

Due diligence: Insider trading profits, legal environment provincial responsibilities

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Abstract: Information on illegal insider trading in China's stock market through court verdicts is analyzed to determine the impact of provincial legalization on the profitability of insider trading. Our findings indicate three key points: first, variations in provincial legal environments significantly influence the subsequent profitability of illegal insider trading. Specifically, a one-standard-deviation increase in the quality of the legal environment leads to a 2.77%–5.78% rise in excess insider trading return. Second, a stronger legal environment and improved law enforcement enhance the legal risk and risk premium associated with insider trading, thereby promoting pricing efficiency. Third, lower informational efficiency strengthens the positive impact of the legal environment on insider trading profitability. Based on these results, we propose policy recommendations regarding the role of provincial governments in promoting and regulating capital market legalization.

Keywords: Insider trading; Cross-sectional stock return; Legal environment; China

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Illegal insider trading profits and legal environment

“Dorothy: You haven’t heard any rumors? Of bribery, embezzlement, misappropriation, INSIDER DEALINGS?”

Sir Desmond: Oh...oh come...those are strong words.”

----“Yes, Prime Minister”, BBC (1987).

1. Introduction

Understanding financial market manipulation, especially concerning complex financial products like interest rate pricing in the London Interbank Offer Rate (LIBOR) market¹, can be challenging for the public due to the intricacies and technicalities involved. However, activities such as illegal insider trading, are relatively more accessible since it involves clear elements of unfair advantage, betrayal of trust, and potential harm to the integrity of financial markets.

To better understand why illegal insider trading occurs and its varying financial consequences, it is essential to grasp the underlying incentives that drive individuals to engage in such practices (Alexander and Cumming, 2020). Illegal insider trading is one of the most common forms of financial market misconduct and typically involves a trade-off between its expected benefits and potential costs (Kacperczyk and Pagnotta, 2019; Kyle, 1985). Despite mounting evidence pointing to the significance of an efficient legal system and robust legal protections for the stock market in both developed and emerging economies, the role of implementing securities laws in curbing financial market misconduct remains a subject of controversy (Aitken et al., 2015; Bhattacharya and Daouk, 2002). This uncertainty may create public mistrust regarding the effectiveness of security laws in effectively limiting illegal insider trading.

In this study, we analyze the profitability of illegal insider trading and its connection to the quality of the legal environment in China. The study adds to a significant literature on the rule of law and governance in emerging and developed markets that began with La Porta et al. (1998).

¹ See Abrantes-Metz et al. (2012) for discussion of the manipulation of the London Bank Interbank Offer Rate (LIBOR) by a group of bank market-makers.

There are several advantages in investigating insider trading in the Chinese context. First, China's security law provides a straightforward and unambiguous definition of insider trading. There are no extenuating circumstances for identifying insider trading, making it easier to distinguish between legal and illegal activities. As a result, any insider trading that exploits nonpublic information is considered illegal (Sha et al., 2020). What is critical, however, is that the quality of the legal environment varies within China, due to judicial interpretation at a provincial level. This provides a natural experiment to test the impact of variation in legal environment on insider trading risk taking and profitability.

China's robust and active stock market also provides a substantial number of insider trading cases, allowing researchers to access a significant amount of data for analysis. China's insider trading laws and the absence of exemptions create a valuable opportunity for ethical discussions and analyses of the impact of such legislation on the financial markets and investor behavior more generally (Ojah et al., 2020; Mazza and Wang, 2021; Blau et al., 2022; Lin et al., 2022). Chinese judicial authorities and securities regulators also provide public access to detailed legal documents related to insider trading cases. This information includes insiders' biographies, trading times and volume details, and local company information, offering rich data for in-depth research. Overall, the use of Chinese insider trading data can contribute to a deeper understanding of the dynamics and motivations of insider trading, its impact on financial markets, and the effectiveness of regulatory measures in maintaining market integrity, not just in China, but in other developing markets worldwide.

To gather the necessary data, we identify insider trading cases from public sources within Chinese judicial authorities and securities regulators. This data collection effort spans the period from 2006 to 2018, allowing us to access a substantial amount of relevant information. As a result, we obtain a total of 521 nonduplicate cases of insider trading for analysis. The sample period ends in 2018 since this is the latest year for which provincial legal environment measures in China (see Wang et al., 2017, for details) are available. Given that judicial authorities usually take about two years to publish the legal documents, this sample contains the most to-date information we can obtain.

To ensure the accuracy and completeness of the dataset, we obtain information of insider trading cases follow the methodology used by Ahern (2017) and Kacperczyk and Pagnotta

(2020). This involves manually retrieving critical details from legal documents. We carefully extract information about the insiders involved, including their biographies, as well as their trading times and volume. Additionally, we gather data related to the characteristics of companies with convicted insiders. The dataset therefore encompasses a detailed account of the insiders, target companies, trading patterns, and profits directly associated with the legal convictions related to insider trading cases in China during the specified timeframe. This comprehensive dataset forms the foundation for the analysis and enables us to draw meaningful conclusions about the profitability and implications of illegal insider trading in the Chinese stock market.

Moreover, we examine how the legal risks of illegal insider trading are associated with subsequent stock returns. In contrast to similar contexts in the U.S., few insiders in China are top managers at local companies or hedge funds, and their returns are abnormally low². We employ three indices to assess the level of development of China's provincial economic and legal environment, each examining different dimensions. The indices used are the provincial market development index and provincial legal environment index, as proposed by Fan et al. (2003), along with the provincial judicial resources index developed by Gao et al. (2016).

The findings reveal that, on average, as the development of the legal environment in a province increases by one standard deviation, the holding period for excess returns through insider trading also rises, ranging from 2.87% to 5.78%. In other words, companies operating in provinces with well-developed legal environments demonstrate a higher likelihood of detection and prosecution for insider trading, which subsequently influences the returns derived from such activities. Both the level of legal environment and the development of legal resources significantly elevate the probability of risk exposure related to insider trading, leading to a higher risk premium. Considering the significant variation in legal environment across regions and the differences in the profits associated with illegal insider trading, the influence of these factors is not only economically significant but also statistically robust. Our study demonstrates that illegal insider trading is affected by the increased effectiveness of the legal system, carrying

² For example, Bloomberg has reported on the largest insider trading cases (see <https://www.bloomberg.com/graphics/2016-insider-trading/> for details) where insider information is leaked by top managers and profitability is “hundreds of millions of dollars”. Very few instances of illegal insider trading in China are associated with notable persons or such profitability.

important implications for both industry and the formulation of public policy. Thus, this study highlights the pivotal role played by an enhanced legal system in shaping the landscape of illegal insider trading, mitigating the occurrences of insider trading and promoting fair and transparent financial markets.

To ensure the reliability of these results, a series of robustness tests are conducted. To address the concern of small sample size, the bootstrap method is employed to re-estimate the coefficient's standard error and obtain more robust estimates of the results. Furthermore, recognizing that the profitability of illegal insider trading is closely related to the timing of trading, we utilize various measures of insider trading profit to ensure we accurately capture different aspects of trading. In addition, to eliminate the possibility of spurious linear correlations between equity returns and provincial legal environments, we replace the continuous provincial level environment variable with a discrete value. This adjustment ensures the reliability and accuracy of our results when dealing with complex relationships between variables.

Following these rigorous tests and adjustments, the results remain consistent and robust, and continue to support the notion that the profitability of illegal insider trading is indeed influenced by the location of a company, which also has important implications for understanding equity returns in different regions. Nevertheless, we acknowledge that our observations of illegal insider trading cases may not have been randomly observed, leading to potential self-selection bias in the statistical interpretation. The reliability of our method for examining insider trading profitability, which relies on information from legal documents, relies on the representativeness of our sample. However, it is essential to recognize that the cases of insider trading observed and penalized by judicial authorities and securities regulators likely represent only a fraction of all instances that occurred in the Chinese securities market. Despite our efforts to include illegal insider trading cases from various sources in our sample, it is inevitable that sampling bias exists due to the inherent unobservability of "private information" (Koudijs, 2015). Thus, the main finding may not be an unbiased estimation if our dataset of insider trading is skewed towards unreal market situations.

In response to this concern, we conduct further analysis and address endogeneity issues by employing the Heckman correction framework. We propose a model that explains the

probability of detecting illegal insider trading in its first-stage regression. This approach allows us to correct for sampling bias in subsequent regressions and ensures more reliable and consistent results in line with our baseline findings.

In addition, we determine that company-level *ex ante* legal risk, which is proxied using the approach proposed by Kim and Skinner (2012), is linked to higher returns from illegal insider trading. The research by Rahman, Oliver, and Faff (2020) supports the notion that insiders are inclined to disseminate misinformation to manipulate stock prices before insider information becomes public. This strategic dissemination of false information, however, exposes the company to increased litigation risk, as shareholders may file lawsuits seeking compensation for their losses. Simultaneously, insiders also face the risk that future lawsuits against the target company will attract scrutiny, potentially leading to the exposure of their illegal insider trading activities.

Considering these dynamics, insiders anticipate higher returns from engaging in illegal trading as compensation for the potential costs associated with committing a crime. In essence, they weigh the chance of detection, based on the quality of the legal environment, and the profits from insider trading. Our research findings substantiate this observation, revealing that a 1% increase in the company's litigation risk corresponds to an 18.1 basis points increase in illegal insider trading returns. This suggests that the company's legal risk plays a significant role in shaping the profitability of insider trading, with insiders factoring in the potential consequences of their actions when seeking higher returns through illegal trading activities.

This study makes two significant contributions to the existing literature. First, while several key studies focus on analysis and impact of illegal insider trading actions (Meulbroek, 1992; Hillier et al., 2015; Adams et al., 2018; Cline and Posynaya, 2019; Biggerstaff et al., 2020; Ashton et al., 2021; Jiang et al., 2021; Gao et al., 2022), predicting the payoffs associated with insider trading has received less attention. For example, Ahern (2020) finds that numerous predictors of illegal insider trading offer little insight into determining its profitability. Considering this, we direct our attention towards the legal environment and its significance in affecting insider trading. Specifically, we focus on a Chinese province's legal environment, where a more developed legal framework implies that illegal insider trading necessitates higher expected returns.

Second, we show that the strength of the legal environment plays a crucial role in shaping the dynamics of insider trading and highlights the importance and limits of existing market regulation (Bosio et al., 2022). In regions with tougher law enforcement, there is a higher likelihood of regulatory investigation and punishment for companies engaged in illegal activities. As a result, insider traders demand a higher investment return as a form of risk compensation for their misconduct (Bhattacharya and Daouk, 2002; Bris, 2005; Jeng et al., 2003; Bhattacharya and Marshall, 2012; Cziraki and Gider, 2021). Our findings reveal that cross-sectional variations in law enforcement across China significantly influence insider trading returns. This provides a rational legal risk-return perspective for understanding the determinants of insider trading profitability. Thus, our study sheds light on the predictability of insider trading returns, with a particular focus on the role of the legal environment. By demonstrating the impact of law enforcement disparities across China on insider trading returns, our research offers valuable insights into understanding the factors that drive insider trading profitability.

Our findings also add to the literature on law and finance. While La Porta et al. (1998) document a positive correlation between the legal system and financial market development, our study focuses on emerging markets, particularly China, where this relationship appears to be weaker. In such markets, corporate governance and political connections have been observed to act as substitutes for law in regulating insider trading (Cinar, 1999; Miller et al., 2008; Beltratti et al., 2016; Chen et al., 2017; Ojah et al., 2020; Jiang et al., 2021; Mazza and Wang, 2021; Sun et al., 2021; Chen et al., 2022). Furthermore, in terms of equity return prediction, few studies examine the role of the legal environment. Our research serves to supplement this area of study by providing direct evidence that the stringency of law enforcement plays a critical role in determining the profitability of illegal insider trading, even when a market's legal environment differs from that of other developing markets.

These findings have important policy implications, particularly for other emerging markets where the development of their domestic financial market might not align entirely with their legal environment. Understanding the relationship between law enforcement and insider trading profitability can help inform policymakers in these markets to better align legal and financial market developments, ensuring fair and transparent financial practices. This research

contributes to a more comprehensive understanding of the factors shaping the relationship between law and finance, particularly in the context of emerging markets, where unique dynamics and governance mechanisms come into play.

The remainder of the paper proceeds as follows: Section 2 provides the institutional background and our hypothesis development. Section 3 describes our data and research design. Section 4 reports our main empirical results. Section 5 lists the results of additional tests. In section 7, we conclude the paper and offer certain policy insights.

2. Literature and institutional background

2.1 Literature review

In the finance literature, insider trading generally refers to the trading of a company's securities by individuals who have access to nonpublic material information about the company. The process of how insider information gets integrated into asset prices has been extensively discussed and studied in empirical research. However, since insider trading remains undisclosed until the relevant information is made public and is difficult to detect, scholars typically examine the determinants and consequences of insider trading using publicly disclosed legal insider trading information.

In many studies, researchers adopt the hypotheses proposed by Fama (1991), Fama and French (2010), and Berk and Green (2004), where individuals such as fund managers and company executives who have access to inside information are considered as insiders. This approach provides an indirect method for assessing the pricing power of insider information. Likewise, when examining insider trading in China's securities market, most research focuses on the behavior of company insiders, namely company executives or major shareholders.

Narrowly defined, insider trading refers to trading activities that exploit insiders' informational advantage about upcoming events to generate illegal profits. Understanding the drivers of profits from informed transactions, which stem from the economic value of nonpublic information, is crucial for further research in this area. To expand this understanding, scholars like Koudijs (2015), Ahern (2017, 2020), Kacperczyk and Pagnotta (2019; 2020) have utilized continuous disclosures of statistics from securities market regulators worldwide. They have collected punitive decisions on illegal insider trading made by capital market regulators to

reveal new insights into information transmission mechanisms, insiders' personal characteristics, and even the asset pricing capacity of insider trading.

Of relevance for this study is the fact that in parallel with the development of China's judicial processes, the information disclosure details of relevant insider trading cases are continuously being disclosed and updated. This provides valuable microdata support for measuring and determining the illegal profit scale of insider trading in the context of the Chinese securities market. These hand collected data present a unique opportunity to gain deeper insights into the dynamics of insider trading and the functioning of China's capital market.

The profitability of financial market misconduct, such as insider trading, raises concerns regarding market efficiency and investor protection. By studying these factors, researchers aim to gain a comprehensive understanding of insider trading dynamics, its impact on asset prices, and its implications for market efficiency and investor confidence. Seyhun (1986) has demonstrated that the average return for illegal insider traders significantly exceeds that of fund managers operating in the same market. To curb such illicit activities, one of the most intuitive approaches is to increase the associated costs. Various studies, following La Porta et al. (1998), have revealed that the primary legal mechanisms for regulating financial market conduct and safeguarding investors involve augmenting the cost of illegal acts, limiting the dissemination of inside information, and ensuring strict punishment for insider trading. These measures undoubtedly raise the costs for insiders who engage in unlawful activities. The profitability of insider trading is influenced by various factors, including the advantage gained from nonpublic information, the size of the company, corporate governance practices, political dynamics, and other relevant considerations (Cline and Posynaya, 2019).

A robust legal system is an integral component of a superior political architecture and plays a crucial role in the development of financial markets (Brown et al., 2019). In China, both the government and securities regulator are committed to enhance regulatory rules and law enforcement to achieve a reliably stable financial system. It is shown that for companies' whose financial misconduct are detected and sanctioned, they tend to suffer more negative stock performance (Wang et al., 2019), higher return volatility (He and Fang, 2019) and higher cost of debt (Gong et al., 2021).

The efficient detection of insider trading is more complicated than other types of financial misconduct such as accounting fraud, which requires coordination among various authorities of local government (Huang, 2005). Provinces with a rapid process of legal development are more likely to employ legal means to restrict insider trading (Huang et al., 2012). Consequently, potential insiders operating in these regions may demand higher excess returns to compensate for the potential legal risks they face. However, the ultimate gains from insider trading are also influenced by the price efficiency in the market. This raises the question of whether the micro trading behavior of market entities is impacted by their macro environment, leading to excess returns in transactions. Understanding the relationship between macroeconomic factors, such as the legal environment, and micro trading behavior can provide valuable insights into the dynamics of insider trading and its implications for market efficiency and investor protection (Ojah et al., 2020). It highlights the importance of considering both macro and micro factors in studying insider trading profitability and its impact on financial markets.

The interplay between individual micro-level behavior and the broader macro-level social environment can be understood through specific mechanisms (Chen et al., 2017; Ding, 2015; Kim et al., 2019; Mazza and Wang, 2021; Narayan et al., 2014). In legal research, it has been demonstrated that judicial authorities and regulators, with limited resources, prioritize their focus on listed companies with a history of punishment records (Alldredge and Cicero, 2015; Cline and Posylnaya, 2019). Consequently, when a company faces higher risk of detection for engaging in financial market misconduct, its investors become more vigilant and responsive to instances of insider trading, leading to heightened supervision and scrutiny of insider behavior (Dai et al., 2016).

In Chinese provinces with well-developed legal environments, insider trading demands exceptionally high expected returns to offset the perceived legal risks and expected losses associated with legal enforcement. However, while an improved legal environment may raise the expected returns from insider trading, it remains constrained by the threat of legal punishment if uncovered, which curtails the overall arbitrage potential in trading (Li and Luo, 2016). This delicate balance between the expected gains from insider trading and the potential legal consequences acts as a pivotal factor shaping the behavior of insiders in the stock market (Davidson and Pirinsky, 2023). It underscores the significance of an effective legal system in

curbing insider trading and highlights the complexities that influence the dynamics of this illicit financial activity (Sha et al., 2020). Understanding these dynamics is essential for policymakers and regulators to devise measures that promote market integrity, transparency, and investor protection.

One key characteristic of insider traders is their superior financial literacy. Insiders typically possess extensive investment experience and have a deep understanding of trading risks. They can make rational decisions regarding their investment strategies and expected returns (Cline and Posylnaya, 2019). Based on studies involving illegal insider trading cases, Bhattacharaya and Marshall (2012) have found that investors with both financial knowledge and awareness of legal risks can achieve higher market returns. Similarly, Yin et al. (2019) have shown that greater financial knowledge plays a crucial role in determining higher investment returns. These studies suggest that "investor financial literacy" could be a potential mechanism independent of the costs associated with the legal environment.

Furthermore, in the context of pursuing excess returns during a merger and acquisition (M&A) in China's capital market, various M&A rumors circulate as "inside information" within a limited network. Although such news may originate from a company's proposed material asset restructuring, informed individuals who believe this inside information may overestimate the likelihood of a successful reorganization or may simply hope for limited arbitrage through price increases (Cho, 2020). Informed investors are aware of the questionable authenticity and reliability of such information but choose to proceed with the deal, exploiting their insider information while potentially facing the consequences of asset price pressure resulting from a failed merger or reorganization.

These research findings provide a basis for studying the intricate influencing mechanisms associated with insider trading. They shed light on the role of investor financial literacy and the complexities involved in decision-making by informed individuals in response to insider information. Understanding these mechanisms is crucial for comprehending the behavior of insiders and the impact of their actions on asset prices and market efficiency. It underscores the importance of addressing factors beyond the legal environment that contribute to insider trading activities in the financial landscape.

2.2 Institutional background

Insider trading has always been a crucial focus of law enforcement in China's capital market. It not only impairs the interests of investors but also disrupts the efficiency of a financial market system. With the rapid expansion of China's capital market, the laws, administrative regulations and securities regulations concerning insider trading have developed through four steps—administrative rules, legal formalization, public enforcement and legislative strengthening.

2.2.1 Administrative rules (1990-1996)

During the early development of the Shanghai Stock Exchange and Shenzhen Stock Exchange, the operational order and growth of the securities market relied heavily on administrative regulations, measures, and rules formulated by national ministries. In 1990, the People's Bank of China introduced the "Interim Measures for the Administration of Securities Companies," which explicitly prohibited securities companies from engaging in activities like "market price manipulation, internal transactions, fraud, as well as other acts and transactions that affect the markets." This marked China's first administrative regulation on insider trading.

Shortly after, in 1993, the State Council issued the "Interim Regulations on the Administration of Stock Issuance and Transaction." Additionally, the "Interim Measures for Securities Fraud" defined key concepts such as "insider" and "insider information," and it formulated specific provisions concerning the confiscation of illegal income, fines, and other punitive measures. However, during this period, the number of reported cases of securities violations, including insider trading, was relatively low based on public information from the China Securities Regulatory Commission (CSRC) and other regulatory bodies. As a result, the literature from this era primarily focused on warnings and reprimands for violations related to information disclosure in stock issuance. Insider trading cases during this stage were considered minor, and the deterrent effect of laws and regulations was relatively limited (Huang, 2005).

As the securities market continued to evolve and mature, regulatory authorities recognized the importance of strengthening measures to address insider trading and other violations effectively. Subsequent developments in legal regulations and enforcement practices played a crucial role in improving market integrity and investor protection in China's capital markets.

2.2.2 Legal formalization (1997-2006)

With the expansion of China's capital market and the increasing complexity of the investor structure, the country's legal regulations have gradually fallen behind the pace of market development to some extent. As the hazards posed by illegal activities, including insider trading, became more prominent, there arose a need for stricter legal sanctions to suppress and deter such motives. To address these concerns, significant developments were made in the legal framework.

In October 1997, Article 180 of the Criminal Law was amended to introduce special provisions on the criminal liability of "insider trading" and "insider information disclosure" for the first time. Subsequently, the Securities Law was enacted in 1999, which played a crucial role in clarifying three fundamental components: "insider information," "insider," and "the type of insider trading." In another amendment in October 2005, Article 75 of the Securities Law further defined inside information as "undisclosed information concerning the company's operation, finance, or that significantly affects the market price of the company's securities."

In terms of civil liability, the law stipulates that individuals or entities who cause losses for investors are liable for compensation according to the law. Furthermore, it emphasizes that offenders whose assets are insufficient to pay penalties, fines, or liabilities "shall bear the civil liability first." This regulatory framework laid the foundation for establishing the legal liability system concerning insider trading crimes.

These legal developments signify significant progress in addressing insider trading and enhancing market integrity in China. By enacting provisions on criminal and civil liability, the authorities have taken crucial steps to deter and punish illicit activities, safeguarding the interests of investors and promoting a fair and transparent capital market (Ma et al., 2010; Huang, 2013). However, given the constantly evolving nature of financial markets and the sophistication of illegal activities, ongoing efforts to keep pace with market developments will be essential to ensure effective regulation and investor protection.

2.2.3 Public enforcement (2007-2019).

The special provisions and law enforcement on insider trading provided a preliminary legal framework for the supervision of insiders' behaviors in China. However, before the year 2007,

the number of insider trading cases investigated by judicial authorities and securities regulators remained relatively low. This was primarily due to the effective concealment of such activities, the diversification of dealers involved, and the complex transmission of insider trading information. To address these challenges and strengthen the enforcement of insider trading regulations, the China Securities Regulatory Commission (CSRC) took significant steps. In 2007 and 2011, the CSRC successively issued two important guidelines: the "Guidelines for the Identification of Insider Trading Behavior in the Securities Market" and the "Provisions on the Establishment of Insider Registration and Management System". These guidelines provided a more detailed and practical basis for the identification and management of insider trading.

The "Guidelines for the Identification of Insider Trading Behavior in the Securities Market" offered clearer criteria and procedures for identifying insider trading behavior, making it easier for regulatory authorities to detect and act against illegal activities. Additionally, the "Provisions on the Establishment of Insider Registration and Management System" laid out a comprehensive framework for registering and managing individuals who possess inside information and for monitoring their trading activities.

These measures were aimed at strengthening the regulatory oversight of insider trading and enhancing market integrity. By providing a more detailed practical basis for identifying insider trading and establishing a robust registration and management system, the CSRC took significant strides towards effectively curbing insider trading activities and promoting fair and transparent trading practices in China's securities market.

To strengthen the enforcement of insider trading rules and laws, the State Council took significant measures to improve the efficacy of legal provisions and deter illicit activities in the capital market. In November 2010, the State Council released a forwarded notice titled "Opinions of the CSRC and Other Departments on the Combat, Prevention, and Control of Capital Market Insider Trading." This notice emphasized the need for close cooperation and coordination between different departments to ensure effective enforcement of insider trading regulations.

Subsequently, in a joint effort, the Supreme People's Court and the Supreme People's Procuratorate issued the "Interpretation on Several Issues Concerning the Practical Application of the Law in the Criminal Cases of Insider Trading and Insider Information Disclosure." This

interpretation provided further clarity and guidance to the judiciary in handling criminal cases related to insider trading and insider information disclosure, strengthening the legal framework and enforcement practices in dealing with such violations.

These newly introduced laws, regulations, and institutional documents played a crucial role in enhancing the efficiency of supervision and law enforcement concerning insider trading. By providing comprehensive guidelines, improving coordination among various authorities, and offering judicial interpretations, the system regulating financial market misconduct, including insider trading, was significantly strengthened. These measures contributed to fostering market integrity, investor confidence, and fair practices in China's capital markets (Wang et al., 2019; Gong et al., 2021; Mazza and Wang, 2021).

The companies with suspected cases of insider trading (target companies) are primarily sourced from the provinces of Guangdong, Jiangsu, Shanghai, Beijing, and some Central and Western regions. The distribution of listed companies and law enforcement departments in these cases is comprehensive, with a higher concentration in these key provinces. There are two main reasons for this distribution pattern. Firstly, the above-mentioned provinces have many market entities, including listed companies and investors engaged in securities trading, which increases the likelihood of detecting insider trading activities in these regions. Secondly, effective law enforcement in the securities market requires a considerable level of professional and legal knowledge. The target areas have relatively balanced law enforcement resources, indicating a higher level of law enforcement ability and quality, making it easier to uncover and investigate insider trading cases.

To bolster law enforcement efforts, various entities such as the China Securities Regulatory Commission (CSRC), and its local agencies have undertaken different initiatives. However, one challenge that remains is the absence of a uniform standard for fines imposed on insiders found guilty of insider trading. In some cases, fines can be as low as 1–3 times the amount of illegal gains or even less than twice that amount, which can be perceived as relatively lenient and may not serve as a strong deterrent to potential offenders (Howson, 2012; He and Fang, 2019). To further strengthen the effectiveness of law enforcement and curb insider trading activities, it may be essential to consider revising and implementing standardized fines that align with the severity of the offense and the potential gains from insider trading. A robust and

stringent enforcement regime can play a significant role in deterring insider trading and promoting market integrity.¹

This phenomenon is more prominent in cases of insider trading loss where the penalized amount far from reflects the impact of the violator's stock transaction amount on the market price.² As per Article 180 of China's Criminal Law and the Judicial Interpretation of Insider Trading, illegal income is considered a significant factor in sentencing for the crime of insider trading and leaking insider information, with a standard fine of RMB 150,000 Yuan.

However, the statistics presented in this paper reveal that insider trading cases involving illegal fines significantly higher than RMB 150,000 Yuan often result in administrative penalties with a low proportion of criminal punishment. For example, according to a law enforcement announcement by the China Securities Regulatory Commission (CSRC), 122 insider trading cases concluded with administrative penalties between 2016 and September 2017, while only 23 cases were considered for potential criminal prosecution. This discrepancy is not solely attributable to variations in case-filing and evidence standards but also points to a lack of sufficient connection between administrative punishment and criminal accountability.

Furthermore, the hierarchical structure among local judicial institutions and local governments can foster powerful rent-seeking behavior (Cull et al., 2017). This can create challenges in ensuring fair and consistent application of penalties for insider trading violations and may lead to certain cases being handled more leniently than others, depending on local dynamics and influence.

To address these issues and enhance the effectiveness³ of deterring insider trading, it is crucial to establish a robust and coherent framework that ensures consistent and appropriate penalties for violations, regardless of regional variations or other influences. Strengthening the connection between administrative and criminal punishment and implementing standardized guidelines for sentencing in insider trading cases can help promote a more equitable and effective regulatory environment in China's capital market.³

2.2.4 Legislative strengthening (2020-to date)

Recently, China's capital market has faced higher demands for legalization and stronger regulatory measures. In March 2020, a revised version of the Securities Law was implemented,

introducing significant improvements to the market's operational framework and enhancing investor protections. This revision also led to a substantial increase in the costs associated with engaging in illegal activities. Regarding insider trading, the revised Securities Law expanded the scope of what constitutes insider information and who can be considered an insider. Moreover, the punishment standard for insider trading was raised from 1–5 times the illegal income to 1–10 times, significantly increasing the penalties for violations. In July 2021, the General Office of the CPC Central Committee and the General Office of the State Council released Opinions outlining strategic reform requirements for the development of legal construction in the capital market. Among the key aspects highlighted in this programmatic document were the improvement of mechanisms for strictly combating illegal securities activities and the enhancement of efficiency in law enforcement and judiciary authorities.

These reform measures show China's commitment to creating a more robust and transparent capital market. By increasing the costs and consequences of illegal actions, especially in cases of insider trading, regulatory authorities aim to discourage such misconduct and promote fair and ethical trading practices. The emphasis on improving law enforcement efficiency and judicial processes further reinforces the government's determination to strengthen the legal framework and ensure the integrity and stability of the capital market. The process of legalization in the capital market has contributed to the establishment of comprehensive norms for dealing with insider trading.

Several key aspects of this evolution can be highlighted: first, over time, the definition of insider trading constituents has been progressively broadened through multiple revisions of the law. Notably, the recently issued Securities Law provides a more quantitative interpretation of "major company investment behavior" included in insider trading information, leading to a more precise judicial procedure. Second, the emphasis has shifted from primarily enhancing the legal framework to enhancing identification and prosecution of illegal acts. Effective implementation of legal securities regulations is facilitated through strengthened coordination between various departments, as exemplified in the Opinions on Strictly Regulating Illegal Securities Activities in Accordance with the Law. Local governments are also required to enhance their risk prevention capabilities under the "strengthening local responsibility" approach, considering the distinct law enforcement environments in different provinces. Third,

some illegal acts lack distinct identification rules and standards, leading to practical challenges in law enforcement. For instance, traditional civil tort liability causal associations may not be suitable for presuming the causal association between insider trading and investors' decisions and losses. In judicial practice, investigating tort liability caused by insider trading encounters difficulties. Additionally, even in cases of insider trading analysis, there is no clarified legal basis for calculating illegal gains, and the "actual transaction margin" is primarily applied as the principle in practice.

The continuous improvement in legal regulations has helped the legal framework address insider trading in China's capital market, contributing to greater market integrity and better protection for investors. The evolving legal landscape has led to a more comprehensive understanding and definition of insider trading, expanding its scope and enabling more accurate judicial procedures.

Despite the progress made, there are still areas that require additional attention and enhancement. Ensuring effective enforcement and coordination between various regulatory authorities is crucial to combat insider trading effectively. Stricter measures should be implemented to prosecute and punish those engaged in illegal activities, with a focus on increasing the deterrent effect of the penalties. Moreover, addressing the challenges in identifying and defining certain illegal acts associated with insider trading is vital to strengthen the practicality and efficiency of law enforcement. Clarity in calculating illegal gains and defining the legal basis for insider trading-related tort liability can significantly contribute to improving the regulatory landscape.

Continued efforts towards refining and clarifying the legal framework will also foster a more transparent and stable capital market in China. By addressing the existing gaps and challenges, the regulatory authorities can create a more robust and conducive environment that discourages insider trading activities and safeguards the interests of all market participants.

The identification of the profits of insider trading will always remain a problem for regulators. For example, consider the simple case where an insider buys and does not sell preferring to remain a long-term investor. As other macroeconomic factors impact company profitability, it may lead to profits that are not correlated with insider trading. This highlights the need for more precise enforcement guidance to distinguish between legitimate trading

activities and illegal insider trading. The policy system described earlier has provided a vital background and basis for selecting the topic of this paper, as it addresses the challenges and complexities surrounding insider trading detection and prevention.

Globally, regulators continue to face difficulties in detecting and preventing insider trading due to the nature of nonpublic material information, which only becomes available when publicly disclosed. The line between legal insider trading, driven by liquidity or diversification needs, and illegal insider trading remains ambiguous. This explains the paradoxical phenomenon where insider trading can yield superior trading profitability (Ali and Hirshleifer, 2017), while the reported proportion of illegal insider trading cases by regulators remains relatively low (Cumming and Johan, 2013).

In developing markets, the efficiency of law enforcement plays a significant role in shaping interpretations of illegal insider trading (Kim et al., 2019; Kwabi et al., 2019; Ojah et al., 2020). To expand the research on the causes and consequences of insider trading, it is essential to consider the salient legal, economic, and other conditions, as proposed by Alexander and Cumming (2020). In summary, the complexity of insider trading and the challenges in distinguishing legal and illegal activities call for further research into the factors influencing insider trading and its consequences. The policy system and legal framework provide a crucial foundation for such investigations and underscore the importance of ongoing efforts to enhance regulation and enforcement in global financial markets.

3. Data and Research Design

3.1 Sample selection

The cases of illegal insider trading used in this study are hand-collected from legal documents issued and archived by China's courts and other regulatory bodies, including the court verdicts and filings of administrative penalties issued by the CSRC. We collect these documents of insider trading cases from two vendors: PKULAW and Lawyee,³ both of which are used in finance and legal research (see for example: Lim et al., 2017; Xu, 2017). To retrieve the judgment documents related to illegal insider trading from these databases, we use "insider

³ <https://home.pkulaw.com/>; <http://www.lawyee.org/>.

trading” as search keywords and retrieve relevant legal documents. For cases that are recorded in multiple legal documents with various judgment results (i.e., first instance, second instance and retrial), only the final legal document is kept in the sample. We carefully read each individual case to identify the details of individual trading as well as the information of companies that are exposed to enforcement actions to ensure the information is relevant for this analysis.

To enrich our sample, we supplement the data by collecting information on administrative penalties issued by the CSRC, the regulatory authority in China. Often likened to the SEC in the United States, the CSRC holds ministerial-level authority in China for identifying abnormal market behavior and has the power to impose administrative penalties in accordance with the Securities Law of the People's Republic of China. Incorporating data from administrative penalties allows us to capture cases that may differ significantly in terms of the extent of damage and complexity compared to those investigated by courts. However, to ensure the accuracy of insider trading profitability estimation, we have applied certain criteria. Cases lacking specific transaction dates for insider trading, those with a time gap exceeding 6 months between buying and selling the stock, or those involving trading securities other than common stocks have been excluded from the analysis. By applying these filters, we aim to maintain the precision and reliability of our estimates of insider trading profitability within the dataset.

The final sample comprises 312 companies involved in 512 different insider trading cases, spanning the period from 2006 to 2018. To ensure consistency, the sample period is limited to 2018 as it is the latest year for which provincial legal environment measures in China are available (refer to Wang, Fan, and Yu (2017) for more details on these measures). Figure 1 illustrates the frequency of insider trading cases categorized by the region in which the shares of listed companies are registered. Our analysis reveals a notable trend, wherein areas with well-developed rule of law also exhibit higher levels of economic development and greater information transparency. Additionally, the regional legal environment shows a direct correlation with the number of illegal insider trading cases in each region.

<Insert Figure 1 Near Here>

3.2 Variables construction

3.2.1 Dependent variable

Insider Trading Excess Returns: The return of illegal insider trading (adjusted gains from illegal insider trading) can be found directly in legal documents or calculated based on the trading volume and stock price in each case, which are common criteria for convictions. We calculate the holding period raw insider trading return (ret_{Raw_i}) in each case based on the number of shares traded, the amount of illegal income and trading dates, as revealed in legal documents:

$$ret_{Raw_i} = \frac{\text{Amount of illegal income}_i}{\text{Trading volume}_i * \text{Closing Pricing of Purchasing date}_i} \quad (1)$$

Next, to estimate the excess return earned by insider traders based on nonpublic information, we construct buy-and-hold abnormal return ($BHAR_i$), calculated as the difference between the raw return and the return during the insider trading holding period ($ret_{Benchmark_i}$).

$$ret_{benchmark_i} = \frac{\text{Closing Pricing of Selling date}_i - \text{Closing Pricing of Purchasing date}_i}{\text{Closing Pricing of Purchasing date}_i} \quad (2)$$

As shown in the legal documents of several cases, insider trading occurs on various days. For those cases, the average daily closing prices during trading dates are estimated.

3.2.2 Main independent variables

Legal Environment: We measure the provincial legal environment with the Marketization Index of China's Provinces, a provincial market development index proposed by Wang, Fan and Yu (2017)⁴. The index is composed of five subcategory indicators where the group "market intermediaries and legal environment" comprises two indices: the development of market intermediaries such as law companies, claims adjusters, association of lawyers and other institutions ($LAW^{Institution}$), and the provincial legal environment index ($LAW^{Environment}$). The utility of these indices is clearly supported in prior studies for understanding the impact of different levels of the local legal environment on economic development, provincial financial development, target companies' fraudulent activities, etc. (Guo, Luo and Li, 2021; Shen et al., 2022). By leveraging these well-established indices, we can confidently examine the interplay

⁴ The data of local legal environment is continuously updated on a two-year basis and available at <https://cmi.ssap.com.cn/>.

between the legal environment and insider trading profitability in China's capital market and derive meaningful implications for market efficiency, investor protection, and policy formulation.

The effect of the accessibility of local judicial resources on the efficiency of law enforcement, the index of provincial judicial resources ($LAW^{Resources}$) of Gao et al. (2016) is also used. This index measures the number of legal facilities at the provincial level including the number of licensed lawyers and the number of offices that provide legal services.

Ex ante Legal Risk: Various studies have documented the implications of accounting and financial irregularities, such as financial fraud, on corporations. When companies engage in such irregularities, they often face regulatory punishments, leading to negative stock market returns and higher capital costs (Wells, 2017). However, it is important to note that in practice, we can only observe companies that have committed accounting and financial irregularities and have been detected by regulators. The inclination to commit irregularities and the specific procedures followed by regulators during investigations are not directly observable.

To address this limitation, we employ a methodology inspired by Kim and Skinner (2012) and Dai et al. (2016). Using probit regression, we estimate the probability of a company's risk exposure to regulatory punishments due to accounting and financial misconduct behaviors ($lnRISK$) at the company level. This approach allows us to estimate the likelihood of companies being exposed to regulatory sanctions based on historical data for all sample companies during the sample period.

By quantifying $lnRISK$, we can gain valuable insights into the risk exposure of companies to potential regulatory punishments for accounting and financial irregularities. This information will help us better understand the relationship between insider trading profitability and companies' regulatory risk, offering valuable implications for market participants and policymakers.⁵ We then use the predicted value to measure company-level *ex ante* legal risk. The data on administrative penalties have been issued by the CSRC regarding the target companies' violations of laws and regulations.

⁵ Specifically, we run a regression in which the dependent variable equals one if a regulatory punishment decision is filed against a company in a given year and zero otherwise. The independent variables include company size, sales growth rate, daily turnover, cumulative returns standard deviation of daily returns, skewness of daily returns and indicators for special treated (ST) companies. All independent variables are lagged one year to alleviate concerns over endogeneity.

3.2.2 Control variables

We follow prior research when accounting for the determinants of stock returns, including ownership structure, company size, book-to-market ratio, past returns, etc. These data are collected from the China Stock Market & Accounting Research (CSMAR) database. Following Kacperczyk and Pagnotta (2020), we construct case-level characteristics including stock holding length, the number of participants, and financial backgrounds of insiders from legal documents. We merge the data from legal documents with company characteristics using stock name as an identifier and maintain a two-month lag between the dependent variable and company fundamentals to ensure that company fundamental information is disclosed and publicly available.

<Insert Table 1 Near Here>

3.2.3 Regression models

Legal documents are a valuable source of information for our research on insider trading cases and form the basis of our research design. Crucial factors that influence insiders' stock trading activities, such as the potential cost of violating the law, may not be explicitly mentioned in these documents. This omission of relevant information can lead to biased and inaccurate results, introducing an omitted variable bias. Furthermore, the concept of the provincial legal environment is highly complex and comprehensive. It encompasses numerous company-level factors that are influenced by laws to varying degrees, and these factors may also impact the progress of the rule of law in the region. The underlying reverse causality can potentially lead to an overestimation of the influence of the legal environment on our target variables.

To address these challenges and limitations, we must carefully consider the potential biases and causal relationships in our research design. Supplementing our analysis with other data sources and employing robust statistical techniques can help mitigate these issues and strengthen the validity and reliability of our findings. It is essential to approach the analysis with caution, considering the nuances and complexities of the legal and economic factors influencing insider trading profitability.

In our research design, we employ two different regression models to verify the mechanism driving the factors influencing insider trading excess return: one includes only the

variable related to the provincial legal environment (equation 3) and another adds all controlling variables (equation 4). By comparing the results from these two models, we can assess the likelihood of significant omitted variables in our analysis.

Additionally, to address the issue of potential biases and causal relationships, we employ lagged company characteristics variables in the regression. This ensures that all information regarding the controlling variables is public when insider trading occurs, thus reducing the problem of counterproductive causality. Finally, if the sample size permits, we incorporate two dummy variables in the analysis. The first-class industry classification of the target companies by the CSRC and the year in which insider trading activities occur can help account for additional factors that may influence excess insider trading return. By carefully considering these aspects and employing appropriate statistical techniques, we aim to enhance the robustness and reliability of our findings and provide valuable insights into the factors influencing illegal insider trading profitability in China's capital market. The baseline models are defined as follows:

$$BHAR_{i,j,t} = \alpha_0 + \alpha_1 LAW_{i,j,t} + Ind_{i,t} + Year_t + \varepsilon_{i,j,t} \quad (3)$$

$$BBHAR_{i,j,t} = \alpha_0 + \alpha_1 LAW_{i,j,t} + \alpha_2 Firm\ Characteristics_{i,j,t} + Ind_{i,j,t} + Year_t + \varepsilon_{i,j,t} \quad (4)$$

where, in model (4), *Law* represents the indicators of the legal environment ($LAW^{Institution}$, $LAW^{Environment}$, $LAW^{Resources}$) at the province where company *j* is registered and insider trading take place at year *t*, and labelled as case *i* in our sample where a company is registered. For detailed description of the *company Characteristics* refer to the control variables mentioned in section 3.2.2.

3.2.4 Summary statistics

We provide the summary statistics for the main variables used in this study. The average excess insider trading return shown in Figure 2 is negative in 008, 2009, 2016-2018, indicating that illegal insider traders do not outperform the market even when they trade using nonpublic news. This finding is consistent with the phenomenon identified by Sha et al. (2020), i.e., “the puzzle of low returns of insider trading” in the Chinese stock market. For the control variables, we find high variety across different provinces in China. Provinces with well-developed legal

environments are also the provinces where the level of economic development and information transparency is higher. Additionally, we find that the legal environment is positively related to the proportion of cases of insider trading.

For the quality of insider information, statistics in Table 2 show that only 18.8% of the M&A insider information ultimately led to traceable M&A events. This indicates the “shell company” nature of the target companies and a relatively high level of uncertainty (Liu et al., 2019) during M&As in China. For the control variables, the average book-to-market ratio of insider information is only 0.393, and the ROE is 0.002, indicating that our target companies tend to be overvalued and less profitable. We also find that institutional ownership is relatively low, as approximately 30% of these companies are state-owned.

<Insert Figure 2 Near Here>

<Insert Table 2 Near Here>

Before regression analysis, we conduct univariate analysis to explore the potential relationship between the distribution of excess returns of insider trading and the legal environment. The annual indices of the legal environment of the provinces where the companies involved in insider trading are registered are classified into a high-level group or low-level group according to the median. As multiple companies may correspond to the same interprovincial legal environment data, samples with values equal to the median are classified into the low-level group, and samples with values higher than the median are classified into the high-level group.

Table 3 presents the variations in excess insider trading return between the high-level group and low-level group based on the legal environment indices. The data analysis highlights how the differences in the legal environment affect the profitability of insider trading in the two groups. The high-level group refers to areas or provinces with a well-developed legal environment, while the low-level group represents regions those with a less developed legal environment. By comparing the excess insider trading returns in these two groups, we can discern the impact of the legal environment on the profitability of illegal insider trading activities. The table displays the relevant statistical measures and significance levels to assess

the significance of the differences in excess returns between the two groups. The results shed light on the relationship between the strength of the legal environment and the expected returns of insider trading, providing valuable insights into how legal regulations and enforcement mechanisms influence the financial misconduct in the capital market.

Clearly, the mean and median values of excess insider trading return in the sample group where the legal environment ($LAW^{Institution}$ and $LAW^{Environment}$) is better are higher than those in the sample group where the legal environment is worse, and both differences are significant at the 1% level. For the index of legal resources ($LAW^{Resources}$), which reflects the quality of legal service in a province more directly, the mean value of excess insider trading return for the high-level group is still significantly higher than that of the low-level group. Hence, this univariate test verifies our expectation, i.e., the stronger the rule of law is in the province where a company involved in insider trading is registered, the higher the excess return.

<Insert Table 3 Near Here>

4. Empirical results

4.1 Legal environment and excess return of insider trading

To further investigate the possible determinants of illegal insider trading return, we perform multivariate cross-sectional analysis. Table 4 reports the regression results of model (4), listing the coefficients of the three provincial legal environment indices ($LAW^{Institution}$, $LAW^{Environment}$ and $LAW^{Resource}$) in columns 1 to 3. The model includes all controlling variables to account for potential influences on excess insider trading return, allowing us to examine the specific impact of the legal environment on insider trading profitability.

The coefficients of the three provincial legal environment indices indicate the strength and direction of the relationship between the legal environment and excess insider trading return. A positive coefficient suggests that a more developed legal environment is associated with higher excess returns from insider trading, while a negative coefficient indicates a potential deterrent effect on insider trading profitability. This analysis provides insights into the extent to which the legal environment affects insider trading returns and the implications of effective law enforcement. The findings presented in Table 4 contribute to our understanding of the role of legal systems in shaping the behavior of market participants and the overall integrity of the

capital market.

After accounting for the effects of all other variables in the model, the legal environment still demonstrates a significant positive influence on the level of excess insider trading return. This means that in regions with a more developed and effective legal environment, insider traders tend to achieve higher excess returns from their illegal trading activities. The significant positive influence of the legal environment on excess insider trading return highlights the importance of legal regulations and enforcement in curbing insider trading activities and maintaining the integrity of the capital market. It confirms that efforts to enhance the legal system and strengthen regulatory measures can play a crucial role in deterring insider trading and promoting fair and transparent financial markets (Dupont and Karpoff, 2020).

These regression results suggest that as the level of development of the legal environment increases by one standard deviation, excess insider trading return will increase by 2.77% to 5.78%. As the average transaction (purchase) amount of insider trading cases in this paper is as high as 54 million RMB, as the level of development of the legal environment improves, its influence on the amount of illegal income among insider traders becomes extremely considerable. Hence, the more advanced the construction of the legal environment, the higher the uncertainty of acquiring illegal income. Insiders with a connection to original sources of information can therefore generate higher “monopoly profits” (Gębka et al., 2017).

<Insert Table 4 Near Here>

4.2 Legal environment and excess return of insider trading: the mediating role of legal risk

The above analysis shows that differences in provincial legal environments can explain excess return of insider trading. Since heterogeneity in the legal environments of different areas leads to different degrees of development of their financial markets, we further explore the impact of the legal environment on the risk and performance of individual financial assets. This provides insights into the mechanism of the relationship between legal regulations and enforcement practices and investors' perceptions of risk and return. For example, a stronger legal environment that effectively penalizes illegal activities may lead investors to perceive lower risk associated with certain assets, leading to higher demand and potentially higher asset prices.

Furthermore, understanding the impact of the legal environment on asset price dynamics can shed light on the efficiency and fairness of financial markets. If a robust legal system enhances the overall confidence of investors and reduces information asymmetry, it may lead to better price discovery and more accurate valuation of financial assets. Therefore, investigating the relationship between the legal environment and the risk and performance of individual financial assets can provide valuable information for policymakers, market regulators, and investors in shaping effective policies and strategies to promote healthy and transparent financial markets.

The uneven development of economic growth and legal environments across different provinces in China can have a significant impact on the behavior of insider traders and the overall dynamics of financial markets. As mentioned earlier, provinces with more developed legal environments are likely to have stricter enforcement of insider trading regulations, leading to higher detection and punishment rates for illegal insider trading activities. This, in turn, increases the costs and risks associated with engaging in insider trading, which may deter some potential insider traders from committing such illegal activities.

On the other hand, provinces with weaker legal environments and limited regulatory resources may have lower detection and enforcement capabilities, making it relatively easier for insider traders to engage in illegal activities without facing significant consequences (Yu and Yu, 2011). As a result, insider trading may be more prevalent in such regions, leading to potential distortions in market efficiency and investor confidence.

The studies by Mazza and Wang (2021), Wang (2013), and Kwabi et al. (2019) highlight how stronger securities law enforcement can act as a deterrent for companies engaging in fraudulent activities and insider traders seeking to exploit information asymmetry. By reducing the value of companies with higher risks of violating laws and regulations, the legal environment creates a disincentive for insider traders who may be targeting these companies. Therefore, the variation in legal environments across different provinces in China can influence the behavior of insider traders, affecting their expected returns and costs of misconduct. A stronger legal environment and more robust law enforcement can contribute to market integrity and investor protection by deterring insider trading and other financial misconduct. On the other hand, weaker legal environments may pose challenges in effectively curbing insider trading

activities and maintaining market fairness and efficiency.

The findings from this research suggest that observable differences in the development of the legal environment in different regions are closely related to the likelihood of local companies' illegal activities, such as insider trading, being detected and investigated by legal authorities and securities regulators. When the legal environment is more advanced and robust in a company's registration location, there is a higher probability that illegal insider trading activities conducted by the company will come under scrutiny. The reasons for this association are multifaceted. A well-developed legal environment typically means stronger law enforcement, better regulatory capabilities, and more effective mechanisms for detecting and investigating financial misconduct (Aitken et al., 2015; Adams et al., 2018). In such regions, legal authorities and securities regulators are more likely to proactively pursue cases of insider trading and other illegal activities, leading to a higher risk of detection for those engaging in such practices.

Moreover, a strong legal environment sends a clear signal of zero tolerance towards financial misconduct, including insider trading. This acts as a deterrent to potential wrongdoers, as they are aware of the higher likelihood of facing severe consequences if caught engaging in illegal activities. This increased external risk of detection and punishment may discourage insider traders from attempting to exploit insider information for illegal gains. Thus, the research findings support the idea that the level of legal environment development in a company's registration location has a significant impact on the probability of insider trading being detected and investigated. This has implications for policymakers, as it highlights the importance of strengthening legal frameworks and law enforcement capabilities to enhance market integrity and investor protection, particularly in regions where the legal environment may be relatively weaker. By doing so, it can help deter illegal activities and promote fair and transparent financial markets.

Therefore, in consideration of the above issues and to clarify their significance in this study, the expected return of insider traders needs to be compensated by a corresponding risk premium. Based on equation (4), the following model of the mediation effect by Wen et al. is used to examine this mechanism:

$$Med = \beta_0 + \beta_1 Law + \beta_2 Firm\ Characteristics + Ind + Year + \varepsilon \quad (5)$$

$$BHAR = \gamma_0 + \gamma_1 Med + \gamma_2 Law + \gamma_3 Firm\ Characteristics + Ind + Year + \varepsilon \quad (6)$$

Med is the mediation variable, or the risk of violations that a company faces. As described above, we use *ex ante* legal risk to measure the probability of insider traders' activities being detected by regulators. The controlling variables of company characteristics remain unchanged, consistent with equation (4).

To examine whether the impact of the provincial legal environment on insider traders' returns is mediated by company-level *ex ante* legal risk, we employ a mediation analysis. We aim to understand the underlying mechanism or pathway through which an independent variable (in this case, the provincial legal environment) influences a dependent variable (insider traders' returns), and whether this influence is mediated by a third variable (company-level *ex ante* legal risk). This analysis provides a deeper understanding of the mechanisms driving the relationship between the provincial legal environment and insider traders' returns and whether the legal risk faced by companies due to the legal environment plays a role in shaping insider trading profitability. The results of this analysis can provide valuable insights into the interaction between legal environment, legal risk, and insider trading returns, and contribute to the understanding of the factors influencing insider trading behavior in the Chinese stock market.

As shown above in Table 3, a difference in the provincial legal environment has a significant positive influence on excess insider trading return. Consequently, whether the impact of the legal environment on companies' risk of violations (β_1) is significant is further examined. Additionally, legal risk is added to the explanatory model of excess insider trading return, and whether its coefficient (γ_1) is significant is examined. If both β_1 and γ_1 are significant, then γ_2 in equation (5) is examined. If γ_2 is nonsignificant, the risk of violation functions as a complete mediation effect. Alternatively, if γ_2 is significant, the risk of violation functions as a partial mediation effect. Finally, if either β_1 or γ_1 is insignificant, a Sobel test is needed. If this test result is significant, then the mediation effect is significant; otherwise, the effect is insignificant.

Table 5 reports the regression results of model (5). Both the level of the legal environment and the level of legal services are positively associated with the risk of being investigated for insider trading at the company level. This means that when the level of the legal environment rises by 1 standard deviation, the possibility that an insider trader is investigated increases by 1.99% to 2.66%. This result can be cross-verified in terms of logic and mechanism verification using Sun et al. (2021). These authors also focus on the impact of a company's legal risk on its investors' behavior, and further demonstrate that institutional environment positively affects the governance of listed companies' regulation violations.

<Insert Table 5 Near Here>

Table 6 presents the regression results of Equation (6), which includes a mediator variable of company-level legal risk in addition to the variables from Equation (4). The inclusion of the mediator variable allows researchers to explore the mediating role of company-level legal risk in the relationship between the provincial legal environment and insider traders' returns. This mediation analysis helps in understanding how company-level legal risk acts as an intermediate factor in explaining the influence of the provincial legal environment on insider traders' returns. It offers valuable insights into the underlying mechanisms through which legal environment factors impact insider trading profitability in China's capital market.

The coefficients reported in Table 6 represent the estimated effects of each variable, including the provincial legal environment indices, company-level legal risk, and other control variables, on insider traders' returns. We show that both the development level of the provincial legal environment and companies' legal risk are significantly and positively correlated with excess insider trading return and that both are significant above the 5% level. The result is consistent with the expectation that company-level legal risk is a risk factor that must be taken into consideration by insider traders to acquire benefits. Table 6 therefore supports our hypothesis, showing that risk exerts a significant partial mediation effect between the legal environment and excess insider trading return. Since litigation risk is measured in log, the coefficient of logarithmic risk, *lnRisk*, can be interpreted as the basis change to return. Specifically, a 1% increase in the litigation risk of insider information's target company is associated with a 17.2 basis point (coefficient of *lnRisk* is 0.172 in column 3, Table 6) to 18.1

basis point (coefficient of $\ln Risk$ is 0.181 in column 1) increase in committing certain illegal insider trading.

<Insert Table 6 Near Here>

4.3 Robustness tests

4.3.1 Control for sampling bias

To test the mediation effect, the indirect effect of the provincial legal environment on insider traders' returns through company-level legal risk needs to be estimated. If the indirect effect is statistically significant and the direct effect of the legal environment on insider traders' returns becomes non-significant or decreases substantially after accounting for the mediator, it suggests that company-level legal risk partially or fully mediates the relationship. To address sampling bias given the limited observations, we use a bootstrap method to construct the inference parameters of the statistics. The results reported in Table 7 indicate that while the bootstrap method reported statistics lower than those of the t tests, the impact of the legal environment variables on insider trading gains remains significant and positive.

<Insert Table 7 Near Here>

Hence, we follow Wang (2013) and Cline and Posylnaya (2019) and use the Heckman estimation to address bias due to missing samples. The use of Heckman estimation is needed, in the context of insider trading research, due to the partial observability of the sample since some insider traders may not be detected and prosecuted, leading to a potentially biased sample that may not fully represent the true population of insider trading cases. In this instance, the purpose is to estimate the influence of the construction of the rule of law (x) on excess insider trading return (y) in terms of the statistical population:

$$y = \alpha + \beta_1 x + \beta X + \varepsilon \quad (7)$$

However, the influence can only be observed when insider trading cases are observable ($S=1$):

$$Sy = S\alpha + \beta_1 Sx + \beta SX + S\varepsilon \quad (8)$$

As whether insider trading is investigated by regulators is a binary variable, the condition for obtaining an unbiased estimation of β_1 from equation (8) is the uncorrelatedness between

ε and Sx . Now, the determining factor of whether insider trading is investigated is defined as follows:

$$S = F(X', \varepsilon') + \eta \quad (9)$$

In equation (9), X' is an observable controlling variable, while ε' is the choice factor that is unobservable in the sample data. $F(X', \varepsilon')$ is the function that determines whether insider trading is likely to be discovered by regulators. Under the circumstance that X' and X may have partial overlap, the estimation of the first equation is biased if a certain omitted variable interferes with the process of estimating ε and ε' simultaneously.

The possible estimation bias caused by sampling bias is corrected with Heckman's two-step method. Regarding listed companies' fraudulent activities in the US capital market, Wang (2013) examines the partial observability problem of the company fraud phenomenon using the same principle. For clear data with a truncated distribution, the inverse Mills ratio (IMR) is constructed following mainstream studies as follows:

$$IMR = E(\varepsilon|D) = f(x) = \begin{cases} \varphi(F(X', \varepsilon')/\phi(F(X', \varepsilon'))), & \text{if } S = 1 \\ -\varphi(F(X', \varepsilon')/(1 - \phi(F(X', \varepsilon'))), & \text{if } S = 0 \end{cases} \quad (10)$$

$\varphi(\cdot)$ and $\phi(\cdot)$ are the density function and the cumulative distribution function of a standard normal distribution, respectively.

Studies on insider trading (Biggerstaff et al., 2020; Cline and Posylnaya, 2019; Fama and French, 2010) have shown that such a partial observability factor comes from two aspects. The first is the failure of insider trading detection due to ineffective law enforcement (Biggerstaff et al., 2020; Kacperczyk and Pagnotta, 2020). To obtain leniency, insider traders may take actions such as voluntarily confessing to a crime with evidence that is not yet available to judicial authorities. Although there is no "plea bargaining" mechanism in the Chinese legal system, the phenomenon of confessions is not in the minority in our target cases of insider trading punishment, since many criminal suspects seek leniency through this mechanism (Mazza and Wang, 2021).

Following Cline and Posylnaya (2019) and Sha et al. (2020), we examine the probability of involvement in illegal insider trading activities ($Prob(S_{litigation} = 1)$) for all companies in the capital market, identifying them through the probit model. To identify insider trading, we use all the company characteristic variables (*Firm Characteristics*), including a company's

ratio of shares held by institutional investors, whether its ultimate controlling owner is a state-owned enterprise, etc. Equation (9)'s empirical analysis model is thus expanded and estimated as follows:

$$Prob(S_{litigation} = 1) = a + b_1 Firm\ Characteristics + \eta \quad (11)$$

The second factor that leads to the partial observability of illegal insider trading is that certain forms of insider trading with extremely high returns go undetected and thus escape punishment, causing omitted observations with high profitability. Fama and French (2010) and Huang et al. (2019) suggest that both the luck and antidetection trading skills of an insider trader can lead to a higher probability of earning an extremely high profit.

To estimate the expected insider trading return $F(X', \varepsilon')$, we concompany the form of function $F(X', \varepsilon')$ by introducing the determining factors of asset pricing estimation according to the efficient market hypothesis. Based on the model of Li and Luo (2016), we construct a probit model with 4 variables including company size ($lnME$), book-to-market ratio ($lnBE/ME$), accumulated profit (MOM), and turnover rate ($TURNOVER$) to explain the probability that the amount of illegal income in cases of insider trading ranks in the top 30% among all cases $Prob(S_{profit} = 1)$. Similarly, the empirical model of equation (9) is written as follows:

$$Prob(S_{profit} = 1) = a + b_1 lnME + b_2 lnBE/ME + b_3 MOM + b_4 TURNOVER + \eta \quad (12)$$

Adding the IMRs calculated with estimations from equation (11) and equation (12) as the control variable mitigates the two potential types of sampling bias. The model, after correction for potential sampling bias, is shown in equation (13):

$$BHAR_{i,j,t} = \alpha_0 + \alpha_1 LAW_{i,j,t} + \alpha_2 Firm\ Characteristics_{i,j,t} + \rho IMR_{i,j,t} + Ind_{i,j,t} + Year_t + \varepsilon_{i,j,t} \quad (13)$$

Specifically, the requirement for identifying sampling bias with the model in equation (12) is that the excludability constraint must be satisfied when estimating X' . In other words, X' is assumed to have no direct influence on Sy and can only impose an indirect influence through IMR . This requirement can be satisfied by the underlying logic of this model. The primary variable of attention y is excess insider trading return whose determining factors should not

be public fundamental information such as company size, growth, and accumulated profit but the impact of insider information itself on the expected return of assets.

In terms of our variables in the first-stage regression X' , the predictability of $\ln ME$, $\ln BE/ME$ and MOM for Chinese listed companies' ROA is robust (Liu et al., 2019). We find that the correlations between y and the four variables incorporated in the first-stage regression are not higher than 0.05, entailing the assumption that the correlation between X' and y is statistically and economically insignificant. Thus, Heckman's two-step method is used to estimate the model. The results in Table 8 thus indicate that after controlling for two types of sampling bias, the impact of the progress of the rule of law on excess insider trading return remains robust.

<Insert Table 8 Near Here>

4.3.2 Alternate dependent variable

To further examine the robustness of the impact of legal environment differences on insider trading return, we calculate the basis rate of return with the highest prices during the period when insider traders buy or sell stocks and re-estimate excess insider trading return to control for the influence of insider traders' market timing ability on their rate of return. That is, this approach provides an insight into whether insider traders can outperform the market based solely on their timing ability or if there are additional factors, such as their access to non-public information, which contribute to their higher returns. Overall, this approach provides additional evidence of the impact of legal environment differences on insider trading return. If the excess insider trading return remains significantly higher even after considering the basis rate of return, it strengthens the argument that legal environment differences play a crucial role in determining insider trading profitability. Conversely, if the excess return is not significantly different from the basis rate of return, it may suggest that insider traders' market timing ability is the primary driver of their higher returns, rather than legal environment differences. Table 9 shows these results, which are consistent with the conclusion in prior discussions, that is, the progress of the rule of law is significantly and positively correlated with excess insider trading returns.

<Insert Table 9 Near Here>

4.3.3 Alternate proxy of key independent variables

To address concerns about the potential bias from accidental correlation that could arise if continuous variables are used directly in a regression, we follow Wang et al. (2019), and change the continuous indices of legal environment differences with dummy variables (provinces whose values are higher than the average = 1, the others = 0) and incorporate them into the regression. The use of dummy variables also simplifies the interpretation of the regression results. The coefficients of the dummy variables represent the average differences in insider trading return between provinces with higher legal environment values and those with lower values. This allows for a straightforward comparison of the impact of legal environment differences on insider trading return across different provinces. These results are presented in Table 10 and are consistent with the previous results discussed, that is, excess insider trading return that occurs in provinces where the progress of the rule of law is further developed than the national average, is significantly higher than insider trading return in other provinces, and the risk of company violations is the mediating factor in this relationship.

<Insert Table 10 Near Here>

5. Additional analysis

5.1 Heterogeneity analysis

Heterogeneity analysis is a crucial step in exploring the generalizability of research findings across different contexts and settings. In the context of this study, on the impact of local legal environment on insider trading return, heterogeneity analysis involves examining whether the observed phenomenon holds true across various subgroups or regions. This approach is employed to help determine if the relationship between legal environment and insider trading return remains consistent across different provinces or regions in China.

In China, the practices of local judicial authorities are often affected by the central judicial authority (Ding, 2015; He and Lin, 2017). Thus, it may be necessary to examine the potential influence of proximity to the central judicial authority on the practices and outcomes of insider trading investigations and adjudication. For example, the adjudication criteria of the regulatory authorities in the Beijing-Tianjin-Hebei region, which is relatively close to the CSRC, are

significantly different from those of the regulatory authorities in other regions, and the mechanism of this phenomenon might also influence our findings. Therefore, as an additional test, we consider insider trading cases grouped according to the distance between their occurrence location and the CSRC: “near” for insider trading cases occurring in the Beijing-Tianjin-Hebei region close to the CSRC and “far” for other provinces.

Based on equation (4), the regression results for grouped samples are displayed in Table 11, and excess insider trading return is subject to the influence from top-level law-enforcing and regulating authorities. Insider trading that occurs close to the political center has a greater effect on its profitability. Depending on the measure in the legal environment, the difference can range from 10 times (see columns (5) and (6)) or 38 times (see columns (1) and (2) or (3) and (4), respectively). This heterogeneity is in line with Chen and Liu (2022), who found that the closer to Beijing, the stricter the capital market inspection, and the more significant the relationship between an insider trader’s expected return and local legal environment.

<Insert Table 11 Near Here>

Local judicial departments in China may prioritize the investigation and punishment of serious cases of law and regulation violation. This practice aligns with the general principle of upholding the rule of law and ensuring accountability for illegal activities. In the context of insider trading and other financial misconduct, relative enforcement priorities is essential for maintaining market integrity and investor confidence. The publication of "guiding cases" by judicial departments in China is an important mechanism for sharing new approaches and thoughts on handling cases, which can provide guidance and standardization for law enforcement agencies across the country. When a major case in the capital market is investigated and handled in a certain province, it may receive heightened attention from both local and central authorities. This can lead to a strengthening of local law enforcement efforts, especially in areas relevant to the case.

With improved law enforcement and greater scrutiny from authorities, there is an increased likelihood of uncovering and exposing insider trading activities in the local capital market. The higher vigilance and resources directed toward addressing financial misconduct can act as a deterrent, making insider traders more cautious about engaging in illegal activities and

increasing the likelihood of detection and prosecution. This approach of focusing on major cases and using them as guiding examples can foster a more robust legal environment in the local capital market and contribute to reducing insider trading and other forms of financial malpractice. Additionally, it demonstrates the commitment of Chinese authorities to enforcing laws and regulations and maintaining the integrity of the financial system.

To test this notion, using public information, we determined whether in the same year when the informed person bought securities through insider trading, the prefecture-level city where these securities were registered had other publicly penalized cases. This additional analysis should provide insights into the relationship between major case investigations and the local legal environment's impact on insider trading activities.

If the review reveals that the prefecture-level city with insider trading cases had a significant number of other publicly penalized cases in the same year, it could support the notion that local authorities were actively investigating and handling serious cases of law and regulation violation. This suggests that the legal environment in that city was relatively strengthened during that time, which may have contributed to the increased likelihood of exposing insider trading activities.

Alternately, if there were few or no publicly penalized cases in the same year in the city where insider trading occurred, it may indicate that the local legal environment was not particularly focused on investigating major cases or that other factors were at play.

The insider trading samples were thus classified into two groups accordingly. According to equation (4), the regression results for the grouped samples are displayed in Table 12. If there are other types of capital market public punishments in the same year, the informed trader is more sensitive to his or her local legal environment. If local law enforcement is strict, an insider trader therefore requires a higher investment return. Results in Table 12 support this notion by showing that insiders are demanding higher returns in such conditions. In the time that legal investigation is occurring, as in column (1), (3) and (5), the premium is positively significant, while at other times, the premium is not stable and even become negative.

<Insert Table 12 Near Here>

The event study conducted by Ferreira (1995), showed that the excess return from insider

trading is stable at 2% in both bull and bear markets in the U.S., a finding that is consistent with insiders' decisions to commit illegal acts not being significantly influenced by market movements. In other words, the profitability of insider trading remains relatively consistent regardless of whether the market is experiencing a bullish (rising) or bearish (falling) trend. This finding is significant since it implies that insiders may have access to non-public information that enables them to make profitable trades irrespective of the overall market direction. It also suggests that the potential risks associated with insider trading, such as legal consequences, may not deter insiders from engaging in such activities.

However, it is possible that the stability of excess returns in both market conditions could also be attributed to other factors, such as the efficacy of insider trading strategies or the level of sophistication of insiders. Thus, further research is needed to explore the underlying reasons for this stable excess return in both bull and bear markets and to better understand the motivations and decision-making processes of insiders in different market conditions.

To provide additional insights into this issue, we split the sample period into bull market and bear markets and re-run our benchmark estimation in different market conditions. The results are reported in Table 13 and show a strong premium when the market is in a bearish mode. In bull markets, the premium is much weaker. The only exception is when legal enforcement is proxied by $LAW^{Resources}$, where the premium seems to be stronger in bull market. The inconsistency in using Gao's legal resource proxy may be due to the sensitivity of our sampling period, where Gao et al. (2016) include a different sampling method.

The results from Table 13, indicating the distinction of insider's profits between bull and bear markets, align with the existing literature on insider trading behavior in emerging markets. For example, in markets where short-selling is restricted or banned, investors can only take long positions, which means they can only profit from a rising market (bull market) by buying and selling at higher prices. In such scenarios, insiders may have a greater incentive and economic benefits to engage in insider trading during bear market conditions.

During bear markets, when all stock prices generally decline, it is difficult for investors to profit from traditional long positions, irrespective of portfolio construction. However, insiders with access to non-public information may have an advantage in identifying declining stocks and avoiding losses or even profiting from short-selling opportunities. This ability to profit in

bear markets provides additional motivation for insiders to engage in illegal insider trading.

The literature on emerging markets⁶ has indeed highlighted the higher profitability of insider trading during bear markets due to the absence of short-selling and the asymmetric access to information. The results from Table 13 add further support to this observation in the context of China's capital market, where short-selling is restricted while insider trading is illegal, and such activities pose significant risks, including legal consequences, reputational damage, and market instability.

<Insert Table 13 Near Here>

5.2 Alternative channels: M&A rumors

As we have noted in the literature review, the conclusion of this paper might be driven by other channels that also influence insider trading return. Hence, we examine whether the following alternative channels explain insider trading return in China's capital market: market rumors, financial literacy, political connections and corporate governance.

In the first instance, investors' expectation of return maybe derived from the information they have. Therefore, the quality and authenticity of this information influences their expected return. Zhou and Sadeghi (2019) find that in the market pricing of IPOs, institutional investors may overreact to rumors that are circulated in the market, increasing the level of investors' expected return. To examine whether rumors influence the level of insider trading return, we follow Sha et al. (2020) and match the M&A data of Chinese listed companies, retrieved from Bloomberg, with the specific insider information mentioned in the legal documents of the target insider trading cases. Dummy variables are then constructed to distinguish whether a case of insider trading is related to the authenticity of M&A information. A dummy variable of 1 is given to insider trading cases that used insider M&A information that matches the real M&A deals in Bloomberg's M&A information. A dummy variable of 0 is given to other types of M&A and insider trading cases, for example, if the trading is driven by rumors. As shown in columns (1) to (4) in Table 13, this regression accounting for the authenticity of M&A information received no supporting evidence. Even though insider trading based on real M&A information can acquire higher excess returns, after adding other variables, such as the legal environment,

⁶ See the references and discussion in for example Tao and Yu (2021).

there is no direct evidence for the hypothesis that the authenticity and accuracy of M&A information influences insider trading return.

5.3 Alternative channels: The financial literacy of insider traders

Second, the level of financial literacy can have a significant impact on investors' stock selection and market timing decisions (Jiang et al., 2021) Financial literacy refers to the knowledge and understanding of financial concepts and instruments, and it plays a crucial role in shaping individuals' investment behavior. In the context of insider trading, informed insider traders, who have access to non-public material information about the company, may use their financial literacy to make more informed and strategic trading decisions. Their superior financial knowledge and understanding of market dynamics may enable them to identify profitable trading opportunities more accurately, both in terms of stock selection and market timing.

We thus extract the financial qualification characteristics of insider traders from the target legal documents and define those who work in the financial industry or finance-related positions as the group with relatively high financial literacy, giving them a dummy value of 1. Other types of investors are given a value of 0. This approach allows determination of whether the difference in financial literacy drives investors' excess insider trading return.

As presented in columns (5) to (8) in Table 14, there is no direct evidence that financial literacy level influences insider trading return. That is, financial industry professionals with high financial literacy have no significant relationship with excess insider trading return. A possible explanation for this is that the influence of financial literacy on asset return is not linear (Yin et al., 2019); therefore, the use of dummy variables simply cannot reveal the complex connection between financial literacy and asset return. However, Sha et al. (2020) find that the impact of the characteristics of those who have insider information, e.g., the number of informed people and their titles, is equally insignificant for excess insider trading return. This result is nonetheless significantly different from Ahern's (2017) finding concerning the characteristics of informed traders. In any case, once more information on insider trading cases is made public, further analysis using these new data may provide additional insights in solving this puzzle in the future.

<Insert Table 14 Near Here>

5.4 Alternative channels: Political connection

Third, insiders are more likely to receive private information from their networks with politicians (Bourveau et al., 2021). The ties linking company's top managers to politicians or regulators encourages insiders' opportunism, which motivates informative trading (Jagolinzer et al., 2020). In addition, the ruling and opposition parties may also have distinctive views towards regulating insider trading (Kacperczyk and Pagnotta, 2020).

Potentially the political tie could benefit insiders where the stock market is commonly perceived to have a weak rule of law. To test this potential mechanism, we obtain the political background of the CEO and board chair of the target company from the CSMAR database. We then set the dummy variable PC_1 equals to one if either CEO or board chair works or previously worked for the government, and zero otherwise. We also set an ordered variable PC_2 ranging from 0-4. The higher value of PC_2 , the higher the position of the politically connected CEO in China's political hierarchy.

Interestingly, the results in Table 15 do not support the view that political connection is a prominent factor in the higher returns to insiders. The proxy for political connection, regardless of its definition, is statistically insignificant in all six columns.

To better understand why political connection is irrelevant in determining illegal insider profits, we carefully read all the legal documents and find that most insiders had a junior or mid-level position in a target company or in an asset management company. The political connection that the insider retains is much weaker than that of the top managers within the company, so their illegal gains are unlikely to be driven by the political factor.

<Insert Table 15 Near Here>

5.5 Alternative channels: Corporate governance

The relationship between the legal environment and corporate governance has been an important research area since La Porta et al. (1998). The development of corporate governance and the legal environment are positively correlated in many influential studies (see, for example: Kim and Skinner, 2012; Morganti and Garofalo, 2019; Kim et al., 2019). However, contrary to the research on the U.S. and other developed economies, corporate governance may serve as an important compliment to the legal environment in emerging economies such as China

(Huang et al., 2012; Mazza and Wang, 2021; Sun et al., 2021) and other economies (Ojah et al., 2020). Additionally, research, such as Miller et al. (2008), has further argued that the quality of corporate governance may carry more weight than law and other institutional regulations for emerging economies. Thus, the relationship we identify between the legal environment and illegal insider returns may be driven by the corporate governance status of the company.

To test whether our results are subject to this alternative explanation, we include several proxies for corporate governance in the benchmark regression, as shown in equation (4), and determine if the coefficient on the legal environment changes. We consider (a) the governance score from Chindices ESG database; (b) Managerial ownership; (c) CEO duality; (d) G-index. These are commonly employed in the relevant literature (see, for example, Alexander and Cumming, 2020 Dai et al 2016 Karpoff et al 2008). The results are presented in Table 16 and show that corporate governance is an independent factor in predicting illegal insider returns. However, this factor does not substitute the role of the legal environment, as we have documented. This finding is consistent with Dai et al. (2016) among others who shows that corporate governance in China insider profitability is insignificant. This implies that the illegal return from a buy-and-hold strategy is unlikely to be affected by corporate governance. We therefore conclude that the predictability of the legal environment to illegal returns are at least independent from the company's corporate governance.

<Insert Table 16 Near Here>

6. Conclusion

This paper investigates how the legal environment impacts the risk premium from illegal insider trading. We use a total of 521 hand-collected legal judgments of illegal insider trading cases from 2006 to 2018 in China to examine the influence of the development of a local legal environment on insider trading return. We demonstrate that the legal environment in the province where the target company operates correlates with excess insider trading return, and the cost of detection significantly affects insider trading return. Specifically, various features in the judicial system, such as the protection of investor rights and the efficiency of the legal process, influence the risk and performance of insider trading. Additionally, we explore the

relevant causal mechanisms, testing the probability that regulators will detect a company's violation of securities law, which further governs the incentives for insider trading by increasing potential legal costs at the company level.

The key findings indicate that a stronger legal environment is associated with higher company-level legal risk, resulting in higher excess insider trading return. We also investigate and dismiss the relevance of "M&A rumors" and "financial literacy" as alternative explanatory mechanisms for insider trading return. These results show that informed insider traders with better financial knowledge do not achieve higher excess trading returns, and traceable information on companies' M&A decisions does not significantly influence the profitability of insider traders.

The study also offers several important implications for enhancing the effectiveness of laws and rules governing illegal insider trading. Firstly, despite improvements in the legal system and more robust enforcement, limited law enforcement resources in different regions of developing and emerging countries like China may hinder the effectiveness of legal regulation, leading to profitable trade opportunities for insiders. To address this issue, it is crucial to establish specialized courts that can unify the key elements of illegal insider trading and judgment criteria. Secondly, illegal insider trading cases often involve diverse perpetrators and complex channels of information transmission. This highlights the need for comprehensive monitoring and surveillance mechanisms to detect and prevent such activities. Regulators could invest in advanced technology and data analytics to identify potential insider trading more efficiently.

Additionally, our findings underscore the importance of financial literacy in mitigating illegal insider trading. Educating market participants about the risks and consequences of insider trading may deter individuals from engaging in such activities. Lastly, to ensure a level playing field and protect investors, continuous efforts to strengthen the legal environment and enforce regulations are essential. Improving transparency, information disclosure, and corporate governance practices can contribute to a fair and well-functioning capital market that discourages insider trading and promotes investor confidence.

In conclusion, financial markets with weak regulatory structures face unique challenges in detecting and preventing insider trading. To address this, it is crucial to enhance their detection

methods, especially when data sharing practices vary across different regions within countries. Adopting real-time warning models that leverage fintech approaches maybe instrumental in identifying suspicious trading activities and potential instances of insider trading.

Furthermore, regulatory authorities need to remain vigilant about more complex variants of insider trading. Although this study focused on insider trading based on non-public good news, they should also be aware of potential exploitations of informational advantage for non-public bad news. This includes investigating abnormal trading activities involving short selling and financial derivatives, as these could also be used to gain an unfair advantage in the market. Overall, continuous efforts to improve the legal and regulatory framework, enhance detection capabilities, and raise awareness about the consequences of insider trading are necessary to foster fair and transparent financial markets that protect investors and promote market integrity.

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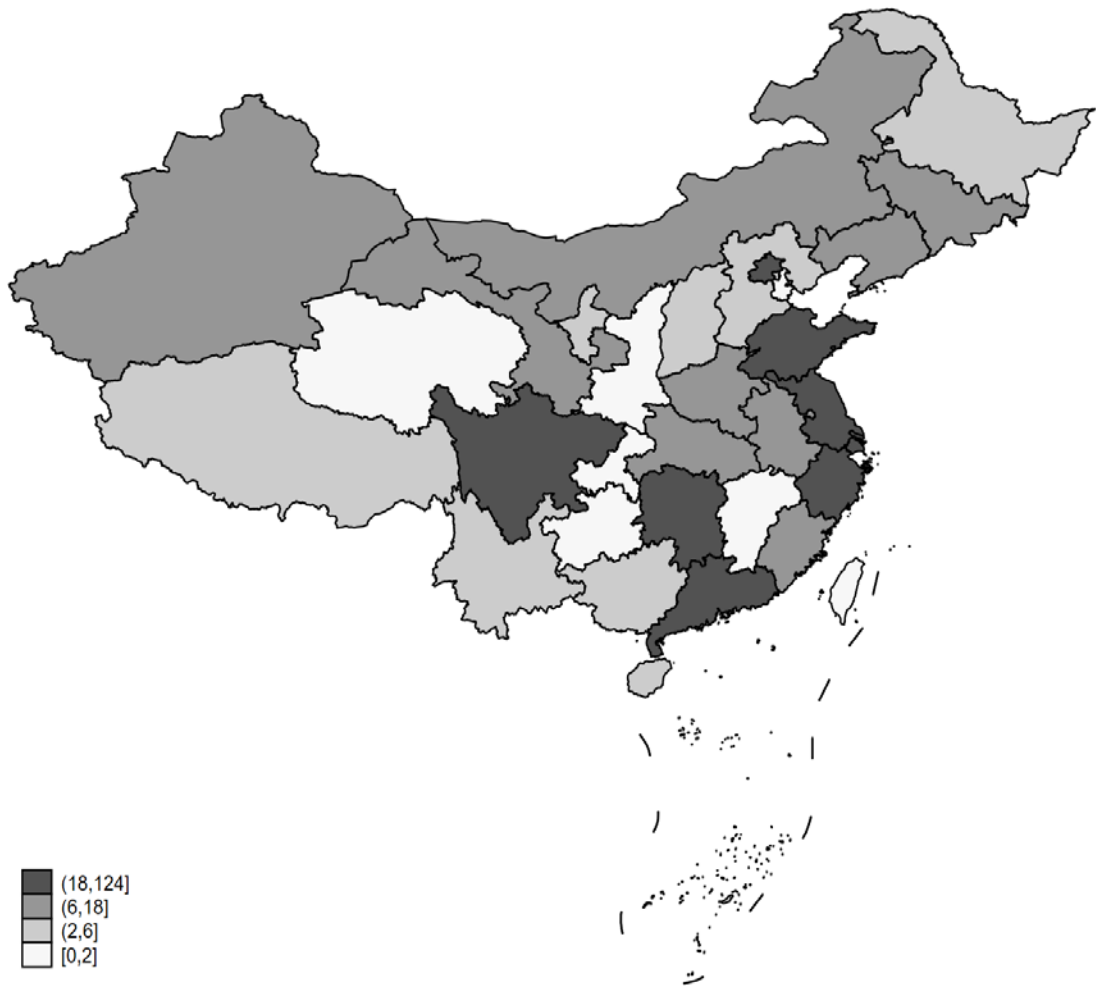


Figure 1: Frequency of illegal insider trading in provinces in China, 2006-2018

Note: The figure plots insider trading frequency by the region in which the shares of listed companies are registered. We find that areas with developed rule of law are usually regions with better economic development and higher degree of information transparency. The regional legal environment is directly proportional to the number of illegal insider trading cases.

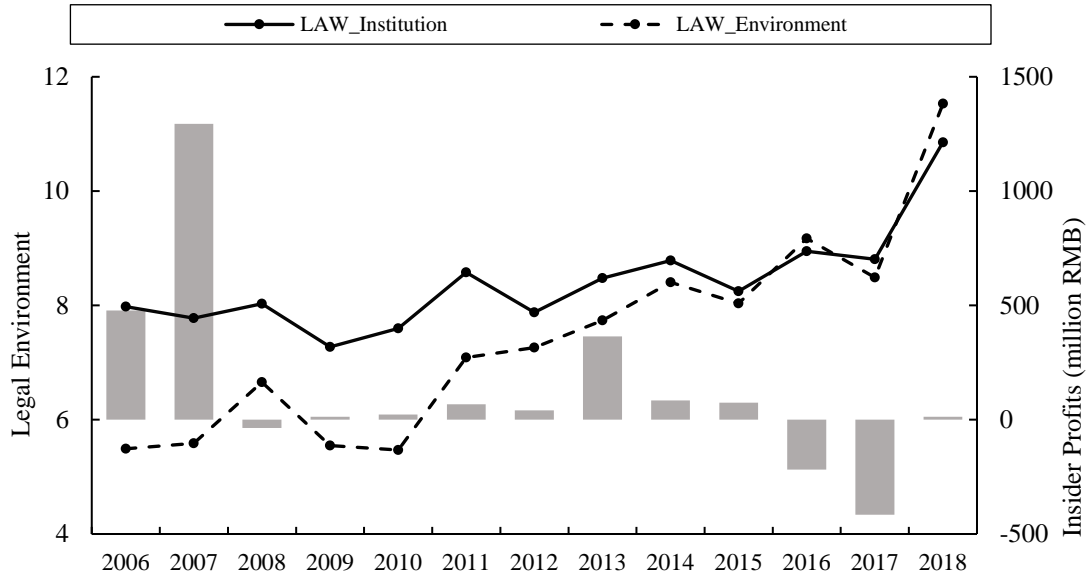


Figure2: Profits from illegal insider trading and the provincial law environment, 2006-2018

Note: The figure plots insider trading profitability by years in which the trading occurred. $LAW^{Institution}$ and $LAW^{Environment}$ are proxies for the quality of the legal environment from Wang, Fan and Yu (2017). See Table 1 for variable definitions.

Table 1. Variable Definitions

| Variable | Symbol | Definition |
|--|----------------------------------|--|
| Dependent variable | | |
| Excess return of illegal insider trading | <i>BHAR</i> | Illegal insider trading gains minus stock returns over the holding period |
| Main independent variable | | |
| Market development index | <i>LAW^{Institution}</i> | Provincial market development index of Fan et al. (2009; 2011; 2013; 2015; 2017). |
| Legal environment index | <i>LAW^{Environment}</i> | Provincial legal environment index of Fan et al. (2009; 2011; 2013; 2015; 2017). |
| Legal resources index | <i>LAW^{Resources}</i> | Provincial legal facilities according to Gao et al. (2016) |
| Ex-ante risk of violation of regulations | <i>lnRISK</i> | Natural logarithm of the probability of legal actions brought by regulators |
| M&A event | <i>DRINFO</i> | Dummy that equals 1 if insider trading is based on traceable M&A event and 0 otherwise |
| Financial literacy | <i>DFINANCE</i> | Dummy that equals 1 if insider trader has finance-related background and 0 otherwise |
| Control variables | | |
| Institutional ownership | <i>FUND</i> | Percentage of shares owned by institutional investors |
| State ownership | <i>DSOE</i> | Dummy that equals 1 if the firm's ultimate controller is the state and 0 otherwise |
| Size | <i>lnME</i> | Natural logarithm of firm's market capitalization in million RMB |
| Book-to-market ratio | <i>lnBE/ME</i> | Natural logarithm of firm's book-to-market ratio |
| Past return | <i>MOM</i> | Cumulative stock return over 6 months prior to insider trading month |
| Turnover ratio | <i>TURNOVER</i> | Average daily stock turnover ratio over 25 days prior to insider trading date |
| Leverage ratio | <i>DEBT/ASSET</i> | Ratio of firm's total debt divided by total assets |
| Return on equity | <i>ROE</i> | Net income divided by the book value of shareholder equity |
| Liquid asset ratio | <i>CASH/ASSET</i> | Ratio of firm's cash holding divided by total assets |
| Firm age | <i>AGE</i> | Number of years firm has been in operation |

Note: Table 1 displays the definitions of the main variables used in this paper. We winsorize continuous independent variables at the 1% and 99% levels.

Table 2. Summary Statistics

| Variable | Obs | Mean | Std | Min | Max |
|----------------------------------|-----|--------|-------|--------|--------|
| <i>BHAR</i> | 521 | -0.114 | 0.676 | -3.774 | 11.567 |
| <i>LAW^{Institution}</i> | 478 | 9.218 | 4.527 | -0.200 | 19.110 |
| <i>LAW^{Environment}</i> | 478 | 8.831 | 4.446 | -0.200 | 16.940 |
| <i>LAW^{Resources}</i> | 491 | 1.047 | 2.843 | -1.211 | 9.893 |
| <i>lnRISK</i> | 493 | 0.037 | 0.016 | 0.018 | 0.098 |
| <i>DFINANCE</i> | 521 | 0.100 | 0.300 | 0 | 1 |
| <i>DRINFO</i> | 521 | 0.188 | 0.391 | 0 | 1 |
| <i>FUND</i> | 521 | 1.442 | 2.335 | 0 | 8.163 |
| <i>DSOE</i> | 521 | 0.296 | 0.457 | 0 | 1 |
| <i>lnME</i> | 521 | 22.149 | 0.926 | 20.682 | 23.881 |
| <i>lnBE/ME</i> | 521 | 0.393 | 0.153 | 0.131 | 0.661 |
| <i>MOM</i> | 521 | 0.168 | 0.324 | -0.326 | 0.825 |
| <i>TURNOVER</i> | 521 | 1.889 | 1.359 | 0.434 | 5.401 |
| <i>DEBT/ASSET</i> | 521 | 0.469 | 0.241 | 0.062 | 0.888 |
| <i>ROE</i> | 521 | 0.002 | 0.098 | -0.350 | 0.101 |
| <i>CASH/ASSET</i> | 521 | 0.546 | 0.215 | 0.138 | 0.883 |
| <i>AGE</i> | 521 | 16.430 | 4.707 | 8.844 | 26.195 |

Note: This table lists the descriptive statistics of the sample. The full sample includes 521 observations from 2006 to 2018. See Sections 3.2.2 and 3.3 for the construction of variables. All continuous variables are winsorized at the 1st and 99th percentiles.

Table 3. Insider Trading Excess Return and Legal Environment:**Univariate Tests**

| Group | Tests for Differences of Mean | | | Tests for Differences of Median | | |
|---------------------------------------|-------------------------------|--------|------------|---------------------------------|--------|------------|
| | N | Mean | Difference | N | Median | Difference |
| Panel A. Group by $LAW^{Institution}$ | | | | | | |
| Low | 282 | -0.137 | 0.085*** | 282 | -0.059 | 0.044*** |
| High | 196 | -0.053 | | 196 | -0.015 | |
| Panel B. Group by $LAW^{Environment}$ | | | | | | |
| Low | 284 | -0.138 | 0.088*** | 284 | -0.051 | 0.033*** |
| High | 194 | -0.050 | | 194 | -0.018 | |
| Panel C. Group by $LAW^{Resources}$ | | | | | | |
| Low | 287 | -0.127 | 0.032 | 287 | -0.051 | 0.021* |
| High | 204 | -0.095 | | 204 | -0.029 | |

Note: This table reports the average and median insider trading excess returns for low and high-level legal environment groups as well as their differences. The sample is divided into high and low-level groups according to the median value of the legal environment indices of firms involved in illegal insider trading cases in each year. The statistics for $LAW^{Institution}$, $LAW^{Environment}$ and $LAW^{Resources}$ are reported in Panels A, B and C, respectively. Tests for the differences in the mean and median across different groups were performed using a Chi-square test. Statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, * respectively.

Table 4. Insider Trading Excess Return and Legal Environment:

| Regression Analysis | | | | | | |
|-----------------------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| Dependent variable: <i>BHAR</i> | | | | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| <i>LAW</i> ^{Institution} | 0.011*** (0.002) | | | 0.012*** (0.003) | | |
| <i>LAW</i> ^{Environment} | | 0.013*** (0.002) | | | 0.013*** (0.003) | |
| <i>LAW</i> ^{Resources} | | | 0.009*** (0.003) | | | 0.008** (0.003) |
| <i>FUND</i> | | | | 0.005 (0.005) | 0.006 (0.005) | 0.0003 (0.006) |
| <i>DSOE</i> | | | | -0.014 (0.027) | -0.013 (0.027) | -0.057** (0.026) |
| <i>lnME</i> | | | | 0.026 (0.019) | 0.026 (0.019) | 0.032 (0.021) |
| <i>lnBE/ME</i> | | | | -0.300*** (0.095) | -0.295*** (0.095) | -0.284*** (0.091) |
| <i>MOM</i> | | | | 0.028 (0.042) | 0.025 (0.041) | 0.092** (0.041) |
| <i>TURNOVER</i> | | | | 0.016 (0.010) | 0.017* (0.010) | 0.008 (0.010) |
| <i>DEBT/ASSET</i> | | | | -0.009 (0.070) | -0.014 (0.070) | 0.067 (0.072) |
| <i>ROE</i> | | | | -0.232 (0.142) | -0.245* (0.142) | -0.107 (0.145) |
| <i>CASH/ASSET</i> | | | | 0.059 (0.056) | 0.042 (0.055) | 0.137** (0.062) |
| <i>AGE</i> | | | | -0.005** (0.002) | -0.005** (0.002) | -0.006** (0.002) |
| Industry Effect | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Effect | Yes | Yes | Yes | Yes | Yes | Yes |
| Constant | -0.235** (0.116) | -0.234** (0.116) | -0.042 (0.125) | -0.757* (0.458) | -0.760* (0.457) | -0.692 (0.436) |
| Adj. <i>R</i> ² | 0.155 | 0.162 | 0.139 | 0.200 | 0.207 | 0.191 |
| <i>N</i> | 478 | 478 | 491 | 478 | 478 | 491 |

Note: This table reports the regression results for the impact of the development of the provincial legal environment on excess insider trading return. Definitions for variables are provided in Table 1. All regressions include industry and year fixed effects. The standard errors reported in parentheses are adjusted for both firm and year clustering effects. Statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, *. For brevity, regression results for model (3) are not included but are available on request.

Table 5. Legal Environment and Legal Risk

| | Dependent variable: <i>lnRISK</i> | | |
|-----------------------------------|-----------------------------------|----------------------|----------------------|
| | (1) | (2) | (3) |
| <i>LAW</i> ^{Institution} | 0.005** (0.002) | | |
| <i>LAW</i> ^{Environment} | | 0.005* (0.002) | |
| <i>LAW</i> ^{Resources} | | | 0.007* (0.004) |
| Firm Characteristics | Yes | Yes | Yes |
| Industry Effect | Yes | Yes | Yes |
| Year Effect | Yes | Yes | Yes |
| Constant | -1.264*** (0.436) | -1.259*** (0.437) | -1.657*** (0.457) |
| Adj. <i>R</i> ² | 0.694 | 0.694 | 0.572 |
| <i>N</i> | 455 | 455 | 464 |

Note: This table reports the regression results on the impact of the development of the provincial legal environment on firm-level legal risk. Definitions of the variables are provided in Table 1. All regressions include unreported industry and year fixed effects. The standard errors reported in parentheses are adjusted for both firm and year-clustering effects. Statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, * respectively.

Table 6. Insider Trading Excess Return and Legal Environment:**The Role of *Ex Ante* Legal Risk**

| | Dependent variable: <i>BHAR</i> | | |
|----------------------------------|---------------------------------|---------------------|---------------------|
| | (1) | (2) | (3) |
| <i>lnRISK</i> | 0.181*** (0.049) | 0.180*** (0.049) | 0.172*** (0.041) |
| <i>LAW^{Institution}</i> | 0.013*** (0.002) | | |
| <i>LAW^{Environment}</i> | | 0.014*** (0.002) | |
| <i>LAW^{Resources}</i> | | | 0.008** (0.003) |
| Firm Characteristics | Yes | Yes | Yes |
| Industry Effect | Yes | Yes | Yes |
| Year Effect | Yes | Yes | Yes |
| Constant | -0.125 (0.418) | -0.130 (0.415) | -0.329 (0.421) |
| Adj. R^2 | 0.237 | 0.244 | 0.221 |
| <i>N</i> | 455 | 455 | 464 |

Note: This table reports regression results of the impact of the development of the provincial legal environment on excess insider trading return, considering the mediation effects of firm-level legal risk. Definitions of the variables are provided in Table 1. All regressions include unreported industry and year fixed effects. The standard errors reported in parentheses are adjusted for both firm and year clustering effects. Statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, * respectively.

Table 7. Insider Trading Excess Return and Legal Environment:

| Bootstrap Method | | | |
|----------------------------------|---------------------------------|---------------------|---------------------|
| | Dependent variable: <i>BHAR</i> | | |
| | (1) | (2) | (3) |
| <i>LAW^{Institution}</i> | 0.012*** (0.002) | | |
| <i>LAW^{Environment}</i> | | 0.013*** (0.002) | |
| <i>LAW^{Resources}</i> | | | 0.008*** (0.003) |
| Firm Characteristics | Yes | Yes | Yes |
| Industry Effect | Yes | Yes | Yes |
| Year Effect | Yes | Yes | Yes |
| Constant | -0.668* (0.404) | -0.662 (0.414) | -0.731 (0.557) |
| Adj. <i>R</i> | 0.200 | 0.207 | 0.191 |
| N | 478 | 478 | 491 |

Note: This table reports regression results on the impact of the development of the provincial legal environment on excess insider trading return, using the bootstrap method to expand our small sample by random simulation. Definitions of the variables are provided in Table 1. All regressions include unreported industry and year fixed effects. The standard errors reported in parentheses are adjusted for both firm- and year-clustering effects. Statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, * respectively.

Table 8. Insider Trading Excess Return and Legal Environment:**Heckman's Two-stage Method**

| | Dependent variable: <i>BHAR</i> | | |
|--|---------------------------------|---------------------|--------------------|
| | (1) | (2) | (3) |
| Panel A. Controlling for sampling bias based on adjustment for detection of insider trading | | | |
| <i>LAW</i> ^{<i>Institution</i>} | 0.011*** (0.003) | | |
| <i>LAW</i> ^{<i>Environment</i>} | | 0.013*** (0.003) | |
| <i>LAW</i> ^{<i>Resources</i>} | | | 0.008** (0.003) |
| Firm Characteristics | Yes | Yes | Yes |
| Industry Effect | Yes | Yes | Yes |
| Year Effect | Yes | Yes | Yes |
| Constant | -5.466 (4.857) | -5.606 (4.790) | -5.214 (4.971) |
| IMR | 6.043 (6.291) | 6.218 (6.213) | 5.786 (6.485) |
| <i>N</i> | 478 | 478 | 491 |
| Panel B. Controlling for sampling bias based on adjustment for illegal insider trading gains | | | |
| <i>LAW</i> ^{<i>Institution</i>} | 0.011*** (0.003) | | |
| <i>LAW</i> ^{<i>Environment</i>} | | 0.012*** (0.003) | |
| <i>LAW</i> ^{<i>Resources</i>} | | | 0.004 (0.004) |
| Firm Characteristics | Yes | Yes | Yes |
| Industry Effect | Yes | Yes | Yes |
| Year Effect | Yes | Yes | Yes |
| Constant | -0.902 (0.995) | -0.856 (1.215) | -1.656 (1.140) |
| IMR | -0.096 (0.425) | -0.076 (0.667) | -0.617 (0.936) |
| <i>N</i> | 478 | 478 | 491 |

Note: This table reports the regression results of the impact of the development of the provincial legal environment on excess insider trading return using the Heckman (1979) two-step sample selection model. Definitions of the variables are provided in Table 1. All regressions include unreported industry and year fixed effects. The standard errors reported in parentheses are adjusted for both firm and year clustering effects. Statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, * respectively.

Table 9. Robustness Test:
Alternative Dependent Variable

| | Dependent variable: <i>BHAR_{high}</i> | | |
|----------------------------------|--|---------------------|---------------------|
| | (1) | (2) | (3) |
| <i>LAW^{Institution}</i> | 0.013*** (0.003) | | |
| <i>LAW^{Environment}</i> | | 0.015*** (0.003) | |
| <i>LAW^{Resources}</i> | | | 0.010*** (0.003) |
| Firm Characteristics | Yes | Yes | Yes |
| Industry Effect | Yes | Yes | Yes |
| Year Effect | Yes | Yes | Yes |
| Constant | -0.826* (0.492) | -0.829* (0.491) | -0.906** (0.458) |
| Adj. <i>R</i> | 0.223 | 0.230 | 0.195 |
| N | 478 | 478 | 491 |

Note: This table reports the regression results of the impact of the development of the provincial legal environment on excess insider trading return using an alternative proxy of excess return, which is calculated based on the highest price on the insider trading date. Definitions of the variables are provided in Table 1. All regressions include unreported industry and year fixed effects. The standard errors reported in parentheses are adjusted for both firm- and year-clustering effects. Statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, * respectively.

Table 10. Robustness Test:
Alternative Independent Variables

| | Dependent variable: <i>BHAR</i> | | |
|--|---------------------------------|---------------------|---------------------|
| | (1) | (2) | (3) |
| <i>D_LAW</i> ^{<i>Institution</i>} | 0.078*** (0.022) | | |
| <i>D_LAW</i> ^{<i>Environment</i>} | | 0.107*** (0.022) | |
| <i>D_LAW</i> ^{<i>Resources</i>} | | | 0.064*** (0.024) |
| Firm Characteristics | Yes | Yes | Yes |
| Industry Effect | Yes | Yes | Yes |
| Year Effect | Yes | Yes | Yes |
| Constant | -0.654 (0.472) | -0.581 (0.465) | -0.767* (0.439) |
| Adj. <i>R</i> | 0.185 | 0.201 | 0.194 |
| N | 478 | 478 | 491 |

This table reports the regression results of the impact of the development of the provincial legal environment on excess insider trading return by changing the independent variables with dummy variables. Definitions of the variables are provided in Table 1. All regressions include unreported industry and year fixed effects. The standard errors reported in parentheses are adjusted for both firm- and year-clustering effects. Statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, * respectively.

**Table 11. Heterogeneity Analysis:
Geographic Distance from the CSRC**

| | Dependent variable: <i>BHAR</i> | | | | | |
|-----------------------------------|---------------------------------|---------------------|-------------------------|---------------------|---------------------|-------------------|
| | Near (1) | Far (2) | Near (3) | Far (4) | Near (5) | Far (6) |
| <i>LAW</i> ^{Institution} | 0.483*** (0.042) | 0.011*** (0.003) | | | | |
| <i>LAW</i> ^{Environment} | | | 0.483*** (0.042) | 0.012*** (0.003) | | |
| <i>LAW</i> ^{Resources} | | | | | 0.047*** (0.012) | 0.004 (0.004) |
| Firm Characteristics | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry Effect | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Effect | Yes | Yes | Yes | Yes | Yes | Yes |
| Constant | -157.367*** (15.425) | -0.814* (0.481) | -157.367*** (15.425) | -0.821* (0.480) | 3.078*** (0.697) | -0.537 (0.447) |
| Adj. <i>R</i> | 0.975 | 0.206 | 0.975 | 0.212 | 0.774 | 0.204 |
| N | 26 | 452 | 26 | 452 | 31 | 460 |

Note: This table reports the regression results of the impact of the development of the provincial legal environment on excess insider trading return by dividing the sample into two subsamples based on the distance from the listed company's headquarters to the seat of the CSRC (Beijing). Definitions of the variables are provided in Table 1. All regressions include unreported industry and year fixed effects. The standard errors reported in parentheses are adjusted for both firm- and year-clustering effects. Statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, * respectively.

Table 12. Heterogeneity Analysis:**Spillover Effects**

| | Dependent variable: <i>BHAR</i> | | | | | |
|-----------------------------------|---------------------------------|-------------------|---------------------|-------------------|--------------------|---------------------|
| | Yes | No | Yes | No | Yes | No |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| <i>LAW</i> ^{Institution} | 0.011*** (0.003) | 0.023 (0.024) | | | | |
| <i>LAW</i> ^{Environment} | | | 0.013*** (0.003) | 0.029 (0.034) | | |
| <i>LAW</i> ^{Resources} | | | | | 0.008** (0.003) | -0.189** (0.033) |
| Firm Characteristics | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry Effect | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Effect | Yes | Yes | Yes | Yes | Yes | Yes |
| Constant | -0.365 (0.438) | -2.042 (4.627) | -0.400 (0.436) | -1.787 (5.168) | -0.492 (0.490) | 9.062** (2.008) |
| Adj. <i>R</i> | 0.196 | 0.323 | 0.203 | 0.286 | 0.188 | 0.910 |
| N | 447 | 31 | 447 | 31 | 461 | 30 |

Note: This table reports regression results of the impact of the development of the provincial legal environment on excess insider trading return by dividing the sample into two subsamples based on whether there are other insider trading cases detected in the same province within a year. Definitions of the variables are provided in Table 1. All regressions include unreported industry and year fixed effects. The standard errors reported in parentheses are adjusted for both firm- and year-clustering effects. Statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, * respectively.

**Table 13. Heterogeneity Analysis:
Illegal Insider Trading in Bull and Bear Market.**

| | Dependent variable: <i>BHAR</i> | | | | | |
|-----------------------------------|---------------------------------|--------------------|----------------------|---------------------|--------------------|----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | Bear | Bull | Bear | Bull | Bear | Bull |
| <i>LAW</i> ^{Institution} | 0.0252*** (0.006) | 0.00609 (0.004) | | | | |
| <i>LAW</i> ^{Environment} | | | 0.0245*** (0.005) | 0.00698* (0.004) | | |
| <i>LAW</i> ^{Resources} | | | | | 0.00607 (0.007) | 0.0160*** (0.005) |
| Firm Characteristics | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry Effect | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Effect | Yes | Yes | Yes | Yes | Yes | Yes |
| Constant | -0.770 (-0.819) | -0.691 (-0.566) | -0.719 (-0.866) | -0.685 (-0.571) | -0.395 (-0.806) | -1.224** (-0.544) |
| Adj. <i>R</i> ² | 0.280 | 0.229 | 0.286 | 0.232 | 0.287 | 0.239 |
| <i>N</i> | 162 | 303 | 162 | 303 | 187 | 304 |

Note: This table reports the regression results of the impact of the development of the provincial legal environment on excess insider trading return by dividing the sample into two subsamples based on whether the stock market is a bear or bull market. Definitions of the variables are provided in Table 1. All regressions include unreported industry and year fixed effects. The standard errors reported in parentheses are adjusted for both firm and year clustering effects. Statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, * respectively.

Table 14. M&A Rumors, Financial Literacy, and Excess Insider Trading Return

| Dependent variable: <i>BHAR</i> | | | | | | | | |
|----------------------------------|-----------------------------|---------------------|---------------------|--------------------|-------------------------------------|---------------------|---------------------|--------------------|
| | Panel A: M&A rumors channel | | | | Panel B: Financial literacy channel | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| <i>DRINFO</i> | 0.022 (0.024) | 0.045 (0.029) | 0.046 (0.028) | 0.037 (0.027) | | | | |
| <i>DFINANCE</i> | | | | | -0.039 (0.040) | -0.032 (0.046) | -0.030 (0.046) | -0.046 (0.043) |
| <i>LAW^{Institution}</i> | | 0.011*** (0.003) | | | | 0.012*** (0.003) | | |
| <i>LAW^{Environment}</i> | | | 0.013*** (0.003) | | | | 0.013*** (0.003) | |
| <i>LAW^{Resources}</i> | | | | 0.007** (0.003) | | | | 0.008** (0.003) |
| Firm Characteristics | No | Yes | Yes | Yes | No | Yes | Yes | Yes |
| Industry Effect | No | Yes | Yes | Yes | No | Yes | Yes | Yes |
| Year Effect | No | Yes | Yes | Yes | No | Yes | Yes | Yes |
| Constant | -0.112*** (0.012) | -0.818* (0.424) | -0.763* (0.425) | -0.742* (0.436) | -0.104*** (0.011) | -0.649 (0.432) | -0.650 (0.431) | -0.639 (0.446) |
| Adj. <i>R</i> ² | -0.001 | 0.203 | 0.210 | 0.193 | 0.001 | 0.200 | 0.207 | 0.193 |
| N | 521 | 478 | 478 | 491 | 521 | 478 | 478 | 491 |

Note: This table reports the regression results of two alternative explanations for excess insider trading return: the M&A rumor channel (Panel A) and the financial literacy channel (Panel B). Definitions of the variables are provided in Table 1. All regressions include unreported industry and year fixed effects. The standard errors reported in parentheses are adjusted for both firm- and year-clustering effects. Statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, * respectively.

Table 15. Political Connection and Excess Insider Trading Return

| | Dependent variable: <i>BHAR</i> | | | | | |
|----------------------------------|-------------------------------------|---------------------|---------------------|-------------------------------|---------------------|---------------------|
| | If insider is politically connected | | | Level of political connection | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| <i>LAW^{Institution}</i> | 0.012*** (0.003) | | | 0.012*** (0.003) | | |
| <i>LAW^{Environment}</i> | | 0.012*** (0.003) | | | 0.012*** (0.003) | |
| <i>LAW^{Resources}</i> | | | 0.011*** (0.004) | | | 0.011*** (0.003) |
| <i>PC</i> | 0.020 (0.055) | -0.016 (-0.053) | 0.033 (0.027) | 0.001 (0.018) | -0.008 (-0.017) | 0.010 (0.009) |
| Firm Characteristics | Yes | Yes | Yes | Yes | Yes | Yes |
| <i>Industry Effect</i> | Yes | Yes | Yes | Yes | Yes | Yes |
| <i>Year Effect</i> | Yes | Yes | Yes | Yes | Yes | Yes |
| Constant | -0.746 (0.455) | -0.749 (-0.456) | -0.481 (-0.480) | -0.745 (-0.457) | -0.753* (-0.456) | -0.488 (-0.478) |
| Adj. <i>R</i> ² | 0.197 | 0.204 | 0.170 | 0.197 | 0.204 | 0.170 |
| <i>N</i> | 478 | 478 | 466 | 478 | 478 | 466 |

Note: This table reports the regression results for alternative explanations for excess insider trading return: political connection. Definitions of the variables are provided in Table 1. All regressions include unreported industry and year fixed effects. The standard errors reported in parentheses are adjusted for both firm- and year-clustering effects. Statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, * respectively.

Table 16. Legal Environment, Corporate Governance, and Excess Insider Trading Return

| | Dependent Variable: <i>BHAR</i> | | | | | | | | | | | |
|-----------------------------------|---------------------------------|-----------|----------|----------------------|----------|-----------|-------------|----------|----------|-----------|----------|----------|
| | ESG Governance | | | Managerial Ownership | | | CEO Duality | | | G-index | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| <i>LAW</i> ^{Institution} | 0.011*** | | | 0.008** | | | 0.012*** | | | 0.087*** | | |
| | (0.039) | | | (0.004) | | | (0.003) | | | (0.023) | | |
| <i>LAW</i> ^{Environment} | | 0.012*** | | | 0.008** | | | 0.012*** | | | 0.080*** | |
| | | (0.029) | | | (0.004) | | | (0.003) | | | (0.023) | |
| <i>LAW</i> ^{Resources} | | | 0.007** | | | 0.007* | | | 0.010*** | | | 0.005 |
| | | | (0.002) | | | (0.004) | | | (0.004) | | | (0.048) |
| <i>Corporate Governance</i> | -0.062** | -0.071*** | 0.005 | -0.108 | -0.214 | -0.120*** | -0.042 | -0.084* | -0.015 | 0.008*** | 0.007** | -0.001 |
| | (-0.027) | (-0.027) | (0.015) | (-0.174) | (-0.189) | (0.037) | (-0.046) | (-1.864) | (-0.026) | (0.003) | (0.003) | (-0.002) |
| Firm Characteristics | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry Effect | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Effect | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Constant | -0.517 | -0.401 | -0.734 | -0.658 | -0.509 | -0.871** | -0.512 | -0.472 | -0.721 | -1.386*** | -1.229** | -0.770 |
| | (-0.434) | (-0.427) | (-0.459) | (-0.416) | (0.410) | (-0.421) | (-1.24) | (-0.413) | (-0.440) | (-0.541) | (-0.502) | (-0.513) |
| Adj. R ² | 0.191 | 0.200 | 0.185 | 0.200 | 0.209 | 0.208 | 0.192 | 0.199 | 0.190 | 0.195 | 0.198 | 0.156 |
| N | 468 | 468 | 480 | 468 | 468 | 480 | 468 | 468 | 480 | 447 | 447 | 435 |

Note: This table reports the regression results for alternative explanations for excess insider trading return: corporate governance. Definitions of the variables are provided in Table 1. All regressions include unreported industry and year fixed effects. The standard errors reported in parentheses are adjusted for both firm- and year-clustering effects. Statistical significance at the 1%, 5%, and 10% levels is indicated by ***, **, * respectively.