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Central Bank Digital Currencies and Banking Disintermediation risk: Whether and to what extent do CBDC related publications generate significant abnormal variations in CDS spreads of Chinese banks.

The e-CNY case.

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- To verify the statistical and econometric consistency of the analyses such as helping to clarify and review the readability of the R code constructed.
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Abstract:

Despite being one of the most actively debated topics in contemporary monetary economics, empirical evidence on market reactions to the perceived risk of banking disintermediation induced by the implementation of a Central Bank Digital Currency (CBDC) remains scarce. This research paper addresses this issue by investigating whether e-CNY-related events generate statistically significant abnormal variations on the Credit Default Swap spreads of three Chinese globally systemically important banks (G-SIBs).

The methodology employed relies on an event study applied to 438 publications over the period [2019–2026], covering the full development trajectory of the e-CNY. The results indicate that e-CNY publications generate statistically significant cumulative abnormal returns across all three event windows tested, [-1,+1], [-3,+3] and [-5,+5], leading to the rejection of the null hypothesis of no significant abnormal variation in Chinese bank CDS spreads. From a phase-based perspective, market reactions intensify significantly across three temporally defined phases, corresponding to the implementation, expansion and internationalisation periods of the Chinese CBDC pilot. Phase differences are statistically significant but non-monotonic, suggesting a structural but non-linear intensification of investor risk perception.

A log-linear time-series regression identifies a statistically significant upward temporal trend in market reactions, driven primarily by media publications rather than official institutional sources. A sovereign CDS comparative analysis indicate that the upward temporal trend is statistically significant for the banking sector but insignificant for the sovereign one. These results contribute to the emerging literature on CBDC-related risks by providing the first empirical evidence of a theoretically induced disintermediation risk that is measurable through CDS spreads and specific to the banking sector.

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Introduction

Modern economies face a broad spectrum of risks and uncertainties, ranging from inflationary pressures to financial instability driven by geopolitical and technological shocks, raising investor concerns about the long-term viability of private monetary instruments. These tensions are reflected in growing uncertainty regarding the future trajectory of monetary systems and the capacity of sovereign states to promote sustainable economic growth.

Meanwhile, technological advances in payment system innovation are leading monetary authorities to seek modernisation, by developing solutions designed to preserve their monetary sovereignty and ensure long-term financial stability. Digital currencies have emerged as a response, with the rise of decentralised currencies such as cryptocurrencies establishing themselves as alternative monetary solutions. Beyond representing new forms of currency, these innovations have given rise to entirely new financial ecosystems, challenging the role of central banks in monetary creation and the free exchange of currencies.

In response to these structural challenges and the need to modernise their monetary systems, several major economic centres have begun exploring and implementing new forms of centralised digital currency. Building on this momentum, the People's Bank of China has implemented its own central bank digital currency (CBDC), the e-CNY. The objective is to provide a secure, resilient and universally accessible digital payment instrument backed by fiat currency and bank deposits.

However, CBDCs also introduce significant challenges for the financial system. The primary risk, currently among the most debated by central banks and financial institutions, is the threat of banking disintermediation, arising from the potential reallocation of deposits by households and firms toward alternative monetary instruments such as cryptocurrencies or CBDC-based accounts held directly at the central bank. Highlighting the growing concerns regarding the systemic implications of introducing a new form of digital currency (Schuman, 2025).

Concerns arise regarding the impact of central bank digital currency implementation and its repercussions on existing payment systems. This research aims to address these questions by conducting an empirical study of the economic challenges associated with digital monetary transformation. Anchored in the Chinese sovereign context and with a view to assessing the resilience of the financial system, this study examines the impact of the e-CNY on the disintermediation of the Chinese banking system through the following research question:

“Central Bank Digital Currencies and Banking Disintermediation risk: Whether and to what extent do CBDC related publications generate significant abnormal variations in CDS spreads of Chinese banks. The case of the e-CNY”

This research question seeks to fill a gap in the existing literature, by directly examining a market-based measure of perceived bank credit risk for institutions linked to the e-CNY. To date, no study has investigated the impact of e-CNY-related publications on CDS spreads as a measure of perceived bank default risk.

1 State of the art

To provide a detailed analysis of the economic implications related to the implementation of a central bank digital currency (CBDC), it is essential to define the conceptual framework of this study. The objective of this first section is to provide a theoretical foundation for the main analysis by examining the various concepts that led to the construction of the research question addressed in this study. A brief explanation of the functioning of the traditional monetary system is provided in the appendix 1. It is intended to provide a visual context for the theoretical understanding of currencies but remains ancillary to the main analysis.

1.1 Typology of Central Bank Digital Currencies

A central bank digital currency (CBDC) is a digital means of payment issued and regulated by a central bank. CBDCs are the equivalent of fiat currencies in a dematerialized form with each unit theoretically pegged at the same value that the national currency to which it is tied (CEP; AMF, 2022). As with fiat money, each newly issued CBDC unit is recorded as a direct liability on the central bank's balance sheet and is backed by a corresponding financial asset guaranteeing its value (government securities, loans to commercial banks, reserves, gold, etc.) (SNB, 2021). CBDCs thus expand the monetary base and constitute a new monetary policy instrument integrated into the broader money supply in circulation (IMF, June 2025).

Of the 114 countries currently exploring CBDC issuance, 69 are at advanced stages, examining pilot programmes and potential launches. Within the G20, 16 of the 19 member states are already engaged in development, implementation or strategic adoption assessment. Among the most advanced, China stands out as the global leader in terms of deployment scale, operating one of the largest CBDC pilot programmes in the world.

1.1.1 wholesale CBDC

A wholesale CBDC restricts access to licensed financial institutions such as commercial banks and payment service providers authorised by the central bank. It is primarily designed for interbank settlements and the finalisation of financial market operations, representing a digital equivalent of commercial bank reserves held at the central bank with additional functionalities. Since a wholesale CBDC would not alter public access to central bank money and already exists in theoretical form as electronic bank reserves, its technological transition would entail limited financial implications. Its impact on monetary policy transmission is therefore constrained and its disintermediation risk significantly lower than that of retail CBDCs (SJES, 2024). This research paper will therefore focus primarily on retail CBDC.

1.1.2 Retail CBDC

A retail CBDC operates on a different principle by functioning as a digital equivalent of physical cash accessible to the general public, including households and businesses, for retail transactions. It is designed to enhance payment systems by increasing transaction speed, reducing costs, and introducing new functionalities such as programmable money or direct interest bearing. Beyond representing a new form of public money, retail CBDCs are instruments that influence both financial stability and monetary policy transmission. Unlike stablecoins and cryptocurrencies, which remain purely speculative, CBDCs are considered stable assets as they are pegged to the sovereign currency to which they are anchored. As liabilities of the central bank, CBDCs carry legal tender status, meaning they cannot be refused as a means of payment under applicable law unlike scriptural money and the payment systems through which it circulates (BIS, 2021). As this study focuses exclusively on retail CBDCs, the term CBDC is used throughout to refer mainly on retail CBDCs.

1.1.3 Main purpose of a central bank digital currency

The main motivations for implementing a central bank digital currency can be summarised across several key dimensions. CBDCs support monetary sovereignty by countering the growing influence of international Big Tech payment providers, such as Visa and Mastercard, and the proliferation of foreign currency-backed stablecoins (IMF, 2024). They contribute to the modernisation of payment infrastructure by enhancing the resilience of electronic payment systems against cyber threats and providing a contingency settlement mechanism (IMF, 2025). CBDCs serve as an innovation tool enabling the use of smart contracts, thereby improving structural efficiency through cost reduction and transaction speed (ECB, 2025). They support the improvement of monetary policy transmission and promote financial inclusion while reducing the cost and friction of cross-border payments (BIS, 2020). According to several research papers published by institutions such as the Bank for International Settlements (BRI) and the International Monetary Fund (IMF), central banks emphasise that CBDCs can enhance transaction confidentiality by balancing traceability requirements with privacy protection.

1.1.4 The CBDC technologies

With the perspective of understanding the design features that modify the arbitrage between commercial bank deposits and central bank money it is relevant to provide a structural analysis of the different architectures and technological concepts that enable the creation and issuance of CBDCs. However, this information constitutes technical material that is only useful for understanding the design of a CBDC. These elements are therefore presented in Appendix 2.

1.2 E-CNY – Digital Renminbi

The e-CNY serves as the empirical foundation of this study. Issued by the People's Bank of China (PBoC), it represents the world's most advanced CBDC pilot, the only project to have moved beyond the conceptual phase and achieved partial integration into the domestic retail economy. This makes it suited for empirical analysis, providing real quantitative data on the coexistence of a CBDC with private payment systems and its implications for the broader financial system.

The PBoC has been exploring the development of a CBDC since 2014. However, the initial pilot was not launched for public testing and distribution to the Chinese population until late 2019 and early 2020, initially restricted to the cities of Shenzhen, Chengdu, Suzhou and Xiong'an.

The project subsequently underwent several key developments, including the launch of the e-CNY application, a major expansion extending access to a broader public across more than 17 provinces from 2022 onwards, etc.

The distribution, wallet opening and payment processing of the e-CNY are operated through commercial banks and financial institutions authorized and selected by the PBoC. The primary banks involved in the e-CNY introduction are four of China's largest and most liquid state-owned banks, whose credit risk is considered quasi-sovereign given their systemic importance to the Chinese state, the Industrial and Commercial Bank of China (ICBC), China Construction Bank (CCB), Agricultural Bank of China (ABC) and Bank of China (BoC)[1].

1.2.1 Architecture and design

The People's Bank of China (PBoC) designed the e-CNY under a two-tier hybrid architecture. The system operates on a centralised and permissioned distributed ledger technology (DLT), functioning exclusively under PBoC governance with restricted node accessibility. While the underlying principle resembles as a blockchain technology, transactions are validated by pre-approved and authorised nodes, meaning that unlike public blockchain systems, the government retains the technical ability to cancel, restore or reverse transactions.

The PBoC acts as the primary issuer, controlling issuance, maintaining a consolidated ledger of retail balances and final transaction settlements. Commercial banks and payment service providers serve as second-tier intermediaries, managing distribution and front, middle and back-office operations. As discussed in appendix 2, the hybrid architecture mitigates disintermediation risk while preserving the integrity of the monetary system and its regulatory oversight. The e-CNY combines token-based and account-based design features. Transactions are conducted through token exchanges via digital wallets, enhancing portability and enabling offline payment capabilities. However, these wallets are linked to digital identifiers equivalent to central bank accounts where transactions do not appear on the balance sheet of the affiliated commercial bank as they constitute direct liabilities of the PBoC. This design seeks to combine the operational infrastructure of the banking system with transaction verification, data accessibility, traceability, quasi-anonymity and privacy protection (PBoC, 2021).

Each wallet is tiered according to the level of user identification provided, with transaction and balance limits calibrated to the degree of KYC/AML compliance. Low-identification wallets are subject to a maximum balance of 10,000 RMB (approximately €1,280) and a per-transaction limit of 2,000 RMB (approximately €256), while fully verified wallets benefit from significantly higher thresholds, with a maximum balance of 500,000 RMB (approximately €64,000) and a per-transaction limit of 50,000 RMB (approximately €6,400). Digital wallets operate along three dimensions, they may be personal or corporate, accessible via software interfaces such

[1] For analytical tractability, the payment institutions functioning as private banks (WeBank, whose parent company is Tencent, and MYbank, managed by Ant Group (Alibaba))are excluded from the analysis, given that they rely on a private capital structure, that their credit risk is linked to their respective parent companies, and that they therefore lack a direct market quotation for what is particularly searched.

as mobile payment applications, or through hardware wallets including smart cards, mobile devices and IoT-connected objects. They can also be structured as parent and sub-wallets to accommodate corporate treasury and liquidity pool management. This architecture is in reality an institutional power dynamic which transfers digital currency management from commercial banks to payment service providers (PSP), thereby progressively disintermediating the banking system and fundamentally altering the structure of monetary intermediation.

1.2.2 Interest bearing

In December 2025, the People's Bank of China announced that e-CNY balances would bear interest, transforming its digital currency into a viable interest-bearing savings instrument (PBoC, January 2026). Whereas the PBoC had previously sought to reassure market participants that its CBDC would not threaten commercial bank liabilities, the introduction of interest-bearing central bank deposits effectively converts the e-CNY into a direct substitute for demand deposits. This development fundamentally alters the perceived economic implications of CBDC adoption, signalling that the e-CNY is no longer designed merely to replace physical cash but to function as a fully-fledged monetary instrument, thereby amplifying disintermediation risks for the Chinese banking sector.

1.2.3 Accessibility

Its applicability to both retail and corporate users means that its scope extends beyond a simple digital substitute of cash and should therefore be understood as going beyond its theoretical classification as a M0 monetary aggregate. The e-CNY represents a strategic instrument for monetary system transformation, reshaping the structure of the monetary base by modifying central bank money supply. It enables corporations to conduct faster, more secure and cost-efficient wholesale business-to-business payments using central bank money. This demonstrates that beyond representing a new form of digital currency, CBDCs are primarily tools of monetary modernisation and strategic innovation aimed at strengthening the monetary and digital sovereignty of issuing states.

1.2.4 Implications for Banking liquidity

Among all currently active CBDCs, the e-CNY is the only project to have reached such a significant operational scale. According to publications of the People's Bank of China, the number of open personal e-CNY wallets exceeded 225 million in November 2025, with nearly 19 million institutional wallets (China Daily, 2025; PBoC, October 2025). Cumulative transaction volume since issuance has surpassed 16.7 trillion yuan, representing over 3.48 billion individual operations. This corresponds to an average of approximately 15 transactions per personal wallet since 2019, suggesting that a significant proportion of opened wallets remain inactive. The e-CNY currently accounts for only a marginal share of total economic transactions in China, indicating that it has not yet been broadly integrated into the Chinese monetary system (PBoC Payment System Report, 2024).

According to recent PBoC publications, future objectives aim to extend and enhance the technical capacity of the e-CNY as a business-to-business payment instrument, combining payment automation, programmability and centralised smart contracts for supply chain transactions. A broader adoption of the e-CNY would therefore extend beyond retail payment replication to compete directly with interbank scriptural deposit-based corporate payments. The analytical focus of this study is accordingly not on transaction volume but on the marginal impact that broader e-CNY adoption could have on higher-value transactions.

1.3 Banking disintermediation

Banking disintermediation refers to the process by which commercial banks lose their role as financial intermediaries, an essential function to the efficient functioning of the economy and the transmission of monetary policy. This process occurs when economic agents are able to finance themselves or reallocate their liquidity directly through capital markets, bypassing the traditional banking system, such as an alternative to conventional bank credit.

Since CBDCs are liabilities of the central bank rather than commercial banks, they directly compete with private monetary instruments. Acquiring a public currency such as a CBDC requires transferring deposits from commercial bank liabilities to central bank liabilities. The e-CNY thereby introduces a new form of liquidity outflow for commercial banks (Fed, 2024). Moreover, CBDCs are designed to improve the financial system by enabling instant transfers in central bank money, directly affecting banking disintermediation risk. This is the primary reason why current CBDC designs universally incorporate holding limits and transaction caps as safeguards against excessive deposit substitution (IMF, 2024).

1.3.1 The role of banks in financial intermediation

Commercial banks play a central role in the functioning of the modern economy, providing households and firms with access to capital and financial products such as savings instruments. Their most significant contribution to the financial system, however, lies in their intermediation function, central to the transmission of monetary policy. This function operates through two intrinsically linked activities, the financing of the economy through money creation and risk management, which are collectively responsible for financial stability. The core functions associated with money creation include the allocation of short-term liquid deposits, such as demand accounts and savings, and the distribution of long-term illiquid credit, such as residential mortgages and corporate loans.

The role of banks in monetary stability operates primarily through the creation of scriptural money via the extension of credit and loans, a process governed by monetary policy frameworks in which capital adequacy ratios constitute the principal regulatory instrument. These regulations limit the risk of bank default and prevent the contagion of individual failures to the broader banking system. However, the primary driver of disintermediation risk lies in bank liquidity. Deposits are the main source of bank funding, stable and low-cost. For each loan or credit extended, recorded as an asset, the bank registers a corresponding deposit on the liability side of its balance sheet generating interest income on which it finances itself.

In this mechanism, the reserve balances held by commercial banks at the central bank play a central role in daily transactions. Interbank flows such as interbank lending and deposit settlements are conducted exclusively in central bank money. Each deposit transfer between bank A and bank B reduces the reserve balance of the sending institution without the deposit itself leaving the banking system. More precisely, a deposit constitutes a liability that must be offset on the asset side of the balance sheet by central bank reserves. If an excessive volume of deposits exits a given bank, it must draw on its reserves to rebalance its balance sheet, potentially becoming insolvent. A bank with depleted reserves is therefore limited in its ability to extend credit, thereby constraining credit creation and the transmission of monetary policy.

However, the balance sheet is structurally unbalanced, which is a central feature of banks functioning and is referred to as maturity mismatch. Deposits are available in the short term for day-to-day transactions. They are offset by loans and credit exposures which are illiquid asset repayable over the medium to long term and are therefore not available as immediate liquidity. If Bank A needs to transfer more liquidity than it holds, it must obtain reserves to cover the shortfall and avoid a liquidity crisis. It is this liquidity mismatch that creates a risk of disintermediation for the banking system.

Meanwhile, Banks do not hold sufficient liquid assets to repay the majority of their depositors simultaneously. If a large number of clients decided to withdraw their deposits outside the bank's liabilities at the same time and over a short period or if exogenous events were to disrupt the market and trigger a massive short-term outflow of bank deposits (such as financial crises, large-scale deposit shifts toward private currencies such as CBDCs, etc.), this may lead to a "bank run" risk. Banks would then be unable to meet such immediate withdrawals and would become insolvent. In order to avoid being unable to honour their financial obligations, they would have to resort to alternative sources of funding such as fire asset sales or emergency funding from the central bank. It is precisely this mechanism that explains the vulnerability of bank liquidity to deposit outflows which consist of rapid and massive withdrawals outside the banking system. As each bank is interconnected, a bank run risk would then spread across the entire financial system leading systemic risk.

In this mechanism, the stability and volume of deposits play a key role. If a bank loses its deposits, it consequently loses its primary funding source and will be constrained in carrying out interbank payments. To offset these losses, it will have to draw on its capital reserves or raise funding by borrowing on the interbank market, which is significantly more expensive. Such a reduction in capital drastically reduces the granting of new credit and loans, which affects the transmission of monetary policy and consequently the money supply growth, this mechanism is referred to as a credit crunch. To compensate, the bank must raise the associated interest rates thereby dampen demand and consumption and triggering a self-reinforcing downturn that culminates in a recession. The bank subsequently faces increased financial fragility and greater exposure to market risk.

CBDCs act as a macroprudential policy tool that modifies the risk profile of commercial banks and directly affects the functioning of banking operations. These effects require regulatory adjustments to capital requirements. To offset the effects of CBDCs on bank profitability and bank risk, existing policies should adapt notably through the implementation of new countercyclical buffers calibrated to stabilize credit supply in the presence of a CBDC.

2 Littérature review

It only exists burgeoning literature addressing the potential impact CBDCs could have on the disintermediation of the financial market. Due to the recentness of this subject, most of the project are still in a theoretical stage or have only recently been adopted as pilot. Therefore, research on the potential market transformation risk of banking disintermediation related to the CBDCs are based solely on theoretical and hypothetical approaches (ECB, 2025).

2.1 Disintermediation

Based on hypothetical survey data and dynamic stochastic general equilibrium (DSGE) modelling, the Bundesbank research paper shows that a CBDC would lead to a substitution from commercial bank deposits, particularly during periods of financial stress. Hypothetically, CBDCs can generate two types of disintermediation. A slow disintermediation which corresponds to a gradual and persistent transfer of bank deposits toward CBDCs which in theory could help stabilise and rebalance the size of the banking sector, potentially making it less vulnerable. A fast disintermediation refers to bank-run-like dynamics. With holding limits, CBDCs can maintain slow disintermediation and may theoretically contribute to financial stability. However, in periods of stress, deposit substitution could become highly destabilising, leading to negative financial welfare outcomes (Deutsche Bundesbank, 2024).

While the Bundesbank highlights the potential benefits of slow disintermediation, this view shifts when payment information flows are considered. A migration of payments toward CBDCs would raise potential information loss concerns that would erode the informational content of deposits and amplify asymmetric information risks, referred to as "relationship banking information advantage loss" (Beyhaghi & al., 2024). Even absent bank run risk, the liquidity signals received and processed by banks would become distorted and incomplete, as asset-liability management becomes more complex and less effective. Even though the e-CNY operates under an account-based design, whereby a significant share of transactional information remains within the banking system, banks would nonetheless lose access to sensitive data regarding deposit volumes and volatility. This erosion of banks' informational capital would impair their ability to generate accurate credit assessments (BIS, 2022).

By having a focus on the mechanisms of monetary mass creation, we can observe a structural change in the functioning of the money multiplier for the Chinese market. The implantation of the e-CNY seems to enhance the effect of both narrow (M1) and broad (M2) money multiplier by increasing the quantity of produced money for each base deposit unit, reinforcing the effect of monetary mass creation (PBoC, 2023). This constatation rely hypothetically more in a shorter-term period, for which the adoption of the e-CNY shows the ability to improve the precision of monetary policy tools. Unlike cash, which disappears from bank reserves once withdrawn and constitutes a loss of demand deposits, the e-CNY is a public currency whose transaction's information are known and managed internally by retail banks. Looking at macro-economic perspective, it is observed a cash substitution effect which reduces liquidity leakage, improve the cash leak rate ratio and impact the effect of money multiplier. This conversion of physical public currencies into digital format (RMB -> e-CNY) converts lost information into known ones. Hypothetically, this allows banks to improve their databases and predict their liquidity movements with greater transparency and accuracy. This improvement in forecasting future cash flows enables the reduction of the excess reserve's ratio held by banks. This reduction in capital requirements frees up equity capital, which can be reallocated to more productive assets such as loans. This alters the multiplier effect and increases money supply creation (Song & al., 2023). This mechanism makes the banking system more responsive and accurate but also more fragile as their buffers which act as safety margins are reduced. It the illusion that liquidities are better protected but the reality is that they circulate within a closed loop. Although it allows better control of transactions flows, it also becomes more sensitive to movements and imbalances in liquidity.

In a short-term window, the implementation of a CBDC has little effect on bank liquidity and is more limited to replacing cash than to truly substituting deposits. Therefore, looking at the structure of Chinese bank's liquidity, via the fixed to demand ratio, the observed impact on the variability of sight deposits is weak and uncertain. However, as adoption progresses, a stronger long-term substitution effect is observed. Even a moderate conversion of cash into MNBC lead to a low-cost financing loss that would be sufficient to create liquidity holes, force banks to adjust the credit offer or to refinance themselves, which would impact the profits of commercial banks (Vollmar & al., 2024). Hypothetically, this action deteriorates the stability of the deposit structure which would affect the effect of the money multiplier (Song & al., 2023).

To discourage deposit outflows, commercial banks may decide to offer more attractive conditions. One of the most direct ways is to increase deposit remuneration by raising deposit interest rates. An increase in interest rates reduces banks' intermediation margins, forcing them to compensate through the rates applied to newly granted loans (IMF, 2024). This mechanism increases the average funding cost of banks' activities and reduces the effectiveness of monetary policy transmission through credit provision, thereby creating a crowding-out effect on credit supply.

To go deeper in the analysis of CBDC disintermediation, a study on 57 commercial banks from 4 developing countries, which have all already implemented their own CBDC pilots, The Bahamas, Zimbabwe, Nigeria and Jamaica, analyse the impact of the introduction of CBDCs on the financial stability of the banks in relation, between 2010 to 2023. They find a positive association between the launch of CBDCs and the improvement of the level of financial stability of bank contributing to financial inclusion and leading to bank resilience and lower inflation rate. However, this improvement in financial stability reflects a strategic response to structural fragility. To offset deposit outflows, banks are forced to turn to wholesale funding markets, where higher borrowing costs compress domestic bank profitability. As a response, banks can strengthen their balance sheets, tighten their internal policies and improve operational efficiency. Even if these adjustments create the appearance of greater financial solidity, they ultimately signal a weakened liability structure, deposit-dependent domestic banks therefore remain adversely affected by CBDCs introduction (Heitmann & al., 2025).

By analysing shifts in user behaviour following the introduction of an unfavourable policy shock as a transaction tax raising payment costs, the differential between zero-cost CBDC transactions and fee-bearing PSP services alters user behaviour making the e-Rupee more attractive and encouraging the deposit migration toward the CBDC (NBER, 2024). This suggests that monetary policy changes affected transaction costs and may carry unintended consequences on CBDC adoption and deposit migration.

By examining US bank's equity reactions, CBDC related introduction Central bank events generate negative abnormal returns on deposit-dependent domestic banks, while announcements mentioning safeguards such as holding limits display more positive reaction (Beckmann & al., 2024). To further decomposed CBDC-related events, two macro-financial metrics were isolated, an attention Index, measuring CBDC visibility through article frequency and media intensity and an uncertainty Index, capturing risk-related CBDC terms. The uncertainty index exhibits stronger cumulative reactions, both positive and negative than media attention, which responds weakly and remains comparatively stable (Wang & al., 2022). Linking uncertainty to market variables reveals two broad patterns. For global banking sector indices, MSCI World Bank Index, equity markets, FTSE All World Index and US economic policy uncertainty, uncertainty events are associated with a negative effect, reflected in reduced volatility, suggesting a cautious and defensive investor response. Given that most banks have not yet integrated the functioning of CBDCs, the market appears to react more speculatively, to a distant and still ambiguous risk, rather than to a genuine solvency shock.

With regard to indices associated with alternative asset markets which are more exposed to capital flows, such as safe-haven assets including gold, the sovereign bond market, currencies, cryptocurrencies, and the US equity market volatility index (VIX), the uncertainty index exhibits a positive association, reflecting an increase in volatility (Wang & al., 2022). Moreover, during periods of crisis, reactions to CBDC events become more pronounced, with stronger responses observed for the VIX and the S&P 500 (Helmi & al., 2023). Investors appeared to rebalance their portfolios, indicating stress and uncertainty. This may reflect a perceived risk of asset substitution regarding the usefulness of CBDCs as a store-of-value instrument.

By looking at the source of the events, it is observed that central bank sentiment (communications, speeches, articles) has a more significant influence on media sentiment than the reverse. In a 3 days short-term event window, sentiment variations in central bank events explain market reactions in a more statistically significant manner than media sentiment. However, this transmission attenuates over longer term windows (to 3 till 10 day). In addition, more positive CBDC-related sentiment (benefits, progress, inclusion, efficiency, etc.) is associated with negative short-term effects on cryptocurrency returns and on the performance of banking stocks and payment service providers (PSPs). A more heterogeneous pattern can also be observed, with more negative effects on banking stocks in advanced economies and more positive effects in emerging economies (inclusion, etc.). Focusing on China, the central bank's more positive events regarding CBDCs have a more negative impact on PSP shares (Alibaba, Tencent), but a positive impact on banks (Hofmann & al., 2025).

2.2 Credit default swap- CDS

Credit default swaps (CDS) are liquid and informational instruments used by investors to speculate on the default risk of a sovereign state or an entity. They represent insurance-like contracts concluded between the protection buyer (bank, fund manager, sovereign entity, etc.), seeking to hedge against a potential default risk (bankruptcy, default, restructuring), and the protection seller (hedge fund, insurance company, etc.), who provides insurance to the buyer and compensates them if the credit event occurs. To obtain protection, the buyer must periodically pay a premium called the CDS spread, expressed in basis points, which are equivalent to one-hundredth of a percentage point with 100 bps meaning that 1% of the total insured notional is paid annually to protect against credit risk. The higher the spread, the greater the market's perceived probability of default risk. Even in the absence of default, CDS prices fluctuate on a daily basis, reflecting the market's perception of credit risk. As the risk premium demanded by investors increases, the market anticipates a higher risk regarding the future creditworthiness of the buyer, and vice versa.

It is distinguished two main categories, the sovereign CDS, which focus on a country's creditworthiness (macroeconomic, political, credit risk, etc.), and domestic CDS, which are linked to the corporate risk of banks and firms (solvency, deposits, liquidity, etc.). These contracts have different maturities depending on the time horizon covered, ranging from 6 months to 10 years. Given that the average debt maturity of firms and banks is around 5 to 10 years, 5-year CDS have become the standard hedge against default risk, without firms having to face higher periodic premiums due to the uncertainty associated with longer maturities. The 5-year maturity spreads provide optimal visibility of trading volumes and offer a more reliable benchmark for financial analysts. As previously discussed, banking disintermediation resulting from a CBDC would materialize through a reduction in deposits, a compression of interest margins, and a decrease in the institution's loss-absorbing capacity, etc. thereby reflecting the perceived solvency of banks involved. This is exactly the mechanism transmitted through CDS. By measuring credit risk, they reflect the perceived probability of default, systemic risks (disintermediation, bank runs, etc.), liquidity conditions and forward-looking expectations. It is this objective of capturing the perception of future risk that is sought.

The sovereign CDS market is studied as an indicator of informational primacy, being more responsive to volatility during systemic shocks. In crisis period, it incorporates new information on credit risk more efficiently and more rapidly than conventional bank CDS. Although cointegration between sovereign and bank CDS demonstrates the existence of a long-term common relationship, domestic banks appear to play a more dominant role in the pre-crisis period (Cotter & al., 2014). Moreover, during periods of stress or structural change, an almost instantaneous unidirectional contagion of information is observed, transmitted from sovereign CDS to linked domestic banks CDS. This transmission is exacerbated by the introduction of CBDCs (Chrzanowski, 2023). This cointegration between sovereign and banking CDS indicates a shared common stochastic trend. This can be explained by the fact that the risk borne by the financial system is primarily transferred to the managing state and is subsequently reflected across each of the entities. Within this mechanism, disintermediation associated with CBDCs acts as a potential transmission channel of volatility. This mechanism makes commercial banks' liabilities more sensitive to fluctuations in sovereign credit risk, thereby increasing the interdependence between the domestic market and the public sector.

2.2.1 Global risk spillover and Chinese bank CDS

With respect to the perception of Chinese banking risk, Chinese bank CDS data are quoted on the offshore market, they are therefore naturally exposed to cross-border capital flows. The analysis of Chinese bank CDS therefore requires particular attention to potential contagion effects, such as the transmission of stress arising from global shocks, which could affect the observed data. It is identified that spillover of volatility transmitted from sovereign CDS of different emerging countries is raising around crisis period, with a higher contagion level coming from Indonesia, China, and Mexico, which act as net transmitters. Based on those observations it was established that global stress factors and incertitude, coming from global market risk, can explain a significative part of the souverain CDS volatility, particularly during crisis (aljarba & al., 2024). Additionally, emerging market countries are proved to be more sensitive to market uncertainty and instability (Pretorius, 2023).

On the Chinese market, the potential risk associated with the e-CNY should be hypothetically measurable and reflected in its intrinsic value, thereby influencing the exchange rate of the currency in which it is denominated. From an econometrical perspective, this value can be reflected through variables such as the RMB exchange rate, for which one measure of volatility is the offshore renminbi (CNH)[2]. By examining the price volatility of Chinese banking stocks, it is observed that offshore market signals, reflected by the volatility of the CNH, have the capacity to transmit signs of stress to the onshore banking sector and that this mechanism is accentuated in periods of global uncertainty (Lai & al., 2019). Given that the volatility associated with the offshore RMB is transmitting stress movements to the Chinese banking sector, it seems coherent to expect that tensions surrounding the digital RMB will also have an impact on Chinese banks' CDS. In this framework, examining how e-CNY announcements affect

[2] In the Chinese market, there are two main denominations used to refer to the currency. CNY represents the onshore RMB, while CNH represents the offshore RMB.

banking risk is relevant, as the Chinese banking sector already appears sensitive to shocks and to episodes of policy-related financial stress. Given that the offshore RMB appears to be a clear indicator of external tensions, this could justify monitoring offshore exchange rate, in order to isolate the effect of announcements on the e-CNY from episodes of global risk aversion.

3 Research question and contribution

The growing interest surrounding the introduction of a CBDC and its potential impact on the financial system has raised many concerns among governments and institutions. By being an alternative to deposits CBDCs weakens banks' main and cheapest source of funding, which can theoretically lead to liquidity risks such as deposit outflows and bank run. By impacting short-term liquidity, it alters the capital structure of banks, resulting in an inevitable rewriting of financial system. Such a mechanism may affect the solvency ratio of banks, amplify debt utilisation and increase refinancing costs, leading to credit crunch and has a weakening of the monetary policy transmission. Therefore, the disintermediation of banking system seems to be a direct subs consequence of the integration of a Central bank digital currency.

Whereas the previous study seems to focus primarily on hypothetical and theoretical analyses with the aimed to understand global market indicators' reactions around announcement. Nearly all of them concentrate on the market as a whole and not on the ones that already implemented such a digital project. Furthermore, recent analyses focus more on market reactions to a distant risk of a potential implementation than on current real development risks that would impact banks whose liability structure is already being altered by a CBDC.

This provides a starting point for studying market movements in systems concerned, for which China has the most advanced CBDC project and is currently the market with the highest adoption rate. From a monetary perspective, it has already been demonstrated that episodes of financial stress can have an impact on the exchange rate of the RMB, and that the currency had the ability to transmit stress movement to the Chinese banking sector (Lai & al, 2019). It is therefore coherent to expect that tensions surrounding the digital RMB will be reflected in market instruments that enable to capture banking risk.

Nevertheless, current analyses which focus on the volatility of Chinese bank stocks do not seem to demonstrate any negative reaction and even provide evidence of a significantly positive behaviour (Hofmann & al., 2025). This observation can be explained by the fact that, in short term, the introduction of a CBDC amounts to replacing cash in a digital format, which allows a reduction of information asymmetry, useful for improving the accuracy of data used to manage banking activities such as loan granting. However, this is rather a superficial than a substantial improvement, as the stability and intermediary role of banks is indeed impacted.

Given that a potential banking disintermediation would affect banks' liquidity and funding structure, focusing on responsive financial instruments, such as bank CDSs is therefore more informative for assessing the stability of an entity or a state. It provides a forward-looking signal of institutions current financial health as well as future expectations regarding the credit risk perceived by investors, a stress measure that allows to observe how information is understood and integrated by the market.

However, empirical analyses examining transmission channels for markets which already implement a CBDC have only received limited attention. Current CDS studies provide a broader macroeconomic perspective on how global financial markets react to CBDCs publications. They are more limited to an understanding of national and systemic risk, via sovereign CDSs, than to banking disintermediation, overlooking the importance of front-line financial actors such as banks of countries involved in a digital currency project. Furthermore, macroeconomic shocks exert a significantly greater impact and a more pronounced contagion effect on sovereign CDS than on those of domestic banks. The latter reflect global financial tensions with less clarity and in a more unidirectional manner through a transmission link coming from the government to the banks (Chrzanowski, Nov 2023). To study the impact that a potential risk of disintermediation could have on domestic banks in a country where a CBDC is issued, it is therefore more relevant to focus on a risk measure which directly express banking disintermediation perspective, CDS of retails banks.

In light of the gaps identified in the literature, the central research question of this thesis Is addressed as follow: "*Central Bank Digital Currencies and Banking Disintermediation risk: Whether and to what extent do CBDC related publications generate significant abnormal variations in CDS spreads of Chinese banks. The case of the e-CNY.*"

Contribution

This study is of informational primacy, it is the first of its kind to examine the CDS spreads of domestic banks in a country that already has a digital currency which has been widely adopted and used by its citizens for several years. The disintermediation of the banking system is understood as a theoretical financial reaction, driven by the design and current standards relating to central bank digital currencies. The aim is to identify a potential reaction using a financial tool designed to measure banking stability, in order to assess whether the market understands the potential and current risks that CBDCs would pose to the banking system.

The purpose of this research question is to understand whether the market considers CBDCs to be a credible structural threat to the systems concerned by such a strategic shift. It contributes to the emerging literature by focusing on banking market reaction from a major economy which already implements a large-scale digital currency project within a substantial banking system. By using a forward-looking financial instrument such as the CDS spread, it becomes possible to assess how investors, analysts, and companies internalize the credit risk and provides insight about the market's confidence in the banks' resilience. Furthermore, this study acts as a channel for financial stability anticipation by measuring the perceived credibility of the banking disintermediation risks. This could potentially help banks to avoid and anticipate cost increases, thereby enabling them to measure and adapt to the impact of monetary policies, to limit the associated financing risks and the threat related to the CBDC shift.

4 Empirical strategy and hypotheses

To investigate this research question, an empirical strategy based on an event analysis is implemented, combining a structured identification of Chinese CBDC-related publications and the selection of CDS spread of Chinese banks. The goal is to identify a potential reaction to the information provided by using a financial tool designed to measure the banking security of the issuing country in order to assess whether the market understands the risks that CBDCs would pose to the current banking system. The risk of disintermediation is considered a theoretical financial consequence, induced by the current design and regulatory framework surrounding the development of the e-CNY.

If the market anticipates that the e-CNY deployment constitutes a future risk to bank liabilities, the CDS spreads of deposit-dependent banks involved are likely to widen, signalling an upward reassessment of their perceived credit risk. Information and analysis related to the advancement of the e-CNY should therefore provoke a general positive reaction on the banking CDS market, showing an awareness that the e-CNY is contributing to the disintermediation of banks. This would be consistent with the market's comprehension of the importance of CBDCs and their role in the stability and sustainability of banks.

Derived on this objective, **two key hypotheses are being tested:**

- ***H1 -*** *Chinese CBDC-related publications generate abnormal and statistically significant variations in CDS spreads of Chinese retail banks.*

Using cumulative abnormal returns (CAR) as an informational indicator of market reactions, it is determined whether events conveying information on the advancement of the e-CNY project trigger interpretable reactions. For each event, the computation of abnormal returns is performed over an event window defined around the publication dates, in order to identify an immediate market reaction within the predetermined estimation window. The objective of this first methodology is to interpret whether the banking system doubts the credibility of the e-CNY, with the primary aim of observing whether the market understands and believes in a disintermediation threat.

- ***H2 -*** *The effect of Chinese CBDC-related publications on the CDS spreads of Chinese retail banks intensifies over time, in relation to the 3 temporal sequences associated to the development's phases of the e-CNY.*

In order to ensure theoretical accuracy and to better understand market reactions based on the chronological intervals of the pilot's development, the second hypothesis tested is based on a division of periods into temporal sequences, segmented according to the different adoption phases of the e-CNY. The objective is to provide an understanding of how the banking market evolves as the CBDC develops and to observe whether any significant differences in reactions are perceptible. Given that the perceived credibility of the e-CNY evolves throughout the pilot adoption phases, it seems likely that noticeable differences will be observed in the evolution of price variations over a longer time horizon.

Robustness: In addition, a comparative analysis of the difference between banking and sovereign CDS is developed to identify sectoral differences. To ensure the robustness of the results, a temporal regression framework and control variables for global financial stress transmission are used to verify the accuracy of the results while reducing the possibility of external contagion affecting the publication reactions.

5 Methodology

5.1 Sample selection

Previous studies relied on databases mainly compiled before the launch of the e-CNY and focused primarily on general publications covering the introduction of a CBDC rather than on publications concerning one which has already been widely adopted and whose development has been documented over several years. This econometric analysis goes further by constructing an event database specific to the e-CNY, focusing on post-implementation periods. The empirical contribution is to test whether the market integrates e-CNY related risks into its assessment of Chinese bank credit risk, and subsequently to independently observe its evolution through three distinct adoption phases.

5.1.1 Event database construction

The event database, which constitutes the independent variable of this analysis, starts with the launch of the e-CNY pilot phase around late 2019 and early 2021, and ends in March 2026. The objective is to encompass the complete development cycle of the e-CNY, from the first official institutional announcements focusing on its introduction and adoption, through its current development, such as the announcement of its remuneration in January 2026.

By 'event' is meant any publication that could potentially impact the perceived credit risk of Chinese retail banks directly related to the e-CNY, regardless of their tone. Content selection criteria include any document containing new information on the deployment, design, progress and development of the e-CNY, as well as technical analyses likely to alter investors' understanding of banking risk. To ensure a more heterogeneous approach, searches were conducted in both Mandarin and English to guarantee multilateral coverage and reach both domestic and international investors.

Publications and announcements are identified and selected based on their direct link to the e-CNY (数字人民币 in Chinese). For the implementation period between 2019 and 2020, during which publications and announcements did not yet openly use the e-CNY term, Chinese CBDC, digital yuan and digital renminbi were used as search criteria. To capture the complexity of the Chinese system, the event database was built manually and consists of two levels.

For the first level, events were selected from three official sources. The People's Bank of China (PBoC), which manages China's national monetary policy, and the Hong Kong Monetary Authority (HKMA), responsible for external economic stability and the management of offshore financial markets through Hong Kong's Exchange Fund. The importance of these two institutions lies in the structural duality of the Chinese system and in the particularity that the e-CNY would hypothetically influence Chinese domestic banks whose CDS are traded offshore, internationally. To complete this first level, the official publications and reports of the Bank for International Settlements (BIS) are added, as the institution responsible for prudential standards and the technical financial stability of international banking systems, whose Basel norms are respected and applied by China.

The second level includes the most widely consulted financial press articles on Bloomberg, through which institutional information reaches domestic and international investors. The retained sources were chosen based on their financial quality in the analysis of the Chinese market. The selected newswires are Bloomberg News, Caixin Global, Yicai Global, China Daily, China Daily - Hong Kong Edition, South China Morning Post and Dow Jones.

Regarding the selection criteria, each event is admitted upon verification of the first publication date, which is publicly accessible to both domestic and international investors. When date deduplication occurred on announcement days, official institutions were preferred over financial newspapers. In cases where multiple news articles from the financial press were published on the same date, the first published article was retained.

The final event database consists of 438 events. Although ten percent of them are in Mandarin, most of the sources selected via Bloomberg are published in English from Chinese newspapers. Regarding publications initially released in Mandarin, they are translated within a few hours and sometimes almost immediately into English. Language was therefore not selected as a differentiation criterion nor as a potential source of informational delays.

Event database – Distribution by Levels

Event type	Source type	Number	Percentage
Official institutional	Level 1	127	29%
Financial media	Level 2	311	71%

5.1.2 Temporal sequencing by phase

To test the evolution of market reactions to events as e-CNY adoption grows, the total event database sample has been divided into three distinct development phases, identified through the academic literature and by the help of PBoC publications.

1. **Phase 1 - Implementation [2019-2021]**

This phase covers the first official announcements related to the implementation of the pilot, which began in late 2019 and early 2020, with experimentation initially limited to 4 provinces in April 2020. In July 2021, the PBoC officially defined for the first time the conceptual framework of the e-CNY. At the end of 2021, the first statistical reports and official data were released regarding the supply in circulation, the number of transactions, etc.

2. **Phase 2 – Expansion [2022-2023]**

This phase is the densest, with high journalistic intensity. It represents the acceleration of the pilot adoption phase and covers declarations on the structural modification of the future monetary system. Between 2022 and 2023, the e-CNY saw its first large-scale public tests, with a deployment for use at the Beijing Winter Olympics in February 2022 and an expansion to new provinces in September 2022. In January 2023, the PBoC officially announced the inclusion of the e-CNY as a complement to the monetary base (M0), demonstrating a strong willingness to use and develop the Chinese CBDC as a new form of money.

3. Phase 3 - Internationalisation and Structural Transition [2024-2026]

Although media intensity is low between 2024 and 2026, institutional reports are expanding significantly, demonstrating a growing institutional importance attributed to the e-CNY. The year 2024 marks a structural turning point for the e-CNY, with the PBoC and HKMA announcing the internationalization of the pilot project through a cross-border expansion to Hong Kong. In 2025, the creation of a management committee was announced, followed by the establishment of an international center responsible for digital RMB's operations. However, it is in December 2025 that the e-CNY undergoes its most significant structural change, with the announcement of interest-bearing wallets and a new management framework. Where the digital yuan was previously seen as a cash substitute, this decision transforms it into a direct competitor to savings and bank liabilities, a critical threshold that reinforces concerns regarding the potential disintermediation of Chinese banking system.

Event database – Distribution by Phases

Sequences	Periods	Institution	Financial media	percentages
Phase 1	2019-2021	30	117	33,56%
Phase 2	2022-2023	45	120	37,67%
Phase 3	2024-2026	52	74	28,77%

5.1.3 CDS database construction

Credit Default Swaps (CDS) are over the counter (OTC) contracts, directly negotiated between investors and documented according to ISDA (International Swaps and Derivatives Association) conventions. The data from the selected Chinese banks complies with North American standards and are quoted in USD. Unlike financial instruments traded on organized exchanges, their negotiation is independent of local stock exchange closing schedules. Data's availability is from Monday to Friday, with no interruption to service related to local stock exchange holidays. The daily closing quote utilized, referred as PX_LAST in Bloomberg, is set at 5:00 PM New York time, regardless of the geographical location of the entity.

The dependent variable selected via the Bloomberg terminal are the 5-year CDS spreads of Chinese retail banks which have complete time series data over the period from May 14, 2019 to March 20, 2026, thereby covering the different development phases of the e-CNY's. 5-year CDS are the academic standard duration as they are one of the most liquid measures that best reflect the structure of real default risk. CDS allow avoiding market noise, as would be the case with equities or stock return indices. They reflect solvency analyses of related entities and stem from a more precise understanding of the entity's viability by investors. Insurance contracts for Chinese banks were primarily traded onshore, remaining largely illiquid and mainly available for financial institution linked to the state. Their introduction to offshore exchange and consequently to institutional investors arise, for most of the banks, on May 2019, making it not relevant to obtain available CDS data before this time.

The specific nature of risk measures of domestic Chinese banks is more complex than those of private banks from other countries. Firstly, these banks have state institutions such as the Ministry of Finance as their majority shareholders. Consequently, the measured credit risk reflects a political dimension, which grants banks a strong governmental guarantee against default risk. However, to provide a more heterogeneous perspective, the CDS of selected banks are available to both international and domestic investors, which allow insight into opinions that are independent of government intervention to observe a global resentment.

Institutions selected for the final sample are the Industrial and Commercial Bank of China (ICBC), the China Construction Bank (CCB) and the Agricultural Bank of China (AGRBK). In terms of total assets and transaction volume, they are ranked among the world's three most systemically important banks, designated as Global Systemically Important Banks (G-SIBs). They were selected based on data availability, importance, and continuity over the selected period. They are the first designated operating banks to offer e-CNY and hold the financial data that forms the basis for statistical reports on the project's progression, they are consequently the most exposed to the banking disintermediation risk induced by CBDC.

Given that daily variations in CDS spreads are rates expressed in basis points rather than prices, as would be the case for equities, calculating arithmetic differences or log-returns would asymptotically converge. In order to preserve the natural economic unit and thus retain the direct information conveyed by the spreads rate, the arithmetic first difference between two consecutive observations is preferred, calculated as the spreads variation between day t and day t−1; $\Delta CDS(t) = CDS(t) - CDS(t-1)$. It is the standard transformation used to ensure the stationarity of the dependent variable series, eliminate long-term trends and preserve the direct interpretability of market movements. More it allows cumulative abnormal returns (CARs) to be interpreted by preserving natural market standards.

5.1.4 Control variable

Two control variables are selected to isolate systemic risks movements which could contaminate the estimation of the normal behaviour of CDS spreads, in order to ensure the accuracy of the observations. Each variable was downloaded from the Bloomberg terminal. The first is the VIX index, a measure use to capture global systemic stress movements that could impact the Chinese market (geopolitical crises, health crises, etc.). Although it is a direct measure of the expected volatility level of the US stock market, based on the S&P 500, the literature demonstrates a significant co-occurrence showing a correlation with Chinese CDS spreads (Beckmann & al., 2024).

Second variable is the 3-month Shanghai Interbank Offered Rate (SHIBOR 3M). It is the benchmark interest rate determining the funding cost at which banks lend funds to one another on the Chinese market. It is the standard measure used to assess short-term stability and sensitivity in reports and publications issued by financial institutions such as the IMF. The three-month horizon provides an overview of the risk filtered out from daily noise that might be influenced by the central bank. It allows to control liquidity crises that may arise from interbank market, which are more closely related to wholesale than retail CBDCs, thereby limiting repercussions that might result from a systemic crisis, independently of the e-CNY.

These two rates are in daily levels and considered stationary due to their intrinsic properties. Both are directly interpretable and their absolute values allow for a meaningful explanation of the daily variation in CDS spreads.

5.1.5 Complementary variable

For the complementary analysis, 5-year Chinese sovereign CDS are selected. Existing academic literature indicates that contagion between sovereign and banking credit risk is observable via the CDS during periods of stress or structural changes (Chrzanowski, Nov 2023). The comparison of sovereign and bank CDS reactions allows to verify whether the observations are dependent on a specific sector. Such as for domestic bank CDS, the arithmetic difference is computed using daily data.

5.1.6 Robustness variable

Two robustness measures are used to control systemic stress periods. The Chinese government bond rate, which acts as a direct transmitter of macroeconomic risk to Chinese bank CDSs. It captures the extreme shocks that force reassessments of the Chinese reference rate and allows to filter out periods of monetary policy anticipation and inflation. More it reflects investors' confidence in the government's ability to repay its debt. Second is the CNH/USD, which is a measure of the Chinese exchange rate and helps to isolate the economic anticipations of international investors, such as those regarding monetary policy and international shocks. Their selection is specifically designed to capture exogenous systemic risks specific to the Chinese system that could contaminate the event sample and confound the CARs observed in H1 and H2.

5.2 Event study

To formalize this empirical analysis, the notation space is defined as follows. Let $i \in \{1,2, ..., N\}$ index the set of events, where N is to the total number of usable publications. Let $j \in$ {CCB, ICBC, AGRBK} index the set of the three Chinese retail banks which constitute the selected balanced panel. Let $t \in \mathbb{Z}$, the time index measured in trading days, from Monday to Friday, as described in the previous section. Each event is identified by (i, τ_i) where τ_i represents the date of first public release of the publications, where $t < 0$ corresponds to the trading days preceding the event and $t > 0$ to the trading days following the event.

To measure the causal effect of e-CNY events on Chinese banks' CDS spreads, it is necessary to estimate the counterfactual behaviour in the absence of events in order to assess whether the observed reactions have a factual informational impact. It is important to note that most events originate from Chinese sources have their publication time based either on the UTC+8 time zone or directly on Eastern Time for Bloomberg releases (EDT/EST). This ensures that they are all systematically available before the daily CDS fixing time, thereby ensuring that the market reaction is almost entirely reflected in the closing spreads used (PX_LAST).

5.2.1 Event Windows

Offshore CDS of Chinese banks are known to be less liquid than their foreign counterparts due to limited market availability and implicit state support. To avoid the risks of information asymmetry, anticipate potential dating issues, and to test the robustness of the results across different time horizons, three symmetric event windows are retained. They are denoted by $k \in \{1,3,5\}$ where k represents the half-length of the event window, defined as follows.

Let $k = 1$ where $t \in \{-1,0,+1\}$, defined as the short-term window, which focuses on immediate reactions and is restricted to a three-day horizon around the publication date on which the event occurs. It includes the preceding day to account for anticipations and for the difference related to the specific time zones of the CDS market, which could lead to dating issues.

Let $k = 3$ where $t \in \{-3, -2, -1, 0, 1, 2, 3\}$, defined as the main reference window, consistent with the standard used in the event study literature based on bank CDS data (Burlon et al., 2022; Beckmann et al., 2024; etc.). It is sufficiently wide to test the hypothesis that Chinese banks' CDS may exhibit a lagged response due to the implied assumption of their limited liquidity, but it remains narrow enough to restrict potential contamination arising from other economic events unrelated to the e-CNY. It also incorporates a broader pre-announcement anticipation window to capture the expectations of institutional investors.

Let $k = 5$ where $t \in \{-5,-4,-3,-2,-1,0,1,2,3,4,5\}$ is defined as a medium-term extended window designed to capture more gradual market reactions, particularly in less liquid markets where information requires time to diffuse. Its objective is to assess whether information necessitates a longer integration period, accounting primarily for the presence of institutional investors who react more cautiously and operate under tighter liquidity and liability constraints.

The event study methodology is applied independently to each pair, consisting of an event and a bank, denoted (i, j). For each of these pairs, cumulative abnormal returns are computed, denoted $\{CAR\ (i, j, k)\}$, with $k \in \{1, 3, 5\}$.

5.2.2 Estimation Window

The estimation window is constructed and defined as $L = [\tau_i\text{-}130, \tau_i\text{-}11]$, where L is the interval of trading days preceding the publication date, spanning 120 trading days. This period represents approximately six calendar months, sufficient to estimate OLS coefficients while accounting for the explanatory variables and avoiding the capture of structural breaks in the relationship. This period covers approximately six calendar months, which is sufficient to estimate OLS coefficients reliably while controlling for systematic risk factors and avoiding the capture of structural breaks or regime changes in the relationship between the dependent and independent variables. The ten trading days preceding the event, spanning the interval $[\tau_i\text{-}10, \tau_i\text{-}1]$, are excluded to form a buffer zone designed to prevent pre-event contamination.

5.2.3 Cleaned estimation window

During the construction of the event dataset, it was observed that e-CNY publications tend to cluster in time. This implies that events falling within the estimation window could bias the market model parameters by overestimating the pre-announcement normal behaviour. To prevent systematic underestimation of abnormal returns, all publication dates falling within the estimation window (*i'*) are excluded from *L* as well as any trading days lying within the interval [-*k*,+*k*] around the date of any other e-CNY event $\tau_{i'}$ ∈ *L*, defined as follows. $L_i^* = L \setminus \bigcup_{i' \neq i} [\tau_{i'} - k, \tau_{i'} + k]$. Where L_i^* is the cleaned estimation window from which all other events *i'* distinct from the principal event *i* {*i*' ≠ *i*} are excluded, removing the interval spanning from -*k* trading days before to +k trading days after each contaminating event date *i'*[τ_i'-*k*,τ_i'+*k*].

5.2.4 Market model

To estimate the normal behaviour of CDSs in the absence of the information signal provided by e-CNY events, a market model is estimated on L_i^* using the ordinary least squares (OLS) method for each event-bank pair (*i,j*), constructed as follows.

$$\Delta CDS_{j,t} = \alpha_{i,j} + \beta_{1\,i,j} \times VIX_t + \beta_{2\,i,j} \times SHIBOR3M_t + \varepsilon_{j,t}.$$

Where $\Delta CDS_{j,t}$ is the daily variation in CDS spreads expressed in basis points for bank *j* at time *t*. $\alpha_{i,j}$ is the event-bank pair-specific intercept for each couple (*i,j*). $\beta_{1\,i,j}$ is the estimated coefficient on the VIX and $\beta_{2\,i,j}$ is the estimated SHIBOR 3M coefficient, both estimated for the associated pair (*i,j*). $\varepsilon_{j,t}$ is the error term capturing the residual variation in CDS spreads unexplained by the systematic control variables. Once estimated over L_i^* the model is applied out-of-sample over the event window, yielding the abnormal returns $AR_{i,j,t}$.

If L_i^* contains fewer than sixty trading days, it is considered insufficient to reliably estimate the normal return parameters of the market model, $|L_i^*|<60$. This threshold is derived from the degrees-of-freedom constraints imposed by the three estimated parameters of the model (α, β_1, β_2). Each parameter consumes one degree of freedom, reducing the residual degrees of freedom by three, yielding a minimum of 57 (60 − 3) residual degrees. This ensures the reliability of the OLS estimators given the number of free parameters in the model.

5.2.5 abnormal returns

Computing abnormal returns measures whether the observed spread variations deviate from the predicted behaviour. They allow to assess whether, at identified event dates, a statistically significant reaction is observable beyond what can be explained by systematic risk factors external to the e-CNY publications. Abnormal returns are computed as follows. $AR_{i,j,t} = \Delta CDS_{j,t} - [\hat{\alpha}_{i,j} + \hat{\beta}_{1\,i,j} \times VIX_t + \hat{\beta}_{2\,i,j} \times SHIBOR3M_t]$. Where $AR_{i,j,t}$ is the abnormal return expressed in basis points for bank *j* at event *i* on day *t*. The term $\left[\hat{\alpha}_{i,j} + \hat{\beta}_{1\,i,j} \times VIX_t + \hat{\beta}_{2\,i,j} \times SHIBOR3M_t\right]$ represents the fitted normal return predicted by the market model in the absence of e-CNY publication effects, conditional on systematic risk factors at day t.

Since abnormal returns are computed on a day-by-day basis, they do not capture the cumulative price effect generated over the full event window. To do this, it is essential to cumulate $AR_{i,j,t}$ for each $k \in \{1,3,5\}$ in order to obtain the cumulative abnormal return, $CAR_{i,j,k} = \sum_{t=-k}^{+k} AR_{i,j,t}$. This makes it possible to obtain the reaction of CDS spreads for each bank *j* around publication dates *i* for each of the event horizons defined previously where $t \in [-k, +k]$. The CARs are then aggregated to obtain the average cumulative abnormal return for each of the three banks.

$$\overline{CAR}_{i,k} = \frac{1}{|J|}\sum_{j \in J} CAR_{i,j,k}$$

Where $\overline{CAR}_{i,k}$is the mean cumulative abnormal return averaged across the set of banks *J* = {CCB, ICBC, AGRBK} for event *i* over window *k*, where the cardinality $|J|$ = 3 corresponds to the three banks in the sample. Averaging the $\overline{CAR}_{i,k}$ across banks into a single event-level observation resolves the cross-sectional clustering problem that arises when a single event simultaneously affects multiple banks. Aggregating the resulting reactions into one mean observation per event ensures the statistical independence of the observations.

5.3 Statistical tests and hypotheses

5.3.1 Hypothesis 1 (*H1*) : CDS spreads reactions around e-CNY events

$H_0^1 : E[\overline{\overline{CAR}}_k]$ = 0 - Chinese CBDC-related publications do not generate any statistically significant variations on CDS spreads of Chinese retail banks.

$H_1^1 : E[\overline{\overline{CAR}}_k]$ ≠ 0 - Chinese CBDC-related publications do generate statistically significant variations on CDS spreads of Chinese retail banks.

To test Hypothesis 1, the grand mean of each event-level $\overline{CAR}_{i,k}$ is computed by aggregating across all usable events *N* for each event window *k*. This allows to determine whether e-CNY publications generate statistically significant average abnormal movements in banks' CDS spreads across each distinct time horizon.

$$\overline{\overline{CAR}}_k = \frac{1}{N}\sum_{i=1}^{N} \overline{CAR}_{i,k}$$

The significance of the grand mean cumulative abnormal return is then assessed by testing whether the observed $\overline{\overline{CAR}}_k$ deviates significantly from zero relative to its natural sampling variability. A standard t-test is computed for each event window *k*, with the test statistic is defined as follows.

$$T_k = \frac{\overline{\overline{CAR}}_k}{\hat{\sigma}_k / \sqrt{N}}$$

Where T_k is the test statistic computed for each event window *k*. $\hat{\sigma}_k$ is the standard deviation of the $\overline{CAR}_{i,k}$ across all *N* usable events, and $\sqrt{N}$ is the square root of the number of usable events. Together they form the denominator representing the standard error of the estimated grand mean. The analysis then seeks to reject H_0^1 at conventional significance levels, with rejection regions defined as $|T_k|$>2,576 at the 1% level, $|T_k|$>1,96 at the 5% level, $|T_k|$>1,645 at the 10% level, corresponding to the standard quantiles of the Normal distribution.

5.3.2 Hypothesis 2 (*H2*) : Temporal Sequencing by development phases

$H_0^2 : E[\overline{\overline{CAR}}_{1,k}]= E[\overline{\overline{CAR}}_{2,k}] = E[\overline{\overline{CAR}}_{3,k}]$ - The average reactions of the 3 different phases of the e-CNY's development are identical to one another and do not show any specific intensification of reactions across phases.

$H_1^2 :\ E[\overline{\overline{CAR}}_{1,k}]< E[\overline{\overline{CAR}}_{2,k}] < E[\overline{\overline{CAR}}_{3,k}]$ - The average reactions of the 3 different phases of the e-CNY's development are distinct from one another and do show an intensification of reactions across phases.

To test the second hypothesis, the mean of each event-level $\overline{CAR}_{i,k}$ is aggregated separately according to the development phase of the e-CNY to form three samples comprising events *i*. The set of each event in a temporal sequence is denoted I_p, with p representing a phase $p \epsilon \{1,2,3\}$, where the number of elements in each phase is denoted by N_p where $N_p = |I_p|$. This allows to obtain the average cumulative abnormal return for each phase, namely $\overline{\overline{CAR}}_{1,k}$ for Phase 1, $\overline{\overline{CAR}}_{2,k}$ for Phase 2 and $\overline{\overline{CAR}}_{3,k}$ for Phase 3, defined as follows.

$$\overline{\overline{CAR}}_{p,k} = \frac{1}{N_p} \sum_{i \epsilon I_p} \overline{CAR}_{i,k}$$

To test Hypothesis 2, each pair of temporal sequences is compared through one-tailed significance tests designed to assess whether the effect of e-CNY events intensifies progressively with the maturity of the pilot program across successive phase pairs. Three *T* test statistics are defined to evaluate each pairwise difference *diff*:

Test 1- Phase 2 vs Phase 1	Test 2- Phase 3 vs Phase 2	Test 3- Phase 3 vs Phase 1
$T_{diff,1\to 2,k} = \frac{\overline{\overline{CAR}}_{2,k} - \overline{\overline{CAR}}_{1,k}}{\sqrt{\frac{\hat{\sigma}_{2,k}^2}{N_2} + \frac{\hat{\sigma}_{1,k}^2}{N_1}}}$	$T_{diff,2\to 3,k} = \frac{\overline{\overline{CAR}}_{3,k} - \overline{\overline{CAR}}_{2,k}}{\sqrt{\frac{\hat{\sigma}_{3,k}^2}{N_3} + \frac{\hat{\sigma}_{2,k}^2}{N_2}}}$	$T_{diff,1\to 3,k} = \frac{\overline{\overline{CAR}}_{3,k} - \overline{\overline{CAR}}_{1,k}}{\sqrt{\frac{\hat{\sigma}_{3,k}^2}{N_3} + \frac{\hat{\sigma}_{1,k}^2}{N_1}}}$

Test 3 constitutes the primary test examining the overall intensification of market reactions between the initial implementation phase and the final phase of e-CNY development. While Tests 1 and 2, are designed to assess whether this intensification is monotonically progressive across each successive pair of phases. The denominator contains the pooled standard error, where $\hat{\sigma}_{1,k}^2$, $\hat{\sigma}_{2,k}^2$, $\hat{\sigma}_{3,k}^2$ are the empirical variances for each $\overline{CAR}_{i,k}$ of events belonging respectively to phase 1, 2 and 3. Unlike H_1^1, the phase effect tests of H_1^2 are one-tailed and designed to detect a strictly positive difference.

H_0^2 is rejected whenever a two-sided statistically significant difference is observed between at least one pair of phases. However, H_0^2 is rejected in favour of H_1^2 only if the test statistic is strictly positive and exceeds the corresponding one-tailed critical values, confirming that the intensification is directionally consistent with the hypothesized monotonic progression across phases. While the significance thresholds remain identical, the one-tailed critical values differ with rejection at 1% if $T_{diff,p\to p,k}$>2.326, 5% if $T_{diff,p\to p,k}$>1.645, and 10% if $T_{diff,p\to p,k}$>1.282.

5.3.3 Clustering

When two publications in the dataset are temporally clustered, their event windows may share overlapping trading days. This overlap induces cross-event correlation among the corresponding CARs, violating the assumption of statistical independence required for standard inference. To address this issue and correct for non-independence without excluding events, thereby avoiding any arbitrary reduction in sample size, standard errors are estimated using a calendar week-level clustered covariance estimator. This accounts for within-group correlation among events whose publication dates fall within the same calendar week, treating them as potentially correlated observations.

5.3.4 Comparative analysis – Sovereign CDS vs. Banking CDS

The objective of this comparative analysis is to assess the sectoral specificity of market reactions and determine whether e-CNY-related risk affects the banking sector independently from the sovereign one. The purpose is not to test whether e-CNY publications generate significant reactions in sovereign CDS spreads, but rather to identify potential sectoral differences that would allow to assess whether the e-CNY is genuinely perceived by the market as a theoretical instrument of banking disintermediation. Furthermore, the literature documents that Chinese sovereign CDS spreads share a common stochastic trend with those of Chinese domestic banks. To conduct this analysis, the methodology developed for H1 is reapplied to a new dependent variable, namely the Chinese 5-year sovereign CDS spread. A comparative analysis is then performed between the credit risk's reactions of the Chinese state and those of its domestic banking sector. The sovereign market model is defined as follows: $\Delta CDS_t^{SOV} = \alpha_i^{SOV} + \beta_{1\,i}^{SOV} \times VIX_t + \beta_{2\,i}^{SOV} \times SHIBOR3M_t + \varepsilon_t^{SOV}$, where the mean sovereign cumulative abnormal returns are computed as $\overline{\overline{CAR}}_k^{SOV} = \frac{1}{N}\sum_{i=1}^{N} CAR_{i,k}^{SOV}$. The observed reactions are subsequently compared to the estimates obtained under H1 and H2 through a week-level clustered t-test of mean differences, comparing the standardised cumulative abnormal returns across sectors.

5.3.5 Robustness 1 - Exclusion of systemic financial stress' periods

To preserve statistical power and ensure that the analysis captures only sector-specific movements within the Chinese banking system, this robustness test re-estimates the principal event study on a cleaned sample that excludes e-CNY events whose event windows overlap with episodes of extreme systemic stress. To this end, the China Government Bond yield and the CNH/USD exchange rate are used to exclude event dates for which at least one episode of extreme systemic stress falls within the event window [-k, +k] of an e-CNY publication, which could potentially contaminate the observed abnormal returns.

To define the exclusion zones, event dates are removed when the daily variation of the China Government Bond yield exceeds 2 standard deviations from its historical distribution. This threshold corresponds to the conventional standard used in empirical finance for outlier detection in stress testing, approximating the exclusion of the most extreme 5% of observations. Regarding the CNH/USD exchange rate, a different threshold is applied given that exchange rates are documented to exhibit asymmetry and abrupt jumps that generate fat-tailed distributions. To address this, a non-parametric threshold is retained at the 99th percentile of the empirical distribution of absolute daily CNH/USD variations, focusing exclusively on the most extreme 1% of exchange rate shocks over the sample period.

5.3.6 Robustness 2 - Time-series trends

While Hypothesis 2 tests whether market reactions intensify across discrete predefined phases, it does not capture the continuous evolution of these reactions over time. This robustness test complements the main analysis by directly examining whether market sensitivity to e-CNY publications increases systematically from the project's implementation in 2019 through March 2026. The analysis is further decomposed into three sub-samples based on publication source defined as, all events combined, Level 1 official institutional publications only and Level 2 media sources only. This allows to assess whether the temporal trend is driven by the institutional signal or by its media diffusion.

To provide a methodological approach independent of the main hypotheses and complementary to the phase-based intensification tests, a log-linear time-series regression is estimated on a continuous explanatory trend variable denoted $Log(TREND_t + 1)$, measuring the logarithmic progression in years elapsed since the first e-CNY publication which has a calculable CAR (December 10, 2019) up to publication date t. This choice is justified by the Ramsey RESET test, reported in Appendix 3, which rejects the linear specification at the 5% significance level for all events combined and for Level 2 publications. For institutional publications (L1), the RESET test fails to reject either the linear or the log-linear specification. For consistency across sub-samples, the log-linear specification is retained for all estimations. The trend regression model is specified as follows: $CAR_t = \alpha + \beta \times Log(TREND_t + 1) + \varepsilon_t$. The coefficient β measures the increase in CARs in basis points per unit increase in the logarithm of years elapsed since the first calculable CAR publication.

To correct for serial correlation and heteroskedasticity in the residuals, whereby events with temporally adjacent publication dates tend to generate similar CARs due to shared market conditions, standard errors are estimated using the Newey-West estimator. It assigns declining weights to residual covariances as a function of their temporal distance, thereby producing more reliable confidence intervals. The bandwidth is set following the data-driven rule $T^{\frac{1}{4}}$ proposed by Newey and West (1994). Applied to the full event sample, the rule gives $364^{\frac{1}{4}} = 4{,}37$, rounded down to 4 observations[3]. This makes it possible to correct for potential autocorrelation among the residuals of the four preceding observations that are temporally the closest. For the sub-samples, it gives a bandwidth set to 3 for L1 with $112^{\frac{1}{4}} = 3{,}25$ and one of 4 for L2 with $253^{\frac{1}{4}} = 4$. The test is conducted separately for each event window in order to assess the robustness of the trend across different time horizons.

[3] Les 364, 112 et 253 observations sont le résultats après nettoyages de la fenêtre d'estimations L_i^*, qui est repris dans la partie résultats et retire un total de 74 évènements sur l'ensemble des années (2019-2026).

6 Empirical Results and Interpretation

6.1 Sample description after cleaning procedure

Following application of the cleaned estimation window procedure L_i^*, on the 438 publications recorded in the e-CNY event database, 364 are retained for the k=1 event window and 365 for k=3 and k=5. In the main analysis, a total of 74 and 73 publications is excluded, as their cleaned estimation window contained fewer than 60 trading days. The distribution of retained events by window and phase is presented in the table 1.

Table 1 – Sample Description – Usable Events by Phase and Event Window

Phase	Period	Total Events	Excluded Events	[-1,+1]	[-3,+3]	[-5,+5]
Phase 1	2019-2021	147	36 & 35	111	112	112
Phase 2	2022-2023	165	20	144	145	145
Phase 3	2024-2026	126	18	109	108	108
Total	2019-2026	438	74 & 73	364	365	365

6.1.1 Hypothesis 1 (H1): CDS spreads reactions around e-CNY events

To address temporal clustering in the inference, cumulative abnormal returns on CDS spreads are computed relative to the market model estimated over L_i^* for each bank-event pair (*i,j*), controlling for the VIX and the 3-month SHIBOR as defined in the methodology. Under this first hypothesis, e-CNY publications generate the following reactions across event windows:

Table 2 – H1 – CAR around e-CNY events

Event Window	N	CAR Mean (bp)	Clustered SE	T-Statistic	P-Value
[-1,+1]	364	0.605**	0.295	2.050	0.0411
[-3,+3]	365	1.428**	0.580	2.462	0.0143
[-5,+5]	365	2.291***	0.803	2.854	0.0046

**** p < 0.01, ** p < 0.05, * p < 0.10. Standard errors clustered at the week level via vcovCL.*

Over the narrow event window [-1,+1], the mean CAR of +0.605 basis points (bp) is statistically significant at the 5% level ($|T_k|$>1,96, p = 0.041), indicating that e-CNY publications generate a positive and significant abnormal widening in Chinese bank CDS spreads. For the intermediate window [-3,+3], the mean CAR increases to +1.428 bp, remaining significant at the 5% level ($|T_k|$>2,462, p = 0.014). For the widened event window [-5,+5], the mean CAR further rises to +2.291 bp with significance strengthening to the 1% level ($|T_k|$>2.854, p = 0.005). Across event windows, both the magnitude of mean CARs and their statistical significance increase consistently with the length of k, from +0.605 basis points at k=1 to +2.291 basis points at k=5.

The results observed indicate that the mean CARs, are positive and statistically significant across all three event windows tested. They do not support the conclusion that Chinese CBDC-related publications do not generate statistically significant variations in the CDS spreads of Chinese retail banks and therefore lead to the rejection of H_0^1 in favour of H_1^1. The magnitude of the CARs increases as the event window widens, suggesting a progressive integration of information into CDS spreads over several trading days.

6.1.2 Hypothesis 2 (H2): Temporal Sequencing by development phases

The analysis of Hypothesis 2 is structured around four complementary steps, each reported in a separate table. Table 3 assesses the statistical significance of mean CARs against zero for each phase individually via a t-test. Table 4 formalizes the differences between phase 2 and phase 3 relative to Phase 1, working as the reference phase. Table 5 complements this analysis by examining one-tailed differences between each phase and Table 6 presents a two-sided clustered difference test between Phase 3 and Phase 2. Tables 5 and 6 jointly serve to test the directional hypothesis formulated in H_1^2 and assess whether a progressive intensification of market reactions can be identified across phases.

6.1.3 Mean CARs by Development Phase

To test whether the average reactions across the three development phases of the e-CNY are distinct from one another and whether a progressive intensification can be identified, the mean CARs are first computed separately for each phase across the three event windows. These data are reported in Table 3, which assesses the individual statistical significance of mean CARs for each phase against zero.

Table 3 – H2 – Mean CARs by Development Phase

Phase	Event Window	N	CAR Mean (bp)	SD	T-Statistic	P-Value
Phase 1	[-1,+1]	111	-0.346	3.284	-1.110	0.2692
Phase 1	[-3,+3]	112	-0.783	5.880	-1.410	0.1613
Phase 1	[-5,+5]	112	-1.032	8.447	-1.293	0.1988
Phase 2	[-1,+1]	144	1.4***	5.550	3.027	0.0029
Phase 2	[-3,+3]	145	3.151***	10.530	3.604	0.0004
Phase 2	[-5,+5]	145	4.86***	13.913	4.206	0.0000
Phase 3	[-1,+1]	109	0.521**	2.601	2.093	0.0387
Phase 3	[-3,+3]	108	1.407***	4.518	3.237	0.0016
Phase 3	[-5,+5]	108	2.29***	5.774	4.121	0.0001

**** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. One-sample t-test against zero with Conventional standard errors*

The mean CARs obtained for Phase 1 are negative across all three event windows, indicating that publications from 2019 to 2021 were on average associated with CDS spread movements below the fitted normal return predicted by the market model. This could suggest that around announcement dates, the market perceived less risk than expected for the banking sector. However, the p-values across all event windows exceed the 10% significance threshold, meaning that there is more than a 10% probability of observing similar deviations in the absence of any event effect. It is therefore not possible to reject H_0^2 solely on the basis of the implementation phase nor to estimate with significance the direction of any phase 1 reaction.

Phases 2 and 3 exhibit slightly distinct patterns. During Phase 2 (2022–2023), mean CARs are positive and statistically significant at the 1% level across all three event windows, suggesting that investors perceive e-CNY events as a source of increased credit risk for Chinese banks during the expansion phase. Phase 3 displays a similar pattern with positive mean CARs across all event windows, significant at the 1% level except for the narrow window [-1,+1] where significance weakens to the 5% level, suggesting that market reactions persist but remain marginally more moderate than in Phase 2. These results serve as the empirical basis for the main test of H_0^2 and are extended in Tables 4 and 5, which test between-phase differences.

6.1.4 Between-Phase differences

To test whether statistically significant differences in market reactions exist across temporal sequences, a regression model is estimated that simultaneously assesses the deviation of mean CARs in Phases 2 and 3 relatives to Phase 1. The objective is to test whether the reactions generated across the three development phases of the e-CNY are significantly distinct from one another. Estimates are computed across the three event windows using week-level clustered standard errors, complementing the phase-level assessment reported in Table 3.

Table 4 - H2 - Phase Effects on CDS Spreads - Two-sided test (Clustered SE)

Event Window	Comparison	Coefficient (bp)	Clustered SE	T-Statistic	P-Value
[-1,+1]	Phase 2 vs Phase 1	1.746**	0.738	2.365	0.0186
[-1,+1]	Phase 3 vs Phase 1	0.868*	0.519	1.672	0.0953
[-3,+3]	Phase 2 vs Phase 1	3.935***	1.452	2.710	0.0071
[-3,+3]	Phase 3 vs Phase 1	2.191**	0.990	2.213	0.0275
[-5,+5]	Phase 2 vs Phase 1	5.892***	2.029	2.904	0.0039
[-5,+5]	Phase 3 vs Phase 1	3.321**	1.405	2.364	0.0186

**** p < 0.01, ** p < 0.05, * p < 0.10. Standard errors clustered at the week level via vcovCL.*

Both phases generate significant positive coefficients across all event windows with Phase 2 generating systematically larger coefficients than Phase 3 in both magnitude and significance. Consistently with the pattern observed in H1, the coefficients of both phases increase with the width of the event window. The results indicate that both phases generate mean CARs significantly in excess of those observed in Phase 1, suggesting that perceived credit risk in Chinese bank CDS spreads has increased significantly since the e-CNY implementation in 2019.

6.1.5 Intensification test by phases differences

In accordance with the methodology specified for H_1^2, three one-tailed clustered t-tests of mean differences are estimated to assess whether the intensification of market reactions is progressive and monotonic across temporal sequences. Specifically, it is tested whether mean CARs in each phase are significantly greater than those of the preceding one. The results, reported in Table 5 allow testing whether the directionality predicted by H_1^2 is supported.

Table 5 - H2 - One-Tailed Tests of Phase Differences (Clustered SE)

Comparison	Event Window	Difference (bp)	Clustered SE	T-Statistic	P-Value
Phase 2 vs Phase 1	[-1,+1]	1.746***	0.739	2.364	0.0094
Phase 3 vs Phase 2	[-1,+1]	-0.879	0.694	-1.267	0.8968
Phase 3 vs Phase 1	[-1,+1]	0.868**	0.519	1.671	0.0481
Phase 2 vs Phase 1	[-3,+3]	3.935***	1.453	2.709	0.0036
Phase 3 vs Phase 2	[-3,+3]	-1.744	1.353	-1.289	0.9008
Phase 3 vs Phase 1	[-3,+3]	2.191**	0.991	2.211	0.0140
Phase 2 vs Phase 1	[-5,+5]	5.892***	2.030	2.903	0.0020
Phase 3 vs Phase 2	[-5,+5]	-2.57	1.820	-1.412	0.9204
Phase 3 vs Phase 1	[-5,+5]	3.321***	1.406	2.362	0.0095

**** p < 0.01, ** p < 0.05, * p < 0.10. Standard errors clustered at the week level via vcovCL.*

Comparing Phase 2 to Phase 1, an intensification of positive reactions is observed as the event window widens with mean CAR differentials increasing systematically from k=1 to k=5, all significant at the 1% level. The cumulative impact strengthens with wider event windows, consistent with a progressive integration of information into CDS spreads. Conversely, Phase 3 to Phase 2 comparison yields negative and statistically insignificant differences across all event windows, failing to support the monotonic progressive intensification predicted by H_1^2.

However, by construction, one-tailed tests can only detect statistically significant positive differences, when the observed difference is negative, p-values mechanically approach 1, precluding any conclusion on significance in the negative direction. To ensure that the absence of intensification between Phase 3 and Phase 2 holds in both directions, a two-sided clustered t-test of mean differences is estimated, the results of which are reported in Table 6.

Tableau 6 – H2 - Phase 3 vs Phase 2 – Two-sided test (Clustered SE)

Comparison	Event Window	Difference (bp)	Clustered SE	T-Statistic	P-Value
Phase 3 vs Phase 2	[-1,+1]	-0.879	0.694	-1.267	0.206
Phase 3 vs Phase 2	[-3,+3]	-1.744	1.353	-1.289	0.198
Phase 3 vs Phase 2	[-5,+5]	-2.57	1.820	-1.412	0.159

**** p < 0.01, ** p < 0.05, * p < 0.10. Standard errors clustered at the week level via vcovCL.*

The two-sided p-values exceed all conventional significance thresholds, indicating that no statistically significant difference can be established between Phase 3 and Phase 2 in either direction. However, the one-tailed test of Phase 3 relative to Phase 1, reported in Table 5, reveals a significant overall positive intensification across all event windows, significant at the 5% level for [-1,+1], [-3,+3] and at the 1% level for [-5,+5]. This supports the existence of a global intensification of market reactions since the e-CNY implementation, while not allowing to conclude that this intensification is strictly monotonic across successive phases.

6.1.6 conclusion

The results reported in Tables 3 through 6 provide evidence against the hypothesis that the three development phases of the e-CNY generate equal market reactions, leading to the rejection of H_0^2. The null hypothesis of phase equality is rejected for both Phase 2 and Phase 3 relative to Phase 1, which reveal positive and significant differences across all event windows.

However, the alternative hypothesis in its strict form, which postulated a strictly increasing intensification with a directional and ordered prediction whereby Phase 1 < Phase 2 < Phase 3, cannot be fully supported. Although the comparison between Phase 3 and Phase 1 indicates an overall intensification of reactions over the full e-CNY development cycle, no significantly stronger reactions are observed between Phase 3 and Phase 2 across any event windows.

Over the full implementation period, the observed intensification is driven by a sharp acceleration through 2023, followed by a consolidation phase between 2024 and 2026 during which market reactions remain significantly elevated relative to the initial implementation period. This pattern reveals that the intensification hypothesised in H_1^2 is non-linear but nonetheless present. However, to ensure the robustness of the findings, the following sections examine alternative specifications.

6.2 Complementary analysis – Sovereign CDS comparison

This comparative analysis tests whether the abnormal variations observed in H1 and H2 are specific to the Chinese banking sector by comparing them with reactions in the 5-year Chinese sovereign CDS spread. Prior to examining sectoral differences, it is first verified, by using a significance test analogous to the one applied under H1, that Chinese 5-year sovereign CDS generate statistically significant mean CARs across all three event windows. The results reported in Table 7 confirm that sovereign CDS react significantly to e-CNY events.

Tableau 7 – complementary analysis – H1 - CAR around e-CNY events based on Chinese sovereign CDS (Clustered SE)

CDS Type	Event Window	N	CAR Mean (bp)	Clustered SE	T-Statistic	P-Value
Sovereign CDS	[-1,+1]	364	0.804***	0.301	2.671	0.0079
Sovereign CDS	[-3,+3]	365	1.258**	0.595	2.113	0.0353
Sovereign CDS	[-5,+5]	365	2.007**	0.855	2.348	0.0194

**** p < 0.01, ** p < 0.05, * p < 0.10. Standard errors clustered at the week level via vcovCL.*

However, whereas banking CARs exhibit increasing significance as the event window widens, strengthening from 5% to 1% level, sovereign CARs display an opposite pattern, significant at the 1% level over the narrow window k=1 before stabilising at the 5% level across the wider windows k=3 and k=5. This suggests that information is integrated more rapidly into sovereign CDS spreads but with less persistence over time.

6.2.1 Difference globale entre CDS Bancaires et souverain

To verify whether the reactions of banking CDS are statistically distinct from those of sovereign CDS, a comparative analysis of SCAR is conducted, normalising each market's reaction by its own structural volatility, thereby ensuring comparability across sectors with distinct volatility profiles. Results are presented in the table 8 below.

Table 8 – complementary analysis – Global difference in SCAR between banking CDS and sovereign CDS (Clustered SE)

Event Window	SCAR Bank	SCAR Sovereign	Difference (SCAR)	Clustered SE	T-Statistic	P-Value
[-1,+1]	0.073	0.147	-0.075	0.061	-1.228	0.2201
[-3,+3]	0.138	0.131	0.007	0.051	0.138	0.8904
[-5,+5]	0.186	0.178	0.008	0.056	0.144	0.8853

**** p < 0.01, ** p < 0.05, * p < 0.10. Standard errors clustered at the week level via vcovCL.*

The observed reactions are statistically insignificant across all event windows, failing to demonstrate that e-CNY informational shocks generate independent reactions in sovereign CDS relative to banking CDS. This indicates that e-CNY publications affect both markets in a broadly similar way over the full sample period. These results support the use of sovereign CDS as a benchmark for cross-phase comparison, justifying a separate phase-level analysis to compare sovereign reaction patterns with those observed for the banking sector.

6.2.2 Temporal Sequencing by development phases

To verify whether the intensification pattern observed in the main analysis of Hypothesis 2 is specific to the banking sector, the same phase-level significance analysis is applied to the

Chinese 5-year sovereign CDS. The results, reported in Appendix 4, display similar patterns to those obtained for banking CDS in Phase 1 and Phase 2.

However, mean sovereign CARs in Phase 1 are close to zero and statistically insignificant across all event windows, indicating a more pronounced absence of abnormal reaction than observed for banking CDS. In Phase 2, both sovereign and banking CDS generate statistically significant mean CARs at the 1% level across all event windows. Phase 3 exhibits a divergent pattern with sovereign CDS reaching significance only at the 5% level for [-1,+1] and [-5,+5] while remaining insignificant for [-3,+3], compared to 1% significance across all event windows for banking CDS.

These initial signals of differentiation motivate the between-sector comparative analysis of phase-based intensification reported in the following tables. To conduct this analysis, it is first tested whether statistically significant differences in reactions exist across temporal sequences using the same estimation methods as those applied in Tables 4 and 6. The results are reported in Table 9.

Table 9 – complementary analysis - H2 - Phase Effects on sovereign CDS Spreads - Two-sided test (Clustered SE)

Comparison	Event Window	Difference (bp)	Clustered SE	T-Statistic	P-Value
Phase 2 vs Phase 1	[-1,+1]	1.639**	0.748	2.191	0.0291
Phase 3 vs Phase 1	[-1,+1]	0.542	0.559	0.971	0.3323
Phase 3 vs Phase 2	[-1,+1]	-1.097	0.710	-1.544	0.1237
Phase 2 vs Phase 1	[-3,+3]	2.465	1.535	1.606	0.1092
Phase 3 vs Phase 1	[-3,+3]	0.689	1.109	0.621	0.5348
Phase 3 vs Phase 2	[-3,+3]	-1.776	1.354	-1.311	0.1909
Phase 2 vs Phase 1	[-5,+5]	4.475**	2.213	2.022	0.0439
Phase 3 vs Phase 1	[-5,+5]	1.737	1.591	1.092	0.2757
Phase 3 vs Phase 2	[-5,+5]	-2.738	1.895	-1.445	0.1496

**** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Standard errors clustered at the week level via vcovCL.*

The OLS regression estimates for the sovereign CDS reveal that Phase 3 versus Phase 1 and Phase 3 versus Phase 2 differences are statistically insignificant across all event windows. The only significant results are observed for the Phase 2 versus Phase 1 comparison, with mean CAR differentials of +1.639 basis points over [-1,+1] and +4.475 basis points over [-5,+5].

Although the between-phase difference tests yield results broadly consistent with those reported in Tables 4 and 6, with no significant difference observed between Phase 3 and Phase 2, the overall pattern in Table 9 leads to distinct conclusions. For the Phase 3 versus Phase 1 comparison, sovereign CDS differences are statistically insignificant across all event windows, whereas banking CDS differences are significantly positive at the 5% level for the windows k=3 and k=5, and at the 10% level for k=1. Results suggest that no significant overall intensification is observed for sovereign CDS, despite sovereign spreads reacting to e-CNY events.

6.3 Robustness 1- Exclusion of systemic financial stress' periods

The objective of this robustness test is to exclude all extreme systemic stress periods specific to the Chinese market that could contaminate the event windows around e-CNY publication dates. The distribution of exclusions by phase and financial instrument is reported in Table 10.

Table 10 – Robustness 1 – Sample description - Systemic risk Exclusion by Instrument and Phase

Instrument	Phase 1 (N=147)	Phase 2 (N=165)	Phase 3 (N=126)	Total Exclusions
China Bond > 2SD	13 (8.8%)	13 (7.9%)	5 (4%)	31
CNHUSD > P99	2 (1.4%)	11 (6.7%)	2 (1.6%)	15
Total combined	15 (10.2%)	23 (13.9%)	7 (5.6%)	45

The balance of the exclusion distribution preserves 89.7% of initial sample structure, thereby ensuring statistical power and avoiding the introduction of systematic bias across phases. Out of a total of 438 e-CNY events, 45 are excluded and 393 are retained for the robustness analysis. The excluded dates have been compiled in an appendix 5. The hypothesis 1 test is then re-estimated on the sample cleaned from periods of systemic stress with results reported in table 11.

Table 11 – Robustness 1 – Cleaned H1 after systemic risk exclusion - CAR around e-CNY events

Event Window	N	CAR Mean (bp)	Clustered SE	T-Statistic	P-Value
[-1,+1]	323	0.643**	0.310	2.071	0.0392
[-3,+3]	324	1.718***	0.609	2.822	0.0051
[-5,+5]	324	2.577***	0.856	3.009	0.0028

**** p < 0.01, ** p < 0.05, * p < 0.10. Standard errors clustered at the week level via vcovCL.*

It is observed that the hypothesis 1 pattern is supported, with average CARs and p-values slightly increasing. The only notable difference is the event window [-3; +3] which becomes significantly more robust at the 1% significance level, compared to 5% in the main analysis. Therefore, the rejection of the null hypothesis H_0^1 is maintained. The statistical significance test of the individual average CARs for each phase relative to zero, is re-estimated on the sample cleansed of systemic stress, with results included in Table 12.

Tableau 12 – Robustness 1 - Cleaned H2 after systemic risk exclusion - Mean CARs by Development Phase

Phase	Event Window	N	CAR Mean (bp)	SD	T-Statistic	P-Value
Phase 1	[-1,+1]	98	-0.025	3.084	-0.081	0.9354
Phase 1	[-3,+3]	99	-0.301	5.777	-0.518	0.6055
Phase 1	[-5,+5]	99	-0.559	8.314	-0.669	0.5050
Phase 2	[-1,+1]	123	1.267**	5.570	2.524	0.0129
Phase 2	[-3,+3]	124	3.631***	10.357	3.904	0.0002
Phase 2	[-5,+5]	124	5.373***	14.042	4.260	0.0000
Phase 3	[-1,+1]	102	0.531**	2.573	2.085	0.0396
Phase 3	[-3,+3]	101	1.348***	4.509	3.005	0.0034
Phase 3	[-5,+5]	101	2.219***	5.900	3.780	0.0003

**** p < 0.01, ** p < 0.05, * p < 0.10. One-sample t-test against zero with Conventional standard errors*

The results obtained are consistent with the one observed for the main analysis, with Phase 1 remaining statistically insignificant, and Phases 2 and 3 significant at same levels, except for Phase 2, which is slightly less significant at the 5% level for the narrow event window. The one-tailed test is then re-estimated on Hypothesis 2, after removing systemic stress events with the results included in table 12

Table 11 – Robustness 1 - Cleaned H2 after systemic risk exclusion - One-Tailed Tests of Phase Differences (Clustered SE)

Comparison	Event Window	Difference (bp)	Clustered SE	T-Statistic	P-Value
Phase 2 vs Phase 1	[-1,+1]	1.293*	0.797	1.623	0.0530

Comparison	Event Window	Difference (bp)	Clustered SE	T-Statistic	P-Value
Phase 3 vs Phase 2	[-1,+1]	-0.736	0.765	-0.962	0.8315
Phase 3 vs Phase 1	[-1,+1]	0.556	0.524	1.063	0.1446
Phase 2 vs Phase 1	[-3,+3]	3.932***	1.566	2.511	0.0064
Phase 3 vs Phase 2	[-3,+3]	-2.283	1.470	-1.553	0.9391
Phase 3 vs Phase 1	[-3,+3]	1.649*	1.027	1.605	0.0550
Phase 2 vs Phase 1	[-5,+5]	5.932***	2.221	2.670	0.0041
Phase 3 vs Phase 2	[-5,+5]	-3.153	2.022	-1.559	0.9398
Phase 3 vs Phase 1	[-5,+5]	2.779**	1.471	1.889	0.0302

**** p < 0.01, ** p < 0.05, * p < 0.10. Standard errors clustered at the week level via vcovCL.*

A reduced statistical significance is observed on k=1, where Phase 2 versus Phase 1 shifts from a 0.0094 p-value to a 0.0530 p-value, less statistically significant than the initial observation but remains significantly equivalent at the 1% level for k = 3 and k = 5. For the Phase 3 versus Phase 1 comparison, the intensification is no longer statistically observable over the narrow window [-1,+1], with the p-value exceeding the marginal 10% threshold. This loss of significance also extends to the wider event windows, where the p-value for [-3,+3] increases from 0.014 to 0.055, marginally above the conventional 5% significance level. For the wide window [-5,+5], significance weakens from the 1% level in the main analysis to the 5% level in the stress-adjusted sample. Regarding the Phase 3 versus Phase 2 comparison, results remain consistent with those of the main analysis, yielding negative and statistically insignificant mean CAR differences across all event windows.

Although the between-phase differences become slightly less significant over narrow event windows, a pattern also observed in the two-sided test reported in Appendix 6, mean CARs remain positive relative to the Phase 1 across all specifications. Following the exclusion of Chinese financial systemic stress episodes, both H1 and H2 initial conclusion are maintained, leading to the successive rejection of H_0^1 and H_0^2. Results are marginally strengthened for H1, with higher mean CARs, while the phase intensification pattern of H2 is preserved with slightly reduced significance on certain windows, notably on the Phase 3 versus Phase 1 comparison, which reaches a 5% significance threshold for the [-5,+5] window.

6.4 Robustness 2- Time-series trends

This second robustness analysis examines the time-series trend in CARs estimated via the Newey-West log-linear regression, such as defined in the methodology. It tests whether the CDS reactions of Chinese banks observed around e-CNY event dates increase systematically over time, by looking at three sub-samples. Prior to this, an OLS regression with week-level clustered standard errors is estimated to test whether event sources decomposed by level, with L1 representing official institutional publications and L2 media sources, generate statistically significant abnormal reactions in Chinese bank CDS spreads.

Table 134 – Robustness 2 - H1 – CAR by Event Level (Newey-West SE)

Event Level	Event Window	N	CAR Mean (bp)	Clustered SE	T-Statistic	P-Value
L1	[-1,+1]	112	0.715*	0.376	1.903	0.0596
L1	[-3,+3]	112	1.666*	0.873	1.909	0.0589

Event Level	Event Window	N	CAR Mean (bp)	Clustered SE	T-Statistic	P-Value
L1	[-5,+5]	112	2.269**	1.099	2.066	0.0412
L2	[-1,+1]	252	0.555	0.374	1.484	0.1390
L2	[-3,+3]	253	1.322*	0.696	1.901	0.0585
L2	[-5,+5]	253	2.301**	0.990	2.324	0.0209

**** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Newey-West standard errors with lag determined by $T^{1/4}$ rule*

Both publication levels generate positive mean CARs with similar significance levels across the wider event windows k=3 and k=5, while the narrow window k=1 yields no significant reaction for Level 2 and only marginal significance at the 10% level for Level 1.

Table 145 - Robustness 2 – L1 vs L2 – Two-sided test (Newey-West SE)

Event Window	L1- L2 (bp)	Clustered SE	T-Statistic	P-Value
[-1,+1]	0.159	0.499	0.319	0.7498
[-3,+3]	0.344	1.044	0.329	0.7421
[-5,+5]	-0.032	1.377	-0.023	0.9814

**** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Newey-West standard errors with lag determined by $T^{1/4}$ rule*

The two-sided test of differences between the CARs across each level does not reveal any significant difference in reactions between Level 1 and Level 2, suggesting that they generate similar reactions in magnitude. The market appears to react to e-CNY events independently of the source, suggesting that information is efficiently transmitted across both official and media sources.

It is then tested whether these reactions evolve progressively over time using a Newey–West regression, which corrects for heteroskedasticity arising from time-varying error variance across different market conditions, as well as for potential autocorrelation. This analysis provides an overview of an adjusted standard error in order to assess their temporal evolution and thereby the reliability of statistical inference. The OLS trendlines estimated over all events combined are reported in the appendix 7, and the observed results are described and reported in table 16.

Table 156 – Robustness 2 – Time series by log linear Newey-west regression – All Events Combined

Event Level	Event Window	N	β (bp/log-year)	NW SE	T-Statistic	P-Value	R^2
All Events	[-1,+1]	364	0.938**	0.467	2.009	0.0453	0.0106
All Events	[-3,+3]	365	2.224**	1.007	2.208	0.0279	0.0171
All Events	[-5,+5]	365	3.247**	1.521	2.135	0.0334	0.0201

**** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Newey-West standard errors with lag determined by $T^{1/4}$ rule*

Each event window generates statistically significant betas at the 5% level, indicating that the identified event reactions increase over the entire horizon of the e-CNY development. To contextualize the observed trend, the model is evaluated by projecting CARs at two distinct dates, the first usable event date in December 2019 and the last in March 2026. The total predicted increase over the period is of +1.9 bps for the [-1; +1] window, +4.4 bps for the [-3; +3] window, and +6.5 bps for the [-5; +5] window. Although this shows that reactions systematically intensify over time, the R^2 values are low, indicating a statistically present but modest effect, with CARs that are substantially different from one another. The logarithmic regression is then tested by levels, as developed in the methodology section.

Tableau 167 – Robustness 2 – Time series by log linear Newey-west regression – L1 and L2

Event Level	Event Window	N	β (bp/log-year)	NW SE	T-Statistic	P-Value	R²
L1 Official Only	[-1,+1]	112	-0.324	0.761	-0.426	0.6711	0.0014
L1 Official Only	[-3,+3]	112	1.125	1.820	0.618	0.5380	0.0035
L1 Official Only	[-5,+5]	112	2.854	2.088	1.367	0.1744	0.0143
L2 Media Only	[-1,+1]	252	1.368***	0.510	2.682	0.0078	0.0215
L2 Media Only	[-3,+3]	253	2.609**	1.094	2.385	0.0178	0.0247
L2 Media Only	[-5,+5]	253	3.542**	1.763	2.009	0.0456	0.0239

**** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Newey-West standard errors with lag determined by $T^{1/4}$ rule*

The results of the time series trend analysis by levels indicate that events originating from official sources are insignificant for any of the event windows tested and do not allow for the identification of a potential statistical relationship indicating an increase in reactions over time. However, the observations become more interesting for Level 2, with a statistically significant logarithmic increase at the 1% level over the short window and at the 5% level over the extended windows. The trend is therefore driven by media sources, which appear to be at the origin of the progressive dissemination of risk-related information to investors. A systematic increase in market reactions over time is consistent with and reinforces the main hypotheses, adding a continuous trend dimension complementary to the discrete phase-based tests previously conducted.

6.4.1 CDS sovereign comparison

The same log-linear regression is applied to the sovereign CDS, with results reported in the appendix 8. In contrast to the banking CDS, no statistically significant temporal trend is identified across any of the sub-samples tested (All, L1 and L2). While the estimated beta coefficients are positive for the combined sample and L2 but negative for L1, none reaches statistical significance, with p-values ranging between 0.30 and 0.71. These results confirm that the upward temporal trend is specific to the banking sector and is driven by all events and Level 2 media publications. The absence of a significant trend in sovereign CDS indicates that the observed reactions do not reflect a broader reassessment of Chinese sovereign risk, reinforcing the interpretation that the progressive and sector-specific awareness of banking disintermediation risk is linked to the development of the e-CNY.

7 Discussion

First and foremost, the current state of the field must be acknowledged. Central bank digital currencies represent an emerging research area for which this study constitutes an early empirical contribution, the results should be interpreted with caution as they are primarily intended to serve as a foundation for future analyses. Although China is the leading market in terms of CBDC adoption, the e-CNY project remains in a prolonged adoption phase. Introducing a new form of digital currency is a complex process deliberately designed for gradual assimilation by citizens. Furthermore, Chinese commercial banks operate under significantly greater implicit state backing than their counterparts in democratic economies, which may constrain market liquidity and consequently dampen observed reactions.

This analysis is designed to capture investors' perception of banking disintermediation risk rather than to measure the microeconomic impact of a CBDC on bank balance sheets. The objective is to provide forward-looking evidence on what may unfold, given the concrete reality that CBDCs are direct liabilities of central banks.

7.1 Hypothesis 1

Each result generate by the previous tests allows to derive several interpretations. First, the confirmation of Hypothesis 1 provides evidence that e-CNY events effectively generate significant and positive informational reactions on the CDS market of Chinese banks. The positive average CARs observed reflect an increased awareness of risk among market participants, who appear to perceive the development of the e-CNY project as a potential threat to the business model of Chinese banks. When examining the event windows, it is observed that the magnitude of the average CARs intensifies as the event window widen, with p-values becoming increasingly significant. Furthermore, these results remain consistent after filtering out systemic stress periods, which strengthens the robustness of the findings. This reaction suggests that the information is progressively understood over several trading days before being incorporated into Chinese bank spreads.

Although the magnitude of CARs appears relatively modest with a slow diffusion of information which tends to reflect a lack of market efficiency, these observations remain consistent with the structural characteristics of the analysed banks. Additionally, the recentness and limited understanding of CBDCs lead investors to act more cautiously, resulting in dispersed reactions and constraining direct speculation. Observing statistically significant reactions despite this structural compression strengthens the robustness of the results.

7.2 Hypothesis 2

Hypothesis 2 provides a nuanced perspective on how the market assesses the risk of disintermediation throughout the development of the e-CNY. Although the absence of differences between phases is rejected, the monotonic intensification of reactions can only be partially validated. During Phase 1, reactions are close to zero and not statistically significant, with results strengthening after excluding periods of systemic stress. Statistically, this does not allow to determine whether the market perceived the e-CNY as a direct risk to banking disintermediation at the implementation time. From an economic perspective, this lack of reaction can be explained by the limited visibility of the e-CNY project during its implementation. Between 2019 and 2021, the e-CNY was restricted to a small number of provinces with constraints on quantities and usage, resulting in low adoption. Moreover, Chinese bank CDS became available to international investors only at the end of 2019. Structurally, their liquidity was still very limited, with investors only beginning to incorporate awareness of CBDCs. This is therefore not a lack of results, but evidence that a regime shift occurred between Phase 1 and the subsequent phases, indicating a gradual construction of risk perception alongside the maturation of the pilot. Furthermore, observations in Phases 2 and 3 goes in opposite direction with significantly positive reactions that persist after excluding systemic stress.

Phase 2 (2024–2026) is the most reactive period, characterized by a strong acceleration in reactions. It contains the largest number of publications, with announcements having high media impact such as the inclusion of the e-CNY as a component of the monetary aggregate, major geographical expansions, new use cases, and the first positive tests reported by the PBoC, etc. This is the period in which the market begins to understand that a risk exists for banks, and this is reflected in the concern transmitted through the observed reactions, which are slightly stronger than in the other phases. Phase 3 is slightly more moderate, reactions remain positive but are slightly less statistically significant indicating a mild stabilization in risk perception which is already partially incorporated by the market. It is characterized by a stronger presence of publications from official sources intended to reassure investors, with more neutral or even positive tones. It is a period of less disruptive consolidation in which banks adapt through new products and internal adjustments. Events become more technical and analytical, which may explain why reactions stabilize.

These findings are reflected in the phase intensification tests, which assess whether the perceived banking disintermediation risk intensifies across successive development phases. Phase 2 vs. Phase 1 comparison suggests that each new publication conveys novel information to investors discovering the project, generating stronger market reactions. By Phase 3, investors have already incorporated the disintermediation risk into their expectations, resulting in more marginal reactions that nonetheless reflect a persistent risk perception. Both observations hold after excluding systemic stress periods though significance weakens on the narrow event window, consistent with the H1 documented pattern. These results are consistent with a progressive market learning process following the development of the e-CNY. However, intensification test between Phase 3 and Phase 2 is not statistically significant which is consistent with the stronger reactions observed in Phase 2 but does not allow for the acceptance of result’s monotonicity. This reflects a structural break in the perception of banking risk rather than a simple continuous progression, indicating that the data do not follow a purely linear trend.

To support the hypothesis of non-linear intensification, a log-linear regression is estimated to test whether market reactions follow a continuous trend without imposing predefined structural breaks tied to the discrete phase boundaries. The objective is to assess whether the observed reactions are persistent throughout the adoption of the e-CNY, thereby determining whether the perceived risk is sustained over the long term. This specification accounts for market learning behaviour, whereby investor reactions accelerate rapidly in the early stages, coinciding with the initial discovery of the project, before gradually decelerating and stabilising as information becomes more fully integrated into prices. Across all publications, the observed reactions exhibit a positive and statistically significant trend over each event window indicating that as the e-CNY develops investors’ perception of banking disintermediation risk intensifies and persists in the long term. Although non-monotonicity was observed in H2 the results remain positively consistent and statistically significant in the overall sample of observations.

When examining differences across publication levels, official institutional publications yield no significant trend whereas financial media sources generate statistically significant reactions across all event windows tested. Although this may appear counterintuitive, it reflects the inherently neutral to positive tone of central bank communications, which are unlikely to openly discuss the potential risks associated with CBDC implementation. Financial media sources amplify and disseminate information to international investors, with analysts and economic journalists able to take direct positions on the potential risks involved. The observed continuous trend independently corroborates the phase-based intensification tests, confirming that perceived risk around e-CNY events increases progressively over the course of the digital currency's development, with reactions driven by media publications acting as the primary transmission channel of information to international investors.

7.2.1 Limitation of the log-linear time series regression

A limitation concerns the low R^2 values observed in the time-series regression, indicating that the majority of the variation in individual CARs is explained by factors not captured by the model. This may reflect the heterogeneity of informational content across events which may carry negative, positive or neutral tones depending on the stance of the issuing source. This could also result from market conditions not captured by the analysis as from sentiment specific to the decisions of one of the three individual banks. This does not imply that the model is misspecified or weak, but rather that individual CAR reactions remain inherently heterogeneous given the nature of the data. The identified temporal trend represents an underlying systematic force that coexists with this individual-level variance and is sustained by the diversity of informational content across publications. Low R^2 values are a well-documented structural characteristic of event studies conducted on heterogeneous informational data, consistent with the broader empirical finance literature (MacKinlay, 1997).

7.3 Comparison of Sovereign to banking CDS

While the observed reactions in banking CDS spreads increase progressively with the event window, sovereign CDS exhibit greater statistical significance over the short window. Investors incorporate information more rapidly, with reactions occurring closer to event dates before partially correcting their positions which appears consistent with more speculative behaviour than the one observed for banks. However, the comparison between sovereign CDS and bank CDS shows that they react in a similar manner to events, with non-significant SCARs, indicating that investors perceive the risk as systemic rather than solely bank-sector specific. However, this contagion assumption no longer holds in the tests of differences across phases, which yield distinct results for each of the analysed sectors. For Chinese sovereign CDS, none of the successive phases tested show statistically significant results except for the difference between Phase 2 and Phase 1. The market appears to react with greater apprehension to the implementation of a CBDC, but this perception of risk is not continuous and is solely based on this observed pattern. This behaviour could be interpreted as more speculative as the reactions do not persist over time. These findings are also observed in the logarithmic regression, which does not reveal any statistically significant time trend across any of the event windows nor any of the subsamples tested.

These differences between sovereign and banking CDS reinforce the idea that the progressive and continuous perception of CBDC-related risk is a sector-specific constant. When cross-referencing the results obtained from the different tests conducted, it appears that the theoretical perceived risk of banking disintermediation is proportional to the development of the e-CNY. The observed reactions are gradual and non-linear, with more pronounced effects over extended windows, which tends to suggest that the market is in a learning phase rather than exhibiting immediate and definitive reactions. It incorporates information progressively over several trading days, which is consistent with the limited liquidity of Chinese bank CDS. This shows that the observed temporal patterns are specific to the banking sector, confirming that investors distinguish bank disintermediation risk from macroeconomic risk and that this effect persists over time and after systemic stress filtering.

8 Conclusion

This research focuses on understanding the informational transmission of banking disintermediation risk associated with the implementation of a CBDC within a specific banking system. The objective is to observe the behaviour of international investors to assess whether the banking disintermediation risk induced by the introduction of a retail CBDC is empirically observable, interpretable, and whether it translates into a sustained increase in the perceived credit risk of Chinese banks over time.

The overall results of the event study led to a clear conclusion, e-CNY events are perceived by the market as a signal of banking disintermediation risk that intensifies over time and is specific to the banking sector. Hypothesis 1 establishes that e-CNY publications generate positive and statistically significant CARs across all tested Chinese bank CDS, with effects increasing as the event window widens. Hypothesis 2 reveals that a significant intensification exists across phases but does not follow a strictly monotonic linear pattern, as the difference between Phase 3 and Phase 2 is not statistically significant. A log-linear time-series analysis further documents a significant upward temporal trend in market reactions, driven by media-level publications, specific to the banking sector and absent from sovereign CDS.

These results indicate that the market perceives the e-CNY as posing a growing risk to the financial soundness of Chinese banks. The persistence of the observed trend throughout the progressive development of the e-CNY suggests that market reactions may continue to intensify going forward. A sustained increase in CDS spreads would trigger several cascading effects that if left unaddressed would amplify the risks associated with CBDC adoption. This would be reflected in an upward repricing of refinancing costs on bond and interbank markets. Risk premia paid by banks to borrow and raise funds would increase thereby compressing their lending margins and curtailing their credit supply capacity. Given that banks constitute the primary channel for monetary and financial stability transmission, a durable increase in their perceived credit risk would have broader macroeconomic implications for the whole financial system. Such stress would act as a signal to international investors, potentially reducing foreign capital flows and constraining the external financing capacity of both banks and corporates.

The implementation of a CBDC involves converting fiduciary and scriptural money into central bank digital currency, and the risks associated with this structural shift in deposit form contribute to the progressive disintermediation of Chinese commercial banks, the primary channel of monetary policy transmission, raising concerns for macroeconomic and financial stability. These mechanisms are further amplified by the interest-bearing feature of the e-CNY, that accelerates bank deposits outflow toward Central Bank holdings. Chinese regulators, including the PBoC, should therefore adapt prudential standards such as capital requirements and liquidity ratios to account for this structural fragility of the banking system.

CBDCs remain a recent and insufficiently explored concept with limited empirical evidence and a shallow understanding of their economic implications and market risks. Moreover, even for China, which leads global CBDC deployment, the market penetration remains at an early stage, and material reactions would require further technical advances or broader adoption across other markets. While disintermediation risk is present, it does not yet constitute an immediate threat given the current market size and the prudential constraints in place to limit adoption.

This study is among the first to empirically measure the perceived impact of a CBDC on banking sector risk through a credit risk instrument such as CDS spreads. The methodology is designed to be replicable across other CBDC frameworks and to serve as a foundation for future empirical analyses. A first avenue for future research would be to apply this methodology to other CBDC projects to enable cross-country comparisons of perceived banking disintermediation risk. Replicating the methodology at more advanced stages of e-CNY adoption would allow testing whether the observed patterns persist over time. A final direction would be to measure the direct impact on bank deposit structures or to analyse the interbank rate curve and compare the findings with those of this study in order to assess the microeconomic consistency of the relationship.

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Appendix

Appendix 1- Architecture of the monetary system

Before addressing the economic and technical specificities of digital currencies, it is essential to clarify the nature of money and its different instruments. This conceptual clarification is all the more important as the object of this study does not concern, strictly speaking, the implementation of a new currency, but rather the creation of a new digital instrument for an already existing currency.

- **Fiat money:**

Two main concepts characterize the money supply. The first is fiat money, which is a legal tender payment instrument, officially recognized by states as a valid medium for commercial and legal transactions. This means that it cannot be refused as a means of payment by institutions and merchants, in this sense, it has immediate legal discharge value, extinguishing debt instantly. It exists exclusively in physical form and refers to the total stock of coins and banknotes in circulation. It is issued by a central authority or government and distributed through commercial banks.

- **Scriptural money**

The majority of the money supply consists of bank deposits (scriptural money). This is a dematerialised form of money that exists as accounting entries, circulating across the bank accounts of financial agents. It is recorded and transferred electronically and can be converted into liquidity, this operation therefore implies a change in the form of the monetary instrument. This intangible form of money is the main source of monetary flows.

The primary driver of the creation of bank deposits is credit. When a commercial bank grants a loan, this generates deposits that are credited to the bank accounts of borrowers (households and firms) in the form of bank ledger entries. These funds do not come directly from commercial banks' reserves, nor from their balances held at the central bank, but result from an ex nihilo money creation process. When a payment is made via bank transfer or card payment, the commercial banks involved are required to ensure the consistency of these accounting entries by crediting and debiting the relevant accounts in order to maintain accounting equilibrium and consumer confidence. From this mechanism, it follows that salary payments and commercial transactions are also forms of scriptural money, operating through electronic transfers as movements of funds. Depositing banknotes and coins into a bank account therefore corresponds to a change in the monetary form.

- **Central bank money**

In addition to these two forms of money, there exists another form that operates in a similar way to scriptural money, in the sense that it is created ex nihilo, but which nevertheless does not have the same functioning or the same status. As with fiat currency, it is directly issued by the central bank, but it differs from it in terms of accessibility and availability. This central bank money is exclusively reserved for interbank transactions and payments and is not accessible to the public. Its objective is to ensure the stability of the banking system through monetary policy operations such as refinancing operations and asset purchases (quantitative easing). Together with fiat money, these two components form what is known as the monetary base.

Two-tier architecture

The design of the contemporary monetary and economic system can be decomposed into a two-tier architecture. At the first level, one finds centralized institutions such as central banks, which issue public money. This includes fiat currency as well as reserves held by commercial banks at the central bank. It is backed by a central authority and is accepted as legal tender, meaning that it is officially recognized by a state and cannot be refused as a means of payment by merchants, in contrast to cryptocurrencies or payment cards. Their role is to contribute to the proper functioning and stability of the monetary system. Public money also serves as a regulatory control tool ensuring security, interoperability and, in a more debatable dimension, confidentiality (transparency).

The second level of this architecture is private money. It is issued by commercial banks and professional corporations. However, from a broader perspective, anyone could issue private money. In a more digital framework, cryptocurrencies and stablecoins also follow this principle. Their functioning relies entirely on trust and on the diversity of assets offered, which allows them to meet more specific innovation-related needs. If they are regulated and interoperable, they can then coexist with public money. Being anchored to central bank money, private money can be constrained and strongly influenced by the global financial environment, it can be considered as financial investments or may contribute to economic stability. This, for instance, allows private money to be convertible into fiat currency and to be directly interoperable, thereby participating in global exchange.

Appendix 2- Conceptual architecture: Main design variant[4]

- **Token based:**

A cash-like token based CBDC, specially design to resemble to cash for which the purpose is to reproduce the anonymity in payments, given by coins and notes. Like the blockchain, the individual would access the CBDC by using a digital signature similar to a password, operating without requiring personal identification but a private-public key cryptography. The problem would be the same as for the DeFi, losing your password would lead to a permanent loss of your money.

- **Account based:**

In opposition, the “account based” approach is built on the verification of the user identity through a digital identity scheme. In this case, a CBDC would be a liability of the central bank and owning a CBDC would be similar to make a deposit on a commercial bank account. This approach is not made to respect or preserve privacy but done to help a system in the monitoring of illicit payments activities. Transactions would then be protected from public and commercial actors by the authentication process itself. This method therefore raises questions about data protection and confidentiality. The account would be held at the central bank and would pass through substantial exchange of information before to be updated by the ledger.

Organizational structure :

- **Direct CBDC Model**

The direct CBDC model is a single-tier architecture system in which the central bank is responsible for all financial intermediary functions, from issuing digital currency to distributing and managing it. The management of an excessively large portion of bank liabilities could lead to a shift of assets from commercial banks to the central bank, leading to a global liquidity drain. A such system is cumbersome and has the most potential of disintermediation (BIS, 2021). Such a model is highly risky and impacts the primary role of central banks, which is to guarantee value stability, ensure the elasticity of the overall money supply, and oversee the security of the financial system.

- **Indirect CBDC model:**

Hybrid architecture – e-CNY model

A hybrid CBDC model is a two-tier architecture system that enables a division of labour between private sector entities, which handle front-office and operational functions, and public sector entities, which manage the central infrastructure and issue the central bank digital currency. In such a system, the central bank and the private sector both play their respective roles.

[4] Based from a BIS annual report, emitted in 2021, the retail CBDCs come in two main variants.

Unlike a direct model, CBDC funds are distributed to the public via commercial banks. The majority of operational and customer service tasks are delegated to commercial banks and non-bank payment service providers (PSPs). They act as intermediaries and are responsible for providing retail services (bank accounts, interfaces, user IDs, compliance, KYC verification, etc.) and for maintaining more equitable competitive conditions. In this model, the central bank's role is to maintain and oversee a central register of individual retail balances for each user (retail balance ledger) and to ensure the system's resilience in the event of default by one of the financial actors (OECD, 2023). The ultimate claim always belongs to the central bank, and CBDCs remain liabilities of the central bank.

According to the OECD, this architectural framework helps to strike a balance between the powers of the central bank and the efficiency of the private sector. Such a system helps to strengthen consumer confidence in the system by retaining the interface of traditional banks and the security provided by central banks. It helps to mitigate the risk of banking disintermediation and to preserve the role of banks in the management of monetary policy. However, it does not eliminate the risks associated with the movement of liquidity from fiat currencies to CBDCs. Funds held in CBDCs do not form part of PSPs' balance sheets, are not subject to seizure by creditors and therefore do not disappear in the event of bankruptcy; they must therefore be subject to their own jurisdiction (segregation of claims). In this model, the legal framework is important as it defines the limits of what PSPs must report to the central bank. However, under current monetary policies, such a system carries risks of vulnerability.

synthetic/ Intermediated Architecture

The intermediate CBDC model is also a two-tier architectural system that operates in a more decentralized manner, largely similar to the current banking system. In this case, the central bank issues the CBDC but does not record individual retail transactions, it only records the aggregated wholesale balances of each PSP. The detailed recording of individual account balances is the responsibility of the PSPs, which report only the aggregate account balance. As with the hybrid model, the CBDC is distributed by commercial banks and remains a liability of the central bank, but here the claim is no longer on the central bank but on the PSPs.

The objective of such a system is to use banks' current technologies and their expertise in data management and collection. They act as intermediaries and as the primary fund managers, thereby reducing the need for centralized data collection and the development of infrastructure that would be costly for the central bank. There would be greater confidentiality and security, as data recording would be decentralized (BIS, 2021).

Although such a system reduces the risk of banking disintermediation, the systemic risk is far greater than in an hybrid system. If one of the PSPs were to go bankrupt, the central bank would be required to restore each of the private ledgers and could face significant and costly restoration challenges. It could also decide to appoint another bank to reconstruct the electronic portfolios of other users. This model therefore requires enhanced supervision to verify that the reported balances correspond to the actual funds held, thereby avoiding recording errors. Guarantees and new prudential standards would then be necessary to supervise PSPs, in order to ensure that the reported aggregate balances accurately reflect the detailed holdings of their customers. (IMF, 2023; BIS, 2021; ECB Occasional Paper No. 286, 2021)

design parameters

As for the technologies used to implement CBDCs, they will not be examined in detail in this thesis, as this raises issues of interoperability rather than system intermediation. However, CBDCs are based on certain design choices, depending on the issuing authority.

Availability: A key feature for all CBDCs, which is more of a requirement than a design choice, is availability. CBDCs must be available 24 hours a day and offer new capabilities such as offline availability, which is essential to ensure the continuity of payments in the same way as cash (technologies such as NFC, Bluetooth, hardware wallets and cold wallets are being explored).

Accessibility: An MNBC must be universally accessible, but the central unit may also impose restrictions on who can hold it, or even make it programmable for specific activities or in certain regions.

Level of confidentiality and anonymity: This depends on the objectives of the central bank issuing it and can, in theory, range from total anonymity to a complete lack thereof. However, a digital currency used on a large scale must comply with tax obligations, Know Your Customer (KYC) regulations, and anti-money laundering and counter-terrorist financing (AML/CFT) laws. CBDCs must respect privacy protection whilst also ensuring compliance with the laws and taxation regulations of the issuing country. This is referred to as “quasi-anonymity”, which allows for partial anonymity in relation to certain intermediaries.

Interest-bearing or non-interest-bearing: When implementing monetary policy, some central banks are exploring the possibility of allowing CBDCs to accrue interest on the amount held (either positive or negative, with negative rates typically reserved for wholesale money). This could enhance the transmission and effectiveness of monetary policy, particularly in terms of interest rate management. A negative rate poses a significant risk of disintermediation towards other currencies or towards decentralised finance.

Limits or caps: Limits or caps may be set to mitigate certain undesirable effects. Some existing CBDCs have caps on price or the amount held, to limit their potential for disintermediation (IMF, 2024). Quantity-based caps help to limit its use as a transactional investment instrument, with the aim of limiting disintermediation. And flow limits on convertibility, which are designed to limit the risk of instantaneous bank runs.

Intermediation: Intermediation refers to synthetic and hybrid architectures, which utilise the private sector to provide payment services. The central bank does not act as the sole intermediary and can therefore focus on its core functions. Unlike a direct, closed system, indirect systems use the principle of intermediation with a view to preserving banking relationships, ensuring competition in payment services and thereby fostering innovation.

Interoperability: Interoperability is key to ensuring the flow of CBDC funds between different payment systems. It is the cornerstone that enables the existence of centralised digital currencies, which must be able to coexist with current financial systems. Interoperability contributes to innovation and improves the efficiency of payment systems and jurisdictions; it is essential for promoting the adoption of CBDCs. If implemented poorly, it can pose problems regarding data transfer and protection. If interoperability is not upheld, this may pose risks of fragmentation (closed systems, etc.) within payment systems.

China encountered a closed-loop problem with its CBDC, the e-CNY: the payment service providers Alipay and WeChat Pay were not interoperable, meaning that a user of one could not pay a user of the other (BIS via CPMI, 2018). This type of issue can lead to systemic risk (dependence on a small number of players), downfall in concurrence and higher cost.

Conclusion

Central banks are aware of the risks associated with implementing a CBDC within their financial landscape. The various design approaches present both advantages and risks. A token-based approach offers greater anonymity but carries higher risks of financial crime, which could compromise financial integrity (BIS, 2021). It requires specific design constraints, such as limits on payment size, which merely reduce the risk rather than eliminating it.

An account-based approach enables better monitoring and detection of illegal activities, such as through user identification, PSP checks (KYC, AML) and easier verification of transaction flows. However, it poses risks of data breaches, banking disintermediation and a greater likelihood of bank runs; a central bank account could be more attractive than one held with a traditional bank. Holding limits could mitigate these issues but would not address the risk.

Security

Regardless of the design approach, the privacy considerations remain the same. The creation, storage and protection of digital data all involve data-related issues, which in turn pose risks of cyber attacks. To address this, the data shared with merchants must be limited, and to ensure this privacy, payment processing must be separated from data management. In China, they use ‘privacy by design’, a form of anonymous control made possible by separate registers designed to preserve anonymity to a certain extent. Transactions are pseudo-anonymous, with identity stored in ID format, and the judicial authorities can access the data if necessary.

The BIS suggests that the most promising design would be a combination of an account-based architecture and a digital identifier. This would enable more effective crime prevention (AML, CFT), better management of cybersecurity risks through the use of an intermediary registry, improved interoperability, and a simpler monetary policy framework that is better suited to different levels.

Appendix 3- Ramsey reset test

Ramsey RESET Test by Linear vs Log Specification

Publication Level	Event Window	F-stat Linear	P-value Linear	F-stat Log	P-value Log
All Publications	[-1,+1]	4.076**	0.0178	3.317**	0.0374
All Publications	[-3,+3]	6.460***	0.0018	3.952**	0.0201
All Publications	[-5,+5]	7.686***	0.0005	5.363***	0.0051
L1 Official Only	[-1,+1]	1.041	0.3565	0.017	0.9831
L1 Official Only	[-3,+3]	1.241	0.2932	0.315	0.7303
L1 Official Only	[-5,+5]	2.417*	0.0940	0.838	0.4356
L2 Media Only	[-1,+1]	3.217**	0.0417	3.487**	0.0321
L2 Media Only	[-3,+3]	5.229***	0.0060	4.066**	0.0183
L2 Media Only	[-5,+5]	5.359***	0.0053	4.996***	0.0075

**** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.*

Appendix 4 - Sovereign CDS Mean CARs by Phase vs Zero

Sovereign CDS Mean CARs by Phase vs Zero

Phase	Event Window	N	CAR Mean (bp)	SD	T-Statistic	P-Value
Phase 1	[-1,+1]	111	-0.007	3.257	-0.022	0.9823
Phase 1	[-3,+3]	112	0.075	6.637	0.120	0.9049
Phase 1	[-5,+5]	112	-0.285	9.615	-0.314	0.7545
Phase 2	[-1,+1]	144	1.632***	5.693	3.441	0.0008
Phase 2	[-3,+3]	145	2.540***	10.358	2.953	0.0037
Phase 2	[-5,+5]	145	4.190***	14.427	3.498	0.0006
Phase 3	[-1,+1]	109	0.536*	2.871	1.947	0.0541
Phase 3	[-3,+3]	108	0.764	4.816	1.649	0.1021
Phase 3	[-5,+5]	108	1.452**	6.519	2.315	0.0225

**** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. One-sample t-test against zero with Conventional standard errors*

Appendix 5 – Robustness 1 – Excluded events by corresponding stress period

Robustness 1 – Excluded events by corresponding stress period

Date	Phase	Instrument
21/02/2020	Phase 1	Bond 2SD
15/04/2020	Phase 1	Bond 2SD
17/04/2020	Phase 1	Bond 2SD
19/04/2020	Phase 1	Bond 2SD
06/08/2020	Phase 1	Bond 2SD
20/10/2020	Phase 1	Bond 2SD
23/10/2020	Phase 1	Bond 2SD
26/10/2020	Phase 1	Bond 2SD
23/11/2020	Phase 1	Bond 2SD
21/12/2020	Phase 1	Bond 2SD
26/12/2020	Phase 1	Bond 2SD
15/06/2021	Phase 1	CNHUSD P99
17/06/2021	Phase 1	CNHUSD P99
19/10/2021	Phase 1	Bond 2SD
20/10/2021	Phase 1	Bond 2SD
03/01/2022	Phase 2	Bond 2SD
04/01/2022	Phase 2	Bond 2SD
05/01/2022	Phase 2	Bond 2SD
06/01/2022	Phase 2	Bond 2SD
07/01/2022	Phase 2	Bond 2SD
26/04/2022	Phase 2	CNHUSD P99
27/04/2022	Phase 2	CNHUSD P99
13/07/2022	Phase 2	Bond 2SD
29/09/2022	Phase 2	CNHUSD P99
17/10/2022	Phase 2	Bond 2SD
24/10/2022	Phase 2	CNHUSD P99
01/11/2022	Phase 2	CNHUSD P99
11/11/2022	Phase 2	Bond 2SD + CNHUSD P99
18/11/2022	Phase 2	Bond 2SD
28/11/2022	Phase 2	CNHUSD P99
01/03/2023	Phase 2	CNHUSD P99
02/03/2023	Phase 2	CNHUSD P99
04/03/2023	Phase 2	CNHUSD P99
10/03/2023	Phase 2	CNHUSD P99
11/07/2023	Phase 2	Bond 2SD
12/07/2023	Phase 2	Bond 2SD
20/10/2023	Phase 2	Bond 2SD
21/10/2023	Phase 2	Bond 2SD
05/01/2024	Phase 3	Bond 2SD
02/08/2024	Phase 3	CNHUSD P99
07/11/2024	Phase 3	CNHUSD P99
06/01/2026	Phase 3	Bond 2SD
08/01/2026	Phase 3	Bond 2SD
13/01/2026	Phase 3	Bond 2SD
16/01/2026	Phase 3	Bond 2SD

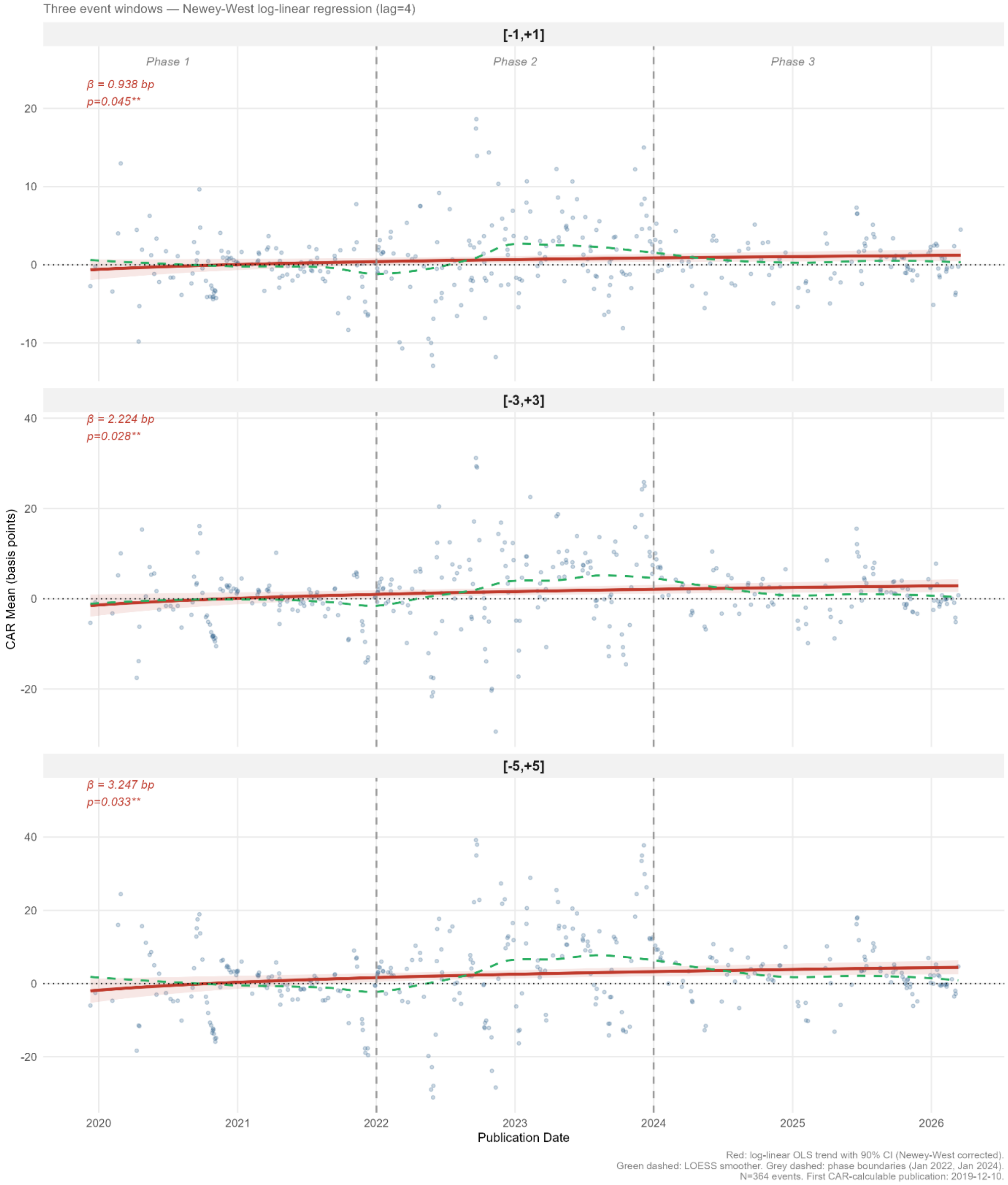
Appendix 6 - Cleaned H2 after systemic risk exclusion- Phase Effects on CDS Spreads

H2 - Robustness 1 - Cleaned H2 after systemic risk exclusion - Phase Effects on CDS Spreads - Two-sided test (Clustered SE)

Comparison	Event Window	Difference (bp)	Clustered SE	T-Statistic	P-Value
Phase 2 vs Phase 1	[-1,+1]	1.293	0.797	1.623	0.1061
Phase 3 vs Phase 1	[-1,+1]	0.556	0.524	1.063	0.2892
Phase 3 vs Phase 2	[-1,+1]	-0.736	0.765	-0.962	0.3369
Phase 2 vs Phase 1	[-3,+3]	3.932**	1.566	2.511	0.0127
Phase 3 vs Phase 1	[-3,+3]	1.649	1.027	1.605	0.1100
Phase 3 vs Phase 2	[-3,+3]	-2.283	1.470	-1.553	0.1218
Phase 2 vs Phase 1	[-5,+5]	5.932***	2.221	2.670	0.0081
Phase 3 vs Phase 1	[-5,+5]	2.779*	1.471	1.889	0.0603
Phase 3 vs Phase 2	[-5,+5]	-3.153	2.022	-1.559	0.1204

**** p < 0.01, ** p < 0.05, * p < 0.10. Standard errors clustered at the week level via vcovCL.*

Appendix 7 - Log-linear trend in CAR around e-CNY events (Newey-west SE)



Appendix 8 - Log-linear trend in CAR around e-CNY events

Robustness 2 – log-linear trend in CAR around e-CNY events – Sovereign CDS - (Newey-west SE)

Level	Event Window	N	β (bp/log-yr)	NW SE	T-Statistic	P-Value	R^2
All	[-1,+1]	364	0.308	0.583	0.529	0.5973	0.0011
All	[-3,+3]	365	0.483	1.277	0.378	0.7055	0.0008
All	[-5,+5]	365	1.179	1.987	0.593	0.5533	0.0024
L1	[-1,+1]	112	-0.574	0.818	-0.701	0.4846	0.0042
L1	[-3,+3]	112	-1.354	1.922	-0.704	0.4827	0.0054
L1	[-5,+5]	112	-1.488	2.890	-0.515	0.6076	0.0030
L2	[-1,+1]	252	0.668	0.718	0.930	0.3531	0.0048
L2	[-3,+3]	253	1.195	1.377	0.868	0.3863	0.0050
L2	[-5,+5]	253	2.270	2.197	1.033	0.3025	0.0094

**** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Newey-West standard errors with lag determined by $T^{1/4}$ rule*

Glossary

Smart contract: A smart contract is a self-executing program that runs automatically once predefined conditions are met without the need for an intermediary. It speeds up transactions, improves transparency, reduces costs associated with intermediaries such as banks, and provides greater security, as it cannot be tampered with or altered once deployed.

Bank run: A massive and rapid outflow of liquidity from the banking system

Product scoring: The internal rating system used by banks to assess their customers' risk profiles (risk premium and probability of default), known as banking scoring, which is used to evaluate the creditworthiness and reliability of a loan. It also refers to the assessment of the sensitivity of investment products such as savings accounts.

Money multiplier: It is the economic concept used to explain the relationship between the issuance of public money (M0) and money creation via bank deposits (M1 and M2), which is far more substantial than simple money issuance.

Excess reserves ratio: This is the additional portion of reserve requirements that banks hold to protect themselves in times of risk.

Central reserves: A bank can obtain wholesale central reserves in three ways: by holding a large volume of deposits, which is inexpensive and highly profitable (the profits are reinvested in the capital). this is achieved through loans, investments, savings accounts, etc. It can borrow on the interbank market from other banks or it can borrow directly from the central bank, which is more expensive.

Demand ratio: This is a microeconomic indicator of the variability in the structure of deposits developed by Song, Zhao & Zhou. It contrasts time deposits, such as savings and investments, which are more stable over time and therefore less volatile, with demand deposits, which are more volatile and more responsive to changes in economic conditions.

Credit rate: It is the interest rate the bank pays on the money you hold in your accounts (savings account, current account with a positive balance).

Net interest margin: It is the difference between what the bank earns on its assets and what it pays on its liabilities.

Crowding-out effect of credit supply: This occurs when the central government, by borrowing to finance itself, diverts savings by pushing up interest rates. Borrowing becomes too expensive and businesses cut back on investment. The public sector then crowds the private sector out of the credit market. This slows down economic growth.

Z-score: It is a statistical measure that indicates how many standard deviations a specific value lies above or below the mean of a dataset.

Credit event: It is a specific incident (bankruptcy, default, restructuring) affecting a borrower (a company or a government) that triggers contractual obligations, in particular the payment of compensation.

High frequency: means a dissipating choc in days or weeks, such as news, stress, risk, etc. (short-term).

Low frequency: It means a persisting choc in months or years, such as new reglementation (long-term).

Connectedness (Diebold–Yilmaz, Baruník–Křehlík): It measures the extent to which the volatility (or risk) of one market explains that of others. If higher connectedness is identified, it indicates that risk is spreading

The Basel Agreements: These consist of a series of standards issued by the Bank for International Settlements (BIS) and adapted by each country in accordance with its own legislation. These mechanisms govern financial stability and set out the capital requirements that banks must meet.