. Coefficients for the four measures of investors' past limited attention are statistically significant and positive across all specifications. The predictive power of investors' past limited attention is even stronger in the post-announcement interval, which fails to support the overreaction hypothesis. Taken together, these results establish that the market reaction to old innovation news is positively associated with the extent of investors' past limited attention.

4.3 | Robustness Checks

First, we conduct a robust check using trading volume as an alternative dependent variable. Although abnormal stock

TABLE 5 | Investors' limited attention and market reaction to stale announcements.

Panel A: Cumulative abnormal returns over announcement interval				
CAR (−1, 1)	**(1)**	**(2)**	**(3)**	**(4)**
LimAtt_Turnover	0.169***			
	(3.18)			
LimAtt_Volume		0.379***		
		(4.22)		
LimAtt_Index			0.905***	
			(3.00)	
LimAtt_Common				0.496***
				(4.31)
BHR	−0.023	−0.025	−0.017	−0.017
	(−1.44)	(−1.56)	(−1.05)	(−1.11)
Size	−0.128	0.120	0.400	0.443
	(−0.36)	(0.33)	(0.76)	(0.86)
BTM	0.508	0.419	−0.063	0.081
	(0.38)	(0.31)	(−0.04)	(0.06)
Leverage	0.358	0.146	0.510	0.581
	(0.21)	(0.09)	(0.28)	(0.32)
ROA	0.661	3.946	1.323	2.190
	(0.12)	(0.72)	(0.23)	(0.39)
SOE	−0.134	−0.478	−0.894**	−0.588
	(−0.36)	(−1.26)	(−2.05)	(−1.53)
Firm age	−0.211	−0.026	0.183	0.012
	(−0.54)	(−0.07)	(0.42)	(0.03)
Constant	1.251	0.217	4.743	−0.404
	(0.73)	(0.13)	(1.65)	(−0.22)
Time FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	2086	2086	1937	1937
R^2	0.150	0.153	0.149	0.153
Panel B: Cumulative abnormal returns over post announcement interval				
CAR (2, 10)	**(1)**	**(2)**	**(3)**	**(4)**
LimAtt_Turnover	0.590***			
	(5.13)			
LimAtt_Volume		1.119***		
		(4.30)		
LimAtt_Index			3.118***	
			(4.08)	

(Continues)

TABLE 5 | (Continued)

Panel B: Cumulative abnormal returns over post announcement interval				
CAR (2, 10)	**(1)**	**(2)**	**(3)**	**(4)**
LimAtt_Common				1.588***
				(5.47)
BHR	−0.006	−0.010	−0.014	−0.015
	(−0.19)	(−0.31)	(−0.44)	(−0.49)
Size	−0.712	0.025	0.563	0.646
	(−0.83)	(0.03)	(0.64)	(0.75)
BTM	12.634***	12.480***	10.245***	10.866***
	(4.96)	(4.97)	(3.93)	(4.21)
Leverage	4.526	3.947	3.221	3.552
	(1.46)	(1.26)	(1.00)	(1.05)
ROA	12.151	22.085**	15.146	17.700
	(1.00)	(2.12)	(1.21)	(1.59)
SOE	−0.898	−2.044***	−3.259***	−2.168***
	(−1.12)	(−2.71)	(−3.89)	(−2.84)
Firm age	−0.824	−0.123	−0.165	−0.698
	(−1.26)	(−0.19)	(−0.26)	(−1.06)
Constant	−0.646	−4.592**	14.690***	−3.246
	(−0.25)	(−2.00)	(2.80)	(−1.37)
Time FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	2086	2086	1937	1937
R^2	0.152	0.154	0.150	0.154

Note: This table reports multivariate regressions testing the relationship between investor inattention and market reactions to stale patent announcements. The dependent variables are the cumulative abnormal returns (CAR (−1, 1)) over a three-day announcement window in Panel A, and the post-announcement CAR over a nine-day interval (CAR (2, 10)) in Panel B. The four proxies for limited attention are the primary variables of interest. Each is constructed by multiplying the negative one (−1) by the average of stock turnover, trading volume, Baidu Search Index, and their first principal component, respectively. The sample includes 2086 stale announcements of patent grants from 2010 to 2018. All variable definitions are detailed in Appendix B, and firm-level characteristics are lagged by 1 year. The specifications include year, month, and day-of-week fixed effects to control for temporal trends, alongside firm fixed effects to account for time-invariant unobservables. *t-statistics* based on standard errors clustered at the firm level are shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

returns are the standard measure of market reaction to information shocks in event studies, trading, however, is the mechanism that causes prices to adjust (DellaVigna and Pollet 2009). If these announcements contain information previously overlooked by existing or potential shareholders, we expect the trading volume response to be stronger. To test this conjecture, we use abnormal trading volume as the dependent variable. This measure is widely used in prior studies of investor attention (see DellaVigna and Pollet 2009; Hirshleifer et al. 2009; Louis and Sun 2010). It is constructed by the difference between the natural logarithm of daily dollar trading volume and the average log dollar trading volume over the estimation window. Formally, the daily abnormal trading volume is defined as follows:

$$\mathrm{VOL}_j = \mathrm{Log}\left(\mathrm{DollarVol}_{t+j}+1\right) - \frac{1}{66}\sum_{k=t-76}^{t-11}\mathrm{Log}\left(\mathrm{DollarVol}_k+1\right), \tag{2}$$

where VOL_j is the daily abnormal trading volume on Day j, $\mathrm{DollarVol}_k$ is the dollar trading volume on Day k. The normal trading volume is assumed to be the average level over the periods from 76 to 11 days before the announcement date, yet the results are robust to the length of the estimation window. We measure market response in the announcement (post-announcement) interval by cumulative abnormal trading volume over days $[t-1, t+1]$ ($[t+2, t+10]$) of the announcements.

We estimate the baseline regression specification to examine the relationship between investors' prior limited attention and trading volume response, with the only change being the dependent variable. The empirical outcomes are shown in Table 6. During the announcement period, we find a significantly positive relationship in two out of four regressions. In particular, the abnormal trading volume is larger for announcements with lower investor attention, as measured by the Baidu Search Index and the principal component, but not for turnover or trading volume-based proxies. When extending the event window to the post-announcement interval ($[t+2, t+10]$), the positive relationship holds across all four regressions.

Second, we test the robustness of our investor attention proxy based on the Baidu Search Index. Although online search volume is a common proxy for firm-specific investor attention, it may not exclusively reflect focus on patents or technological innovations. To confirm the robustness of our baseline findings, we utilize the multiple-keyword query function in the Baidu Search Index. Specifically, we search for both the firm's stock name abbreviation and the Chinese term for "patent" (denoted as BSI2), ensuring the search volume reflects attention directed toward both the focal firm and its patent. We also include the Chinese term for "technological innovation" as a third keyword (denoted as BSI3) to construct a more comprehensive measure of investor interest in the firm's innovation activities. Following the methodology outlined in the baseline study, we construct two alternative variables: LimAtt_BSI2 and LimAtt_BSI3.[7]

Table 6, Panel C reports the results for these two alternative proxies. Columns 1 and 2 show that LimAtt_BSI2 (joint search volume of the focal firm and its patent) is significantly and positively correlated with market reactions to patent announcements. This pattern aligns with our baseline findings, where investors' limited attention is positively associated with both announcement-period and post-announcement returns. Columns 3 and 4 use LimAtt_BSI3 (three keywords search volume) as the limited attention proxy. The positive association between limited attention and capital market responses remains significant, albeit at the 10% level. This reduced significance may reflect heterogeneity between investor interest in general innovation versus patents.

5 | Cross-Sectional Tests

5.1 | Retail Versus Institutional Investors

Prior research shows that institutional investors are less susceptible to behavioral biases and cognitive constraints than their retail counterparts. Barber and Odean (2008) argue that attention is a less scarce resource for institutional investors than for retail ones. Ben-Rephael et al. (2017) contrast institutional attention, measured through Bloomberg terminal activity, with retail attention, measured using Google search frequency, and identify distinct behaviors and market impacts. They find that institutional attention precedes retail attention, responds more quickly to major news events, and facilitates permanent price adjustments. Despite the dominance of retail investors in the Chinese stock market (Leippold et al. 2022), institutional investors may still significantly affect stock price reactions to patent announcements.

Cross-sectionally, we conduct a subsample analysis using shareholding size as a proxy for investor composition to examine the extent to which sophisticated investors (typically institutional investors) influence the market reaction to stale innovation news. Following Leippold et al. (2022), we compute the average market capitalization of outstanding shares per shareholder. We match each announcement to the respective average market capitalization per shareholder at the beginning of each year and partition all observations into two subgroups based on the annual median: firms predominantly held by retail investors and firms held by non-retail investors. We then re-run the baseline model on each subgroup to examine the influence of institutional presence.

Table 7 reports the results of this cross-sectional analysis. In the subgroup of firms predominantly held by retail investors, we find a significant positive relationship between investors' limited attention and the market response to corporate patent announcements. In contrast, in the other subgroup, we find no significant association between investors' inattention and market reactions. Furthermore, the statistical tests using bootstrapping indicate significant differences between the two subgroups for two of the four coefficient estimates associated with the limited attention proxies. These results are consistent with the argument that retail investors' limited attention drives market reactions to stale innovation news.

5.2 | Information Environment

Rational inattention theory posits that learning is a choice made after weighing the cost of external information acquisition and its expected benefit (Sims 2003; Blankespoor et al. 2020; Maćkowiak et al. 2023). If it is costly to collect and analyze value-relevant information, the fraction of inattentive investors should be higher, resulting in an initial underreaction to patent grant news. We anticipate that inattentive behavior is more prevalent among firms with a less transparent information environment, resulting in stronger return predictability for stale patent news. To test this proposition, we use analyst coverage to proxy for a firm's information environment, as it reflects sell-side information gathering and firm transparency. The role of financial analysts as information intermediaries is well documented. For example, Andrade et al. (2013) show that analyst coverage helped constrain bubbles in China's stock market in 2007. They attribute this effect to analysts' function in disseminating information to market participants and coordinating investor beliefs.

We collect data on the number of analysts following from CSMAR. For each firm-year observation from 2010 to 2018, we match it with the analyst coverage at the end of each year. To examine the proposed impact of the information environment, we partition the whole sample into two groups based on the annual median. The low (high) analyst coverage group includes the bottom (top) 50% of the annual analyst coverage distribution. Table 8 presents the results for this subsample analysis.

TABLE 6 | Robustness tests.

	(1)	(2)	(3)	(4)
Panel A: Abnormal trading volume over announcement period				
Dependent variable = CAV (−1, 1)				
LimAtt_Turnover	0.043			
	(1.22)			
LimAtt_Volume		0.074		
		(1.20)		
LimAtt_Index			0.593***	
			(2.70)	
LimAtt_Common				0.154*
				(1.76)
Controls	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	2041	2041	1893	1893
R^2	0.255	0.255	0.257	0.255
Panel B: Abnormal trading volume over post-announcement period				
Dependent variable = CAV (2, 10)				
LimAtt_Turnover	0.339***			
	(3.12)			
LimAtt_Volume		0.535***		
		(2.89)		
LimAtt_Index			2.780***	
			(4.80)	
LimAtt_Common				0.956***
				(3.79)
Controls	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	2041	2041	1893	1893
R^2	0.268	0.266	0.267	0.266
Panel C: Investor attention based on alternative Baidu Search Index				
	CAR (−1, 1)	**CAR (2, 10)**	**CAR (−1, 1)**	**CAR (2, 10)**
LimAtt_BSI2	1.951**	8.508***		
	(2.17)	(3.01)		
LimAtt_BSI3			2.066*	10.873***
			(1.93)	(3.88)
Controls	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes

(Continues)

TABLE 6 | (Continued)

Panel C: Investor attention based on alternative Baidu Search Index				
	CAR (−1, 1)	**CAR (2, 10)**	**CAR (−1, 1)**	**CAR (2, 10)**
Firm FE	Yes	Yes	Yes	Yes
Observations	1925	1925	1925	1925
R^2	0.146	0.190	0.146	0.193

Note: This table presents the results of robustness tests. Panels A and B report the results using abnormal trading volume over the announcement and post-announcement periods as the dependent variables; Panel C presents the results using alternative Baidu Search Index to proxy for investors' limited attention. Detailed variable definitions are provided in Appendix B. For brevity, coefficients for control variables are omitted. *t-statistics* calculated using standard errors clustered at the firm level are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

We expect the positive relationship between investors' prior limited attention and market reactions to be more pronounced among firms followed by fewer financial analysts, as these firms face a more opaque information environment. The results provide supporting evidence for our conjecture. In particular, the baseline findings are statistically significant only for the subsample of firms with low analyst coverage and insignificant for the high analyst coverage subsample. In addition, the coefficient estimates for the four limited attention proxies differ significantly between the two groups (*p-value* < 0.10 or lower). Collectively, this empirical evidence suggests that the effect of investors' past limited attention on market reaction to stale patent news is likely due to a poor information environment.

5.3 | News Announcement Recency

Theory on investor attention suggests that conscious attention allocation depends on the ease of memory retrieval (Kahneman and Tversky 1973; Hirshleifer and Teoh 2003). Individuals assess a phenomenon based on their ability to retrieve relevant information from memory (Kahneman and Tversky 1973). Therefore, if investors have recently observed similar disclosures from a firm, they are more likely to attend to subsequent disclosures of the same type, as information about the firm's innovation is more salient in their memory.

In our setting, nearly half of the firms in the baseline sample make two announcements per year upon receipt of patent certificates, with the number of disclosures ranging from 1 to 33. This feature allows us to measure the recency of corporate patent news. Since the earlier corporate announcements of patent grants activate the categorical attention of investors to innovation, subsequent announcements in the near term could grab more attention. Building on this idea, we create a measure of recency as a dummy variable equal to one if an announcement is preceded by another announcement from the same firm within 3 months.[8]

We conduct a subsample analysis by splitting the baseline sample using the indicator of announcement recency and then re-estimate the Model (1). To control for the number of patents disclosed in each announcement, we include the natural logarithm of patent counts to the control variables. Table 9 reports the empirical results. Consistent with the idea that investors pay more attention to salient information, we find that the positive relationship between limited investor attention and market reactions is stronger among announcements made following previous announcements. Specifically, the relation between market reaction and past limited attention is statistically significant at the 1% level for the subgroup with prior similar corporate patent announcements within 3 months but insignificant for the other subgroup. Furthermore, the differences in coefficient magnitudes are substantial. Taking the limited attention captured by the Baidu Search Index as an example, the coefficient is more than twice as large for the high-recency subgroup (1.215) compared to the low-recency subgroup (0.456). Together, these findings support our prediction and strengthen the baseline results.

6 | Additional Analyses

6.1 | Market Reactions to Patent Grants

The baseline findings imply that the market reaction to the stale innovation news is stronger when investors are less attentive to the initial patent grant. Since we can trace the initial publication dates of related patents in the *Patent Gazette*, we test the market reaction to the original patent grants. However, it is important to consider potential confounding factors and institutional characteristics that might affect our analysis. As suggested by Kogan et al. (2017), investors only respond to unexpected components of patent-related information. In this case, it is hard to differentiate whether the underreaction stems from investor inattention or from a lack of informational surprise. Moreover, CNIPA grants three types of patent: invention, utility model, and design patents. Fang et al. (2017) argue that invention patents and utility model patents are "innovation patents" with more innovative content than design patents. If so, the market reaction to these three types of patent could differ significantly even within the same firm. Considering the above empirical challenges, we construct a sample of patents with statistically significant market reaction to their initial grants, then examine the effect of limited attention at the grant date. In doing so, we can at least rule out the insignificant reaction due to low patent value or rational anticipation.

We collect all patents disclosed in the baseline sample. For each patent category, we calculate the market reaction to patent grants using the same market model as in the baseline analysis. The results show that the abnormal stock return on the patent grant day is insignificant for design patents, marginally insignificant for utility model patents, but significantly positive for invention patents.[9] Furthermore, the market reaction varies

TABLE 7 | Shareholding size and the effect of investors' limited attention.

Proxy for institutional ownership by shareholding size								
	Small	**Large**	**Small**	**Large**	**Small**	**Large**	**Small**	**Large**
CAR (−1, 1)	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
LimAtt_Turnover	0.180**	0.134						
	(2.44)	(1.25)						
LimAtt_Volume			0.544***	0.238				
			(4.59)	(1.25)				
LimAtt_Index					1.482***	0.341		
					(3.17)	(0.54)		
LimAtt_Common							0.575***	0.368
							(3.70)	(1.43)
BHR	−0.026	−0.024	−0.026	−0.026	−0.013	−0.027	−0.015	−0.028
	(−1.02)	(−1.00)	(−1.04)	(−1.13)	(−0.49)	(−1.18)	(−0.55)	(−1.22)
Size	0.321	−0.687	0.560	−0.553	1.888*	−0.683	1.795*	−0.665
	(0.55)	(−1.20)	(1.12)	(−0.93)	(1.92)	(−1.08)	(1.91)	(−1.03)
BTM	0.090	2.509	0.469	2.093	−0.592	2.403	0.008	1.792
	(0.04)	(1.29)	(0.21)	(1.02)	(−0.24)	(1.13)	(0.00)	(0.84)
Leverage	1.151	0.795	0.606	0.976	0.958	1.289	1.172	1.180
	(0.36)	(0.35)	(0.20)	(0.42)	(0.31)	(0.55)	(0.38)	(0.51)
ROA	−7.697	8.296	−6.310	9.980	−7.986	8.566	−8.326	9.230
	(−0.74)	(1.05)	(−0.61)	(1.30)	(−0.75)	(1.11)	(−0.80)	(1.18)
SOE	0.148	3.530***	−0.238	3.146**	−1.300*	3.185**	−0.500	2.882**
	(0.22)	(3.25)	(−0.37)	(2.55)	(−1.66)	(2.54)	(−0.73)	(2.34)
Firm age	−0.898	0.231	−0.721	0.276	−0.794	0.881	−0.886	0.661
	(−1.42)	(0.35)	(−1.14)	(0.42)	(−1.21)	(1.26)	(−1.36)	(0.93)
Constant	3.845	−1.457	2.921	−1.811	11.583***	−2.124	2.535	−3.302
	(1.48)	(−0.48)	(1.14)	(−0.61)	(3.06)	(−0.38)	(0.98)	(−1.08)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1031	997	1031	997	941	946	941	946
R^2	0.187	0.178	0.192	0.179	0.196	0.179	0.198	0.181
p	0.37		0.09		0.08		0.26	

Note: This table shows the result of subsample analyses based on shareholding size, measured by the average market capitalization of outstanding shares per shareholder. The sample is split into small/large groups using the annual median, and then we apply the baseline specification to identify the effect. The dependent variable is the cumulative abnormal returns over the three-day announcement window. The sample includes announcements disclosing stale patent grants news from 2010 to 2018. Variable definitions are provided in Appendix B. *t*-statistics calculated using standard errors clustered at the firm level are reported in parentheses. *p*-values reported at the bottom are derived from a bootstrap procedure with 1000 iterations and are used to test for significant differences in the coefficients of the limited attention proxies between the two groups. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

year by year, and we find insignificant reactions after 2016. As a result, we form a sample with invention patents and utility model patents granted before 2017 for our empirical tests. The final sample comprises 2261 patents, with an average event-day abnormal return of 13.05 basis points (*t*-statistic = 2.40). To measure limited investor attention, we still use the measures in the baseline study because we assume they reflect differences in the level of investor attention received by these firms at the grant dates. We estimate the baseline regression specification, but replace the dependent variable with abnormal returns to CNIPA's initial patent grants and substitute firm fixed effects with industry fixed effects.

TABLE 8 | Information environment and the effect of investors' limited attention.

Proxy for information environment by analyst coverage								
	Low	High	Low	High	Low	High	Low	High
CAR (−1, 1)	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
LimAtt_Turnover	0.260***	−0.067						
	(4.40)	(−0.54)						
LimAtt_Volume			0.592***	0.149				
			(4.83)	(1.01)				
LimAtt_Index					1.298***	0.130		
					(3.18)	(0.18)		
LimAtt_Common							0.691***	0.150
							(4.79)	(0.59)
BHR	−0.031	0.007	−0.030	0.003	−0.025	0.004	−0.026	0.003
	(−1.54)	(0.24)	(−1.46)	(0.10)	(−1.18)	(0.15)	(−1.27)	(0.11)
Size	−0.593	−0.409	−0.394	−0.258	−0.098	0.367	−0.207	0.451
	(−0.89)	(−0.49)	(−0.60)	(−0.32)	(−0.13)	(0.26)	(−0.28)	(0.32)
BTM	0.084	0.106	0.338	−0.466	−0.916	−0.965	−0.644	−1.117
	(0.05)	(0.03)	(0.20)	(−0.15)	(−0.52)	(−0.24)	(−0.38)	(−0.29)
Leverage	3.095	−0.084	2.906	−0.714	2.543	−0.264	2.821	−0.409
	(1.43)	(−0.02)	(1.34)	(−0.19)	(1.11)	(−0.06)	(1.25)	(−0.09)
ROA	7.918	2.145	9.644	3.936	5.866	−0.226	7.099	0.585
	(0.77)	(0.32)	(0.95)	(0.54)	(0.56)	(−0.03)	(0.69)	(0.07)
SOE	−0.184		−0.672		−1.081*		−0.775	
	(−0.35)		(−1.23)		(−1.92)		(−1.44)	
Firm age	−0.445	0.050	−0.130	0.018	−0.107	0.290	−0.324	0.267
	(−0.84)	(0.06)	(−0.25)	(0.02)	(−0.19)	(0.30)	(−0.58)	(0.28)
Constant	1.533	−0.036	−0.104	0.563	7.799**	0.172	0.368	−0.583
	(0.65)	(−0.01)	(−0.04)	(0.19)	(1.99)	(0.03)	(0.15)	(−0.16)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1338	706	1338	706	1235	664	1235	664
R^2	0.210	0.184	0.211	0.185	0.202	0.179	0.210	0.180
p	0.01		0.04		0.07		0.04	

Note: This table shows the result of subsample analyses based on the information environment, measured by analyst coverage. The sample is split into low/high groups using the annual median, and then we apply the baseline specification to identify the effect. The dependent variable is the cumulative abnormal returns over the three-day announcement window. The sample includes announcements disclosing stale patent grants news from 2010 to 2018. Variable definitions are provided in Appendix B. *t*-statistics calculated using standard errors clustered at the firm level are reported in parentheses. *p* reported at the bottom are derived from a bootstrap procedure with 1000 iterations and are used to test for significant differences in the coefficients of the limited attention proxies between the two groups. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Table 10 presents the estimates. The results show that the market reaction to initial patent grants is weaker when investor attention is limited. For example, the coefficients on Limatt_Turnover, Limatt_Volume, Limatt_Index, and Limatt_Common are −0.081 (*t*-statistic = −3.84), −0.069 (*t*-statistic = −2.15), −0.129 (*t*-statistic = −1.15), and −0.113 (*t*-statistic = −2.51), respectively. All coefficients are significant at the 5% level or better, expect for *Limatt_Index*. This evidence suggests that investor inattention influences capital market responses to CNIPA's initial patent grants for the patents disclosed in firms' stale announcements.

TABLE 9 | News announcement recency and the effect of investors' limited attention.

Proxy for recency by whether an announcement follows another announcement within 3 months								
	No	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**
CAR (−1, 1)	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
LimAtt_Turnover	0.024	0.286***						
	(0.24)	(4.45)						
LimAtt_Volume			0.286	0.432***				
			(1.30)	(3.62)				
LimAtt_Index					0.429	1.218***		
					(0.75)	(2.85)		
LimAtt_Common							0.201	0.666***
							(0.84)	(4.52)
BHR	0.024	−0.054**	0.023	−0.056**	0.036	−0.051**	0.037	−0.053**
	(0.79)	(−2.35)	(0.76)	(−2.43)	(1.14)	(−2.20)	(1.18)	(−2.35)
Size	0.757	−0.494	1.048	−0.276	2.014*	−0.099	2.022*	−0.048
	(0.89)	(−0.95)	(1.22)	(−0.49)	(1.75)	(−0.16)	(1.81)	(−0.08)
BTM	−1.474	1.054	−1.775	1.245	−2.333	0.328	−2.192	0.463
	(−0.61)	(0.56)	(−0.72)	(0.65)	(−0.81)	(0.16)	(−0.79)	(0.25)
Leverage	−0.748	0.742	−1.085	0.779	−0.961	1.123	−0.952	1.369
	(−0.22)	(0.34)	(−0.32)	(0.37)	(−0.26)	(0.49)	(−0.26)	(0.61)
ROA	11.575	−5.353	13.766	−1.019	9.368	−2.416	9.708	−1.674
	(1.16)	(−0.70)	(1.36)	(−0.13)	(0.93)	(−0.29)	(0.96)	(−0.21)
SOE	0.337	−0.745	0.248	−1.258**	−0.188	−1.750**	−0.047	−1.396**
	(0.37)	(−1.27)	(0.28)	(−2.19)	(−0.20)	(−2.61)	(−0.05)	(−2.35)
Firm age	0.230	−0.014	0.181	0.329	0.586	0.391	0.507	0.158
	(0.35)	(−0.02)	(0.27)	(0.49)	(0.83)	(0.55)	(0.70)	(0.23)
Patent	0.395	−0.234	0.384	−0.298	0.411	−0.274	0.405	−0.312
	(1.53)	(−1.04)	(1.50)	(−1.33)	(1.50)	(−1.22)	(1.48)	(−1.38)
Constant	−1.198	1.480	−0.918	−0.554	−0.062	6.478	−2.507	−0.410
	(−0.40)	(0.57)	(−0.31)	(−0.21)	(−0.01)	(1.56)	(−0.82)	(−0.15)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	779	1203	779	1203	727	1123	727	1123
R^2	0.298	0.166	0.300	0.166	0.306	0.161	0.307	0.171
p	0.03		0.28		0.18		0.10	

Note: This table shows the results of subsample analyses based on news announcement recency, measured by whether an announcement is preceded with another announcement from the same firm within 3 months. The full sample is split into two groups by the dummy indicator of announcement recency. We then apply the baseline specification to identify the effect. The dependent variable is the cumulative abnormal returns over the three-day announcement window. The sample includes announcements disclosing stale patent grant news from 2010 to 2018. Variable definitions are provided in Appendix B. *t*-statistics calculated using standard errors clustered at the firm level are reported in parentheses. *p* values reported at the bottom are derived from a bootstrap procedure with 1000 iterations and are used to test for significant differences in the coefficients of the limited attention proxies between the two groups. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

6.2 | Trading Behavior Over Announcement Periods

It is intriguing to examine how different types of investors trade around the announcement days. As discussed before, retail investors tend to pay less attention to CNIPA's initial patent grant publications. When firms' stale patent disclosures attract their attention, prior research suggests a significant reaction to innovation news (e.g., Huberman and Regev 2001; Nekrasov et al. 2023). Alternatively, studies such as Barber and Odean (2008) and Tetlock (2011) argue that retail investors overreact to stale information because they are less sophisticated in distinguishing the nature of information compared to professional investors. If retail investors react to these announcements, they are more likely to be net buyers of the firm's stocks following attention-grabbing disclosures. Furthermore, if the reaction to stale patent grant news is a delayed reaction caused by past inattention, increased buying activity should be observed among investors who face greater constraints on their attention capability.

To analyze this, we use trade size to represent investor sophistication (see Wang 2017; Shi et al. 2018). We retrieve high-frequency trading data from the CSMAR Trade & Quote Research Database, which records detailed stock trading information every 5 or 6 seconds during trading hours. Since our data source ends in 2015, this analysis is restricted to announcements made before that time. Following Wang (2017), we categorize each record as small, medium, or large trade by thresholds of 20,000RMB and 100,000RMB. Specifically, a trade with a value equal to or lower than 20,000RMB is classified as small; a trade with a value equal to or lower than 100,000RMB but greater than 20,000RMB is classified as medium, and the rest are classified as large. Fortunately, every record has an indicator of buyer- or seller-initiated trades, allowing us to sum the value of buys and sells for each trade size category on Day t. We compute the buy-sell imbalance and its abnormal level as follows:

$$\mathrm{BSI}_{it} = 2 \times \frac{\sum_{j=1}^{m_{it}} VB_{ij} - \sum_{j=1}^{n_{it}} VS_{ij}}{\sum_{j=1}^{m_{it}} VB_{ij} + \sum_{j=1}^{n_{it}} VS_{ij}}, \tag{3}$$

$$\mathrm{ABSI}_{it+j} = \mathrm{BSI}_{it+j} - \frac{\sum_{q=-40}^{-11} BSI_{it-q}}{N_{it}}, \tag{4}$$

where BSI_{it} is the buy-sell imbalance of trade size category i ($i \in \{\text{small}, \text{medium}, \text{large}\}$) on day t,$m_{it}(n_{it})$ is the number of buys (sells) in category i on day t, VB_{ij} and VS_{ij} are the value of each purchase and sale in category i, separately. ABSI_{it+j} is the abnormal buy-sell imbalance for category i on day $t+j$. We measure the normal level of buy-sell imbalance by its average value over the day $[t-44, t-11]$, requiring at least 20 non-missing data points. For all announcements, we calculate the abnormal buy-sell imbalance of each trade size category over the period $[t-3, t+10]$ and compare differences between high- and low-attention groups (measured by the first principal component of investor attention proxies).

TABLE 10 | Limited investor attention and market reaction to patent grants.

AR (0)	(1)	(2)	(3)	(4)
LimAtt_ Turnover	−0.081***			
	(−3.84)			
LimAtt_ Volume		−0.069**		
		(−2.15)		
LimAtt_ Index			−0.129	
			(−1.15)	
LimAtt_ Common				−0.113**
				(−2.51)
BHR	0.004	0.004	0.004	0.004
	(0.46)	(0.42)	(0.49)	(0.45)
Size	−0.025	−0.155*	−0.158	−0.152*
	(−0.26)	(−1.66)	(−1.53)	(−1.69)
BTM	0.245	0.340	0.309	0.399
	(0.61)	(0.84)	(0.74)	(0.98)
Leverage	−0.333	−0.214	−0.169	−0.184
	(−0.81)	(−0.52)	(−0.41)	(−0.45)
ROA	−1.711	−2.746	−2.585	−2.335
	(−0.98)	(−1.56)	(−1.46)	(−1.34)
SOE	0.095	0.089	0.090	0.080
	(0.26)	(0.23)	(0.24)	(0.21)
Firm age	0.022	−0.019	−0.028	−0.020
	(0.25)	(−0.22)	(−0.31)	(−0.23)
Constant	−0.085	0.281	−0.421	0.327
	(−0.22)	(0.74)	(−0.54)	(0.86)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	2261	2261	2261	2261
R^2	0.015	0.012	0.011	0.013

Note: This table presents the results from the pooled regression testing the relationship between limited investor attention and market reaction to CNIPA patent grants. The dependent variable is the abnormal stock return on the patent grant day, calculated using a market model consistent with the baseline study. The main explanatory variables are four proxies for limited investor attention. To alleviate confounding effects, the sample includes only invention and utility model patents granted before 2017. Variable definitions are provided in Appendix B, and all firm characteristics are lagged by 1 year. We include year fixed effects to control for common trends and industry fixed effects to account for time-invariant industry characteristics. *t*-statistics based on standard errors clustered at the firm level are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

TABLE 11 | Trading behavior over announcement periods.

	Panel A. small trades			Panel B. medium trades			Panel C. large trades		
Window	**High**	**Low**	**Diff**	**High**	**Low**	**Diff**	**High**	**Low**	**Diff**
−3	0.004	0.005	−0.001	−0.007	0.01	−0.017	0.003	0.005	−0.002
−2	0.003	−0.010	0.013	−0.011	0.007	−0.018	−0.029	0.010	−0.039
−1	0.009	−0.004	0.013	−0.006	0.007	−0.013	−0.014	0.029	−0.043
0	0.011	0.050	−0.039***	0.016	0.058	−0.042***	0.006	0.039	−0.033
1	0.017	0.002	0.015	0.004	0.009	−0.005	0.01	−0.007	0.017
2	0.006	0.012	−0.006	−0.003	0.030	−0.033**	−0.02	−0.004	−0.016
3	−0.005	0.026	−0.031**	−0.016	0.037	−0.053***	0.006	0.015	−0.009
4	0.007	0.008	−0.001	−0.02	0.022	−0.042***	−0.016	0.014	−0.030
5	0.002	0.026	−0.024*	−0.016	0.035	−0.051***	−0.03	0.018	−0.048*
6	0.009	0.015	−0.006	−0.015	0.027	−0.042***	−0.019	0.034	−0.053*
7	0.009	0.028	−0.019	−0.011	0.024	−0.035**	0.009	0.028	−0.019
8	0.011	0.027	−0.016	−0.013	0.03	−0.043***	−0.004	0.031	−0.035
9	0.006	0.008	−0.002	−0.007	0.008	−0.015	−0.021	−0.029	0.008
10	0.001	0.015	−0.014	−0.004	0.006	−0.010	−0.017	0.028	−0.045
−3, −2	0.007	−0.005	0.012	−0.019	0.017	−0.036*	−0.025	0.014	−0.039
−3, 3	0.042	0.082	−0.040	−0.024	0.158	−0.182***	−0.035	0.092	−0.127
−2, 2	0.044	0.051	−0.007	−0.002	0.111	−0.113***	−0.045	0.069	−0.114*
−1, 1	0.037	0.048	−0.011	0.014	0.074	−0.060**	0.002	0.063	−0.061
0, 1	0.028	0.052	−0.024	0.020	0.067	−0.047**	0.016	0.033	−0.017
1, 10	0.064	0.170	−0.106	−0.103	0.229	−0.332***	−0.123	0.122	−0.245**
2, 10	0.047	0.169	−0.122**	−0.107	0.221	−0.328***	−0.135	0.129	−0.264**
3, 10	0.041	0.155	−0.114**	−0.104	0.190	−0.294***	−0.114	0.132	−0.246**

Note: This table presents investor trading behavior around the announcement days. Announcement are split into high/low-attention groups by the median investor attention derived from the principal component analysis. Trades are categorized into small, medium, and large trades. Small trades are those with values less than or equal to 20,000 RMB, medium trades have values greater than 20,000 RMB but less than or equal to 100,000 RMB, and large trades have values greater than 100,000 RMB. The trade imbalance is calculated as the value of buyer-initiated trades minus the value of seller-initiated trades, divided by the total value of trades, and then multiplied by two. We report its abnormal level, calculated as the realized value minus the mean over the estimation window [*t*-44, *t*-11]. The sample includes all stale announcements made between 2010 and 2015. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 11 reports the univariate analysis results, where Panels A, B, and C present mean difference between the two groups for small, medium, and large trades, respectively. Before the announcement day *t*, there are no significant differences in order imbalance for any type of trade. On the announcement day *t*, both small and medium trades exhibit a statistically significantly greater net buying of stocks of firms in the low-attention group, while large trades remain unchanged. Moreover, medium trades maintain this pattern of net buying (selling) for low- (high-) attention firms in the post-disclosure period, but small and large trades do not. The cumulative order imbalance aggregated over these three trade types likewise produces consistent results. Collectively, these trading patterns support our argument that the market reaction to stale corporate innovation news is driven by inattentive investors, especially those with greater attention constraints.

6.3 | Alternative Explanations

In this section, we examine two alternative explanations for our baseline findings: strategic timing and signaling.[10] The positive market reaction to patent announcements may be driven by the underlying momentum effect, where managers strategically time disclosures to coincide with periods of positive price momentum. To test this alternative explanation, we add a medium-term price momentum variable (MOM6)—defined as the focal firm's trailing 6-month return ending in month m-1 (Chan et al. 1996)—to the control variables of our baseline model. Our results remain robust after controlling for price momentum (Panel A of Table 12).[11]

Another possible explanation is that positive market reactions reflect the signaling effect of boilerplate statements in

TABLE 12 | Tests of alternative explanations.

Panel A: Strategically timing periods of positive price momentum				
CAR (−1, 1)	**(1)**	**(2)**	**(3)**	**(4)**
LimAtt_Turnover	0.144**			
	(2.46)			
LimAtt_Volume		0.348***		
		(3.52)		
LimAtt_Index			0.748**	
			(2.42)	
LimAtt_Common				0.453***
				(3.59)
MOM6	−0.462	−0.326	−0.623	−0.316
	(−1.18)	(−0.85)	(−1.58)	(−0.79)
Controls	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	2083	2083	1936	1936
R^2	0.152	0.155	0.151	0.155
Panel B: The signaling effect of boilerplate statements				
CAR (−1, 1)	**(1)**	**(2)**	**(3)**	**(4)**
LimAtt_Turnover	0.169***			
	(3.19)			
LimAtt_Volume		0.379***		
		(4.21)		
LimAtt_Index			0.916***	
			(3.04)	
LimAtt_Common				0.498***
				(4.31)
Statement	0.419	0.347	0.481	0.451
	(0.68)	(0.57)	(0.80)	(0.72)
Controls	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	2086	2086	1937	1937
R^2	0.152	0.155	0.150	0.155

Note: This table presents the results of tests addressing two alternative explanations. Panel A reports empirical results concerning the first explanation: the strategic timing of corporate patent announcements during periods of positive price momentum. Panel B evaluates the second explanation: the signaling effect of boilerplate statements. *MOM6* is the focal firm's trailing 6-month return ending in month m-1, whereas *Statement* is an indicator variable equal to 1 if a boilerplate statement is present in the announcement and 0 otherwise. Detailed variable definitions are provided in Appendix B. For brevity, coefficients for control variables are omitted. *t-statistics* calculated using standard errors clustered at the firm level are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

corporate patent disclosures. These statements typically describe the impact of receiving patent certificates with phrases such as "beneficial for enhancing core competitiveness". Although such phrasing often constitutes standard boilerplate language rather than a product-specific endorsement, we identify these statements across our sample and find that approximately 93% of announcements include them.

To examine whether these statements function as signals, we construct a binary indicator, Statement, which equals 1 if the announcement includes such boilerplate language and 0 otherwise. If the positive market reaction is driven by these strategic signals rather than by investors' prior limited attention, the baseline relationship should be attenuated or become insignificant after controlling for this indicator. The empirical results reported in Panel B of Table 12, however, do not support this alternative explanation. The coefficient for the Statement variable is statistically insignificant when the dependent variable is CAR (−1, 1), suggesting that these boilerplate statements do not provide a differentiated or credible signal to the market.

6.4 | Determinants of Announcement

We also investigate whether firms disclose stale patent news in response to investors' inattention to CNIPA's initial patent grants. To examine this, we estimate a Logit model using a sample of firm-year observations with patents granted between 2010 and 2017, based on annual patent grant information obtained from CSMAR, which covers through 2017. The main variable of interest is limited investor attention, which we measure by multiplying the annual average of stock turnover, trading volume, and Baidu Search Index by negative one, as well as using the first principal component of these three proxies. The dependent variable is a binary indicator equal to 1 if the firm issues at least one stale patent disclosure (receipt of patent certificates) in a year, and 0 otherwise. Table 13 shows the estimated results.

We find that the probability of announcing the receipt of patent certificates is positively related to limited investor attention, as three of the four proxies have coefficients significant at the 5% level or better, whereas the trading volume-based proxy is insignificant. We also find that smaller and younger firms are more likely to issue stale patent disclosures. Even though managers may recognize investors' behavioral biases, they might have other motivations driving their disclosures of nonfinancial information, such as reducing the cost of equity capital (Dhaliwal et al. 2011). The empirical results are consistent with these arguments. In particular, firms with lower leverage, higher sales growth, and non-SOE firms tend to announce patent grant news, indicating that reducing the cost of equity may be a motivating factor. Overall, these findings indicate that firms proactively issue patent grant disclosures to attract investor attention during periods of low investor attention to their patent grants.

TABLE 13 | Determinants on the initiation of announcement.

Announcement	(1)	(2)	(3)	(4)
Limatt_Turnover	0.051**			
	(2.42)			
Limatt_Volume		−0.016		
		(−0.31)		
Limatt_Index			0.284***	
			(3.53)	
Limatt_Common				0.211**
				(2.56)
Size	−0.414***	−0.398***	−0.307***	−0.334***
	(−3.90)	(−3.73)	(−2.79)	(−3.07)
Firm age	−0.774***	−0.679***	−0.680***	−0.712***
	(−10.20)	(−10.60)	(−10.34)	(−10.62)
Growth	0.260***	0.258***	0.212***	0.233***
	(3.52)	(3.49)	(2.79)	(3.08)
SOE	−1.339***	−1.372***	−1.305***	−1.301***
	(−5.00)	(−5.14)	(−4.80)	(−4.79)
Institutional ownership	−0.023**	−0.018*	−0.024**	−0.025**
	(−2.07)	(−1.67)	(−2.17)	(−2.20)
BTM	0.409	0.541	0.210	0.229
	(0.95)	(1.26)	(0.47)	(0.51)
Leverage	−0.741*	−0.800**	−0.799**	−0.776*
	(−1.84)	(−1.97)	(−1.97)	(−1.91)
ROA	−0.434	−0.372	−0.140	−0.108
	(−0.33)	(−0.28)	(−0.10)	(−0.08)
Analyst coverage	0.110*	0.115*	0.128**	0.124**
	(1.85)	(1.93)	(2.15)	(2.08)
Constant	0.606	−0.014	3.283***	1.679**
	(0.84)	(−0.02)	(3.88)	(2.44)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	13,086	13,086	12,071	12,071
Pseudo R^2	0.161	0.160	0.163	0.162

Note: This table presents the results from a Logit regression on the determinants of stale patent disclosure initiation. The dependent variable is a dummy variable equal to one if the firm issues an announcement upon receipt of the patent certificate, and zero otherwise. The main variables of interest are four measures of limited investor attention, calculated as minus one times the annual average of stock turnover, trading volume, Baidu Search Index, and the principal component of these three measures. We limit the sample to firms with at least one patent grant and restrict the sample period to 2010–2017. Year fixed effects are included to control for common trends, and industry fixed effects are included to control for other time-invariant industry characteristics. *Z*-statistics based on standard errors adjusted for heteroscedasticity and firm clustering are reported in parentheses. ***, **, and * denote coefficient estimates significant at the 1%, 5%, and 10% levels, respectively.

7 | Conclusion

We exploit a unique setting in China, where many public firms announce stale patent news that merely repeats existing innovation information about patent grants from China's patent office, to investigate the role of past investor inattention in determining the market reaction to stale news. Our results show a positive market reaction to the announcement of old innovation news. We further find that this reaction is positively related to investors' past limited attention, consistent with the market

correcting its initial underreaction to CNIPA's patent grant information. The results are robust to the use of alternative proxies for market reactions and investor attention. Moreover, we find that this relation is more pronounced for firms characterized by low institutional ownership, opaque information environment, or announcements preceded by the same type of disclosure within the past 3 months. Furthermore, we find that retail investors, who face greater constraints on their attention capacity, pay more attention to corporate patent news than to CNIPA's initial publications. Additional analyses confirm that the baseline results are not driven by managerial strategic timing or the signaling effect of boilerplate statement. Our analysis suggests that the market reaction to stale information depends on investors' attention levels at different points in time. If investors were inattentive to the initial information and thus underreacted, capital markets may exhibit a delayed reaction to stale information when it is re-disclosed in attention-grabbing events (e.g., firms' voluntary disclosures).

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Conflicts of Interest

The authors declare no conflicts of interest.

Endnotes

[1] CNINFO is equivalent to the Electronic Data Gathering, Analysis, and Retrieval system (EDGAR) in the U.S.

[2] Details about the rule to implement the law can be found in the website of CNIPA: http://english.cnipa.gov.cn/lawpolicy/patentlawsregulations/915571.htm.

[3] Only 29 announcements regarding the receipt of patent certificates occurred prior to 2010. These announcements are distributed as follows: 1 in 2005, 1 in 2007, 3 in 2008, and 24 in 2009.

[4] It is the designated platform for corporate disclosure by China Securities Regulatory Commission (CSRC), which is the Chinese equivalent of the U.S. SEC's EDGAR system. It can be freely accessed at the following address: http://www.cninfo.com.cn/new/index.

[5] In unreported results, we also account for three other event types: analyst site visits, institutional investor site visits, and new product announcements. The baseline results remain robust to these additional exclusion criteria. To balance the sample size and selection, we follow the screening criteria established in prior studies.

[6] In the Online Appendix, we examine quality differentials between announced and unannounced patent grants across both short- and long-term horizons. The results demonstrate that undisclosed patents accrue 0.155 more three-year forward citations and 0.63 more patent claims than disclosed patents. These findings suggest that firms do not strategically disclose higher-value patents.

[7] These two alternative search volume-based attention measures exhibit strong correlations with the existing metric. The correlation coefficients are 0.63 (p-value <0.01) for LimAtt_BSI2 and LimAtt_Index, and 0.79 (p-value <0.01) for Limatt_BSI3 and LimAtt_Index, respectively, indicating that investors' attention to firms and their technological innovations is closely aligned.

[8] Our results are robust to the choice of interval between two announcements made by the same firm. We tested six intervals ranging from 1 month to 6 months. The three-month interval is selected because the two subsamples are relatively balanced in terms of observations.

[9] On the grant day, abnormal returns are −2.47 basis points (t-statistic = −0.2) for design patents, 7.45 basis points (t-statistic = 1.26) for utility model patents, and 21.66 basis points (t-statistic = 3.40) for invention patents, respectively.

[10] We are grateful to the anonymous reviewer for the insightful suggestions regarding the testing of alternative explanations.

[11] Our findings are also robust to controlling for a three-month price momentum.

References

Andrade, S. C., J. Bian, and T. R. Burch. 2013. "Analyst Coverage, Information, and Bubbles." *Journal of Financial and Quantitative Analysis* 48, no. 5: 1573–1605.

Bailey, W., W. Huang, and Z. Yang. 2011. "Bank Loans With Chinese Characteristics: Some Evidence on Inside Debt in A State-Controlled Banking System." *Journal of Financial and Quantitative Analysis* 46, no. 6: 1795–1830.

Barber, B. M., and T. Odean. 2008. "All That Glitters: The Effect of Attention and News on the Buying Behavior of Individual and Institutional Investors." *Review of Financial Studies* 21, no. 2: 785–818.

Ben-Rephael, A., Z. Da, and R. D. Israelsen. 2017. "It Depends on Where You Search: A Comparison of Institutional and Retail Attention." *Review of Financial Studies* 30, no. 9: 3009–3047.

Blankespoor, E., E. deHaan, and I. Marinovic. 2020. "Disclosure Processing Costs, Investors' Information Choice, and Equity Market Outcomes: A Review." *Journal of Accounting and Economics* 70, no. 2–3: 101344.

Chan, L. K., N. Jegadeesh, and J. Lakonishok. 1996. "Momentum Strategies." *Journal of Finance* 51, no. 5: 1681–1713.

Chemmanur, T. J., D. Li, K. Tseng, and Y. Y. Wang. 2026. "Measuring the Economic Value of an Innovation When Some Investors Are Inattentive." *Journal of Financial and Quantitative Analysis* 61, no. 1: 206–238.

Chen, J., Y. J. Liu, L. Lu, and Y. Tang. 2016. "Investor Attention and Macroeconomic News Announcements: Evidence From Stock Index Futures." *Journal of Futures Markets* 36, no. 3: 240–266.

Chen, M. A., Q. Wu, and B. Yang. 2019. "How Valuable Is FinTech Innovation?" *Review of Financial Studies* 32, no. 5: 2062–2106.

Cohen, L., and A. Frazzini. 2008. "Economic Links and Predictable Returns." *Journal of Finance* 63, no. 4: 1977–2011.

Da, Z., J. Engelberg, and P. Gao. 2011. "In Search of Attention." *Journal of Finance* 66, no. 5: 1461–1499.

DellaVigna, S., and J. M. Pollet. 2007. "Demographics and Industry Returns." *American Economic Review* 97, no. 5: 1667–1702.

DellaVigna, S., and J. M. Pollet. 2009. "Investor Inattention and Friday Earnings Announcements." *Journal of Finance* 64, no. 2: 709–749.

Dhaliwal, D. S., O. Z. Li, A. Tsang, and Y. G. Yang. 2011. "Voluntary Nonfinancial Disclosure and the Cost of Equity Capital: The Initiation of Corporate Social Responsibility Reporting." *Accounting Review* 86, no. 1: 59–100.

Fang, L. H., J. Lerner, and C. Wu. 2017. "Intellectual Property Rights Protection, Ownership, and Innovation: Evidence From China." *Review of Financial Studies* 30, no. 7: 2446–2477.

Fedyk, A. 2024. "Front-Page News: The Effect of News Positioning on Financial Markets." *Journal of Finance* 79, no. 1: 5–33.

Fedyk, A., and J. Hodson. 2023. "When Can the Market Identify Old News?" *Journal of Financial Economics* 149, no. 1: 92–113.

Gargano, A., and A. G. Rossi. 2018. "Does It Pay to Pay Attention?" *Review of Financial Studies* 31, no. 12: 4595–4649.

Gervais, S., R. Kaniel, and D. H. Mingelgrin. 2001. "The High-Volume Return Premium." *Journal of Finance* 56, no. 3: 877–919.

Gilbert, T., S. Kogan, L. Lochstoer, and A. Ozyildirim. 2012. "Investor Inattention and the Market Impact of Summary Statistics." *Management Science* 58, no. 2: 336–350.

Glaeser, S., and M. Lang. 2024. "Measuring Innovation and Navigating Its Unique Information Issues: A Review of the Accounting Literature on Innovation." *Journal of Accounting and Economics* 78, no. 2: 101720.

Hirshleifer, D., P. H. Hsu, and D. Li. 2013. "Innovative Efficiency and Stock Returns." *Journal of Financial Economics* 107, no. 3: 632–654.

Hirshleifer, D., P. H. Hsu, and D. Li. 2018. "Innovative Originality, Profitability, and Stock Returns." *Review of Financial Studies* 31, no. 7: 2553–2605.

Hirshleifer, D., S. S. Lim, and S. H. Teoh. 2009. "Driven to Distraction: Extraneous Events and Underreaction to Earnings News." *Journal of Finance* 64, no. 5: 2289–2325.

Hirshleifer, D., and S. H. Teoh. 2003. "Limited Attention, Information Disclosure, and Financial Reporting." *Journal of Accounting and Economics* 36, no. 1–3: 337–386.

Huang, S., Y. Huang, and T. C. Lin. 2019. "Attention Allocation and Return co-Movement: Evidence From Repeated Natural Experiments." *Journal of Financial Economics* 132, no. 2: 369–383.

Huberman, G., and T. Regev. 2001. "Contagious Speculation and A Cure for Cancer: A Nonevent That Made Stock Prices Soar." *Journal of Finance* 56, no. 1: 387–396.

Kahneman, D., and A. Tversky. 1973. "On the Psychology of Prediction." *Psychological Review* 80: 237–251.

Kogan, L., D. Papanikolaou, A. Seru, and N. Stoffman. 2017. "Technological Innovation, Resource Allocation, and Growth." *Quarterly Journal of Economics* 132, no. 2: 665–712.

Lee, C. M., S. T. Sun, R. Wang, and R. Zhang. 2019. "Technological Links and Predictable Returns." *Journal of Financial Economics* 132, no. 3: 76–96.

Leippold, M., Q. Wang, and W. Zhou. 2022. "Machine Learning in the Chinese Stock Market." *Journal of Financial Economics* 145, no. 2: 64–82.

Li, Z., J. Liu, X. Liu, and C. Wu. 2024. "Investor Attention and Stock Price Efficiency: Evidence From Quasi-Natural Experiments in China." *Financial Management* 53, no. 1: 175–225.

Liu, H., L. Peng, and Y. Tang. 2023. "Retail Attention, Institutional Attention." *Journal of Financial and Quantitative Analysis* 58, no. 3: 1005–1038.

Loh, R. K. 2010. "Investor Inattention and the Underreaction to Stock Recommendations." *Financial Management* 39, no. 3: 1223–1252.

Louis, H., and A. Sun. 2010. "Investor Inattention and the Market Reaction to Merger Announcements." *Management Science* 56, no. 10: 1781–1793.

Maćkowiak, B., F. Matějka, and M. Wiederholt. 2023. "Rational Inattention: A Review." *Journal of Economic Literature* 61, no. 1: 226–273.

Nekrasov, A., S. H. Teoh, and S. Wu. 2023. "Limited Attention and Financial Decision-Making." In *Handbook of Financial Decision Making*, 17–35. Edward Elgar Publishing.

Shi, S., Q. Sun, and X. Zhang. 2018. "Do IPOs Affect Market Price? Evidence From China." *Journal of Financial and Quantitative Analysis* 53, no. 3: 1391–1416.

Sims, C. A. 2003. "Implications of Rational Inattention." *Journal of Monetary Economics* 50, no. 3: 665–690.

Tetlock, P. C. 2011. "All the News That's Fit to Reprint: Do Investors React to Stale Information?" *Review of Financial Studies* 24, no. 5: 1481–1512.

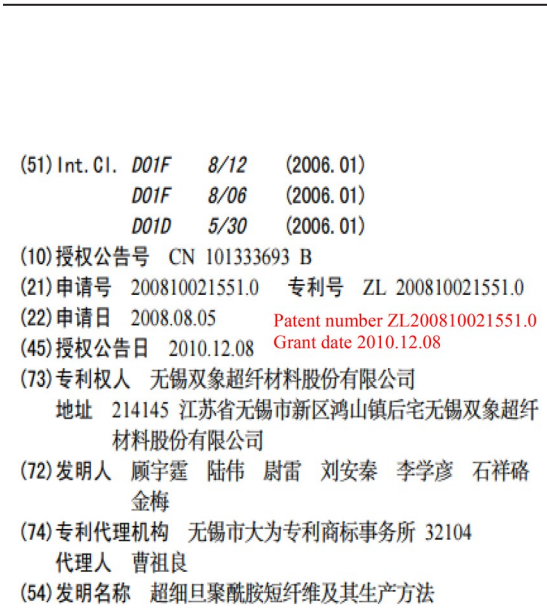
Wang, B. 2017. "Ranking and Salience. Working Paper."

Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Data S1:** irfi70078-sup-0001-Appendix.docx.

Appendix A

Illustration of the Empirical Setting



(51) Int. Cl. *D01F 8/12* (2006.01)
D01F 8/06 (2006.01)
D01D 5/30 (2006.01)
(10)授权公告号 CN 101333693 B
(21)申请号 200810021551.0 专利号 ZL 200810021551.0
(22)申请日 2008.08.05 Patent number ZL200810021551.0
(45)授权公告日 2010.12.08 Grant date 2010.12.08
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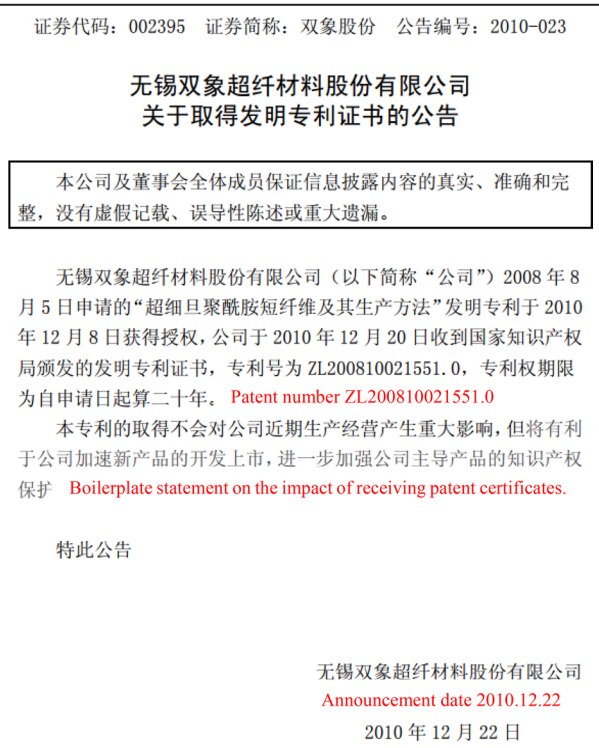
代理人 曹祖良
(54)发明名称 超细旦聚酰胺短纤维及其生产方法

Panel A. Patent grant in the *Patent Gazette*.
(Published by the patent office on December 8, 2010).



证券代码：002395 证券简称：双象股份 公告编号：2010-023

无锡双象超纤材料股份有限公司
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无锡双象超纤材料股份有限公司（以下简称“公司”）2008 年 8 月 5 日申请的“超细旦聚酰胺短纤维及其生产方法”发明专利于 2010 年 12 月 8 日获得授权，公司于 2010 年 12 月 20 日收到国家知识产权局颁发的发明专利证书，专利号为 ZL200810021551.0，专利权期限为自申请日起算二十年。 Patent number ZL200810021551.0

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特此公告

无锡双象超纤材料股份有限公司
Announcement date 2010.12.22
2010 年 12 月 22 日

Panel B. Announcement of receipt of patent certificate.
(Disclosed by listed firm on December 22, 2010).

Note: This table demonstrates the empirical setting with an example. Panel A presents a snapshot of the patent grant from the Patent Gazette: the National Intellectual Property Administration (CNIPA) granted Patent ZL 200810021551.0 to Wuxi Double Elephant Fiber Material Co. Ltd. on December 8, 2010. The firm received the patent certificate from CNIPA on December 20, 2010, and disclosed the receipt via a corporate announcement on December 22, 2010. Panel B presents the full corporate announcement. The two sets of information are substantively identical, with only minor formatting differences.

Appendix B

Variable Definitions

Variable	Definition and data source
Panel A: Independent variables	
Abnormal returns	Abnormal stock returns are calculated using a market model and are reported in basis points. The estimation window is [*t*-200, *t*-11] (190 days), with a minimum of 160 trading days required. Abnormal stock returns are defined as the realized returns minus expected returns over the event window [*t*-3, *t* +10] (3 days before to 10 days after the corporate patent announcement). *Source:* CSMAR.
Abnormal volume	Abnormal volume on day j relative to the announcement date t is defined as the normalized difference between the log dollar volume on day j and the average log dollar volume over the period [*t*-76, *t*-11]. A minimum length of 56 days is required. *Source:* CSMAR.
Cumulative abnormal returns	The cumulative abnormal stock returns over different event windows, specifically [*t*-1, *t* + 1] and [*t* + 2, *t* + 10]. *Source:* CSMAR.
Cumulative abnormal volume	The cumulative abnormal trading volume over different event windows, specifically [*t*-1, *t* + 1] and [*t* + 2, *t* + 10]. *Source:* CSMAR.
Announcement	Indicator variable equals one if a firm makes at least one announcement regarding the receipt of patent certificate from China National Intellectual Property Administration, and zero otherwise. *Source:* CNINFO.
Panel B: Dependent variables	

Variable	Definition and data source
LimAtt_Turnover	Minus one times the average stock turnover over the 3 months prior to the announcement [*t*-63, *t*-2]. For the Logit regression (determinants of disclosure), the estimation window is 1 year. Source: CSMAR.
LimAtt_Volume	Minus one times the average dollar trading volume over the 3 months prior to the announcement [*t*-63, *t*-2]. For the Logit regression (determinants of disclosure), the estimation window is 1 year. *Source:* CSMAR.
LimAtt_Index	Minus one times the average Baidu Search Index of stock name abbreviations over the 3 months prior to the announcement [*t*-63, *t*-2]. For the Logit regression (determinants of disclosure), the estimation window is 1 year. *Source:* Baidu.
LimAtt_Common	The first principal component of LimAtt_Turnover, LimAtt_Volume, and LimAtt_Index. *Source:* Self-calculated.
LimAtt_BSI2	Minus one times the average Baidu Search Index of stock name abbreviations and the Chinese term for "patent" over the 3 months prior to the announcement [*t*-63, *t*-2]. *Source:* Baidu.
LimAtt_BSI3	Minus one times the average Baidu Search Index of stock name abbreviations and the Chinese term of "patent" and "technological innovation" over the 3 months prior to the announcement [*t*-63, *t*-2]. *Source:* Baidu.
BHR	Buy-and-hold stock returns from 2 weeks to 1 week prior to the announcement date or patent grant date [*t*-10, *t*-6]. *Source*: CSMAR.
Size	The natural logarithm of total assets *Source:* CSMAR.
BTM	Book-to-market ratio, constructed as the book value of equity divided by the market value of equity at the end of the fiscal year. *Source:* CSMAR.
Leverage	Total liabilities over total assets. *Source:* CSMAR.
Growth	Sales growth for each fiscal year, calculated as the ratio of total sales in year t to total sales in year t-1 and then minus 1. *Source:* CSMAR.
ROA	Return on assets is defined as net income divided by total assets for each fiscal year in percentage. *Source:* CSMAR.
SOE	A dummy variable that equals one if the ultimate controllers of a firm is a government-owned entity or a government agency, and zero otherwise. The government agency includes the central government, local governments at the provincial, municipal, and county level, and other institutions. *Source:* CSMAR.
Firm age	The natural logarithm of one plus the number of months the firm has been listed on the exchange up to the fiscal year prior to the announcement. *Source:* CSMAR.
Analyst coverage	The number of analysts (teams) who have conducted tracking analysis on the company within a year; each team is counted as one, regardless of the number of its members. *Source:* CSMAR.
Announcement recency	Dummy indicator equal to one if the announcement is made following another announcement from the same firm within 3 months, and zero otherwise. *Source:* CNINFO.
Patent	Natural logarithm of the number of patents disclosed in each announcement. *Source:* Self-calculated.
Shareholding size	The market capitalization of outstanding shares divided by the total number of shareholders (in thousands). *Source:* CSMAR.
MOM6	The focal firm's cumulative raw return over the trailing six-month period, specifically from month *m*-6 to *m*-1. *Source:* CSMAR.
Statement	A dummy variable that equals one if a boilerplate statement is present in corporate patent announcements, and zero otherwise. *Source:* CNINFO.

Appendix C

Figures and Tables

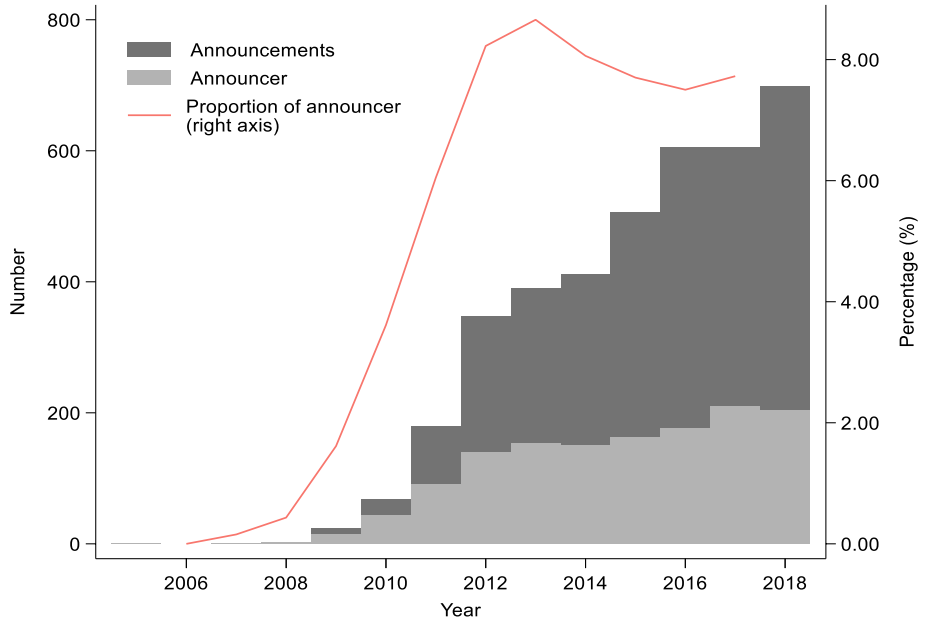

FIGURE C1 | Distribution of announcements and announcers over 2005–2018. The figure displays the time-series distribution of the number of disclosures regarding the receipt of patent certificates (or notices), and the number/proportion of disclosing firms. Data are collected from CNINFO, (China's EDGAR equivalent) for 2005–2018, totaling 3838 disclosures (29 before 2010). The dark gray bars indicate the annual number of announcement, while the light gray bars represent the annual number of disclosing firms. On the right axis, the red line shows the percentage of announcers among all listed firms with at least one granted patent (ends in 2017 due to data constraints).

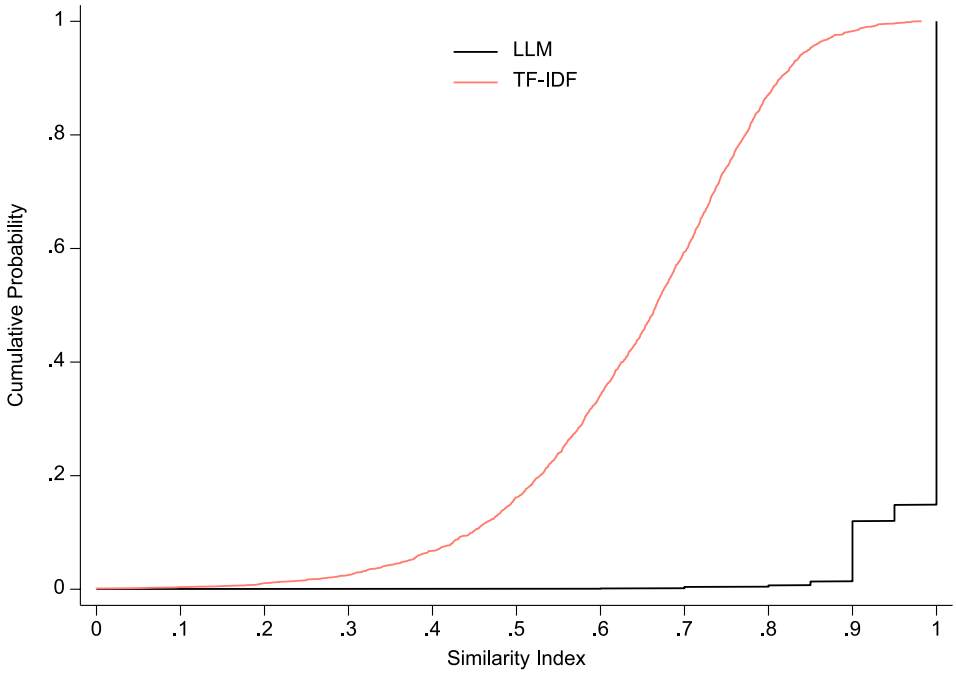

FIGURE C2 | Cumulative distribution of textual similarity indices. This figure plots the cumulative probability (y-axis) against similarity scores ranging from 0 to 1 (x-axis) between CNIPA's Patent Gazette entries and firms' stale patent disclosures. Two methods are compared: TF-IDF-weighted cosine similarity, which treats documents as vectors in a high-dimensional feature space, and LLM-based semantic similarity, which maps narrative disclosure language to structured patent entries. Patent Gazette content is extracted to match disclosure items for direct comparability.

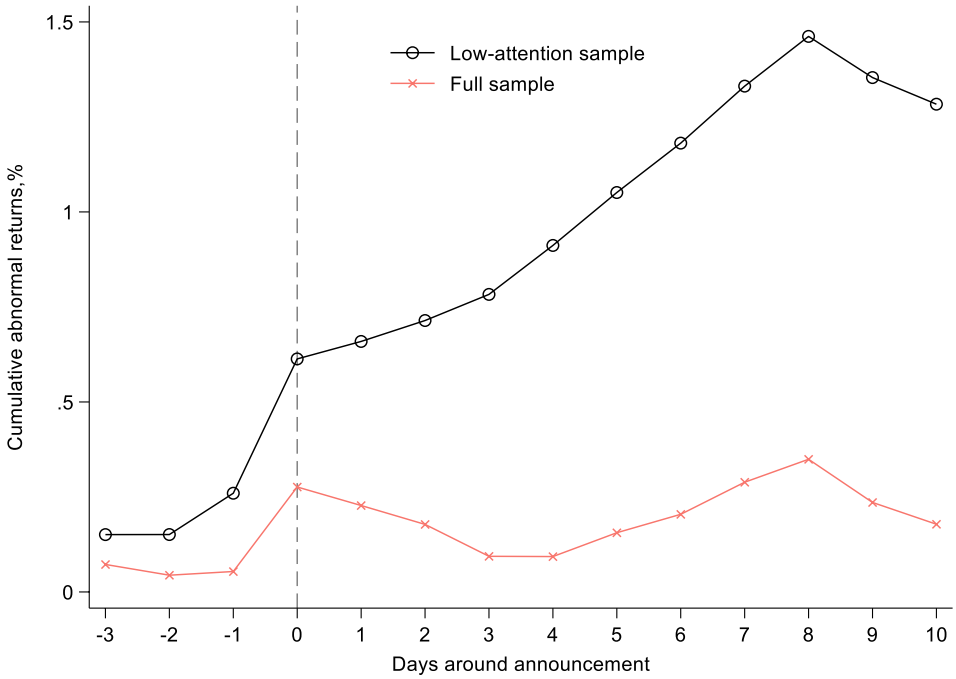

FIGURE C3 | Cumulative abnormal returns around announcement day. This figure presents cumulative abnormal returns (CARs) around stale patent announcement dates (receipt of patent certificates). Abnormal returns are calculated using a market model with an estimation window of [*t*-200, *t*-11], requiring a minimum of 160 trading days. The full sample is split annually into high- and low-attention groups using the median of trading volume-based investor attention. The red solid line depicts CARs for the full sample, covering 3 days before and 10 days after the announcement dates, while the dark solid line corresponds to the low-attention group. All announcements are from the baseline sample.