

The Hidden Risks of Innovation Leadership: Institutional Parasites in Financial Markets

This study proposes the Institutional Parasites Theory (IPT) to explain why innovation-oriented top management teams (TMTs) may drive higher stock price crash risk (SPCR). Rather than blaming individual cognitive biases, IPT highlights systemic institutional flaws—such as regulatory ambiguity—that allow innovation-focused TMTs to hide negative financial information, elevating SPCR. Using data from Chinese A-share firms (2008–2021), the research finds that R&D-driven TMTs are more prone to SPCR, but mechanisms like digital transformation, foreign institutional investors, and CEO political connections act as “institutional antibodies” that moderate these risks. The findings reveal how institutional structures shape risk concealment in innovation-intensive firms and call for stronger institutional safeguards.

Keywords: Institutional Parasites Theory; Top Management Teams (TMTs) innovativeness; Stock Price Crash Risk; Corporate Governance; Digital Transformation; Foreign Institutional Investors; CEO Political Connections

Authors:

Yasir Shahab, Xijing University: yasirshahab@outlook.com

Tanveer Hussain, University of Essex: th22205@essex.ac.uk

Naeem Ashraf, EDHEC Business School: naeem.ashraf@edhec.edu

Teng Li, University of Essex: teng.li@essex.ac.uk

Introduction

Innovation-oriented top management teams (TMTs) are widely credited with driving strategic breakthroughs and fostering R&D but are also linked to heightened stock price crash risk (SPCR) due to their ability to withhold adverse financial information (Bendig et al., 2023; Georgakakis et al., 2017; He & Hirshleifer, 2022). While traditional agency theory (Jensen & Meckling, 1976) suggests that firms pursuing exploratory innovation are more prone to SPCR (Jia, 2018), and upper echelons perspectives highlight psychological factors such as overconfidence (Kim, Wang & Zhang, 2016) and early-life experiences (Chen et al., 2021), these explanations overlook the role of institutional structures. In many cases, overlapping regulations, ambiguous enforcement, and state-driven innovation incentives create conditions that allow innovation-driven TMTs to accumulate and conceal risks until a sudden market correction occurs (Besharov & Smith, 2014; Briscoe & Murphy, 2012). Institutional Parasites Theory (IPT) (Rintamäki, Parker & Spicer, 2024) provides a more comprehensive lens, arguing that institutional complexity enables TMTs to extract legitimacy and resources while privatizing financial risks. Rather than simply being overconfident or inattentive, these leaders strategically exploit governance blind spots, using the prestige of R&D initiatives to mask unresolved financial vulnerabilities (Bendig et al., 2023; Briscoe & Murphy, 2012). This opportunistic behavior flourishes in weakly coordinated regulatory environments, where fragmented enforcement and conflicting policy mandates allow risk concealment to persist (Lu & Qiu, 2023; Mahoney & Thelen, 2010).

Using data from Chinese A-share firms (2008–2021), we find that innovation-focused TMTs significantly increase SPCR, supporting the argument that institutional vulnerabilities—not just managerial cognition—shape financial risk dynamics. However, we also identify mechanisms that mitigate these risks, functioning as "institutional antibodies." Specifically, digital transformation initiatives (Cheng et al., 2024), foreign institutional investors (Huang & Zhu, 2015; Zhang, Pan & Ma, 2023), and CEO political connections

(Chin & Semadeni, 2017) each play a role in curbing the extent to which innovation-oriented TMTs can obscure negative information.

Our study contributes to the literature in three key ways. First, it reframes the TMT-SPCR relationship by shifting the focus from cognitive biases to systemic institutional flaws, highlighting how governance complexity fosters risk concealment (Sajko, Boone & Buyl, 2021; Voronov, Glynn & Weber, 2022). Second, it reveals how institutional structures enable the decoupling of ambitious innovation narratives from actual firm-level risk exposure—an aspect overlooked by traditional theoretical perspectives (Certo et al., 2006; Georgakakis et al., 2017). Third, it underscores the importance of institutional safeguards in mitigating the "dark side" of innovation leadership by limiting TMTs' ability to exploit regulatory gaps. These findings suggest that reducing SPCR in high-innovation firms requires more than improved managerial decision-making; it demands structural reforms to enhance transparency and regulatory coordination. Strengthening institutional oversight can help prevent firms from leveraging innovation as a cover for unchecked risk accumulation, ultimately fostering more sustainable financial markets.

Theory and Hypotheses

Institutional Parasites Theory (IPT) explains how actors—whether individuals, firms, or organizations—exploit institutional complexity for self-serving gains while shifting the associated risks or liabilities onto others. Unlike traditional views that focus on managerial biases or cognitive limitations, IPT conceptualizes parasitism as a strategic maneuver, where actors manipulate regulatory gaps, fragmented oversight, and symbolic legitimacy to secure resources without proportionate accountability (Rintamäki et al., 2024). Over time, unchecked parasitism leads to institutional drift, where rules and enforcement weaken,

allowing deeper exploitation until the system reaches a breaking point (Rintamäki et al., 2024).

Parasites thrive within institutions due to three conditions: (1) opportunities (loopholes in governance or enforcement), (2) supply (actors with the knowledge and ability to exploit these loopholes), and (3) demand (external forces that incentivize or enable parasitic strategies, such as government innovation subsidies or investor enthusiasm for high-tech firms). As parasites proliferate, their actions normalize, further embedding exploitative behaviors within the institution (Rintamäki et al., 2024). Functionaries—those responsible for governance and oversight—may either monitor passively, activate enforcement mechanisms, or fail to act (non-activation), allowing institutional decay to continue.

In the corporate context, IPT suggests that top management teams (TMTs) can behave as parasites when they use institutional prestige, investor optimism, and regulatory ambiguity to sustain an illusion of success while concealing real financial risks. This can lead to stock price crashes, as undisclosed problems accumulate and eventually trigger market corrections when the truth emerges.

TMT Innovativeness and Stock Price Crash Risk

R&D-intensive top management teams (TMTs) are well-positioned to act as "institutional parasites," leveraging their expertise, legitimacy, and institutional backing to secure resources while avoiding immediate accountability (He & Hirshleifer, 2022; Islam & Zein, 2020). Celebrated as visionaries, these executives justify temporary setbacks as necessary for long-term innovation, enabling them to accumulate hidden liabilities until disclosure becomes unavoidable. Institutional Parasites Theory (IPT) argues that such TMTs exploit systemic regulatory contradictions—such as state-driven innovation incentives versus financial transparency laws—and fragmented enforcement to sustain this concealment (Rintamäki et

al., 2024; Briscoe & Murphy, 2012). By continuously projecting technological advancements through patents and research initiatives, they maintain external confidence while deferring financial reckoning.

IPT identifies three systemic conditions that enable this behavior. First, fragmented regulatory oversight allows firms to time disclosures strategically, emphasizing breakthroughs while downplaying financial setbacks (Mahoney & Thelen, 2010). Second, state-subsidized R&D programs and abundant specialized talent provide extended financial runway, shielding underperforming projects from early market scrutiny (Bromley & Powell, 2012). Third, investor and policymaker bias toward visible innovation outputs (e.g., patents, prototypes) over financial transparency incentivizes TMTs to prioritize symbolic technological progress over substantive risk management (Kuruvilla & Li, 2021; Wijen, 2014). Together, these factors decouple innovation rhetoric from financial realities, fostering unchecked risk accumulation.

A key aspect of IPT is institutional drift—where regulators, auditors, and investors fail to enforce corrective actions, allowing parasitic behaviors to persist (Voronov et al., 2022; Rintamäki et al., 2024). R&D-heavy TMTs, benefiting from their perceived legitimacy, evade early interventions even when financial warning signs emerge (Briscoe & Murphy, 2012). This prolonged non-activation of oversight mechanisms compounds risks, creating an environment ripe for sudden market collapses.

Moreover, these TMTs strategically align with dominant institutional narratives, using digital transformation and innovation policies as shields against scrutiny (Kuruvilla & Li, 2021; Wijen, 2014). They also engage in layering—introducing new innovations, acquisitions, or partnerships to divert attention from financial vulnerabilities. This reinforces external confidence, delaying market corrections until a tipping point is reached. When the accumulated risks can no longer be concealed—due to external shocks, whistleblower

revelations, or liquidity crises—market confidence collapses, triggering severe stock price crashes (Rintamäki et al., 2024; Voronov et al., 2022).

Ultimately, IPT suggests that unchecked parasitism leads to institutional breakdown, where deferred risks overwhelm the system, forcing regulators to impose stricter governance—often too late to prevent financial damage. This interplay between institutional complexity, weak enforcement, and opportunistic TMT behavior makes stock price crashes not just likely, but inevitable. Given the IPT-based arguments above, we propose that:

Hypothesis 1: Firms led by innovation-oriented TMTs exhibit higher stock price crash risk.

Role of Digital Transformation

Institutional Parasites Theory (IPT) argues that innovation-driven TMTs exploit institutional gaps to delay disclosing negative outcomes (Rintamäki et al., 2024). Digital transformation—via data analytics, cloud computing, and other technologies—enhances transparency, limiting TMTs’ ability to conceal financial underperformance (Hanelt et al., 2021; Warner & Wäger, 2019). By systematically capturing and disseminating internal data, digital systems reduce the ability to hide cost overruns or failing R&D efforts.

A key IPT mechanism, *drift*, occurs when TMTs gradually erode oversight by misreporting or withholding adverse information (Briscoe & Murphy, 2012). However, digital tools disrupt this process through real-time monitoring, audit trails, and cross-department transparency, providing functionaries with consistent warning signals (Cheng et al., 2024; Bendig et al., 2023). Even if oversight bodies are passive or fragmented (*non-activation*), digital dashboards expose performance anomalies, prompting earlier interventions (Lawrence & Suddaby, 2006).

Despite institutional complexity—such as contradictory regulations and overlapping jurisdictions—digital transformation unifies internal reporting, preventing TMTs from

selectively exploiting loopholes. By integrating performance metrics into a central system, these technologies force earlier scrutiny, reducing TMTs' ability to accumulate undisclosed risks and weakening the link between TMT innovativeness and stock price crash risk. We therefore posit that:

Hypothesis 2: Digital transformation weakens the positive effect of innovation-oriented TMTs on stock price crash risk.

Role of Foreign Institutional Investors

Foreign institutional investors, bound by global disclosure norms and reputational pressures, enhance corporate transparency and limit TMT concealment (Fang et al., 2015; Kim et al., 2020). From an IPT perspective, these investors disrupt institutional complexities that enable risk accumulation, as TMTs must meet stricter global shareholder expectations or face capital withdrawal and legal scrutiny (Rintamäki et al., 2024; Huang & Zhu, 2015).

In emerging markets, local regulators may tolerate TMT secrecy due to economic incentives or resource constraints (Mahoney & Thelen, 2010). However, foreign investors demand timely disclosures, compelling functionaries to shift from passive monitoring to active oversight (Fang et al., 2015; Zhang et al., 2023). This pressure raises the cost of concealment, reducing the likelihood of prolonged non-disclosure (Briscoe & Murphy, 2012).

While foreign investors generally promote transparency, TMTs may still exploit regional regulatory loopholes through local alliances or complex structures (Fang et al., 2015). Thus, their effectiveness depends on alignment with strong local oversight, integrated audits, and reduced institutional gaps (Rintamäki et al., 2024). Ultimately, firms with significant foreign ownership face stronger disclosure incentives, limiting TMTs' ability to accumulate hidden risks. Therefore, we propose that:

Hypothesis 3: *Foreign institutional investors reduce the positive relationship between innovation-oriented TMTs and stock price crash risk.*

Role of CEO Political Connections

From an IPT perspective, CEO political connections have dual effects on TMT parasitism. They can enable concealment through regulatory leniency and preferential funding (Chin & Semadeni, 2017; Faccio et al., 2006) or enforce transparency if political legitimacy depends on verifiable success (Wei et al., 2010; Wei, Jia & Bonardi, 2023). The impact depends on the broader institutional context (Mahoney & Thelen, 2010).

Politically connected CEOs may neutralize oversight by aligning with public officials who benefit from projecting “innovation success,” allowing hidden risks to accumulate. However, if political stakeholders face reputational risks—such as media scrutiny or anti-corruption efforts—they may demand genuine disclosures, increasing the cost of secrecy (Briscoe & Murphy, 2012).

Political ties can either deepen institutional drift by preventing enforcement or drive reform by imposing accountability (Rintamäki et al., 2024). If political backing hinges on symbolic claims, TMTs may exploit their connections to conceal failures. Conversely, if measurable returns are required, stronger oversight curbs parasitic behavior (Faccio et al., 2006). Thus, CEO political connections can either amplify or mitigate TMT-driven stock price crash risk, depending on whether they reinforce or constrain institutional parasitism. We therefore posit that:

Hypothesis 4: *CEO political connections lessen the positive relationship between innovation-oriented TMTs and stock price crash risk.*

Data and methods

The hypotheses were examined utilizing data about Chinese A-share listed firms on the Shanghai and Shenzhen stock exchanges from the period spanning 2008 to 2021. China offers a critical setting for testing IPT due to its unique combination of state-driven innovation policies and hybrid governance structures. First, heavy R&D subsidies create demand for symbolic compliance rather than substantive performance outcomes. Second, hybrid governance—combining state oversight with foreign institutional investors accountability—creates niches for both parasitic exploitation and antibody responses. Third, *guanxi* networks foster relational opacity that allows TMTs to suppress negative information while leveraging state support for high-risk initiatives. These factors make China an ideal context for examining how systemic institutional dynamics interact with firm-level behaviors to amplify SPCR.

We employ the China Stock Market and Accounting Research (CSMAR) database (<https://data.csmar.com/>), and China Research Data Services (CNRDS), renowned Chinese databases (Chu et al., 2024; Lu and Qiu, 2023), to compile data essential for the measurement of TMT innovativeness, stock price crash risk, qualified foreign institutional investors (QFII), political connections of CEOs and several control variables. Further, we employ the Pipixia Database, organized and managed by the Pixia Team to compile data about digital transformation attention following previous relevant research (Zhao et al., 2021). We combine the above datasets and drop (a) firms from the financial industry owing to their unique regulatory and reporting frameworks, (b) special treatment firms (ST firms), and (c) firm-years that exhibited incomplete data for the variables utilized in our analysis. Upon the application of these filters, we acquired 30,378 firm-year observations. All the continuous variables are winsorized at 1% and 99% levels to alleviate the impact of outliers.

Variables

Dependent variable: Stock price crash risk

Following the literature (Kim et al., 2011; Kim, Wang and Zhang, 2019; Lu and Qiu, 2023), we employ two proxies for stock price crash risk – negative coefficient of skewness (NCSKEW) and down-to-up volatility (DUVOL) at future time (t+1). For NCSKEW, we estimate weekly returns for each firm and year using the natural logarithm of one plus the residual from the market model and presented as follows:

$$R_{f,t} = \alpha_f + \gamma_1 R_{m,t-2} + \gamma_2 R_{m,t-1} + \gamma_3 R_{m,t} + \gamma_4 R_{m,t+1} + \gamma_5 R_{m,t+2} + \varepsilon_{f,t} \quad (1)$$

where $R_{f,t}$ shows the return of stock f in week t and $R_{m,t-2}$ identifies value-weighted market returns in week t . Eventually, weekly returns for firm f in week t are shown as: $W_{f,t} = \ln(1 + \varepsilon_{f,t})$, whereas $\varepsilon_{f,t}$ shows residual from Eq. (2). Our main proxy of SPCR is computed as the negative of the third moment of the firm's weekly returns for every year and scaled it by the standard deviation of firm's weekly returns raise to the third power.

Specifically, in the second step, we calculate the NCSKEW as follows:

$$NCSKEW_{f,t+1} = - \frac{n(n-1)^{3/2} \sum W_{f,t}^3}{(n-1)(n-2)(\sum W_{f,t}^2)^{3/2}} \quad (2)$$

The higher value of NCSKEW shows that a stock is more probably to crash and vice versa. Further, we employed Eq. (3) to calculate our second proxy of SPCR (DUVOL) as follows:

$$DUVOL_{f,t+1} = \log \frac{(n_u-1)\sum_{down} W_{f,t}^2}{(n_d-1)\sum_{up} W_{f,t}^2} \quad (3)$$

where n_u and n_d show the number of up and down weeks. For firm f in year t , we separate all weeks with firm weekly returns above the annual mean (i.e., up weeks) from those with firm weekly returns below the annual mean (i.e., down weeks). Also, we calculate the standard deviation for both subsamples independently. Finally, following prior studies (Kim et al., 2011; Kim et al., 2019; Lu and Qiu, 2023), we calculate DUVOL as the “log of

the ratio of the standard deviation of the down weeks to that of the standard deviation of the up weeks”. The increase in DUVOL shows that a stock is probable to crash and vice versa.

The operationalization of SPCR via NCSKEW, and DUVOL aligns with institutional parasites theory’s emphasis on systemic institutional deterioration caused by parasitic exploitation. IPT posits that institutional parasites exploit opacity and complexity to conceal risks, leading to institutional drift—gradual erosion of trust and stability (Rintamäki et al., 2024; Voronov et al., 2022). SPCR captures this drift through delayed disclosure of bad news, reflecting the accumulation of hidden risks caused by parasites (innovative TMTs).

Moreover, NCSKEW measures asymmetry in returns, where extreme negative skewness signals abrupt corrections from concealed risks (Kim et al., 2011). This aligns with IPT’s notion of asymmetric exploration, where TMTs privatize innovation gains while socializing crash risks. Whereas DUVOL quantifies volatility asymmetry (down vs. up weeks), proxying the destabilizing effect of parasitic hoarding (Lu and Qiu, 2023). Higher DUVOL reflects institutional deterioration from prolonged opacity. Moreover, as parasites thrive on institutional complexity (e.g., opaque governance) to delay disclosures (Rintamäki et al., 2024), SPCR metrics operationalize this behavior, for example, residual returns ($W_{\{f,t\}}$) calculated as deviations from market returns (Kim et al., 2011), residuals isolate firm-specific risks concealed by TMTs. Parasites can suppress these residuals to maintain institutional trust. Similarly, SPCR measured at $t+1$ reflects the temporal dynamics of parasitism, where risks accumulate undetected before triggering crashes (Mahoney and Thelen, 2010).

Our main predictor is the proportion of *TMT with an R&D or innovation background*. IPT posits that parasites thrive when actors possess institutional expertise to exploit complex governance structures (Mahoney and Thelen, 2010; Rintamäki et al., 2024). TMT members with R&D or innovation backgrounds are uniquely equipped to navigate state-driven

innovation ecosystems (e.g., China's policy subsidies), leveraging institutional trust to prioritize high-risk projects while concealing failures. The proportion of such members in TMT proxies the supply of parasitic expertise within the TMT. A higher proportion increases the likelihood of systemic exploitation (asymmetric exploration), where gains (e.g., patents, subsidies) are privatized, while risks (e.g., SPCR) are socialized (Rintamäki et al., 2024). This measure also reflects the critical mass of parasitic actors within the TMT, validating IPT's assertion that institutional decay accelerates as parasitic expertise proliferates (Voronov et al., 2022). China's hybrid governance (state subsidies and complex oversight) creates opacity, enabling TMTs to conceal risks (Lu and Qiu, 2023). R&D expertise allows TMTs to navigate this complexity, aligning with IPT's emphasis on institutional ambiguity as a breeding ground for parasites (Rintamäki et al., 2024). Summing, our operationalizations align with IPT's core tenets by capturing how TMT innovativeness enables parasitic resource extraction (R&D expenditure) and asymmetric exploration (delayed risk disclosures) and validate IPT's assertion that institutional complexity and expertise supply drive systemic exploitation (Rintamäki et al., 2024).

We also computed and used alternate operationalizations of our main predictor for robustness check. These include the total number of TMT members with R&D/Innovation backgrounds and a dummy variable that takes the value of 1 if TMT has members with R&D backgrounds. The former measure aligns with IPT, that is, parasitic behavior scales with the availability of expertise (Rintamäki et al., 2024). A larger number of R&D-specialized TMT members amplifies the capacity to exploit institutional complexity (e.g., opaque R&D policies), creating niches for resource extraction. Whereas the dummy variable (1 = presence of R&D/innovation background) aligns with the IPT notion that even minimal parasitic expertise can trigger institutional exploitation (Rintamäki et al., 2024). The mere presence of R&D-experienced TMT members signals the potential for parasitism, as these individuals can

initiate high-risk strategies that externalize costs. This measure can capture the threshold condition for parasitic behavior, where even a single member's expertise can exploit institutional trust (Mahoney and Thelen, 2010).

Moderating variables

To empirically test our moderating hypotheses, we employ (a) digital transformation (for hypothesis 2), (b) qualified foreign institutional investors i.e., QFII (for hypothesis 3) and (c) CEO's political connections (for hypothesis 4) as moderating variables.

First, *digital transformation*, functions as an institutional antibody by disrupting parasitic opacity through real-time monitoring and transparency (Bendig et al., 2023; Rintamäki et al., 2024). Digital transformation is measured as the natural logarithm of digital keywords' frequency obtained from the Pipixia database. Following Zhao et al. (2021), we gathered publicly listed firms' annual reports between 2000 and 2023 and conducted a word frequency analysis to count the number of words appearing in the text of annual reports based on the keywords about digital transformation attention. A higher number of counted words shows the firm's propensity for digital transformation. The larger the number of words, the more resources the company attaches to digital transformation and the faster its transformation speed Zhao et al. (2021). Moreover, we also employ the percentage of the keywords of digital transformation attention to the total number of words in the text of the annual report as an alternate measure for digital transformation. A higher frequency of digital keywords signals firms' efforts to integrate technologies that reduce institutional complexity through automated tools simplifying the governance structures, diminishing the opacity parasites exploit (Bendig et al., 2023; Cheng et al., 2024; Mahoney and Thelen, 2010). Moreover, investment in digital transformation enforces accountability as digital tools like AI

analytics break information silos, enabling stakeholders to detect concealed risks before they accumulate (Rintamäki et al., 2024; Cheng et al., 2024).

Second, we follow prior studies (Fang et al., 2015; Huang and Zhu, 2015; Jin et al., 2016) and employ the proportion of *qualified foreign institutional investors* (QFII) to the total shares of the listed firms. QFII ownership acts as a cross-border antibody by imposing external accountability and disrupting local parasitic networks. Foreign investors can enforce transparency and demand compliance with global governance standards, reducing opportunities for information hoarding (Fang et al., 2015; Kim et al., 2020). Moreover, QFII simplifies governance and counteracts institutional complexity by aligning practices with international norms (Rintamäki et al., 2024).

Third, following previous literature (Faccio et al., 2006; Marquis and Qian, 2014; Cai et al., 2020), we develop a dummy variable for the *political connections of CEOs*. This dummy variable is equal to 1 if the CEO of the firm has previously or currently served in the government, National People's Congress, or member of the Chinese People's Political Consultative Conference, party committees, permanent institutions of the People's Congress, or the Chinese People's Political Consultative Conference, procuratorates, and courts, and zero otherwise.

Political connections represent host adaptations that stabilize parasitic overload by buffering systemic shocks and leveraging guanxi networks to suppress scrutiny and stabilize legitimacy (Wei et al., 2010; Wei et al., 2023). These connections also maintain institutional trust signaling the alignment with state priorities, reducing investor anxiety about hidden risks (Faccio et al., 2006; Cai et al., 2020).

Control variables

We use two sets of control variables associated with SPCR: firm characteristics and TMT-related characteristics.

We control for (a) lagged values of negative coefficient of skewness (*Lagged NCSKEW*) by estimating Eq. 2 and down to up volatility (*Lagged DUVOL*) by estimating Eq. 3. Lagged SPCR (*NCSKEW/DUVOL*) controls for prior risk accumulation, capturing how past parasitic behavior (e.g., concealed risks) contributes to future systemic instability. It also reflects institutional drift—delayed deterioration caused by parasitic exploitation (Rintamäki et al., 2024; Voronov et al., 2022).

Tobin's Q (Lang and Stulz, 1994). is measured as total assets minus the book value of equity plus the market value of equity divided by total assets. Tobin's Q proxies institutional complexity and decoupling—firms with high market valuations may prioritize symbolic compliance (e.g., innovation metrics) over substantive governance, creating parasitic niches.

Dominant shareholders (Wei et al., 2010) reflect the top one percent of shareholders of the firm as a control for the effect of concentrated ownership, which may amplify institutional opacity by enabling relational networks (*guanxi*) to suppress scrutiny, fostering parasitic exploitation (Wei et al., 2010).

High *leverage* (Kim et al., 2011; Lu and Qiu, 2023), calculated as total liability divided by total assets, increases demand for parasites—firms under financial strain may engage in risky, short-term strategies (e.g., R&D hoarding) to meet stakeholder expectations, aligning with parasitic resource extraction.

As larger firms face greater institutional complexity (Lu and Qiu, 2023), creating opacity for parasites to conceal risks, and may also correlate with antibody mechanisms (e.g., digital tools) that counteract parasitism. We therefore controlled for the effect of *firm size* (log of total assets) following Kim et al. (2011).

State-owned enterprises (SOE) operate in hybrid governance systems with state-backed incentives and weak oversight, creating parasitic niches and providing opportunities for parasitic host adaptations to stabilize legitimacy (Faccio et al., 2006; Cai et al., 2020).

Moreover, state-driven policies create perverse incentives for parasitic exploitation (Rintamäki et al., 2024: 14). We therefore controlled whether firms is SOE or not, by creating a dummy that takes the value of 1 in case of SOE, and zero otherwise.

Parasites conceal risks by decoupling symbolic achievements from substantive outcomes. (Rintamäki et al., 2024: 9). We used the absolute value of *discretionary accruals* (Kim et al., 2011; DeFond and Zhang, 2014), computed from the modified Jones model (Dechow et al., 1995), to account for the effect of information asymmetry—a hallmark of parasitic behavior where TMTs manipulate earnings to delay risk disclosures (Kim et al., 2011, Chen et al., 2021).

As parasites privatize gains while socializing risks, leading to abrupt market corrections (Rintamäki et al., 2024: 15), we therefore accounted for the effects of high volatility (*Weekly Sigma*) and liquidity (*Monthly Turnover*), following (Hutton et al., 2009) which reflect institutional instability exacerbated by parasitic opacity. Whereas *Weekly Returns* capture short-term gains from parasitic exploitation before crashes. Weekly return measured the return with cash dividend reinvested. Weekly sigma is a standard deviation with cash dividends reinvested, whereas monthly turnover is computed through the means of the firm stock's monthly turnover.

We also controlled for the effect of domestic institutional ownership, measured as the percentage of shares held by domestic institutional investors, to account for their monitoring role in corporate governance (Chen et al., 2021). Unlike foreign institutional investors (QFII), domestic institutional investors may lack cross-border enforcement leverage but still influence transparency through localized oversight.

Institutional functionaries, including the board of governors, police parasitic threats to maintain integrity, however, concentrated power may enable parasitic autonomy by weakening governance checks. We, therefore, controlled for the dual role of CEO through

CEO duality (Certo et al., 2006) which is a binary variable that takes the value of 1 if the CEO also serves as a board chairperson and zero otherwise.

Parasites require institutional expertise to game complex systems (Rintamäki et al., 2024: 11). Older TMTs may resist parasitic risks due to conservative tendencies, while higher salaries reflect the supply of expertise that parasites exploit (He and Hirshleifer, 2022). We therefore controlled for the effect of *TMT age* (natural logarithm of the average age of TMT members), and *TMT salary* (natural logarithm of the average salary of TMT members).

Econometric models and variables description

We used the following panel-regression models to investigate proposed hypotheses while including year and industry fixed-effects and clustering at the industry level in all the models. Our first model examines the effect of TMT innovativeness on the stock price crash risk in the presence of control variables and is presented as follows:

$$SPCR_{f,t+1} = \alpha + \beta_1 TMT\ innovativeness_{f,t} + \sum \beta_x Controls_{f,t} + \lambda_t + \eta_i + \varepsilon_{f,t} \quad (4)$$

Where $SPCR_{f,t+1}$ is stock price crash risk in time (t+1) measured by NCSKEW (main proxy) and DUVOL (alternate proxy). $TMT\ innovativeness_{f,t}$ shows the top management teams' level of innovation, as defined earlier. f , t and i represent firm, time, and industry respectively. $\sum \beta_x Controls_{f,t}$ depicts a vector of specific control variables while following existing relevant studies (Callen and Fang, 2015a, b; Kim et al., 2011; Kim, Wang and Zhang, 2019; Lu and Qiu, 2023).

To examine the moderating role of the employed moderators on the nexus between TMT innovativeness and SPCR, we estimate the following model:

$$\begin{aligned}
SPCR_{f,t+1} = & \alpha + \beta_1 TMT\ innovativeness_{f,t} + \beta_2 Moderators_{f,t} + \\
& \beta_3 TMT\ innovativeness_{f,t} \times Moderators_{f,t} + \sum \beta_x Controls_{f,t} + \\
& \lambda_t + \eta_i + \varepsilon_{f,t}
\end{aligned} \tag{5}$$

where all the variables are the same as in Eq. 4 except moderators. Here, we are interested in the interaction terms (β_3), in separate regressions, that capture the combined effect of digital transformation attention, qualified foreign institutional investors, and CEO political connections on the association between TMT innovativeness and SPCR.

Results

Table I shows the results of descriptive statistics and the correlation for the key variables employed in our study. The mean values of NCSKEW and DUVOL are -0.42 and -0.29, respectively which are comparable to related studies from in the Chinese context (e.g., Lu and Qiu, 2023). Moreover, the correlation values are not high, thus multicollinearity among the variables is not a concern in our study.

INSERT TABLE I HERE

Table II presents the results for the impact of TMT innovativeness on SPCR i.e., our hypothesis 1. In models 1 and 2, we include the proportion of TMT with innovation or R&D background as our main proxy of TMT innovativeness and NCSKEW and DUVOL as main measures for SPCR, in the presence of all the control variables and industry and year fixed effects. Our results document that TMT innovativeness has a significantly positive impact on both proxies of SPCR at the 1% level i.e., for NCSKEW ($\beta = 0.033$, t-statistic = 2.993) and for DUVOL ($\beta = 0.035$, t-statistic = 3.756), showing that with the increase in TMT innovativeness, SPCR also increases. Thus, we find strong support for our hypothesis 1.

To determine the robustness of our hypothesis 1, we include alternate proxies of TMT innovativeness i.e., TMT innovativeness2 (in models 3 and 4) and TMT innovativeness3 (in

models 5 and 6) in our baseline regression in Table II. TMT innovativeness₂ refers to the total number of TMT members with R&D or innovation backgrounds. TMT innovativeness₃ is a dummy variable equal to 1 if a TMT member has an R&D or innovation background and 0 otherwise. Our results for robustness remain statistically significant at 1% level with strong t-values across models 3 to 6, providing further support for our main hypothesis. The results are also economically significant, affirming our predictions that innovative teams increase crash risk.

INSERT TABLE II HERE

Table III provides results for the moderating effects of digital transformation attention (hypothesis 2), qualified foreign institutional investors (hypothesis 3), and political connections of CEOs (hypothesis 4) on the nexus between TMT innovativeness and SPCR. For hypothesis 2, we employ two measures for digital transformation attention. In models 1 and 2, we use the natural logarithm of digital keywords' frequency as the main moderator for digital transformation attention. The coefficient on the interaction term (TMT innovativeness x Digital transformation (Log of Keywords)) in models 1 and 2 is negative and statistically significant for both proxies of SPCR i.e., for NCSKEW (i.e., $\beta = -0.040$, t-statistic = -3.879) and for DUVOL (i.e., $\beta = -0.018$, t-statistic = -2.590). The results remain similar for the interaction term (TMT innovativeness x Digital transformation (Proportion of Keywords)) against both proxies of SPCR in models 3 and 4. These results suggest that the degree to which a firm adopts digital endeavors can affect innovation-related risks. Figures 1a and 1b exhibit the moderating effect of digital transformation (using a log of the keywords and percentage of keywords). The figures show that, at high digital transformation, an increase in innovation-oriented TMT decreases the stock price crash risk. Thus, hypothesis 2 is supported.

Models (5) and (6) of Table III report the results for the moderating impact of QFII on the relationship between TMT innovativeness and SPCR. The coefficients on the interaction term (TMT innovativeness x Qualified foreign institutional investors) are negative and statistically significant for both proxies of SPCR, i.e., for NCSKEW (i.e., $\beta = -0.052$, t-statistic = -3.044) and for DUVOL (i.e., $\beta = -0.033$, t-statistic = -2.329). These findings corroborate our proposition that QFII serves as external monitors to ensure alignment between the interests of managers and shareholders and eventually mitigate the financial risks including SPCR. Figure 2 demonstrates the moderating effect of QFII, that at higher values of QFII, an increase in innovation-oriented TMT decreases the stock price crash risk. Thus, hypothesis 3 is supported.

Models (7) and (8) of Table III report the results for the moderating impact of CEO's political connections on the relationship between TMT innovativeness and SPCR. The coefficients on the interaction term (TMT innovativeness x CEOs political connections) are negative and statistically significant for both proxies of SPCR, i.e., for NCSKEW (i.e., $\beta = -0.071$, t-statistic = -1.780) and for DUVOL (i.e., $\beta = -0.059$, t-statistic = -2.814). These findings corroborate our proposition that the CEO's political connections can mitigate the stock price crash risk. Figure 3 demonstrates the moderating effect of the CEO's political connections, that is, at higher values of political connections of the CEO, an increase in innovation-oriented TMT decreases the stock price crash risk. Thus, hypothesis 4 is also supported.

INSERT TABLE III HERE

INSERT FIGURES 1, 2, 3 HERE

Discussion and Conclusion

Our results reveal that innovation-oriented top management teams (TMTs)—particularly those with extensive R&D expertise—exert a notable impact on stock price crash

risk (SPCR). Building on Institutional Parasites Theory (Rintamäki et al., 2024), we argue that such TMTs exploit institutional complexity to accumulate hidden liabilities and delay negative disclosures (Besharov and Smith, 2014; Briscoe and Murphy, 2012; Bromley and Powell, 2012). In line with this premise, our empirical analyses show a robust, positive relationship between TMT innovativeness and SPCR, even after controlling for conventional firm-level governance and financial variables. This finding suggests that while R&D-intensive TMTs can advance risky high-reward projects, they also utilize institutional “blind spots” to divert scrutiny and postpone the revelation of underperformance, ultimately leading to abrupt market corrections.

Regarding digital transformation, our analyses confirm that higher levels of digitally oriented initiatives curb the parasitic exploitation by TMTs. In many cases, digital initiatives enable more real-time oversight and unified data architecture (Bendig et al., 2023; Hanelt et al., 2021; Warner and Wäger, 2019), making it more difficult for TMTs to hide cost overruns or project failures. This is consistent with IPT’s notion of “institutional antibodies”: integrated digital systems can short-circuit the institutional drift that arises from neglected disclosure or unverified reporting. By contrast, when digital adoption is minimal, the TMT’s capacity to exploit contradictory rules and discretionary reporting remains high, thus sustaining the risk of an eventual crash.

Similarly, foreign institutional investors emerge as a salient force mitigating TMT-driven stock price crashes. Foreign institutional investors often uphold global disclosure standards and exert pressure on local firms to adhere to stricter governance practices (Fang et al., 2015; Huang and Zhu, 2015; Zhang et al., 2023). In IPT terms, foreign investors reduce the “toleration” of parasitism by limiting the TMT’s ability to obscure failing ventures for extended periods. Our findings show that TMT innovativeness poses less risk where foreign investors hold substantial equity, presumably because TMTs face heightened sanctions if they

systematically suppress damaging information. However, it is worth noting that foreign presence alone does not fully guarantee robust oversight; persistent fragmentation in local regulatory systems can still enable partial or delayed disclosure (Mahoney and Thelen, 2010; Rintamäki et al., 2024).

Lastly, the CEO's political connections also moderate the TMT innovativeness–SPCR link, reinforcing IPT's assertion that political ties can either accentuate or restrain parasitic exploitation (Faccio et al., 2006). Our evidence indicates that political connections attenuate SPCR in innovation-led organizations—suggesting that either the pursuit of public legitimacy requires greater transparency or that politically connected CEOs must ensure more verifiable outcomes to safeguard their reputational capital (Chin and Semadeni, 2017). Nonetheless, IPT cautions that, in some contexts, political alliances may foster leniency and intensify TMTs' freedom to operate non-transparently. Our data and context, however, align more closely with the view that such connections can function as an antidote when external or governmental stakeholders demand accountability for state-backed innovations (Briscoe and Murphy, 2012; Rintamäki et al., 2024).

In sum, these findings expand the paradox identified by prior scholars (He and Hirshleifer, 2022; Islam and Zein, 2020): while TMTs with R&D acumen can fuel valuable innovations, our findings also present a latent risk of parasitic non-disclosure if unchecked. Our novel evidence extends these observations by showing that institutional conditions—particularly digital transformation, foreign ownership, and political affiliations—mitigate the capacity of TMTs to amass undisclosed failures and facilitate abrupt collapses.

First, our study examines the TMT-driven crash risk using the Institutional Parasites Theory, adding structural and contextual depth beyond managerial cognition. By framing TMT opportunism as the exploitation of institutional contradictions (Seo and Creed, 2002), we extend our understanding of how maintenance and change co-evolve (Micelotta et al.,

2017) in high-innovation contexts. Recent literature adopting the Upper Echelons Theory (Hambrick & Mason, 1984) emphasizes executives' psychological traits or functional diversities e.g., age, overconfidence, early-life disaster experiences, etc. (Andreou et al., 2017; Chen et al., 2021; Kim et al., 2016) as sources of hidden risk. However, by positioning TMT innovativeness within the broader institutional environment, we show that persistent information hoarding is rooted in governance blind spots and contradictory enforcement—not merely leaders' biases (Briscoe and Murphy, 2012; Mahoney and Thelen, 2010). This address calls in the literature for more integrative frameworks that link TMT decision-making with the structural conditions enabling or constraining those decisions (Bromley and Rau, 2016; Greenwood et al., 2011; Neely Jr. et al., 2020).

Second, we offer a more nuanced perspective on the role of innovation in shaping firm outcomes. While innovation is typically championed for fostering long-run growth and competitiveness (Certo et al., 2006; Islam and Zein, 2020), our findings reveal a “dark side,” wherein TMTs with R&D credentials can become institutional parasites, extracting institutional goodwill without proportionate accountability (Rintamäki et al., 2024). This realigns the conversation from binary discourses of “innovation is good” or “innovation is risky” to a structural account, wherein the institutional conditions determine whether TMT-led innovation fosters transformative breakthroughs or fosters risk concealment.

Third, by empirically testing three moderators—digital transformation, foreign ownership, and CEO political ties—we expand IPT beyond abstract conceptualization, demonstrating how some “institutional antibodies” operate in practice (Bromley and Powell, 2012). Our analysis clarifies that “antibodies” are not uniformly effective; foreign institutional investors work primarily through globally recognized oversight norms (Fang et al., 2015; Zhang et al., 2023), digital transformation through data-driven transparency (Bendig et al., 2023; Hanelt et al., 2021; Warner and Wäger, 2019), and political ties through

shifting external scrutiny (Chin and Semadeni, 2017; Faccio et al., 2006). Thus, we illuminate the multifaceted ways in which functionaries, both internal and external, may interrupt parasitic TMT behaviors, mitigating SPCR.

Our research suggests several practical implications for executives, regulators, and investors aiming to curb parasitic exploitation that can culminate in stock price crashes. First, executives—particularly those leading innovation-heavy firms—should recognize that symbolic compliance with governance, or perfunctory references to “digital upgrades,” no longer suffice in an era of increased scrutiny (Bendig et al., 2023). Genuine internal data integration and consistent progress milestones reduce the scope for accumulative risk concealment, thereby lowering the likelihood of abrupt market shocks.

Second, regulators and policy-makers keen to foster innovation while maintaining market stability should address the institutional fragmentation that TMTs exploit. Streamlined enforcement across multiple agencies and transparent reporting frameworks—especially for large-scale, high-tech investments—limit the ability to manipulate contradictory rules. Additionally, our findings suggest that foreign institutional investors can strengthen local governance by injecting external standards; thus, policy reforms that facilitate or encourage foreign shareholding in emerging markets could improve overall disclosure quality (Huang and Zhu, 2015; Zhang et al., 2023).

Third, investors—institutional and retail alike—must not uncritically accept R&D claims or digital transformation narratives. Instead, they should push for substantive evidence of actual project viability or system integration. The presence of a politically connected CEO might reduce or enhance crash risk depending on whether such connections deter or facilitate non-disclosure, so shareholders must examine the specific nature of political alliances rather than viewing political ties as uniformly beneficial or harmful (Chin and Semadeni, 2017; Faccio et al., 2006).

Despite making significant strides, our study faces limitations that open avenues for future inquiry. First, although China provides an exemplary context of hybrid governance and strong innovation policies, these institutional features may limit generalizability. Future research might replicate our IPT-based framework in other emerging economies or in advanced markets with different patterns of state intervention, thereby testing whether TMT parasitism under institutional complexity holds universally (Mahoney & Thelen, 2010; Rintamäki et al., 2024).

Second, while we proxy digital transformation using textual analyses of corporate reports, additional qualitative indicators or firm-level audits would yield deeper insight into whether digital systems are truly integrated or primarily rhetorical (Bromley and Powell, 2012; Zhao et al., 2021). More fine-grained measures—e.g., actual IT expenditures or software usage logs—could reveal precisely how technology adoption disrupts TMT concealment. Similarly, the measure of CEO political ties is a binary approach capturing any prior or current affiliation; it would be insightful to compare the varying degrees or intensities of political connections and how these shape parasitic behaviors differently (Chin and Semadeni, 2017; Faccio et al., 2006).

Third, although we show endogeneity checks (2SLS, Heckman corrections, and matching approaches), there may remain unobserved institutional elements—such as internal power structures or cross-shareholding patterns—that influence both TMT composition and the potential for exploitation (Rintamäki et al., 2024). Future studies could employ multi-level or multi-country data to isolate the interplay between local institutional complexity and TMT opportunism. Moreover, a longitudinal approach might capture the dynamic process through which TMTs escalate or reduce their parasitic activities, bridging micro-level actions and macro-level institutional drift over time.

Finally, qualitative or mixed-methods research could enrich our understanding of precisely how TMTs operationalize parasitic concealment in day-to-day decisions and reporting. Interviews with board members, regulators, or TMTs themselves could yield deeper insight into the symbolic and rhetorical strategies TMTs employ (Bromley and Powell, 2012). Triangulating such evidence with archival data would help confirm whether the “antibody” mechanisms—digital transformation, foreign investors, or political scrutiny—curtail or merely slow TMT opportunism, advancing the theoretical nuances of IPT in corporate governance contexts.

References

- Andreou, P. C., Louca, C. and Petrou, A. P. (2017). CEO age and stock price crash risk. *Review of Finance*, **21**, 1287–325.
- Bendig, D., Wagner, R., Piening, E. P. and Foege, J. N. (2023). Attention to digital innovation: Exploring the impact of a chief information officer in the top management team. *MIS Quarterly*, **47**, 4.
- Besharov, M. L. and Smith, W. K. (2014). Multiple institutional logics in organizations: Explaining their varied nature and implications. *Academy of Management Review*, **39**, 364–381.
- Bostan, I. and Mian, G. M. (2024). Inventor CEOs and financing of innovation: Evidence from IPOs. *Journal of Banking & Finance*, **164**, 107204.
- Briscoe, F. and Murphy, C. (2012). Sleight of hand? Practice opacity, third-party responses, and the interorganizational diffusion of controversial practices. *Administrative Science Quarterly*, **57**, 553–584.
- Bromiley, P. and Rau, D. (2016). Social, behavioral, and cognitive influences on upper echelons during strategy process: A literature review. *Journal of Management*, **42**, 174–202.
- Bromley, P. and Powell, W. W. (2012). From smoke and mirrors to walking the talk: Decoupling in the contemporary world. *Academy of Management Annals*, **6**, 483–530.
- Cai, Y., Fang, V. W. and Xu, L. (2020). Political connections, local protectionism, and firm performance. *Journal of Banking & Finance*, **112**, 105206.
- Callen, J. L. and Fang, X. (2015a). 'Short interest and stock price crash risk'. *Journal of Banking & Finance*, **60**, 181–94.
- Callen, J. L. and Fang, X. (2015b). Religion and stock price crash risk. *Journal of Financial and Quantitative Analysis*, **50**, 169–95.
- Certo, S. T., Lester, R. H., Dalton, C. M. and Dalton, D. R. (2006). Top management teams, strategy, and financial performance: A meta-analytic examination. *Journal of Management Studies*, **43**, 813–839.
- Chen, J., Chan, K. C., Dong, W. and Zhang, F. (2017). Internal control and stock price crash risk: Evidence from China. *European Accounting Review*, **26**, 125–52.
- Chen, Y., Fan, Q., Yang, X. and Zolotoy, L. (2021). CEO early-life disaster experience and stock price crash risk. *Journal of Corporate Finance*, **68**, 101928.
- Chen, S., Ma, H., Wu, Q. and Zhang, H. (2024). Common institutional ownership and stock price crash risk. *Contemporary Accounting Research*, **41**, 679–711.
- Cheng, W., Li, C. and Zhao, T. (2024). The stages of enterprise digital transformation and its impact on internal control: Evidence from China. *International Review of Financial Analysis*, **92**, 103079.
- Chin, M. K. and Semadeni, M. (2017). CEO political ideologies and pay egalitarianism within top management teams. *Strategic Management Journal*, **38**, 1608–1625.
- Chu, J., Tang, Y. and Wan, G. (2024). Do Female State Officials Improve Corporate Social Responsibility in their Jurisdictions? A Disadvantage-Prohibiting Perspective. *Journal of Management Studies*. <https://doi.org/10.1111/joms.13172>

- Dechow, P. M., Sloan, R. G. and Sweeney, A. P. (1995). Detecting earnings management. *The Accounting Review*, **70**, 193–225.
- DeFond, M. L. and Zhang, J. (2014). A review of archival auditing research. *Journal of Accounting and Economics*, **58**, 275–326.
- Faccio, M., Masulis, R. W. and McConnell, J. J. (2006). Political connections and corporate bailouts. *The Journal of Finance*, **61**, 2597–633.
- Fang, V. W., Maffett, M. and Zhang, B. (2015). Foreign institutional ownership and the global convergence of financial reporting practices. *Journal of Accounting Research*, **53**, 593–631.
- Georgakakis, D., Greve, P. and Ruigrok, W. (2017). Top management team faultlines and firm performance: Examining the CEO-TMT interface. *The Leadership Quarterly*, **28**, 741–758.
- Greenwood, R., Raynard, M., Kodeih, F., Micelotta, E. R. and Lounsbury, M. (2011). Institutional complexity and organizational responses. *Academy of Management Annals*, **5**, 317–371.
- Hainmueller, J. and Xu, Y. (2013). Ebalance: A Stata package for entropy balancing. *Journal of Statistical Software*, **54**, (7).
- Hambrick, D. C. and Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, **9**, 193–206.
- Hanelt, A., Bohnsack, R., Marz, D. and Antunes Marante, C. (2021). A systematic review of the literature on digital transformation: Insights and implications for strategy and organizational change. *Journal of Management Studies*, **58**, 1159–1197.
- He, Z. and Hirshleifer, D. (2022). The exploratory mindset and corporate innovation. *Journal of Financial and Quantitative Analysis*, **57**, 127–169.
- Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica: Journal of the Econometric Society*, **47**, 153–61.
- Huang, W. and Zhu, T. (2015). Foreign institutional investors and corporate governance in emerging markets: Evidence of a split-share structure reform in China. *Journal of Corporate Finance*, **32**, 312–326.
- Hutton, A. P., Marcus, A. J. and Tehranian, H. (2009). Opaque financial reports, R2, and crash risk. *Journal of Financial Economics*, **94**, 67–86.
- Islam, E. and Zein, J. (2020). Inventor CEOs. *Journal of Financial Economics*, **135**, 505–527.
- Jensen, M. C. and Meckling, W. H. (1976). Theory of the firm: Managerial behaviour, agency costs and ownership structure. *Journal of Financial Economics*, **3**, 305–60.
- Ji, Q., Quan, X., Yin, H. and Yuan, Q. (2021). Gambling preferences and stock price crash risk: Evidence from China. *Journal of Banking & Finance*, **128**, 106158.
- Jia, N. (2018). Corporate innovation strategy and stock price crash risk. *Journal of Corporate Finance*, **53**, 155–173.
- Jin, D., Wang, H., Wang, P. and Yin, D. (2016). Social trust and foreign ownership: Evidence from qualified foreign institutional investors in China. *Journal of Financial Stability*, **23**, 1–14.

- Kim, J. B., Li, Y. and Zhang, L. (2011). Corporate tax avoidance and stock price crash risk: Firm-level analysis. *Journal of Financial Economics*, **100**, 639-662.
- Kim, J. B., Wang, Z. and Zhang, L. (2016). CEO overconfidence and stock price crash risk. *Contemporary Accounting Research*, **33**, 1720-1749.
- Kim, C., Wang, K. and Zhang, L. (2019). Readability of 10-K reports and stock price crash risk. *Contemporary Accounting Research*, **36**, 1184-1216.
- Kim, J. B., Li, X., Luo, Y. and Wang, K. (2020). Foreign investors, external monitoring, and stock price crash risk. *Journal of Accounting, Auditing & Finance*, **35**, 829-853.
- Kuruvilla, S. and Li, N. (2021). Behavioral invisibility: The reliability of supplier data and the unique role of audit consultants. In S. Kuruvilla (Ed.), *Private Regulation of Labor Standards in Global Supply Chains: Problems, Progress, and Prospects*: 17-47.
- Lang, L. H. and Stulz, R. M. (1994). Tobin's q, corporate diversification, and firm performance. *Journal of Political Economy*, **102**, 1248-1280.
- Larcker, D. F., and T. O. Rusticus. (2010). On the use of instrumental variables in accounting research. *Journal of Accounting and Economics*, **49**, 186-205.
- Lawrence, T. B. and Suddaby, R. (2006). Institutions and institutional work. In S. R. Clegg, C. Hardy, W. R. Nord, & T. B. Lawrence (Eds.), *The SAGE Handbook of Organization Studies* (2nd ed.): 215-254. London: SAGE.
- Lu, J. and Qiu, Y. (2023). Does non-punitive regulation diminish stock price crash risk?. *Journal of Banking & Finance*, **148**, 106731.
- Mahoney, J. and Thelen, K. (2010). A Theory of Gradual Institutional Change. In J. Mahoney & K. Thelen (Eds.), *Explaining Institutional Change: Ambiguity, Agency, and Power*: 1-37. New York: Cambridge University Press.
- Marquis, C. and Qian, C. (2014). Corporate social responsibility reporting in China: Symbol or substance?. *Organization Science*, **25**, 127-48.
- Micelotta, E., Lounsbury, M. and Greenwood, R. (2017). Pathways of institutional change: An integrative review and research agenda. *Journal of Management*, **43**, 1885-1910.
- Neely Jr, B. H., Lovelace, J. B., Cowen, A. P. and Hiller, N. J. (2020). Metacritiques of upper echelons theory: Verdicts and recommendations for future research. *Journal of Management*, **46**, 1029-62
- Oster, E. (2019). Unobservable selection and coefficient stability: Theory and evidence. *Journal of Business & Economic Statistics*, **37**, 187-204.
- Rintamäki, J., Parker, S. and Spicer, A. (2024). Institutional parasites. *Academy of Management Review*, In press, <https://doi.org/10.5465/amr.2021.0502>.
- Sajko, M., Boone, C. and Buyl, T. (2021). CEO greed, corporate social responsibility, and organizational resilience to systemic shocks. *Journal of Management*, **47**, 957-992.
- Seo, M. G. and Creed, W. D. (2002). Institutional contradictions, praxis, and institutional change: A dialectical perspective. *Academy of Management Review*, **27**, 222-247.
- van de Wal, N., Boone, C., Gilsing, V. and Walrave, B. (2020). CEO research orientation, organizational context, and innovation in the pharmaceutical industry. *R&D Management*, **50**, 239-254.

- Voronov, M., Glynn, M. A. and Weber, K. (2022). Under the radar: institutional drift and non-strategic institutional change. *Journal of Management Studies*, **59**, 819-842.
- Warner, K. S. and Wäger, M. (2019). Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal. *Long Range Planning*, **52**, 326-349.
- Wei, L. Q., Liu, J., Chen, Y. Y. and Wu, L. Z. (2010). Political skill, supervisor–subordinate guanxi and career prospects in Chinese firms. *Journal of Management Studies*, **47**, 437-454.
- Wei, Y., Jia, N. and Bonardi, J. P. (2023). Corporate political connections: A multidisciplinary review. *Journal of Management*, **49**, 1870-1910.
- Wijen, F. (2014). Means versus ends in opaque institutional fields: Trading off compliance and achievement in sustainability standard adoption. *Academy of Management Review*, **39**, 302–323.
- Zhang, D., Pan, X. and Ma, S. (2023). The effects of institutional investors and their contestability on firm innovation: Evidence from Chinese listed firms. *Research Policy*, **52**, 104872.
- Zhao, C., Wang, W. and Li, X. (2021). How Digital Transformation Affects Total Factor Productivity of Enterprises. *Finance and Trade Economics*, **42**, 114-129. (In Chinese)

Table I. Descriptive statistics and correlation matrix

Variables	N	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1) NCSKEW	30,378	-0.42	0.73																	
(2) TMT innovativeness	30,378	0.21	0.21	0.01																
(3) Digital transfor. ^a	30,378	3.81	1.4	0.004	0.15*															
(4) QFII	6,052	1.08	2.84	0.03	0.06*	0.03*														
(5) Pol. connections	30,378	0.32	0.47	-0.002	-0.04*	-0.12*	-0.02													
(6) Tobin's q	30,378	2.04	1.3	0.02*	0.07*	0.001	0.05*	-0.05*												
(7) Dominant shareholders	30,378	34.57	14.9	-0.01	-0.05*	-0.11*	-0.05*	0.01	-0.12*											
(8) Leverage	30,378	0.43	0.2	-0.05*	-0.15*	-0.03*	-0.03*	0.01	-0.28*	0.06*										
(9) Firm size	30,378	22.21	1.28	0.01	-0.06*	0.19*	-0.03	0.02*	-0.37*	0.20*	0.48*									
(10) SOE	29,812	0.4	0.49	-0.06*	-0.06*	-0.16*	-0.05*	-0.02*	-0.16*	0.22*	0.29*	0.34*								
(11) Discretionary accruals	29,940	0.01	0.09	0.03*	-0.003	-0.11*	-0.01	0.05*	0.004	0.06*	-0.09*	0.02*	0.001							
(12) Weekly returns	30,378	0.003	0.01	-0.19*	0.03*	0.05*	-0.004	-0.02*	0.38*	-0.02*	-0.02*	-0.04*	-0.05*	0.01						
(13) Weekly sigma	30,378	0.07	0.02	-0.15*	0.03*	-0.05*	-0.02	-0.05*	0.29*	-0.07*	-0.02*	-0.24*	-0.10*	-0.06*	0.41*					
(14) Monthly turnover	30,374	34.16	24.1	-0.14*	0.02*	0.04*	-0.05*	-0.04*	0.25*	-0.29*	-0.003	-0.29*	-0.07*	-0.09*	0.41*	0.60*				
(15) Dom. inst. investors	30,378	43.21	23.9	0.03*	-0.09*	-0.06*	0.05*	0.005	-0.04*	0.48*	0.21*	0.43*	0.41*	0.04*	-0.03*	-0.09*	-0.32*			
(16) CEO duality	29,963	0.27	0.44	0.03*	0.06*	0.11*	0.01	-0.06*	0.08*	-0.07*	-0.14*	-0.16*	-0.30*	-0.01	0.02*	0.06*	0.04*	-0.20*		
(17) TMT age	30,378	3.85	0.08	-0.03*	0.08*	0.14*	0.01	-0.01	-0.08*	0.08*	0.09*	0.28*	0.27*	-0.02*	-0.01	-0.14*	-0.08*	0.21*	-0.03*	
(18) TMT salary	30,313	13.1	0.71	0.03*	0.05*	0.42*	0.07*	-0.05*	-0.02*	-0.02*	0.05*	0.43*	-0.02*	-0.005	0.02*	-0.14*	-0.15*	0.18*	0.04*	0.22*

Note: a = log-transformed, digital transformation. QFII = Qualified foreign institutional investor. The mean and SD for DUVOL is -0.29 and 0.49, respectively. * shows the significance level at the 0.05

Table II. Results for the impact of TMT innovativeness on stock price crash risk

	(1) NCSKEW _(t+1)	(2) DUVOL _(t+1)	(3) NCSKEW _(t+1)	(4) DUVOL _(t+1)	(5) NCSKEW _(t+1)	(6) NCSKEW _(t+1)
TMT innovativeness	0.033*** (2.993)	0.035*** (3.756)				
TMT innovativeness2			0.004** (2.924)	0.005*** (4.991)		
TMT innovativeness3					0.019*** (3.757)	0.018*** (4.266)
Lagged NCSKEW	0.070*** (13.918)		0.070*** (13.941)		0.070*** (13.901)	
Lagged DUVOL		0.058*** (7.496)		0.058*** (7.455)		0.058*** (7.482)
Tobin's q	0.032*** (5.884)	0.022*** (4.682)	0.031*** (5.914)	0.022*** (4.722)	0.032*** (5.888)	0.022*** (4.725)
Dominant shareholders	-0.001** (-2.775)	-0.000* (-1.839)	-0.001** (-2.715)	-0.000 (-1.744)	-0.001** (-2.809)	-0.000* (-1.865)
Leverage	-0.122*** (-5.835)	-0.079*** (-5.327)	-0.122*** (-5.890)	-0.079*** (-5.392)	-0.122*** (-5.971)	-0.079*** (-5.509)
Firm size	0.031*** (10.242)	0.014*** (4.980)	0.030*** (10.328)	0.013*** (4.712)	0.030*** (10.466)	0.013*** (4.933)
SOE	-0.079*** (-7.568)	-0.053*** (-11.370)	-0.079*** (-7.605)	-0.053*** (-11.609)	-0.079*** (-7.638)	-0.053*** (-11.575)
Discretionary Accruals	0.127*** (3.193)	0.061* (2.085)	0.126*** (3.149)	0.061* (2.034)	0.127*** (3.213)	0.062* (2.108)
Weekly returns	14.766***	10.018***	14.765***	10.016***	14.749***	10.002***

	(1) NCSKEW _(t+1)	(2) DUVOL _(t+1)	(3) NCSKEW _(t+1)	(4) DUVOL _(t+1)	(5) NCSKEW _(t+1)	(6) NCSKEW _(t+1)
Weekly sigma	(29.685) -0.940**	(28.927) -1.223***	(29.675) -0.936**	(28.939) -1.222***	(29.533) -0.933**	(28.612) -1.214***
Monthly turnover	(-2.527) -0.002***	(-5.495) -0.001***	(-2.526) -0.002***	(-5.544) -0.001***	(-2.507) -0.002***	(-5.440) -0.001***
Domestic institutional investors	(-7.300) 0.001***	(-6.805) 0.001***	(-7.329) 0.001***	(-6.857) 0.001***	(-7.330) 0.001***	(-6.849) 0.001***
CEO duality	(3.491) 0.026***	(3.694) 0.012**	(3.494) 0.026***	(3.759) 0.012**	(3.576) 0.025***	(3.838) 0.012**
TMT age	(4.803) -0.165***	(2.782) -0.130***	(4.781) -0.164***	(2.754) -0.130***	(4.748) -0.166***	(2.717) -0.130***
TMT salary	(-3.385) 0.003	(-4.270) 0.006	(-3.402) 0.003	(-4.359) 0.006	(-3.436) 0.003	(-4.336) 0.006
Constant	(0.440) -0.226	(0.879) -0.014	(0.464) -0.219	(0.906) -0.002	(0.470) -0.221	(0.918) -0.013
	(-1.100)	(-0.094)	(-1.081)	(-0.012)	(-1.086)	(-0.087)
Observations	23,752	23,752	23,752	23,752	23,752	23,752
Industry and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.065	0.071	0.065	0.071	0.065	0.071

Notes: Robust t-statistics are reported in the parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table III. Results for the moderating role of (a) digital transformation attention (b) QFII and (c) Political connection of CEOs

	(1) NCSKEW _(t+1)	(2) DUVOL _(t+1)	(3) NCSKEW _(t+1)	(4) DUVOL _(t+1)	(5) NCSKEW _(t+1)	(6) DUVOL _(t+1)	(7) NCSKEW _(t+1)	(8) DUVOL _(t+1)
TMT innovativeness	0.183*** (4.442)	0.102*** (3.302)	0.066*** (3.513)	0.047*** (3.308)	0.085 (1.651)	0.056 (1.179)	0.055*** (3.317)	0.053*** (4.405)
Digital transformation (Log of Keywords)	0.016*** (3.112)	0.011*** (3.009)						
TMT innovativeness x Digital transformation (Log of Keywords)	-0.040*** (-3.879)	-0.018** (-2.590)						
Digital transformation (Proportion of Keywords)			0.121*** (3.991)	0.084*** (3.154)				
TMT innovativeness x Digital transformation (Proportion of Keywords)			-0.260** (-2.597)	-0.099* (-1.848)				
Qualified foreign institutional investors (QFII)					0.024*** (3.319)	0.014** (2.435)		
TMT innovativeness x Qualified foreign institutional investors					-0.052*** (-3.044)	-0.033** (-2.329)		
Political connections							0.017 (1.497)	0.012 (1.682)
TMT innovativeness x Political connections							-0.071* (-1.780)	-0.059** (-2.814)
Constant	-0.264 (-1.279)	-0.033 (-0.214)	-0.237 (-1.163)	-0.018 (-0.118)	-0.469 (-1.325)	0.128 (0.673)	-0.218 (-1.034)	-0.010 (-0.060)
All Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	NCSKEW _(t+1)	DUVOL _(t+1)	NCSKEW _(t+1)	DUVOL _(t+1)	NCSKEW _(t+1)	DUVOL _(t+1)	NCSKEW _(t+1)	DUVOL _(t+1)
Industry and Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	23,752	23,752	23,748	23,748	4,408	4,408	23,752	23,752
R-squared	0.065	0.0709	0.0648	0.0708	0.0796	0.0850	0.065	0.0708

Notes: Robust t-statistics are reported in the parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Figure 1a: The moderating effect of digital transformation (log of keywords)

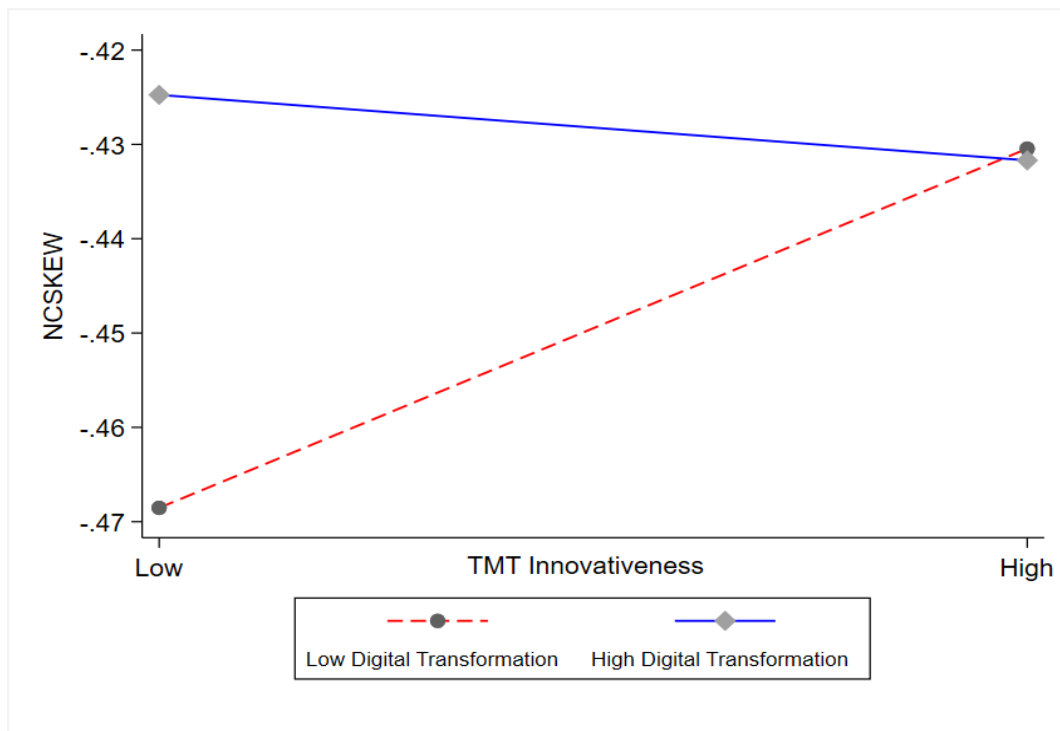


Figure 1b: The moderating effect of digital transformation (percentage of keywords)

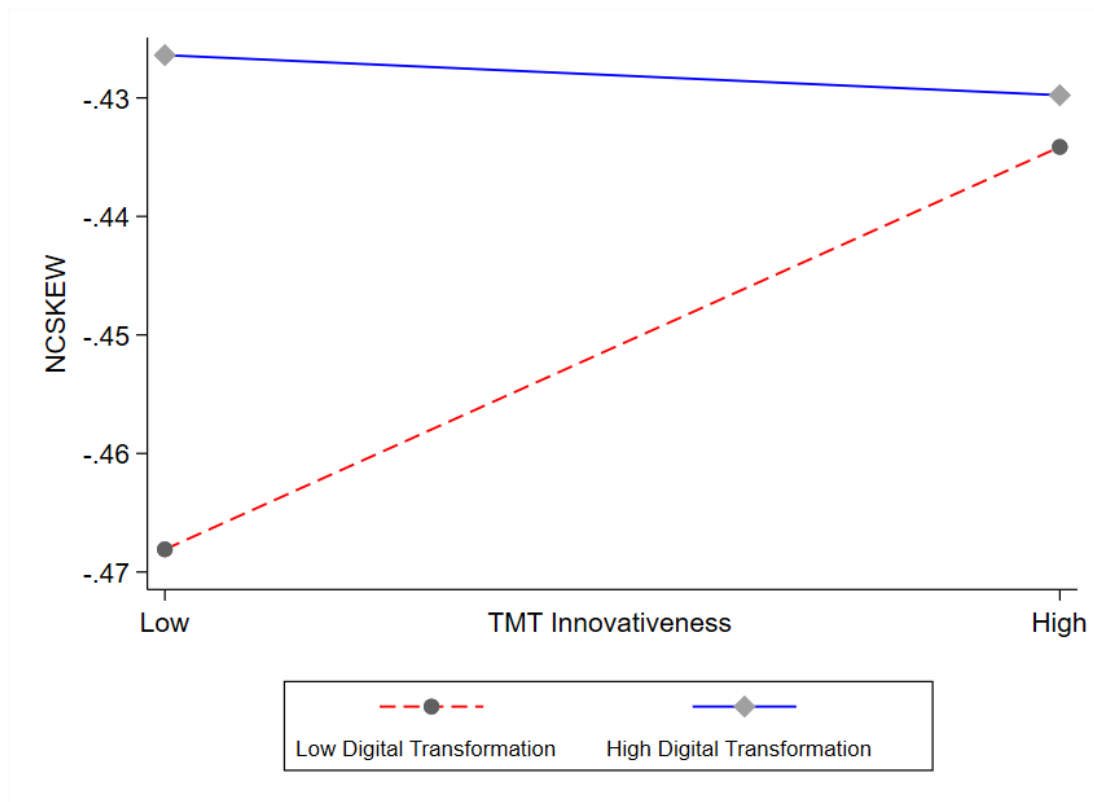


Figure 2: The moderating effect of Qualified Foreign Institutional Investors (QFII)

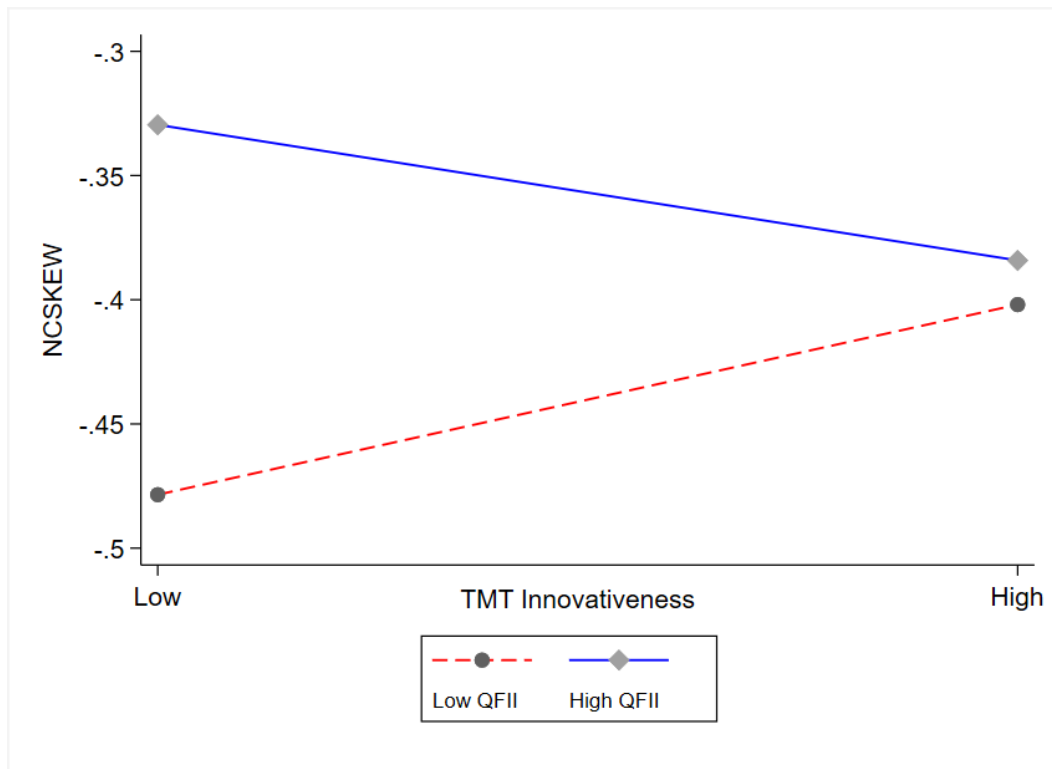


Figure 3: The moderating effect of Political Connections

