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Abstract

As of December 2025, over 130 countries are developing central bank digital currencies (CBDC), yet systematic evidence on the geopolitical determinants of their design orientation remains absent from the scholarly literature. This thesis addresses that gap by examining whether and how countries' economic, financial, and institutional dependencies on China shape the degree to which their CBDC projects are oriented toward China's renminbi (RMB)-based cross-border payment ecosystem.

Drawing on a cross-national dataset of 133 countries, the study introduces CBDC China Alignment—a rule-based ordinal measure (0–3) capturing a country's technical integration with, institutional commitment to, or strategic orientation toward China's RMB payment infrastructure, encompassing Project mBridge, the Cross-Border Interbank Payment System (CIPS), bilateral RMB swap agreements, and the e-CNY. Four theoretically derived hypotheses are tested: trade dependence (H1), lending dependence (H2), institutional embeddedness (H3), and network diffusion (H4).

The theoretical framework integrates dependency theory and infrastructure lock-in, historical institutionalism and path dependency, and geopolitical competition theories of monetary statecraft. Its central claim is that CBDC alignment is not a direct function of bilateral economic exposure but an institutionally mediated outcome contingent on three co-present conditions: economic interdependence that generates demand-side incentives, formal monetary institutional integration that lowers supply-side barriers, and geopolitical affinity that removes political constraints on strategic commitment.

The empirical analysis employs a non-parametric strategy Spearman rank correlations, Kruskal-Wallis and Mann-Whitney tests with an ordered logistic regression as a multivariate robustness check. Three of the four hypotheses receive statistically significant support. H1 is supported: trade dependence correlates positively with alignment ($r_s = 0.383$, $p < 0.001$), functioning as a gateway variable that establishes the economic rationale for alignment. H2 is not supported: Chinese lending exposure shows no significant relationship with alignment ($r_s = 0.142$, $p = 0.102$), a theoretically consequential null result that challenges debt-trap diplomacy narratives in the domain of digital monetary governance. H3 receives the strongest support: CIPS membership ($r_s = 0.542$, $p < 0.001$) and RMB swap agreements ($r_s = 0.415$, $p < 0.001$) are the most powerful predictors, consistent with path-dependent infrastructure lock-in theory. H4 is supported at a weaker effect size ($r_s = 0.231$, $p = 0.008$), reflecting regionally concentrated rather than globally uniform diffusion dynamics.

The study makes four contributions: the first systematic cross-national quantitative analysis of CBDC China alignment; the demonstration that institutional rather than debt-based mechanisms drive alignment; the introduction of the conceptual distinction between functional and strategic institutional embeddedness; and the construction of a replicable CBDC China Alignment instrument enabling longitudinal tracking of this rapidly evolving phenomenon.

Kurzfassung (Deutsch)

Im Dezember 2025 entwickeln über 130 Länder digitale Zentralbankwährungen (CBDC). Die vorliegende Masterarbeit untersucht erstmals systematisch, ob und in welchem Ausmaß wirtschaftliche, finanzielle und institutionelle Abhängigkeiten von China die strategische Ausrichtung nationaler CBDC-Projekte auf Chinas RMB-basiertes Zahlungsinfrastruktur-Ökosystem beeinflussen.

Auf Basis eines länderübergreifenden Datensatzes von 133 Ländern werden vier theoretisch abgeleitete Hypothesen zu Handelsabhängigkeit (H1), Kreditabhängigkeit (H2), institutioneller Einbettung (H3) und netzwerkbasierter Diffusion (H4) mittels nicht-parametrischer Methoden getestet. H1 und H3 werden stark bestätigt: CIPS-Mitgliedschaft ($r_s = 0,542$, $p < 0,001$) und RMB-Swap-Abkommen ($r_s = 0,415$, $p < 0,001$) erweisen sich als die stärksten Prädiktoren, konsistent mit pfadabhängiger Infrastruktur-Lock-in-Theorie. H2 wird nicht bestätigt ein theoretisch bedeutsames Null-Ergebnis, das Narrativen der Schuldenfallen-Diplomatie im Bereich digitaler Währungsgovernance widerspricht. H4 wird mit schwächerem Effekt bestätigt.

Die Arbeit zeigt, dass Chinas monetäre Infrastrukturstrategie primär über institutionelles Lock-in wirkt, nicht über Schuldenhebel, und leistet damit einen empirischen Beitrag zur Debatte über digitale Währungsgeopolitik.

On my honour as a student of the Diplomatische Akademie Wien, I submit this work in good faith and pledge that I have neither given nor received unauthorized assistance on it.

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1. Introduction

In November 2024, the Bank for International Settlements formally transferred governance of Project mBridge, the world's most operationally advanced multi-central-bank digital currency platform to its participating central banks, marking a decisive shift from multilateral experimentation to institutionalized infrastructure under the stewardship of the People's Bank of China. Within months, the e-CNY International Operation Center launched in Shanghai with an explicit mandate to extend digital renminbi settlement across borders, and the People's Bank announced that e-CNY wallets would henceforth bear deposit-linked interest rates, converting China's central bank digital currency into a direct competitor to foreign currency holdings.¹ These developments, unfolding during the core research period of this thesis, crystallize a question that has been gathering analytical urgency for several years: are countries' choices about the design and orientation of their own central bank digital currencies shaped by their economic and institutional relationships with China?²

Central bank digital currencies (CBDC) have emerged as one of the most consequential and least understood frontiers of contemporary monetary governance. As of December 2025, over 130 countries have active CBDC projects at some stage of development, ranging from early research to live deployment, a figure that encompasses more than 95 percent of global GDP.³ For most of the decade in which this phenomenon has unfolded, scholarly and policy attention has focused on the domestic rationale for CBDC adoption: improving payment efficiency, extending financial inclusion to unbanked populations, enhancing monetary policy transmission, and managing systemic stability risks associated with private digital money.⁴ This domestically-oriented literature has produced rich documentation of why central banks adopt digital currencies. It has paid considerably less attention to a structurally distinct question: once a country decides to develop a CBDC, how does it orient its architecture within the global payment infrastructure landscape? And to what extent are those orientation choices shaped by economic and institutional dependencies on a particular major monetary power like China?

The international monetary stakes of this question are considerable. China has constructed, over the past decade, a layered ecosystem of RMB-denominated financial infrastructure that operates in parallel to the dollar-dominated global monetary system. This ecosystem comprises four mutually reinforcing components: the Cross-Border Interbank Payment System (CIPS), which

¹ *Reuters*, 'BIS to Leave China-Backed Central Bank Digital Currency Project'.

² Tang Shihua, 'China's E-Yuan Int'l Operation Center in Shanghai Begins Operations'.

³ 'Central Bank Digital Currency Tracker'.

⁴ Kuehnlenz et al., 'Central Bank Digital Currencies and the International Payment System'.

handles both messaging and settlement in RMB and connected over 1,700 institutions across 122 countries as of mid-2025⁵; a network of approximately 40 bilateral RMB swap agreements with central banks representing roughly 590 billion USD in liquidity facilities; over 35 RMB clearing banks operating across 33 jurisdictions⁶; and Project mBridge, the shared distributed ledger platform that by late 2025 had processed over 4,000 cross-border transactions totaling 55.5 billion USD, with the e-CNY accounting for approximately 95 percent of settlement volume. The e-CNY sits atop this infrastructure as its digital apex, and mBridge provides the cross-border settlement rail through which it can be internationalized without requiring the capital account liberalization and institutional prerequisites that have historically constrained RMB adoption in global markets.⁷

Existing scholarship has not yet examined systematically whether and how this infrastructure strategy shapes the CBDC orientation choices of third countries the smaller and medium-sized economies that constitute the majority of the global state system and that are the primary targets of China's Belt and Road Initiative and its associated financial architecture. The domestic CBDC literature cannot answer this question by design: it treats alignment with international monetary infrastructure as exogenous to its analytical framework. The international monetary power literature identifies the strategic logic of China's approach and offers detailed analysis of the major economies involved China, the United States, the European Union but provides limited systematic evidence on how other countries and territories respond. The G24 Policy Brief on CBDC geopolitics explicitly identified this as an underexplored dimension of the field in 2023, and the empirical situation has not substantially changed since.⁸

This thesis addresses that gap directly. Drawing on a cross-national dataset of 133 countries, it tests four theoretically derived hypotheses about the determinants of CBDC China Alignment a rule-based ordinal measure (0–3) capturing the degree to which a country's digital currency project is technically integrated with, institutionally committed to, or strategically oriented toward China's RMB-based payment ecosystem. The four hypotheses correspond to four distinct theoretical mechanisms: trade dependence (H1), which generates demand-side incentives to reduce currency conversion costs; lending dependence (H2), which may generate leverage through debt exposure; institutional embeddedness (H3), which produces supply-side path dependency through CIPS membership and RMB swap agreements; and network diffusion (H4), which amplifies alignment through regional peer effects among central banks.

⁵ Cross-Bord. Interbank Paym. Syst. Profile, 'Cross-Border Interbank Payment System (CIPS) Company Profile'.

⁶ Steil et al., 'Central Bank Currency Swaps Tracker | Council on Foreign Relations'.

⁷ Chu et al., 'Reshaping State-Finance-Tech Nexus through Central Bank Digital Currencies'.

⁸ Conti, *Central Bank Digital Currencies and the Evolving International Payment System*.

The theoretical framework integrates three established traditions in international political economy: dependency theory and infrastructure lock-in, historical institutionalism and path dependency, and geopolitical competition theories of monetary statecraft. Its central claim is that CBDC alignment is not a direct function of bilateral economic exposure but an institutionally mediated outcome contingent on the co-presence of economic interdependence, formal monetary institutional integration, and geopolitical affinity. Trade creates incentives; institutional embeddedness enables implementation; geopolitics removes political barriers to strategic commitment.

The empirical analysis employs a non-parametric strategy Spearman rank correlations, Kruskal-Wallis and Mann-Whitney tests, and an ordered logistic regression robustness check appropriate for the ordinal dependent variable and the pronounced right-skew of the sample distribution. The primary findings are as follows. H1 is supported: trade dependence is a significant positive predictor of CBDC alignment ($r_s = 0.383$, $p < 0.001$), establishing it as a gateway variable that creates the economic environment in which alignment becomes rational. H2 is not supported: Chinese lending exposure shows no statistically significant relationship with alignment ($r_s = 0.142$, $p = 0.102$), a null result that constitutes a theoretically informative challenge to debt-trap diplomacy narratives in the domain of digital monetary governance. H3 receives the strongest support: CIPS membership ($r_s = 0.542$, $p < 0.001$) and RMB swap agreements ($r_s = 0.415$, $p < 0.001$) are the most powerful predictors in the study, consistent with path-dependent infrastructure lock-in theory. H4 is supported at a weaker effect size ($r_s = 0.231$, $p = 0.008$), consistent with regionally concentrated rather than globally uniform diffusion dynamics.

The study makes four contributions to the existing literature. First, it provides the first systematic cross-national quantitative analysis of CBDC China alignment across a near-global sample. Second, it advances the theoretical debate on Chinese financial statecraft by demonstrating that institutional, not debt-based, mechanisms drive alignment in the digital monetary domain. Third, it introduces the conceptual distinction between functional and strategic institutional embeddedness differentiating market-driven integration from politically motivated alignment as a theoretical tool applicable beyond the CBDC context. Fourth, it constructs a replicable CBDC China Alignment instrument that can be updated annually to enable longitudinal tracking of this rapidly evolving phenomenon.

The remainder of the thesis proceeds as follows. Chapter 2 reviews the existing literature across three bodies of scholarship: domestic drivers of CBDC adoption, cross-border payment frictions and multi-CBDC solutions, and the international monetary power literature on currency rivalry

and digital financial infrastructure. Chapter 3 develops the theoretical framework, deriving four testable hypotheses from dependency theory, historical institutionalism, and geopolitical theories of monetary statecraft, and articulating the causal sequencing through which trade dependence, institutional embeddedness, and geopolitical affinity jointly produce CBDC alignment. Chapter 4 describes the research design, operationalization the dependent variable and all independent variables, and justifies the non-parametric analytical strategy adopted in light of the distributional properties of the data. Chapter 5 presents the empirical results, reporting bivariate Spearman correlations for each hypothesis alongside regional group analyses, control variable associations, and robustness checks. Chapter 6 interprets these findings theoretically, examining the explanatory mechanisms underlying each result, the institutional embeddedness paradox observed among Western economies, the geopolitical and regime-type dimensions of alignment, and the study's contributions to the literature, before acknowledging limitations and proposing directions for future research. Chapter 7 concludes by synthesizing the study's principal findings and reflecting on their implications for scholarship on monetary statecraft and the evolving architecture of global digital finance.

2. Literature Review

2.1 Domestic Drivers of CBDC Adoption

The dominant strand of CBDC scholarship conceptualizes central bank digital currencies primarily as instruments designed to address domestic institutional and economic challenges.

This literature documents three motivational clusters:

1. payment system modernization and financial inclusion
2. monetary policy transmission and financial stability
3. and technical design optimization

that collectively frame CBDC adoption as a response to internal pressures rather than external strategic incentives and pressures. While this literature provides a valuable foundation, its domestic orientation constitutes a significant analytical limitation for the purposes of this master thesis.

2.1.1 Payment Efficiency and Financial Inclusion

The most prominent motivation documented in the CBDC literature concerns payment system modernization and the extension of formal financial services to underserved populations and communities. Central banks, particularly in emerging market and developing economies (EMDEs), have identified CBDCs as instruments to reduce transaction costs, accelerate settlement, and provide accessible digital money to populations excluded from the traditional banking system.⁹ The Bank of International Settlements (BIS) survey of central banks in emerging market economies confirms that financial inclusion and cash-equivalent digital payment provision consistently rank among the primary motivations for CBDC exploration.¹⁰

Sub-Saharan Africa occupies a distinctive position in this narrative. The region has emerged as a global laboratory and testing ground for digital payment innovation, driven by mobile money platforms such as M-Pesa and MTN Mobile Money, which collectively account for approximately 70 percent of global mobile money transaction volume and over two-thirds of active mobile money users worldwide. In 2020, only 33 percent of adults in Sub-Saharan Africa held formal financial institution accounts, yet mobile wallet penetration exceeded 100 percent in markets such as Kenya and Ghana.¹¹ This asymmetry, high mobile penetration alongside low formal banking, has shaped regional CBDC development strategies that prioritize complementarity with existing digital ecosystems rather than as a standalone deployment.

Beyond Africa, similar dynamics characterize CBDC motivations in Southeast Asia and Latin America. In Thailand and Cambodia, central bankers want to use mobile payment penetration as an enabling infrastructure for CBDC-based financial inclusion. In Brazil, the Drex project explicitly frames digital currency as a mechanism to reduce remittance costs averaging 6–8 percent of transaction value. The United Nations Development Programme has similarly documented how CBDCs can serve as vehicles for targeted social assistance distribution, reducing leakage in public transfer programs. Across these varied contexts, EMDEs increasingly treat CBDCs as complements to existing payment ecosystems—an orientation that, as this thesis argues, creates structural openings for external technical cooperation and infrastructure alignment.¹²

⁹ Allen et al., ‘Design Choices for Central Bank Digital Currency’; Ozili, ‘Central Bank Digital Currency Research around the World’.

¹⁰ Bank für Internationalen Zahlungsausgleich, *CBDCs in Emerging Market Economies*.

¹¹ Klapper, Leora et al., ‘Global Findex Database, 2025’.

¹² Heng Wang, ‘Driving Financial Inclusion Through Central Bank Digital Currencies’; International Monetary Fund Monetary and Capital Markets Department, ‘Central Bank Digital Currency’.

2.1.2 Monetary Policy Transmission and Financial Stability

A second major strand of the CBDC literature examines implications for monetary policy implementation and financial system stability. Scholars and central bank practitioners have argued that a well-designed retail CBDC could enhance policy rate transmission by enabling direct interaction between central banks and end users, reducing dependence on commercial bank intermediation.¹³ The theoretical appeal is considerable: a CBDC with programmable features and direct distribution channels could, in principle, accelerate the pass-through of policy rate changes to household and corporate spending decisions.

However, the financial stability literature emphasizes countervailing risks from poorly designed implementations. The primary concern centers around bank disintermediation: a highly attractive retail CBDC, particularly during periods of financial stress, could trigger deposit outflows from commercial banks towards central bank digital balances and wallets, undermining bank funding and destabilizing credit provision.¹⁴ Research on the potential digital euro illustrates this concern in granular detail system-wide bank run dynamics appear contingent on specific design parameters, including remuneration caps, holding limits, and tiered interest structures or even negative interest rates.¹⁵ These findings have elevated CBDC design choices to the center of macroprudential policy discussions, as central banks attempt to calibrate financial inclusion gains against systemic risk considerations.

2.1.3 Technical Design as Institutional Optimization

A third body of research examines CBDC architecture and structure choices retail versus wholesale systems, account-based versus token-based structures, privacy-preserving versus surveillance-enabling designs, and centralized versus distributed ledger models as primarily technical, institutional and operational questions.¹⁶ This literature has generated rich comparative documentation of trade-offs between competing policy objectives: scalability versus security, financial privacy versus anti-money laundering compliance, and universal access versus system integrity.

¹³ International Monetary Fund Monetary and Capital Markets Department, ‘Central Bank Digital Currency’; European Central Bank, *Progress on the Preparation Phase of a Digital Euro - Second Progress Report*.

¹⁴ Gross et al., ‘Evaluating the Implications of CBDC for Financial Stability’.

¹⁵ Brühl, *The Digital Euro: Implications for the European Banking Sector*; European Central Bank, ‘Financial Stability Review, November 2025’.

¹⁶ Auer et al., ‘Rise of the Central Bank Digital Currencies: Update as of 1 March 2024’; Allen et al., ‘Design Choices for Central Bank Digital Currency’; Bindseil Ulrich, ‘ESCB Legal Conference 2020’.

Critically, however, this design literature treats CBDC architecture choices as decisions to be optimized within the issuing jurisdiction, abstracting from the respective country's position within global monetary and payment infrastructure networks. The International Monetary Fund (IMF) CBDC Virtual Handbook a leading practitioner reference frames design choice as a domestic governance question resolved through stakeholder consultations and technical feasibility analysis.¹⁷ The international context in which design choices are made receives only peripheral attention in academia.

2.1.4 Limitations of the Domestic Literature

Collectively, the domestic-focused CBDC literature provides comprehensive documentation of why central banks adopt digital currencies to solve internal problems. It does not, however, offer analytical purchase on understanding variation in CBDC orientation, namely, the specific technical, institutional, and operational choices that embed countries' digital payment systems within particular international architectures. Whether a country's CBDC becomes technically compatible with RMB-based settlement infrastructure rather than dollar-based systems is a question the domestic literature is, by design, not equipped to answer. To examine this variation systematically, it is necessary to engage the international political economy of monetary power, currency rivalry, and infrastructural dependency the focus of the following section.¹⁸

2.1.5 Cross-Border Payment Frictions and the Multi-CBDC Solution

While early CBDC literature focused heavily on retail applications for domestic use, recent scholarship has increasingly shifted towards wholesale CBDCs (wCBDCs) designed to address profound inefficiencies in cross-border payments. Contemporary international payment flows and architecture relies predominantly on the correspondent banking network, which is structurally plagued by high transaction costs, slow settlement speeds, limited access, and lack of transparency. The Financial Stability Board (FSB) and the G20 have identified these frictions as a primary bottleneck for global economic integration, particularly for Emerging Market and Developing Economies (EMDEs) that suffer disproportionately from the ongoing trend of de-risking practices, as major global banks reduce or terminate correspondent relationships with developing-country's institutions to mitigate compliance burdens and perceived regulatory risk.

¹⁷ International Monetary Fund Monetary and Capital Markets Department, 'Central Bank Digital Currency'.

¹⁸ Taylor, 'Challenging Dollar Dominance?'

To resolve these structural frictions, central banks are exploring multi-CBDC (mCBDC) arrangements. The BIS Innovation Hub categorizes these arrangements into three models: compatible standards, interlinked systems, and single systems. The most advanced theoretical and practical work focuses on the third model: shared mCBDC platforms, where multiple central banks issue their digital currencies onto a single shared distributed ledger (DLT). This architecture fundamentally alters international settlement by enabling direct, peer-to-peer exchange between participating commercial banks across borders. It allows for atomic payment-versus-payment (PvP) settlement, effectively eliminating the settlement risk that currently exists when transactions span different time zones and banking hours.¹⁹

Crucially, the literature on mCBDC platforms highlights a transition from technical experimentation to strategic implementation. Projects such as Jura, Dunbar, and notably mBridge have demonstrated that shared platforms can reduce cross-border settlement times from multiple days to mere seconds, while cutting costs by up to 50 percent. However, as this literature notes, the creation of mCBDC platforms is not merely a technical upgrade; it requires participating central banks to agree on shared governance, rulebooks, and technological standards. This necessity for shared standards transforms cross-border CBDC projects from simple efficiency upgrades into arenas of institutional alignment and interoperability choices setting the stage for the geopolitical dynamics discussed in the following section.²⁰

2.2 CBDCs, Currency Internationalization, and International Monetary

Power

A smaller but rapidly growing body of scholarship situates CBDCs within the context of international monetary competition and currency hierarchies. This literature reframes CBDCs from domestic technical instruments to strategic assets tools through which major monetary powers can reshape global payment architectures and extend their currencies' international roles. Three interconnected arguments structure this literature: the technology-driven pathway to currency internationalization, the geopolitical weaponization of payment infrastructure, and the emergence of China's integrated RMB ecosystem as a systemic challenger to the dollar-dominated financial order.²¹

¹⁹ Auer et al., 'Rise of the Central Bank Digital Currencies: Update as of 1 March 2024'.

²⁰ Bank für Internationalen Zahlungsausgleich, *CBDCs in Emerging Market Economies*.

²¹ Taylor, 'Challenging Dollar Dominance?'

2.2.1 Technology-Driven Currency Internationalization

A central argument in the geopolitical CBDC literature is that digital currencies issued by major economies offer a technologically novel pathway to currency internationalization that partially circumvents classical prerequisites. Historically, achieving reserve currency status required deep domestic capital markets, sustained current account surpluses, capital account liberalization, and decades of market-driven network effects conditions that the renminbi has not yet fully met through conventional channels.²²

CBDCs, by contrast, offer what Zeng and Lau term a "technology-driven" internationalization mechanism: by embedding a currency into programmable cross-border payment infrastructure, policymakers can lower barriers to its use in international trade and finance without requiring the institutional preconditions that historically gated reserve currency status. The e-CNY exemplifies this strategy. Rather than awaiting RMB internationalization through market-driven processes, Chinese policymakers have designed the e-CNY's architecture, including payment-versus-payment (PvP) settlement, programmable smart contracts for trade finance, and instant cross-timezone settlement to directly address the operational frictions that deter less-liquid currency adoption in international transactions.²³ Cambridge's Finance and Society literature on currency internationalization as an infrastructural process reinforces this point: currency power increasingly depends on who controls the technical rails of international transactions, not merely macroeconomic fundamentals.²⁴

Notably, as of January 2026, the People's Bank of China announced that e-CNY holdings in digital wallets will bear interest rates tied to deposit yields, converting the e-CNY into a "digital deposit" instrument that competes directly with foreign currency holdings. Simultaneously, the e-CNY International Operation Center launched in Shanghai with explicit mandates to support cross-border RMB payments and blockchain infrastructure positioning the e-CNY as the foundation for a new international financial architecture. These developments, emerging during the final drafting stages of this thesis, confirm the analytical relevance of treating the e-CNY as a strategic internationalization instrument rather than a domestic payment modernization project.²⁵

²² Eichengreen, 'Exorbitant Privilege'; Prasad, *The Future of Money*.

²³ Zeng and Lau, 'The Digital Yuan in the Shadow of Dollar Hegemony'.

²⁴ Westermeier et al., *The Cambridge Global Handbook of Financial Infrastructure*.

²⁵ People's Bank of China / Xinhua, 'China to Enhance Digital Yuan Management with Deposit Features Starting 2026'.

2.2.2 Payment Systems as Geopolitical Infrastructure

The second major argument concerns the strategic deployment of digital payment systems to challenge existing global financial infrastructure. Payment systems are not neutral technologies: they are critical infrastructure that carries geopolitical weight proportional to the dependency they create.²⁶ The contemporary global payment system is heavily concentrated around the US dollar and Society for Worldwide Interbank Financial Telecommunication (SWIFT), connecting over 11,000 financial institutions and granting the United States structural power through the ability to exclude targeted actors from global financial flows.

Recent scholarship has established that CBDCs and multi-CBDC platforms constitute a deliberate strategy to build alternative settlement networks operating outside SWIFT and dollar-clearing channels. Chu, Fang, and Lai demonstrate that Project mBridge China's multi-central-bank digital currency platform effectively recodes offshore finance by enabling direct peer-to-peer settlement between central banks without SWIFT intermediation, using distributed ledger technology to achieve settlement within seconds at approximately 50 percent lower cost than traditional correspondent banking.²⁷ Critically, these authors frame mBridge not as a neutral efficiency improvement but as a mechanism that "redraws the state-finance nexus through programmable infrastructure," reinforcing China's monetary sovereignty while creating dependency relationships with participating central banks.

The geoeconomics literature has extended this argument to Western CBDC projects as well. Analysis of the digital euro's design logic reveals that European Central Bank motivations were substantially geoeconomic, a defensive response to the prospect of dollar- and yuan-based digital payment competition eroding European monetary sovereignty.²⁸ In this reading, CBDC development globally reflects not domestic optimization but a competitive positioning logic in which states attempt to anchor international transactions in their own monetary infrastructure.

McDowell complicates this picture by examining the actual effectiveness of China's bilateral swap agreements as instruments of financial statecraft, finding that their coercive leverage is often overstated and their effectiveness contingent on recipient-country alternatives. This nuance is important for the present study: the hypothesis tested here is not that China forces countries to

²⁶ Farrell and Newman, 'Weaponized Interdependence: How Global Economic Networks Shape State Coercion'.

²⁷ Chu et al., 'Reshaping State-Finance-Tech Nexus through Central Bank Digital Currencies'.

²⁸ Quaglia and Verdun, 'The Geoeconomics of Central Banks Digital Currencies (CBDCs)'.

align their CBDCs with RMB infrastructure, but that economic dependencies create incentive structures that make alignment a rational if not politically neutral choice.²⁹

2.2.3 China's Integrated RMB Ecosystem

Rather than treating the e-CNY as an isolated instrument, recent scholarship recognizes it as one component within a layered, multifaceted ecosystem designed to facilitate RMB internationalization through infrastructure accumulation.³⁰ This ecosystem operates across four complementary institutional layers:

Cross-Border Interbank Payment System (CIPS): Launched in 2015 and significantly expanded since, CIPS distinguishes itself from SWIFT by handling financial messaging, clearing & settlement in a single system for its full participants. As of August 2025, CIPS connected more than 1,700 direct and indirect participants across 122 countries and regions worldwide. The system's correspondent network extends to banking institutions in 189 countries and regions, with a growing presence in Sub-Saharan Africa, the Middle East, Central Asia, and Southeast Asia. Unlike SWIFT exclusion, CIPS integration provides countries with an alternative settlement rail that directly facilitates RMB-denominated transactions.³¹

Bilateral RMB Swap Lines: The People's Bank of China (PBOC) has extended bilateral currency swap agreements to approximately 40 countries, totaling roughly \$590 billion in liquidity facilities.³² Fair Observer analysis documents how these agreements, while offering short-term liquidity, structurally orient recipient countries toward RMB-denominated transactions agreements are frequently extended to economies with strong trade ties to China or significant Belt and Road Initiative (BRI) exposure, and RMB access is practically constrained to trade settlement with China due to the currency's limited convertibility. China's Central Bank has increasingly become a lender-of-last-resort for distressed developing economies, Argentina's use of \$1.7 billion in RMB swaps to service IMF obligations in 2023 marked a significant precedent for RMB use in multilateral financial contexts.³³ These precedents suggest that the RMB swap lines functions not merely as liquidity backstops but as entry points into a broader RMB-denominated financial ecosystem, one that progressively reduces recipient countries dependence on dollar-clearing channels as well as an indicator to a decline in the Dollar hegemony.

²⁹ McDowell, 'The (Ineffective) Financial Statecraft of China's Bilateral Swap Agreements'.

³⁰ Prasad, *The Future of Money*; Johnston, *China's Central Bank Digital Currency*.

³¹ Cross-Bord. Interbank Paym. Syst. Profile, 'Cross-Border Interbank Payment System (CIPS) Company Profile'.

³² Steil et al., 'Central Bank Currency Swaps Tracker | Council on Foreign Relations'.

³³ Yoshimori, 'The Long-Term Dangers of China's Expanding Swap Line Strategy'.

RMB Clearing Banks: Currently there are dozens of RMB clearing banks which operate across over 30 jurisdictions, serving as critical liquidity nodes anchoring local RMB markets. Chinese authorities have strategically deployed these banks toward Belt and Road countries and major Asian trading partners, creating a distributed infrastructure layer beneath the CIPS messaging system.³⁴ As of 2024, RMB clearing banks are operational in numerous BRI-member jurisdictions, including key financial hubs such as Singapore, Frankfurt, Johannesburg and Dubai. Their presence reduces transaction costs for local institutions seeking CIPS access, thereby lowering the threshold for institutional embeddedness.

Project mBridge: As of late 2025, mBridge had executed over 4,000 cross-border transactions totaling \$55.5 billion, a 2,500-fold increase from early 2022 pilot volumes, with the e-CNY accounting for approximately 95 percent of settlement volume. Full participants include the central banks of China, Hong Kong, Thailand, the UAE, and Saudi Arabia, with observer status extended to three African central banks: the Bank of Mauritius, Bank of Namibia, and South African Reserve Bank. In November 2024, the BIS formally handed over mBridge governance to its central bank participants, signaling the platform's transition from experimental to operational infrastructure. This governance transfer marks a critical institutional shift: mBridge is no longer a multilateral experimental sandbox but an operational payment infrastructure steered by its largest user, the PBOC.

2.2.4 Limitations of the International Literature

Despite substantial contributions, the international monetary power literature on CBDCs exhibits a critical empirical gap. Most existing work either focuses on major central banks as issuers, China, the United States, the European Union, or adopts a speculative tone regarding third-country implications.³⁵ Systematic empirical research examining how third countries, particularly smaller or less-developed economies, orient their CBDC projects in response to major-power infrastructure strategies remains rare. The G24 Policy Brief explicitly identifies this as an underexplored dimension of CBDC geopolitics, noting that the strategic implications of CBDC adoption for developing-country monetary sovereignty have received limited analytical attention. This thesis directly addresses this empirical gap.³⁶

³⁴ Prasad, *The Future of Money*.

³⁵ Auer et al., 'Rise of the Central Bank Digital Currencies: Update as of 1 March 2024'; Prasad, *The Future of Money*.

³⁶ Conti, *Central Bank Digital Currencies and the Evolving International Payment System*.

2.3 Research Gap and Contribution

The foregoing review reveals a structural asymmetry in the existing CBDC literature. Domestic-focused scholarship provides detailed insight into why countries adopt CBDCs but cannot explain how they orient their projects within international monetary networks. International monetary power scholarship identifies the strategic logic of major-power CBDC deployment but offers limited systematic evidence on third-country responses. At the intersection of these literatures and constituting their most significant shared blind spot lies the question this thesis addresses: to what extent do China's economic and financial linkages with countries globally shape their incentives to develop CBDCs aligned with China- and RMB-based cross-border payment infrastructure?

By applying dependency-theoretic mechanisms to a global cross-national sample of 133 countries, this study provides the first systematic empirical test of whether and how major-power payment infrastructure strategies shape third-country CBDC design choices. In doing so, it bridges two largely separate bodies of literature and contributes cross-national evidence to a policy debate dominated by case studies and theoretical speculation.

3. Theoretical Framework

3.1 Overview: Integrating Three Theoretical Traditions

The literature review established two foundational asymmetries in CBDC scholarship: domestic-focused research explains why countries adopt CBDCs but cannot account for how they orient their projects within international payment architectures, while international monetary power scholarship identifies strategic logic but lacks systematic evidence on third-country responses. This thesis bridges these literatures by integrating three complementary theoretical traditions: dependency theory and infrastructure lock-in mechanisms, institutionalism and path dependency, and geopolitical competition theories of monetary statecraft. Rather than treating these as competing frameworks, the chapter constructs them as nested mechanisms operating at distinct analytical levels.

The central theoretical claim is that CBDC alignment with China's RMB-based payment ecosystem is not a direct function of bilateral economic exposure, but an institutionally mediated outcome contingent on the co-presence of three conditions: economic interdependence that generates demand-side incentives for alignment, formal monetary institutional integration that lowers supply-side barriers to implementation, and geopolitical affinity that removes political

constraints on strategic commitment. This sequencing reflects a layered functionalist logic: trade creates incentives, institutions enable implementation, and geopolitics removes barriers.

3.2 Dependency Theory and Infrastructure Lock-In

3.2.1 Classical Dependency Mechanisms

The first theoretical foundation derives from dependency theory in international political economy, which holds that structural economic relationships between states create asymmetric vulnerabilities that shape political outcomes. Classical dependency scholarship, rooted in structuralist accounts of global inequality, argues that peripheral economies' dependence on core economies for market access, capital, and technology generates policy constraints and subordinate insertion into global hierarchies. While dependency theory has been critiqued for economic determinism, contemporary applications in monetary and financial governance demonstrate how economic interdependence produces conditional constraints not invariant outcomes, but incentive structures that make certain policy choices more economically rational.

In the monetary domain, the most direct analogue is Cohen's currency competition framework, which demonstrates that the international use of a currency is driven primarily by network externalities generated through three channels: invoicing in bilateral trade, reserve holdings by foreign central banks, and vehicle currency use in foreign exchange markets. Countries that trade heavily with a particular currency zone face economic incentives to reduce transaction costs by holding and using that currency, creating path-dependent network effects that privilege incumbent currencies and impose adoption costs on rivals.³⁷

Applied to CBDCs, the dependency mechanism operates as follows. Countries with high trade exposure to China develop demand-side incentives to reduce currency conversion frictions by adopting payment infrastructure compatible with RMB settlement. A firm in Vietnam exporting predominantly to China faces lower operational costs if payments are settled in RMB rather than routed through dollar-clearing channels. This incentive operates independently of political alignment it is market-driven and economically rational. Accordingly, H1 hypothesizes that trade dependence, measured as China Trade Share, correlates positively with CBDC alignment. However, trade exposure alone does not determine infrastructure choices: for these incentives to

³⁷ Cohen, 'Currency Power'.

materialize as alignment, countries must face lower institutional barriers to integration the subject of the following section.

3.2.2 Infrastructure Lock-In and Switching Costs

Infrastructure lock-in theory, developed in economics through David and Shapiro-Varian's work on network effects and extended to financial infrastructure by Farrell and Newman, argues that once economic actors commit to a particular technological platform, switching to an alternative imposes substantial costs. In the context of payment system architecture, these costs operate through four complementary channels.³⁸

First, sunk investments: financial institutions that have integrated into CIPS purchasing hardware, training personnel, establishing operational procedures, and adapting legacy systems have incurred non-recoverable costs. Extending this commitment to e-CNY interoperability does not require re-incurring them; the institutions are already embedded in the system's technical and governance architecture. Second, technical complementarities: CIPS operates on specific message protocols, settlement rules, and data standards to which the e-CNY is architecturally designed to conform, lowering the marginal integration cost for CIPS members relative to outsiders who would need to build parallel infrastructure from scratch. Third, regulatory familiarity: central banks in CIPS-member countries have already established compliance frameworks governing cross-border payment participation, anti-money laundering requirements, and data-sharing arrangements with Chinese authorities. These frameworks, once negotiated, constitute institutional templates that reduce implementation costs for CBDC-layer integration. Fourth, network effects: as more financial institutions within a payment system adopt a common protocol, the value of that system increases for all participants an externality that rewards deepening commitment and penalizes exit.³⁹

These mechanisms combine to produce a path-dependent dynamic in North's institutional sense: prior choices constrain and incentivize future choices in specific directions. H3 accordingly hypothesizes that institutional embeddedness operationalization through CIPS membership and bilateral RMB swap agreements is a stronger predictor of CBDC alignment than trade dependence alone.

³⁸ Shapiro and Varian, *Information Rules*; Farrell and Newman, 'Weaponized Interdependence: How Global Economic Networks Shape State Coercion'.

³⁹ Hall et al., 'Path Dependence and QWERTY's Lock-In'; Cross-Bord. Interbank Paym. Syst. Profile, 'Cross-Border Interbank Payment System (CIPS) Company Profile'.

3.2.3 Lending Dependence and Conditionality

A third dependency mechanism concerns the leverage generated by lending relationships. If China deploys lending as an instrument of financial statecraft, countries with high debt exposure should face pressure to align their CBDCs with China's monetary infrastructure as a condition of continued access to financing. H2 operationalization this mechanism by hypothesizing that Chinese lending as a share of GDP correlates positively with CBDC alignment.

However, the theoretical logic supporting H2 is structurally weaker than that underlying H1 and H3. As Brautigam and McDowell document, Chinese lending contracts do not typically include explicit conditionality governing CBDC design or payment infrastructure choices. More fundamentally, Chinese lending transfers physical assets and generates commercial obligations without typically conferring governance authority over recipient-country monetary policy; a country servicing 28 percent of its GDP in Chinese loans retains domestic control over its CBDC architecture.⁴⁰

The theoretical expectation is accordingly modest: if lending does correlate with alignment, the mechanism likely operates indirectly through political affinity effects or technical assistance pathways rather than through explicit conditionality. A null result for H2 would itself be theoretically informative, indicating that debt leverage, notwithstanding prominent debt-trap narratives in the policy literature, does not extend into the domain of digital monetary infrastructure.

3.3 Institutionalism and Path Dependency

3.3.1 Historical Institutionalism and Lock-In

The second theoretical foundation is historical institutionalism, which emphasizes how institutional arrangements, once established, shape subsequent choices through increasing returns to adoption, coordination effects, and actor learning. North's foundational work argues that institutions reduce transaction costs and provide governance templates that lower the costs of cooperation among actors with divergent interests. Applied to international monetary infrastructure, this logic implies that the institutional choices countries make in one period constrain the menu of options available in the next.⁴¹

⁴⁰ McDowell, 'The (Ineffective) Financial Statecraft of China's Bilateral Swap Agreements'; Brautigam, 'A Critical Look at Chinese "Debt-Trap Diplomacy"'.
⁴¹ North, *Institutions, Institutional Change and Economic Performance*.

Pistor's work on legal origins and financial systems extends this argument: financial infrastructure is path-dependent because legal and technical standards develop through incremental elaboration of rules, protocols, and interpretations that cohere into integrated systems. Switching costs increase nonlinearly small adjustments within a system are tractable, but wholesale migration to an alternative architecture is exponentially more costly.⁴²

For CBDCs, this framework predicts that countries already embedded in China's CIPS architecture face strong path-dependent pressures toward CBDC alignment. Once a country's financial infrastructure has integrated into CIPS including personnel training, IT system modification, establishment of new interbank relationships, and creation of regulatory templates the institutional complementarities make further integration incrementally rational and exit structurally costly. As infrastructure deepens, the rate of return to additional integration increases, producing a convex cost-benefit function that incentivizes escalating commitment.

3.3.2 Varieties of Institutional Embeddedness: Functional versus Strategic

A critical theoretical distinction emerges from examining the dataset's outlier cases: not all institutional integration carries equivalent alignment implications. Some countries are functionally embedded in China's monetary infrastructure they participate in CIPS and maintain RMB swap lines because these arrangements serve pragmatic commercial purposes (serving Chinese clients, accessing RMB liquidity, enabling bilateral trade settlement) without exhibiting any strategic intent to align their CBDC systems with China's architecture.

Strategic embeddedness, by contrast, reflects deliberate political commitment: countries explicitly design their CBDC architectures to be compatible with China's system as an expression of geopolitical alignment and conscious monetary infrastructure diversification away from dollar-denominated systems.

This distinction carries a clear empirical implication: institutional embeddedness predicts CBDC alignment most strongly among geopolitically aligned countries. Western economies with maximum CIPS membership Australia, the Euro Area, the United Kingdom, Switzerland, South Korea score zero on CBDC alignment not because institutional integration has failed to take root, but because functional embeddedness has not translated into strategic embeddedness. Their CIPS participation is instrumentally bounded; they use China's payment infrastructure for specific commercial purposes while maintaining primary strategic alignment with dollar-denominated

⁴² Pistor, *The Code of Capital*.

systems. The geopolitical filter discussed in Section 3.4 therefore acts as a moderator: institutional embeddedness predicts alignment among geopolitically compatible states but is effectively neutralized among states embedded in competing security architectures.⁴³

3.4 Geopolitical Competition and Monetary Statecraft

3.4.1 Currency as Strategic Infrastructure

The third theoretical foundation concerns the political economy of monetary statecraft and geopolitical competition over international payment infrastructure. This literature argues that control over financial infrastructure constitutes an instrument of state power comparable to military or diplomatic resources. Eichengreen demonstrates that reserve currency status confers 'exorbitant privilege' through seigniorage gains, preferred access to liquidity, and the structural capacity to deploy financial exclusion as a coercive tool.⁴⁴

A foundational insight of this literature is that payment infrastructure is politically non-neutral. The contemporary global payment system is dollar-denominated and organized around SWIFT—an institution subject to American political oversight. The United States has repeatedly exercised this structural advantage, excluding Iran from SWIFT and threatening similar measures against other targeted states, creating systemic dependence on American goodwill for access to global financial flows. This asymmetry generates geopolitical incentives for rival powers, particularly China, to develop alternative infrastructure that operates outside dollar and SWIFT control.

Chu, Fang, and Lai's analysis of mBridge demonstrates this strategic logic: the platform enables direct peer-to-peer central bank settlement without SWIFT intermediation, using distributed ledger technology to achieve settlement in seconds at substantially lower cost than correspondent banking. Crucially, these authors frame mBridge not as a technical efficiency improvement but as a mechanism that 'redraws the state-finance nexus through programmable infrastructure'—reinforcing China's monetary sovereignty while creating dependency relationships among participating central banks.⁴⁵

⁴³ Granovetter, 'Economic Action and Social Structure'.

⁴⁴ Eichengreen, 'Exorbitant Privilege'.

⁴⁵ Chu et al., 'Reshaping State-Finance-Tech Nexus through Central Bank Digital Currencies'.

3.4.2 *Currency Internationalization as Infrastructure Strategy*

Recent scholarship, particularly the work of Zeng and Lau, argues that CBDCs represent a novel pathway to currency internationalization that partially circumvents classical prerequisites.

Historically, reserve currency status required deep domestic capital markets, sustained current account surpluses, capital account liberalization, and decades of market-driven network effects—conditions the renminbi has not yet fully satisfied through conventional channels.

CBDCs offer what Zeng and Lau term a 'technology-driven internationalization mechanism': by embedding a currency into programmable cross-border payment infrastructure with features including instant settlement, smart contract functionality for trade finance, and direct central bank-to-central bank transaction capabilities, policymakers can lower barriers to the currency's international use without requiring the institutional preconditions that historically gated reserve currency status. The e-CNY is explicitly architected for this purpose. Its design choices payment-versus-payment settlement, programmable smart contracts, and instant cross-timezone settlement directly address the operational frictions that deter adoption of less-liquid currencies in international transactions.⁴⁶

3.4.3 *The Geopolitical Filter: Security Architecture and Regime Affinity*

Not all countries face equivalent incentives or political capacity to adopt China-aligned infrastructure. Two factors function as geopolitical filters that determine whether economic and institutional conditions translate into observable alignment.

The first is security architecture. Countries embedded in US-led security alliances face institutional constraints that override economic incentives. Australia, South Korea, and the United Kingdom, despite high institutional embeddedness in China's monetary infrastructure, score zero on CBDC alignment not due to technical incapacity or lack of economic motivation, but because formal defense commitments to the United States create strategic incompatibilities with deep monetary alignment with a geopolitical rival.⁴⁷ The filter operates through explicit policy coordination among alliance partners and implicit reputational costs associated with visible defection from alliance norms.

The second filter is regime affinity. Authoritarian governments exhibit stronger affinity for China's monetary governance model than democratic governments. The e-CNY's design features

⁴⁶ Bilotta and Botti, *The (Near) Future of Central Bank Digital Currencies*; Zeng and Lau, 'The Digital Yuan in the Shadow of Dollar Hegemony'.

⁴⁷ Kirshner, *Currency and Coercion*.

programmability enabling spending restrictions, centralized issuance without commercial bank intermediation, and transaction visibility to the issuing authority are architecturally compatible with governance preferences that prioritize state monetary control, capital flow management, and fiscal reach.⁴⁸ The empirical gradient is nearly consistent: mean V-Dem democracy scores decline monotonically from 0.412 for countries scoring 0 on alignment to 0.146 for countries scoring 3, with the exception of Score 2 where Mauritius (V-Dem = 0.71) raises the group mean. This pattern does not reflect coercion; rather, it reflects a rational-choice dynamic in which authoritarian policymakers are drawn to a governance model that reinforces their preferred institutional arrangements. Democratic governments' lower alignment propensity reflects both the geopolitical filter democratic states are disproportionately US-aligned and the regime filter: commitments to financial privacy and statutory limitations on state monetary control render China-style CBDC architectures normatively unattractive regardless of economic incentives.⁴⁹

3.5 Network Diffusion and Regional Institutional Isomorphism

The fourth mechanism underlying CBDC alignment is institutional diffusion through regional peer effects. This draws on organizational sociology's concept of mimetic isomorphism, developed by DiMaggio and Powell: organizations facing uncertainty adopt practices observed among peers they consider legitimate reference points. Applied to central banks, this logic suggests that when peer institutions in a region participate in infrastructure projects such as mBridge, other regional central banks face both informational and legitimacy pressures to follow suit.⁵⁰

H4 operationalization this mechanism by hypothesizing that countries whose regional peers participate in mBridge exhibit higher CBDC alignment scores. The mechanism operates through two channels. First, information diffusion: observing that peer central banks have successfully implemented CBDC interoperability with mBridge reduces uncertainty about technical feasibility and policy consequences, lowering the decision threshold for joining. Second, competitive pressure: as regional participation deepens, remaining countries face relative disadvantage in market access and risk appearing technologically behind a cost particularly

⁴⁸ Wang, 'China Meets Digital Currency'.

⁴⁹ Coppedge, Michael, et al., 'Dataset Archive – V-Dem'.

⁵⁰ DiMaggio and Powell, 'The Iron Cage Revisited'.

salient for central banks in emerging markets where payment modernization carries political salience.⁵¹

However, the diffusion mechanism is theoretically secondary to H1 and H3 because it amplifies existing incentives rather than generating new ones from first principles. A country with low trade exposure to China and minimal institutional embeddedness has limited reason to join mBridge regardless of regional peer behavior. Peer effects are real but conditional on baseline economic and institutional preconditions which is why the expected effect size for H4 is weaker than for H1 and H3, and why the mechanism is expected to exhibit regional clustering rather than uniform global diffusion.

3.6 Theoretical Integration and Causal Sequencing

The four hypotheses can be ordered by theoretical strength and causal sequencing, yielding a hierarchical framework of nested mechanisms:

1. Gateway mechanism (H1): Trade dependence creates demand-side incentives for currency alignment. It establishes why alignment is economically rational without explaining why it materializes in some cases but not others, a necessary but insufficient condition.⁵²
2. Primary institutional mechanism (H3): Institutional embeddedness through CIPS membership and RMB swap agreements lowers supply-side barriers to alignment and produces path-dependent lock-in. This is theoretically the strongest mechanism because it operates through concrete switching costs and network externalities analytically distinct from political preferences.
3. Contingent filter (Geopolitics): Geopolitical alignment determines whether institutional embeddedness translates into strategic commitment or remains functionally bounded. The same degree of institutional integration produces alignment in geopolitically compatible states and non-alignment in Western-aligned states, confirming that geopolitics functions as a moderating condition rather than an independent driver.
4. Contextual amplifier (H4): Regional peer diffusion amplifies alignment among countries that already satisfy H1, H3, and the geopolitical filter. This produces wave-like diffusion

⁵¹ Dobbin et al., 'The Global Diffusion of Public Policies: Social Construction, Coercion, Competition, or Learning?'; Bank für Internationalen Zahlungsausgleich, *CBDCs in Emerging Market Economies*.

⁵² Ragin, *Redesigning Social Inquiry*.

within receptive regional clusters visible in ASEAN and the Gulf Cooperation Council—rather than uniform global spread.

5. Weak mechanism (H2): Lending dependence is theoretically weakest because it operates without explicit conditionality mechanisms that would translate debt exposure into institutional pressure on CBDC design choices, and is accordingly expected to exhibit null or marginal empirical results.

In summary, trade dependence establishes the incentive foundation for alignment, institutional embeddedness enables it, geopolitical affinity removes political barriers, and regional diffusion amplifies adoption within receptive clusters. Lending dependence, lacking explicit conditionality pathways, is expected to show minimal explanatory power a null finding that would itself constitute a theoretically informative contribution by delimiting the boundaries of Chinese financial statecraft.⁵³

4. Methodology & Research Design

4.1 Research Design and Unit of Analysis

This study employs a cross-sectional quantitative research design to examine the relationship between countries' economic, financial, and institutional interdependence with China and their CBDC orientation toward RMB-based payment infrastructure. The unit of analysis is the individual nation-state. The temporal reference frame spans 2023 to 2025: independent variable data capturing economic and institutional linkages trade flows, lending commitments, and infrastructure membership are drawn primarily from 2023, the most recent complete year available at the time of data collection, while CBDC development status and institutional participation data are recorded as of December 2025.

A cross-sectional design is well-suited for this research question given the contemporary character of the phenomenon. As of early 2025, the global diffusion of CBDC projects has created a rare empirical setting: central banks worldwide confront broadly similar technological choices and comparable timing constraints, yet display substantial variation in their strategic orientation toward China's RMB-linked settlement infrastructure most notably Project mBridge. Because CBDC alignment constitutes a strategic policy posture adopted at a discrete point in time, and because longitudinal data for multi-CBDC platforms are not yet available, a cross-

⁵³ Kirshner, *Currency and Coercion*.

sectional snapshot provides the most feasible empirical strategy for capturing this variation at a critical juncture in the evolution of global digital monetary infrastructure.

The design's primary limitation is the inability to establish temporal precedence or to identify causal relationships definitively. This constraint is addressed in the Discussion (Section 6.6) and partially mitigated through robustness checks and a theoretical framing that treats results as evidence consistent with the proposed mechanisms rather than as causal estimates.

4.2 Sample and Data Collection

4.2.1 Analytical Universe and Inclusion Criteria

The analytical universe comprises all countries with a documented central bank digital currency project at any stage of development research, development, pilot, or launched as of December 2025. The population was identified through two primary sources: the Atlantic Council CBDC Tracker⁵⁴, a continuously updated repository maintained by the GeoEconomics Center; and the 2024 BIS survey of central banks' CBDC activities, which provides corroborating documentation across G20 economies, emerging markets, and selected developing countries. Triangulating across two independent sources reduces measurement error attributable to individual source bias.⁵⁵

Two criteria governed inclusion in the final analytical sample. First, a country must possess an active or explicitly documented CBDC project as of December 2025. Second, it must have complete data for all primary China-linkage indicators China Trade Share, Chinese Lending, RMB Swap Agreement status, and CIPS Membership as well as for all control variables. Countries failing either criterion were excluded from the sample.

4.2.2 Sample Composition

Applying these criteria yields a final analytical sample of $N = 133$ countries, representing over 95 percent of global GDP and encompassing highly diverse regional, income, and institutional contexts: 46 Sub-Saharan African countries, 23 Latin American and Caribbean countries, 19 East Asian and Pacific countries, 18 European and Central Asian countries, 17 Middle Eastern and North African countries, 8 South Asian countries, and 2 North American countries.

⁵⁴ Atl. Counc., 'Central Bank Digital Currency Tracker'.

⁵⁵ Illes et al., 'Advancing in Tandem – Results of the 2024 BIS Survey on Central Bank Digital Currencies and Crypto'.

4.2.3 Missing Data and Sources

All analyses are conducted on the complete-case subset of countries for which data are available across all variables. Rather than employing statistical imputation, this approach preserves data integrity by avoiding model-dependent estimates that could introduce systematic bias, and ensures full transparency and replicability. The full dataset is compiled from 16 distinct primary sources, including the World Bank's World Integrated Trade Solution (WITS), AidData's Global Chinese Development Finance Dataset (Version 3.0), and the V-Dem Institute's democracy indices following the validation procedures detailed in Appendix A.

4.3 Dependent Variable: CBDC China Alignment

4.3.1 Conceptualization

The dependent variable, CBDC China Alignment, captures the degree to which a country's digital currency project is technically integrated with, institutionally committed to, or strategically oriented toward China's RMB-based payment ecosystem. Alignment is conceptualized as an ordinal variable reflecting cumulative thresholds of institutional and technical commitment.

Four ordinal levels are distinguished.

Score 0 (No Alignment) denotes countries without meaningful institutional linkages to China's payment infrastructure, or Western-aligned economies where isolated linkages exist but do not translate into CBDC-level alignment.

Score 1 (Low Alignment) denotes countries with baseline institutional linkages, such as indirect CIPS membership, an active RMB swap agreement, or BRI membership, but lacking advanced CBDC integration.

Score 2 (Moderate Alignment) denotes countries meeting either of two pathways: (i) formal mBridge observer status combined with China-linkage indicators, or (ii) direct CIPS membership, an active RMB swap line, BRI integration, and a CBDC project at pilot or launched stage.

Score 3 (High Alignment) denotes full mBridge participation combined with direct CIPS membership, an active RMB swap line, BRI integration, and a CBDC project at pilot or launched stage.

4.3.2 Rule-Based Ordinal Classification Procedure

Rather than using an additive mathematical index, the alignment scale is constructed using a deterministic, rule-based classification procedure. This approach ensures that a country's score reflects specific, qualitative thresholds of integration that match the theoretical mechanisms of network lock-in and institutional embeddedness. The classification relies on four verifiable dimensions:

1. Network Participation: mBridge status (None, Observer, Full).
2. Institutional Embeddedness: CIPS membership (None, Indirect, Direct) and active PBOC RMB swap agreements.
3. Geopolitical Framework: Belt and Road Initiative (BRI) membership.
4. Domestic Readiness: CBDC project stage (Research, Development, Pilot, Launched).

A country is assigned the highest alignment score for which it meets the necessary baseline criteria. To account for the functional embeddedness paradox discussed in Section 3.3.2, explicit rules prevent Western-aligned security partners from being coded above 0 solely on the basis of commercial CIPS usage or mBridge observation, as their strategic monetary orientation remains firmly dollar-centric.

4.3.3 Score Distribution and Country Classification

Table 4.1 presents the coding criteria and resulting distribution across the four alignment levels.

Score	Label	Criteria	N	%
0	No Alignment	Minimal China financial linkage, or Western-aligned economies where isolated linkages do not translate into strategic CBDC cooperation.	89	66.9
1	Low Alignment	Some institutional linkage, such as indirect CIPS participation, an active RMB swap agreement, or BRI membership, but no advanced CBDC interoperability.	34	25.6
2	Moderate Alignment	Either mBridge observer status combined with China-linkage indicators, or direct CIPS membership, an active RMB swap agreement, BRI membership, and a CBDC project at pilot or launched stage.	5	3.8
3	High Alignment	Full mBridge participation combined with direct CIPS membership, an active RMB swap agreement, BRI membership, and a CBDC project at pilot or launched stage.	5	3.8
	Total		133	100

Table 1. CBDC China Alignment scale: coding criteria and sample distribution ($N = 133$)

High Alignment (Score 3, n = 5): China, Hong Kong, Saudi Arabia, Thailand, and the United Arab Emirates. These five economies are the founding full participants of Project mBridge. All hold direct CIPS membership, participate in the Belt and Road Initiative, and have advanced their CBDC projects to the pilot stage with documented cooperation on cross-border e-CNY settlement. Saudi Arabia, Hong Kong, Thailand, and the UAE additionally maintain active PBOC bilateral swap lines.

Moderate Alignment (Score 2, n = 5): Cambodia, Egypt, Mauritius, Russia, and South Africa. Cambodia, Egypt, Mauritius, and South Africa hold mBridge observer status and combine this with CIPS membership and active RMB swap lines. Russia meets the second pathway to Moderate Alignment: direct CIPS membership, an active RMB swap agreement, BRI membership, and a CBDC project at pilot stage, all verified through independent institutional sources.

Low Alignment (Score 1, n = 34): Argentina, Bahrain, Belarus, Brazil, Cuba, Djibouti, Ethiopia, Indonesia, Iran, Jordan, Kazakhstan, Kenya, Kyrgyzstan, Laos, Malaysia, Maldives, Mongolia, Myanmar, Namibia, Nepal, Nigeria, Pakistan, Philippines, Qatar, Rwanda, Sri Lanka, Suriname, Tajikistan, Turkey, Uzbekistan, Venezuela, Vietnam, Zambia, and Zimbabwe. These countries possess some baseline institutional linkages, such as indirect CIPS participation, an RMB swap agreement, or BRI membership, but do not meet the threshold for moderate or high alignment.

No Alignment (Score 0, n = 89): The remaining 89 countries, including the United States, Japan, Germany, France, the United Kingdom, Canada, Australia, South Korea, Singapore, and India, as well as the majority of Sub-Saharan African, Latin American, and European economies. These countries either lack meaningful institutional linkages to China's monetary infrastructure or are Western-aligned economies in which existing linkages have not translated into strategic CBDC cooperation, the functional embeddedness paradox discussed in Section 3.3.2.

4.4 Independent Variables and Operationalization

Four primary independent variables are constructed to test hypotheses H1 through H4, each operationalization to map directly onto the theoretical mechanisms outlined in Chapter 3.

4.4.1 H1: Trade Dependence — China Trade Share (%)

This variable measures the proportion of a country's total merchandise trade conducted with China:

$$\text{China Trade Share (\%)} = [(Exports\ to\ China + Imports\ from\ China) / (Total\ Exports + Total\ Imports)] \times 100$$

Data are sourced from the World Bank’s WITS database and UN Comtrade, using 2023 merchandise trade figures—the most recent complete year available at time of data collection. Only merchandise trade is included, consistent with standard practice in the currency-internationalization literature and ensuring cross-country comparability. The variable ranges from 2.1 percent (Iceland) to 100 percent, with a mean of 15.36 percent (SD = 12.42; Median = 12.4). The 100 percent ceiling is a coding convention applied to China itself, whose bilateral trade share is measured relative to the full sample; robustness checks confirm that excluding China does not materially alter the results (Section 6.5). The measure operationalization the theoretical argument that trade concentration on China generates demand-side incentives to reduce currency conversion costs by adopting interoperable RMB-compatible payment infrastructure.

4.4.2 H2: Lending Dependence — Chinese Lending (% of GDP)

This variable measures cumulative official-sector lending commitments from China as a share of the recipient country’s annual GDP:

$$\text{Chinese Lending (\% GDP)} = (\text{Cumulative Chinese Official-Sector Loans} / \text{Annual GDP}) \times 100$$

Data are drawn from AidData’s Global Chinese Development Finance Dataset (Version 3.0) ⁵⁶, the most comprehensive source for Chinese official-sector lending globally. The dataset covers lending commitments from 2000 to 2021, with project implementation data extending through 2023, encompassing over 13,000 projects across 165 countries and totaling approximately USD 843 billion in official-sector financing. For countries with missing or incomplete lending records, a value of zero is assigned, consistent with the assumption that the absence of recorded commitments reflects negligible Chinese lending exposure rather than systematic data gaps.

4.4.3 H3: Institutional Embeddedness

Institutional embeddedness is operationalization through two distinct but complementary indicators, each reflecting a primary formal channel of integration into China’s monetary architecture. Both are entered as independent predictors to test H3 across two dimensions of the same underlying mechanism.

⁵⁶ ‘AidData | Banking on the Belt and Road’.

RMB Swap Agreement (Binary). This indicator equals 1 if a country holds an active bilateral currency swap agreement with the People’s Bank of China (PBOC) as of December 2025, and 0 otherwise. Data derive from official PBOC annual reports and recipient central bank announcements. Of the 133 sample countries, 36 (27.1%) hold active bilateral swap agreements. These agreements provide direct access to RMB liquidity without dollar intermediation and signal formal monetary coordination with the PBOC, representing a prior institutional commitment that lowers the marginal cost of CBDC-layer integration.⁵⁷

CIPS Membership (Ordinal, 0–2). This variable measures a country’s level of participation in China’s Cross-Border Interbank Payment System (CIPS): 0 (non-member), 1 (indirect member: can receive transactions but not initiate them), or 2 (direct member: full transactional rights). Data are sourced from CIPS’s official participant lists as of 2024. Of the sample, 20 countries (15.0%) are direct members, 44 (33.1%) are indirect members, and 69 (51.9%) are non-members. Direct membership is theoretically and operationally distinct from indirect membership because it confers full participation privileges and imposes the greatest sunk-cost constraints on future defection from China’s payment architecture.

4.4.4 H4: Network Diffusion — *mBridge Regional Peer Share (%)*

This variable measures the proportion of a country’s World Bank geographic region peers participating in Project mBridge—as either full participants or observers—as of December 2025:

$$mBridge\ Regional\ Peer\ Share\ (\%) = (\# \text{ Regional } mBridge\ Participants\ or\ Observers\ [excl. \\ country\ itself]) / (Total\ \# \text{ Countries in Region} - 1) \times 100$$

The country itself is excluded from both numerator and denominator to prevent the variable from being mechanically endogenous to the dependent variable. World Bank geographic region classifications define the unit boundaries; BIS Innovation Hub records provide mBridge participation status. The variable ranges from 0 to 100 percent, with a mean of 21.81 percent (SD = 18.44). Regional variation is substantial: East Asia and Pacific records the highest substantive peer share (47.1%; 9 of 19 countries), followed by the Middle East and North Africa (37.5%; 7 of 17 countries), while Sub-Saharan Africa records the lowest (4.4%; 2 of 46 countries). North America records a value of 100 percent for one country, reflecting a measurement artifact arising from a region of only two countries this is discussed as a limitation in Section 6.6. The geographic heterogeneity across regions is expected to produce regionally

⁵⁷ ‘Bank of China Releases 2024 “RMB Internationalization White Paper”’; Horn et al., ‘China as an International Lender of Last Resort’.

concentrated rather than globally uniform peer effects, consistent with the theoretical prediction in Section 3.5 that diffusion amplifies existing economic and institutional conditions rather than generating alignment independently.

4.5 Control Variables

To isolate the specific effects of monetary and economic dependency on China, the models incorporate a comprehensive set of control variables addressing alternative explanations:

- **Economic Scale and Vulnerability:** Log(GDP), GDP per capita (USD), and External Debt (% of GDP)⁵⁸ control for domestic innovation capacity and macroeconomic vulnerability.
- **Technological Readiness:** Internet Penetration (%)⁵⁹ and Digital Payment Penetration (%)⁶⁰ control for the domestic technical preconditions required to support advanced CBDC architectures.
- **Geopolitical and Institutional Affinity:** BRI Membership (binary)⁶¹ controls for overarching geopolitical alignment with Beijing. UNGA Voting Alignment with China (0–1 index)⁶² explicitly controls for broader diplomatic and political affinity, ensuring that financial alignment is measured independently of general geopolitical subservience. The V-Dem Democracy Score (v14)⁶³ controls for regime type.
- **Geography:** Distance to Beijing (km)⁶⁴ controls for standard gravity-model effects common in international economics.

4.6 Variable Summary

Variable	Type	Range	Mean (SD)	Primary Source
CBDC China Alignment (DV)	Ordinal (0–3)	0–3	0.44 (0.74)	Author coding
China Trade Share (%)	Continuous	2.1–100.0	15.36 (12.42)	World Bank WITS / UN Comtrade (2023)
Chinese Lending (% GDP)	Continuous	0.0–28.4	4.49 (5.48)	AidData GCDF v3.0 (2000–2023)

⁵⁸ World Bank Group, ‘External Debt | Data’.

⁵⁹ The World Bank Group, ‘World Bank Open Data’.

⁶⁰ World Bank Group, ‘Global Findex Database 2021 Survey Headline Findings on the Use of Financial Services’.

⁶¹ Nedopil Christoph, ‘Countries of the Belt and Road Initiative (BRI) – Green Finance & Development Center’.

⁶² Voeten, ‘United Nations General Assembly Ideal Points’.

⁶³ Coppedge, Michael, et al., ‘Dataset Archive – V-Dem’.

⁶⁴ Mayer, T. Zignago, S., ‘Notes on CEPII’s Distances Measures: The GeoDist Database’.

RMB Swap Agreement	Binary (0/1)	0–1	0.27 (0.45)	PBOC Annual Reports (2024)
CIPS Membership	Ordinal (0–2)	0–2	0.63 (0.73)	CIPS Official Participant Lists (2024)
mBridge Regional Peer (%)	Continuous	0.0–100.0	21.81 (18.44)	BIS Innovation Hub / World Bank Regions
log(GDP)	Continuous	0.26–10.20	4.23 (2.07)	World Bank WDI (2023)
GDP per Capita (USD)	Continuous	245–100,413	13,289 (20,970)	World Bank WDI (2023)
External Debt (% GDP)	Continuous	0.0–642.1	73.0 (76.5)	World Bank IDS (2023)
Internet Penetration (%)	Continuous	2.0–99.7	62.0 (28.5)	ITU / World Bank WDI (2023)
Digital Payment Pen. (%)	Continuous	8.4–97.1	50.5 (25.7)	World Bank Global Findex (2021)
BRI Membership	Binary (0/1)	0–1	0.79 (0.41)	Green BRI Center (2024)
UNGA Voting Alignment	Continuous (0–1)	0.00–1.00	0.83 (0.11)	Voeten Ideal Points (2025)
V-Dem Democracy Score	Continuous (0–1)	0.03–0.92	0.36 (0.25)	V-Dem Institute, v14 (2023)
Distance to Beijing (km)	Continuous	0–19,345	8,960 (4,206)	CEPII GeoDist Database
Region	Categorical (7)	7 categories	—	World Bank Country & Lending Groups

Table 2. Summary of all variables: type, observed range, descriptive statistics, and primary data source ($N = 133$)

4.7 Analytical Strategy

Given the ordinal nature of the dependent variable (CBDC China Alignment, 0–3 scale) and its pronounced positive skew with 66.9 percent of observations concentrated at zero traditional Ordinary Least Squares (OLS) regression violates core distributional and interval-scale assumptions. This study therefore adopts a multi-tiered, non-parametric inferential strategy.

Primary analysis: Spearman rank-order correlations (r_s): Spearman’s ρ evaluates monotonic rather than strictly linear relationships and is robust to outliers through its rank-based

computation, making it methodologically appropriate for the ordinal dependent variable and the skewed distributions of several independent variables. Spearman correlations serve as the primary inferential tool for testing H1 through H4.

Group-difference tests: To detect structural differences across categories, the study employs Kruskal-Wallis H tests for multi-group comparisons (e.g., regional variation in alignment) and Mann-Whitney U tests for binary independent variables (e.g., BRI membership, RMB swap status).

Robustness check : Ordered Logistic Regression: As a multivariate robustness check, an ordered logit model is specified to evaluate whether the bivariate dependency relationships hold when confounding factors are controlled simultaneously. Given the sparse frequencies in the highest alignment categories (Levels 2 and 3, $n = 5$ each), bootstrapped standard errors are applied. While the ordered logit model is not the primary inferential tool due to these distributional constraints, it provides critical validation that the observed mechanisms remain robust to controls for digital readiness, diplomatic affinity (UNGA voting alignment), and economic scale.

5. Results

This chapter presents the empirical findings of the cross-national analysis examining whether countries' economic and financial interdependence with China correlates with their CBDC orientation toward RMB-based payment infrastructure. The results are organized as follows: Section 5.1 presents descriptive statistics; Section 5.2 reports bivariate Spearman correlations for the four primary hypotheses; Section 5.3 provides regional and institutional group analyses; Section 5.4 reports control variable associations; and Section 5.5 synthesizes all hypothesis test outcomes and presents robustness checks.

5.1 Descriptive Statistics

Table 1 presents descriptive statistics for the dependent variable, primary independent variables, and selected controls. The dependent variable (CBDC China Alignment) exhibits a mean of 0.44 ($\$SD = 0.74\$$), reflecting the expected right-skewed distribution and the dominance of the zero category (no observable alignment).

Variable	Mean	SD	Min	Max	N
CBDC China Alignment (0-3)	0.444	0.743	0.00	3.00	133
China Trade Share (%)	15.36	12.42	2.10	100.00	133
Chinese Lending (% GDP)	4.49	5.48	0.00	28.40	133
RMB Swap Agreement (binary)	0.271	0.446	0.00	1.00	133
mBridge Status (0-2)	0.256	0.517	0.00	2.00	133
CIPS Membership (0-2)	0.632	0.733	0.00	2.00	133
mBridge Regional Peer (%)	21.81	18.44	0.00	100.00	133
log(GDP)	4.23	2.070	0.26	10.20	133
V-Dem Democracy Score	0.363	0.251	0.03	0.92	133
Distance to Beijing (km)	8960	4206	0	19345	133

Table 3. Descriptive statistics for dependent variable, primary independent variables, and selected controls (N = 133)

Among the primary independent variables, China Trade Share averages 15.36% (SD = 12.42), with notable high-exposure outliers including Mongolia (62.4%), Angola (43.1%), and Turkmenistan (42.6%). Chinese Lending averages 4.49% of GDP (SD = 5.48), with particularly high debt exposure concentrated in Laos (28.4%), Angola (22.8%), Zambia (18.9%), and Djibouti (18.2%). With regard to formal monetary institutional ties, 27.1% of the sample countries (n = 36) hold active bilateral RMB swap agreements with the PBOC. The Shapiro-Wilk test confirms that all continuous independent variables are significantly non-normally distributed (all $p < 0.001$), justifying the use of non-parametric methods throughout.

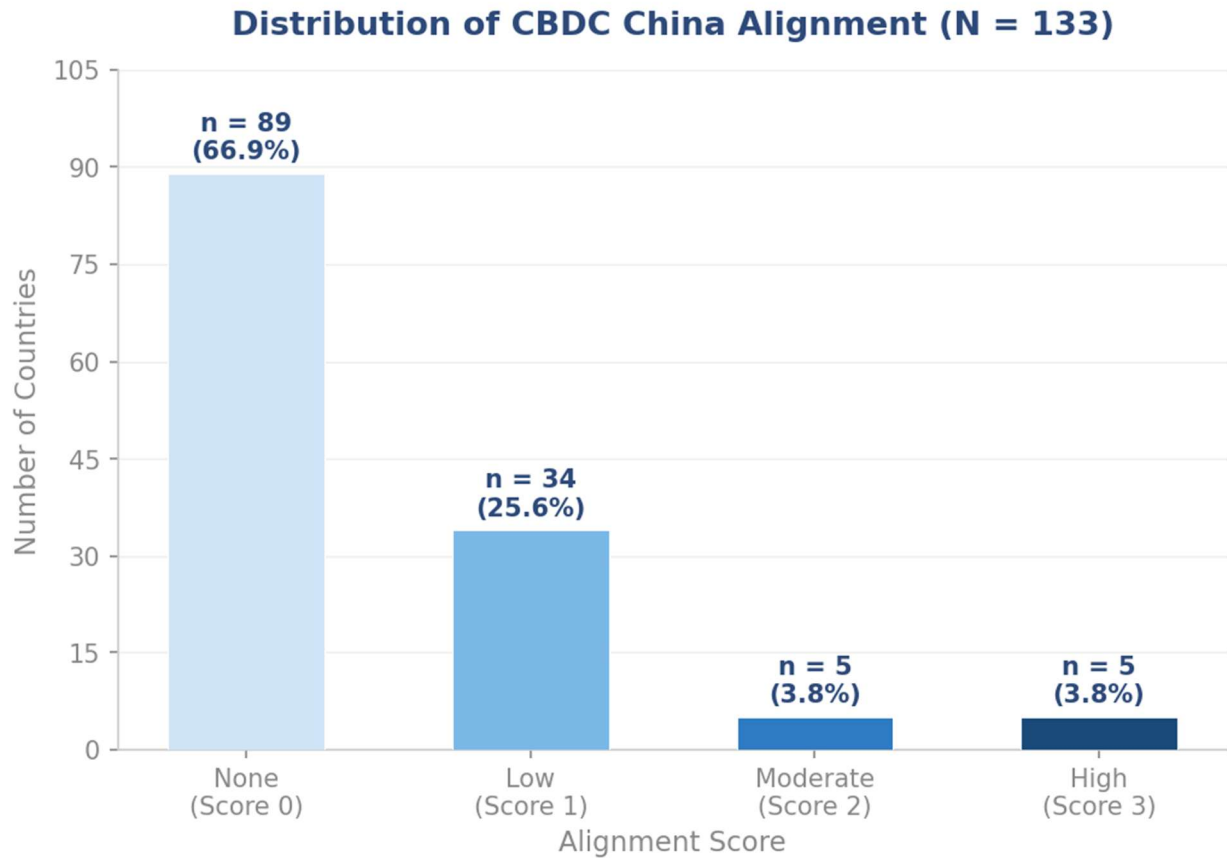


Figure 1. Distribution of the dependent variable CBDC China Alignment (N = 133). Score 0 = None (n = 89), Score 1 = Low (n = 34), Score 2 = Moderate (n = 5), Score 3 = High (n = 5)

5.2 Bivariate Analysis: Spearman Correlations

Given the ordinal nature of the dependent variable and the non-normal distribution of all continuous predictors, Spearman rank correlations constitute the primary inferential method. Table 4 presents the results for all four theoretical hypotheses. Three of the four hypotheses receive statistically significant support.

Hypothesis	Variable	r_s	p-value	Result
H1 - Trade Dependence	China Trade Share (%)	0.383	< 0.001 ***	Supported
H2 - Lending Dependence	Chinese Lending (% GDP)	0.142	0.102 (ns)	Not Supported
H3 - Institutional (Swap)	RMB Swap Agreement	0.415	< 0.001 ***	Supported
H3 - Institutional (CIPS)	CIPS Membership (0-2)	0.542	< 0.001 ***	Supported
H4 - Network Diffusion	mBridge Regional Peer (%)	0.231	0.008 **	Supported

Table 4. Spearman rank correlations between China linkage variables and CBDC China Alignment ($N = 133$). *** $p < 0.001$, ** $p < 0.01$, ns = not significant

H1 - Trade Dependence Hypothesis

H1 is supported ($r_s = 0.383$, $p < 0.001$). Countries with higher trade exposure to China exhibit significantly higher CBDC China Alignment scores (Figure 2). This moderate positive correlation is consistent with the theoretical expectation that bilateral trade interdependence creates incentives to reduce currency conversion frictions and adopt payment infrastructure compatible with China's digital yuan ecosystem. The effect is robust to the exclusion of China from the sample ($r_s = 0.366$, $p < 0.001$), confirming that the result is not driven by China's own extreme trade share value of 100%.

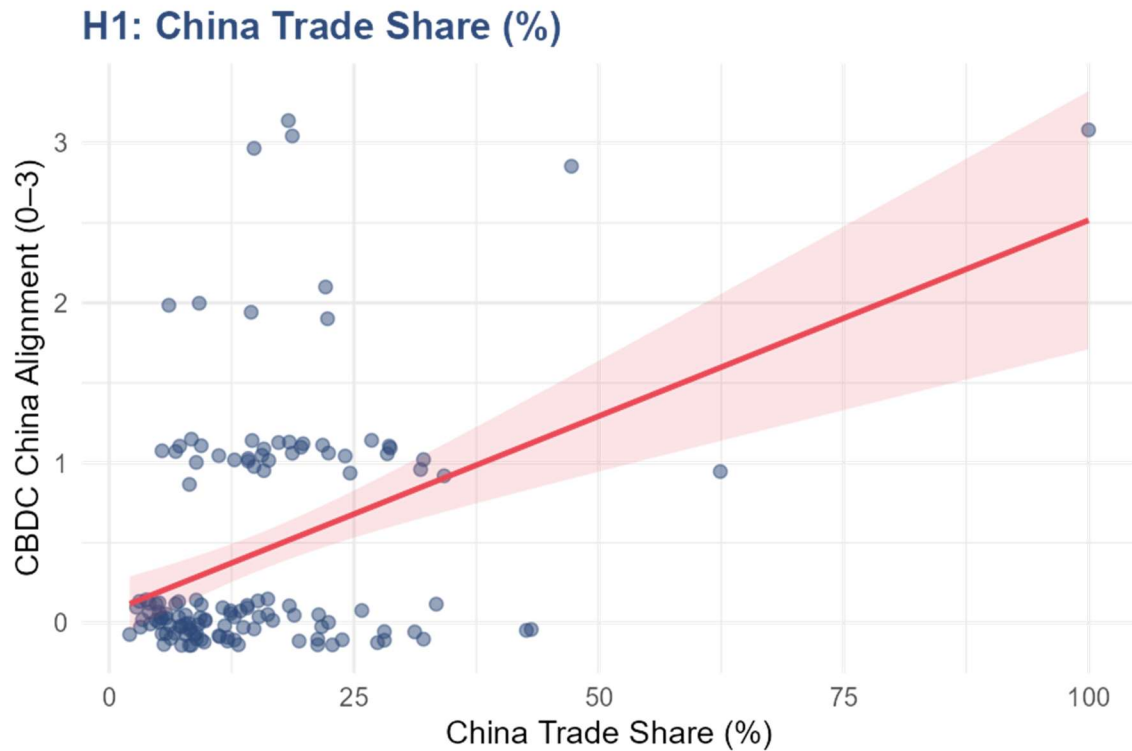


Figure 2. Scatterplot of China Trade Share (%) vs. CBDC China Alignment ($N = 133$). Trend line with 95% confidence interval.
 $r_s = 0.383, p < 0.001$

H2 - Lending Dependence Hypothesis

H2 is not supported ($r_s = 0.142, p = 0.102$). Chinese lending exposure as a share of GDP shows no statistically significant correlation with CBDC alignment (Figure 3). While the direction is positive as predicted, the magnitude falls below conventional significance thresholds. This null finding may reflect the structural ambiguity of Chinese lending as a driver of CBDC adoption: high-debt countries may face conditionality pressures that do not translate directly into digital monetary integration, or the lending-to-CBDC pathway may be mediated by institutional variables not captured in this model. Countries with the highest lending exposure, Laos (28.4%), Angola (22.8%), score only 1 and 0 on alignment respectively, confirming that debt exposure does not mechanically produce monetary infrastructure alignment. This result is consistent with the broader literature suggesting that Chinese lending does not generate automatic policy alignment.

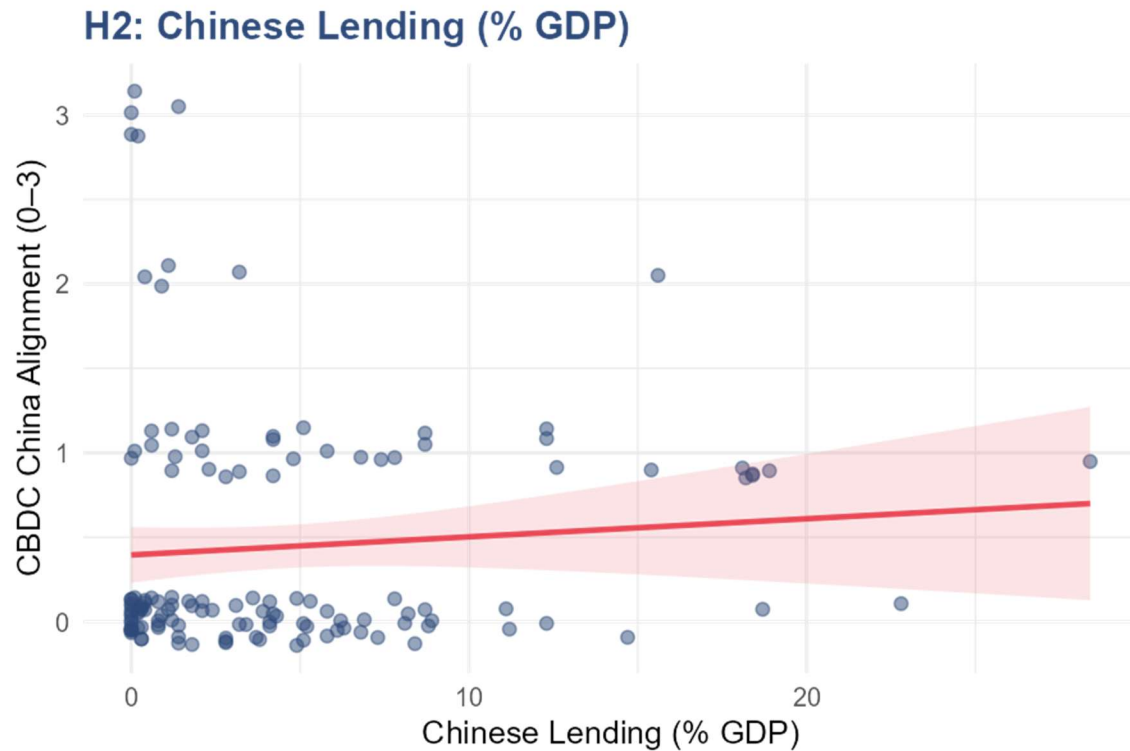


Figure 3. Scatterplot of Chinese Lending (% GDP) vs. CBDC China Alignment ($N = 133$). Flat trend line illustrates the non-significant relationship. $r_s = 0.142$, $p = 0.102$

H3 - Institutional Embeddedness Hypothesis

H3 receives strong support across both operationalizations. RMB swap agreements correlate positively with alignment ($r_s = 0.415$, $p < 0.001$), and CIPS membership yields the strongest bivariate correlation in the entire study ($r_s = 0.542$, $p < 0.001$). Countries embedded in Chinese monetary institutions are significantly more likely to exhibit China-aligned CBDC strategies. The CIPS finding is particularly notable: participation in China's Cross-Border Interbank Payment System represents an existing infrastructure commitment that likely lowers the marginal cost of deeper CBDC-level integration, producing path-dependent alignment. Both results remain stable in robustness tests excluding China (H3a: $r_s = 0.432$; H3b: $r_s = 0.531$).

H4 - Network Diffusion Hypothesis

H4 is supported, though with a weaker effect relative to H1 and H3 ($r_s = 0.231$, $p = 0.008$). Countries whose regional peer central banks participate in mBridge or similar platforms show significantly higher alignment scores, consistent with network diffusion theory and regional institutional isomorphism. The relatively modest correlation may reflect the geographic concentration of high-alignment countries - East Asia Pacific and the Middle East/North Africa - limiting the variance explained by regional peer effects across the full global sample.

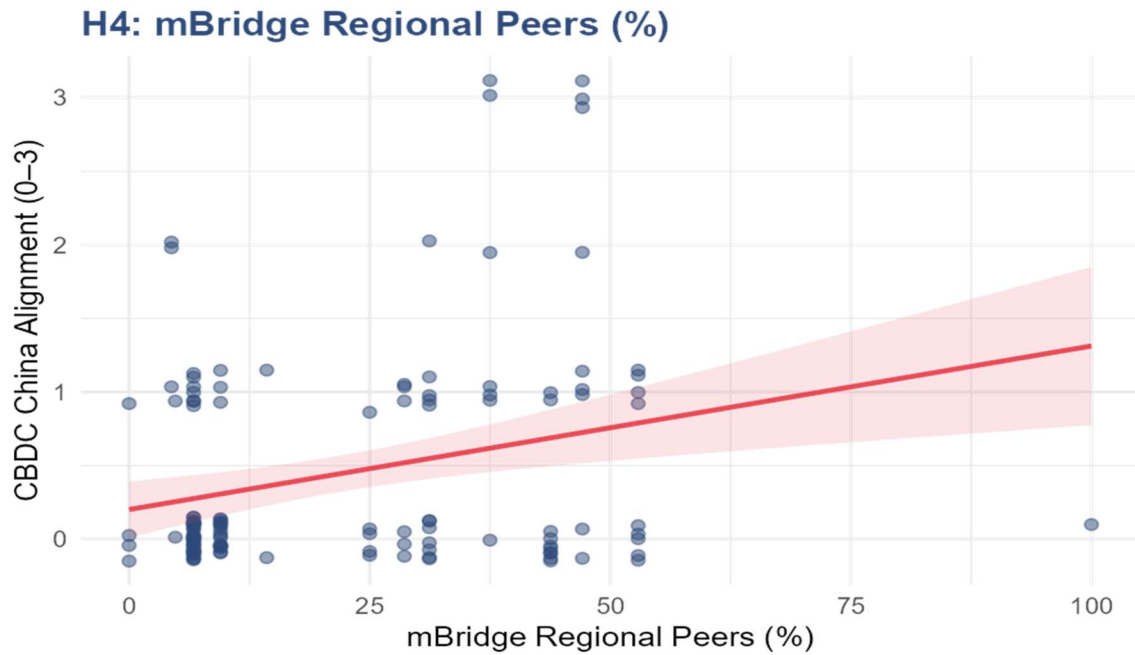


Figure 4. Scatterplot of mBridge Regional Peer Participation (%) vs. CBDC China Alignment ($N = 133$). $r_s = 0.231$, $p = 0.008$

5.3 Regional and Institutional Group Analysis

Table 3 presents mean CBDC China Alignment by region. A Kruskal-Wallis test confirms significant cross-regional variation ($H = 14.41$, $p = 0.025$). East Asia Pacific shows the highest mean alignment (0.95), driven by mBridge full participants China, Hong Kong, and Thailand, alongside observers such as Cambodia, Malaysia, and Vietnam. The Middle East/North Africa region ranks second (0.77), reflecting the participation of Saudi Arabia and the UAE as mBridge full members. Sub-Saharan Africa and Latin America/Caribbean display the lowest alignment scores.

Region	Mean Alignment	N	Key High-Alignment Countries
East Asia Pacific	0.95	19	China, Hong Kong, Thailand, Cambodia
Middle East North Africa	0.77	17	Saudi Arabia, UAE, Egypt
South Asia	0.50	8	Pakistan, Sri Lanka, Nepal
Europe Central Asia	0.39	18	Russia, Kazakhstan, Turkey
Sub-Saharan Africa	0.26	46	South Africa, Mauritius
Latin America Caribbean	0.22	23	Argentina, Brazil
North America	0.00	2	-

Table 5. Mean CBDC China Alignment by world region. Kruskal-Wallis $H = 14.41$, $p = 0.025$ *

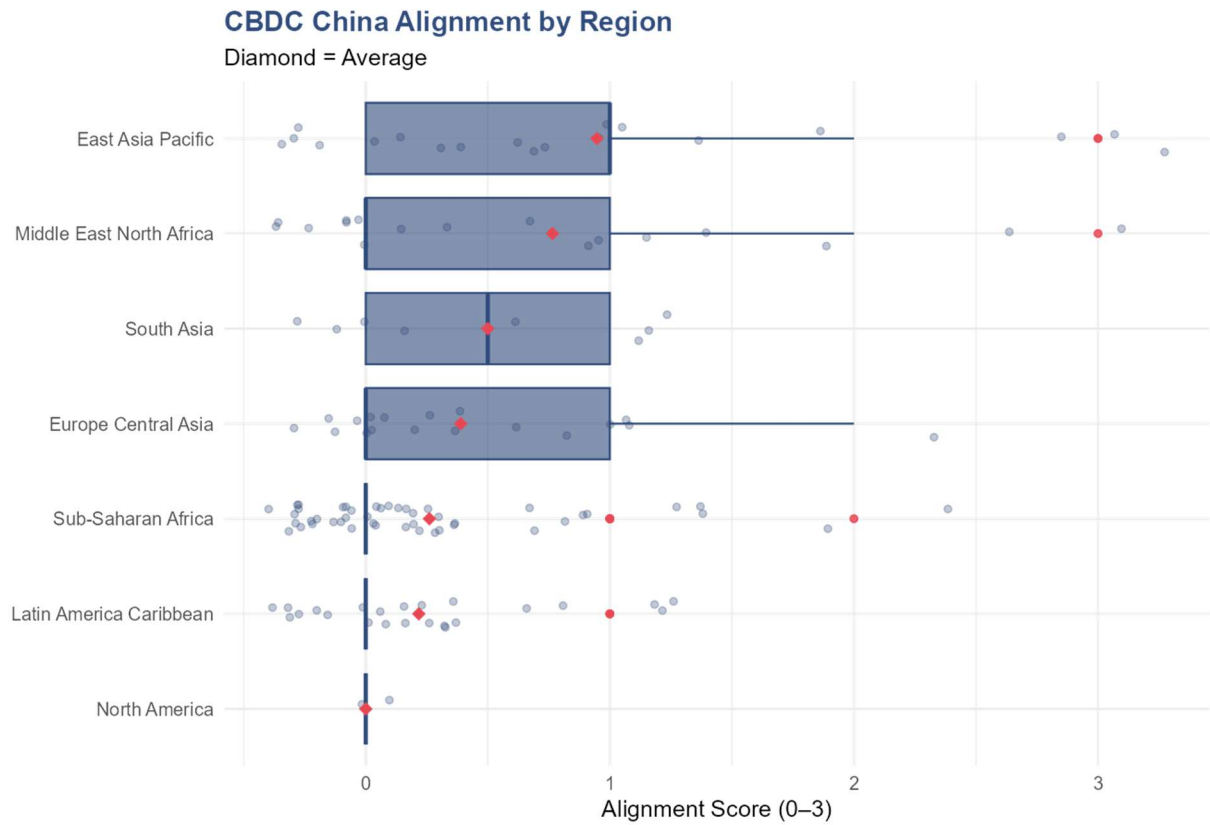


Figure 5. CBDC China Alignment by world region (N = 133). Boxplot with jittered data points. Diamond = group mean. Regions ordered by mean alignment

BRI membership is significantly associated with higher CBDC alignment. BRI members (n = 105) record a mean alignment of 0.54 versus 0.07 for non-members (n = 28), a difference confirmed by a one-tailed Mann-Whitney U test ($U = 977(\text{non BRI}), p < 0.001$). This result is consistent with the control hypothesis that broader Belt and Road institutional integration predicts CBDC adoption intensity, though it does not isolate the CBDC-specific alignment mechanism.

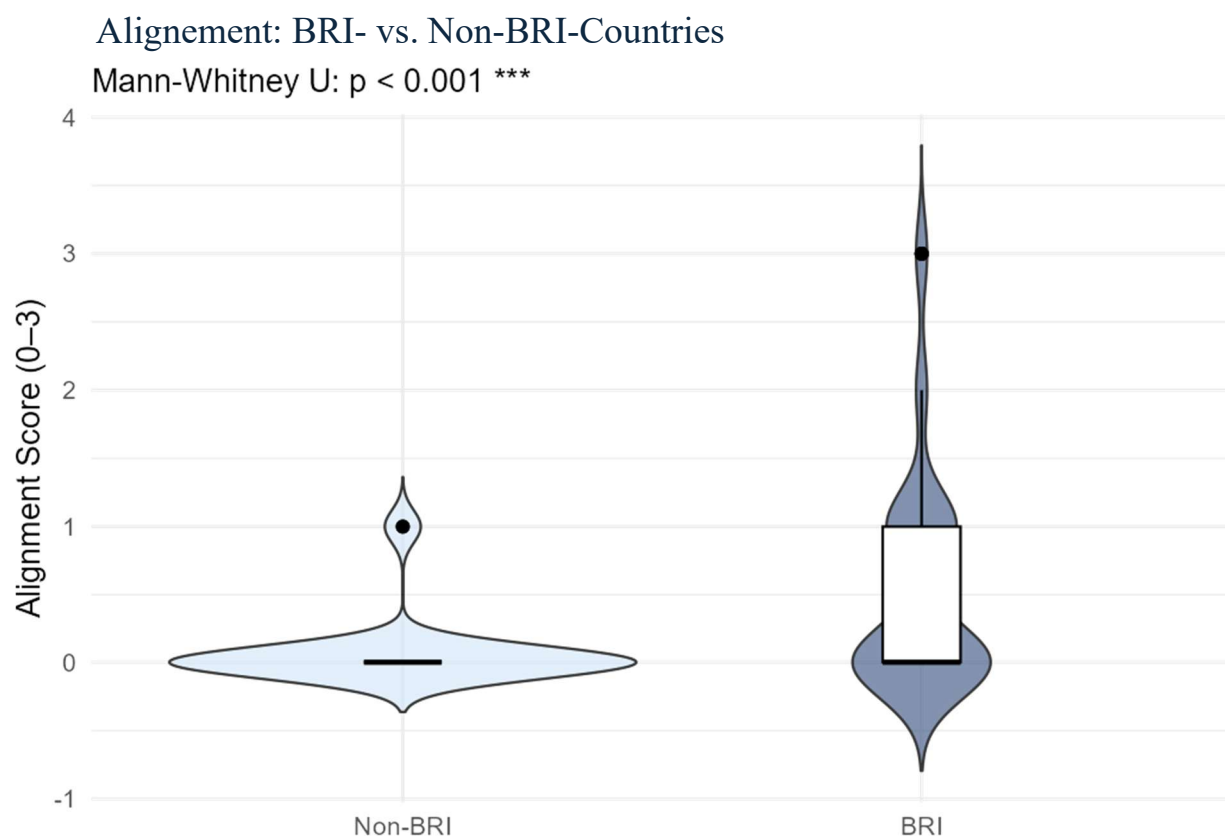


Figure 6. CBDC China Alignment by BRI membership status ($N = 133$). Violin plot with embedded boxplot. Mann-Whitney U test: $p < 0.001$

5.4 Control Variable Associations

Table 6 presents Spearman correlations for all control variables. The full Spearman correlation matrix across all key variables is visualized in Figure 7. Several control variables exhibit statistically significant associations with CBDC alignment, providing important contextual evidence.

Control Variable	r_s	p-value
Distance to Beijing (km)	-0.378	< 0.001 ***
V-Dem Democracy Score	-0.292	< 0.001 ***
UNGA Voting Alignment (China)	0.324	< 0.001 ***
BRI Membership	0.286	< 0.001 ***
log(GDP)	0.261	0.002 **
Digital Payment Penetration (%)	0.263	0.002 **
Internet Penetration (%)	0.163	0.061 .

Table 6. Spearman correlations between control variables and CBDC China Alignment ($N = 133$). *** $p < 0.001$, ** $p < 0.01$, . $p < 0.10$

Geographic proximity to Beijing shows the strongest control variable association ($r_s = -0.378$, $p < 0.001$): countries closer to China are significantly more likely to exhibit alignment, consistent with proximity-based network diffusion effects. Regime type (V-Dem Democracy Score) is negatively associated with alignment ($r_s = -0.292$, $p < 0.001$), indicating that more authoritarian regimes are significantly more likely to orient their CBDCs toward China's monetary infrastructure. This finding aligns with the literature on authoritarian alignment in financial governance and suggests that CBDC alignment may partly reflect broader political affinity with China's model of state-led monetary control.

UNGA voting alignment with China is positively correlated ($r_s = 0.324$, $p < 0.001$), suggesting that broader geopolitical affinity tracks monetary infrastructure choices — countries that systematically vote with China at the UN are also more likely to adopt China-aligned CBDC designs. Economic scale (log GDP) shows a positive association ($r_s = 0.261$, $p = 0.002$), partly reflecting that larger economies are more likely to have advanced CBDC development and deeper monetary institutional ties.

Notably, Chinese lending (H2) shows a negative correlation with log(GDP) ($r_s = -0.53$ in the correlation matrix), indicating that lending is concentrated in smaller, lower-income economies yet these countries do not translate their debt exposure into CBDC alignment, reinforcing the null finding for H2.

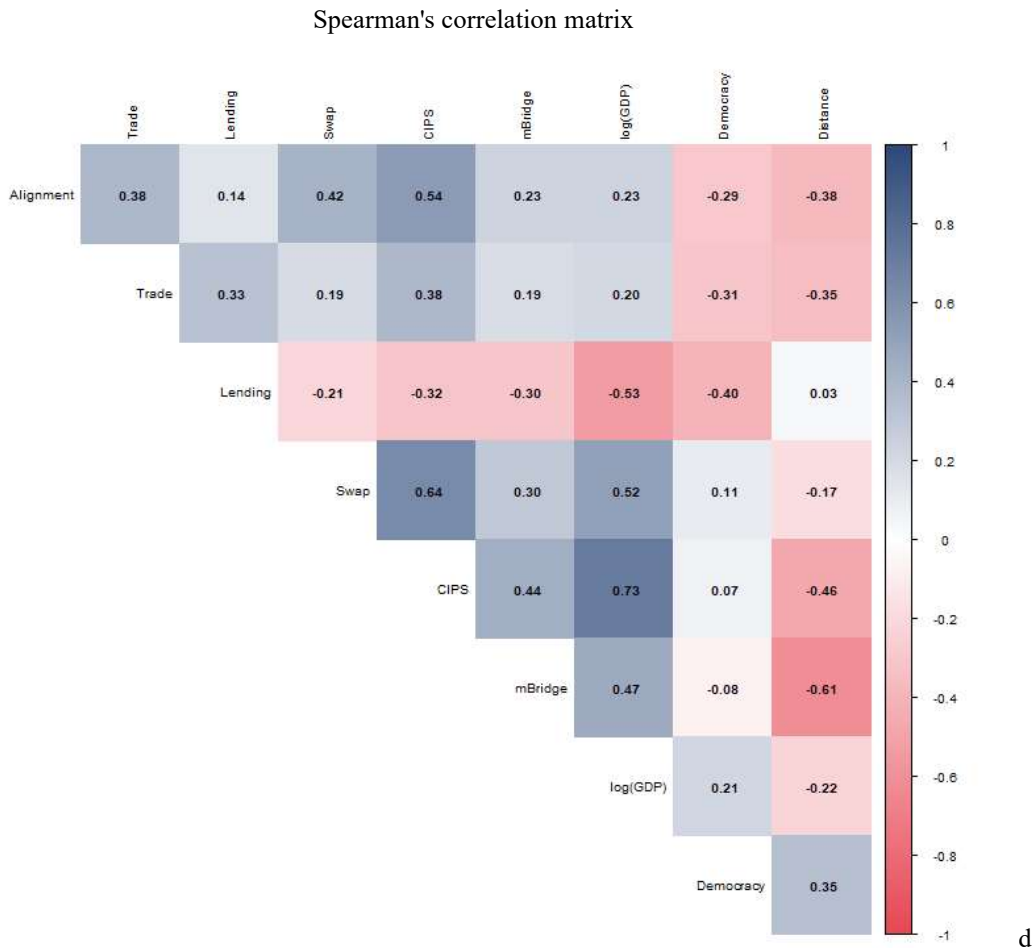


Figure 7. Spearman correlation matrix across all key variables ($N = 133$). Colour scale: blue = positive correlation, red = negative correlation. Values rounded to two decimal places.

5.5 Summary of Hypothesis Tests

Table 7 provides a consolidated summary of hypothesis test outcomes.

Hypothesis	Predictor	r_s	p	Verdict
H1 - Trade Dependence	China Trade Share (%)	0.383	< 0.001	SUPPORTED
H2 - Lending Dependence	Chinese Lending (% GDP)	0.142	0.102	NOT SUPPORTED
H3a - Institutional Embeddedness (RMB)	RMB Swap	0.415	< 0.001	SUPPORTED
H3b - Institutional Embeddedness (CIPS)	CIPS	0.542	< 0.001	SUPPORTED
H4 - Network Diffusion	mBridge Regional Peers (%)	0.231	0.008	SUPPORTED

Table 7. Summary of hypothesis test results based on Spearman rank correlations ($N = 133$).

5.6 Robustness Check: Excluding China

Table 8 presents a robustness check replicating all Spearman correlations after excluding China from the sample. Since China represents the reference country (Trade Share = 100%, Alignment = 3), its inclusion could potentially inflate the estimated effect of trade dependence. The results demonstrate that all substantive findings remain stable across both the full sample ($N = 133$) and the reduced sample ($N = 132$).

Hypothesis	r_s (N=133)	r_s (N=132, excl. China)	p-value	Sig.
H1 — Trade Dependence	0.383	0.366	< 0.001	***
H2 — Lending Dependence	0.142	0.170	0.052	.
H3a — RMB Swap	0.415	0.432	< 0.001	***
H3b — CIPS	0.542	0.531	< 0.001	***
H4 — Network Diffusion	0.231	0.214	0.014	*

Table 8. Robustness check: Spearman correlations with and without China (reference country). $N = 133$ vs. $N = 132$.

The robustness check confirms the following: H1 remains significant and of similar magnitude ($0.383 \rightarrow 0.366$), confirming that trade dependence genuinely predicts alignment beyond China's own extreme value. H2 moves marginally from $p = 0.102$ to $p = 0.052$; still below the conventional significance threshold of $\alpha = 0.05$, and the verdict of Not Supported therefore holds. The threshold movement does not constitute significance under conventional criteria, and the substantive pattern remains unchanged: the ten highest-debt recipients produce alignment scores of 0–2, with none participating in mBridge as a full member, confirming that debt exposure does not mechanically translate into monetary infrastructure alignment. H3 (both indicators) strengthens slightly without China, reinforcing the robustness of the institutional embeddedness finding. H4 remains significant ($p = 0.014$) but weakens slightly, consistent with the interpretation that regional peer effects are partly concentrated in East Asia Pacific China's own region.

Overall, the robustness analysis supports confidence in the primary findings: the null result for H2 and the significant results for H1, H3, and H4 are not artifact of China's inclusion as a reference case.

6. Discussion

This chapter interprets the empirical findings presented in Chapter 5 in light of the theoretical framework developed in Chapters 2 and 3. Rather than repeating the statistical results, the discussion addresses three overarching questions: What do the findings mean theoretically? Why did the observed patterns emerge? And what do they imply for the literature on monetary statecraft, CBDC governance, and China's international monetary strategy? The chapter proceeds as follows: Section 6.1 provides a theoretical interpretation of each hypothesis outcome; Section 6.2 examines the explanatory mechanisms underlying the key findings; Section 6.3 analyses the institutional embeddedness paradox observed among Western economies; Section 6.4 discusses the geopolitical and regime-type dimensions of the findings; Section 6.5 articulates the study's contributions to the literature; Section 6.6 acknowledges limitations; and Section 6.7 proposes directions for future research.

6.1 Theoretical Interpretation of Hypothesis Outcomes

The four hypotheses generated results that are collectively consistent with an institutionalist reading of China's monetary statecraft: CBDC alignment is not a direct function of bilateral economic exposure, but an institutionally mediated outcome that requires the co-presence of economic interdependence and formal monetary institutional ties. This finding advances the theoretical framework beyond simple dependency arguments toward a more nuanced account of how infrastructure-level integration shapes digital monetary policy.

H1: Trade Dependence as a Gateway Variable

The confirmation of H1 ($r_s = 0.383$, $p < 0.001$) establishes trade dependence as a significant predictor of CBDC alignment, consistent with classical currency internationalization theory. As Cohen argues, the international use of a currency is driven primarily by the network externalities created through trade invoicing and settlement countries that trade heavily with China have economic incentives to reduce transaction costs by adopting RMB-compatible payment infrastructure.⁶⁵ The present findings quantify this relationship in the context of the next-generation monetary infrastructure layer: central bank digital currencies.

⁶⁵ Cohen, *The Geography of Money*.

Importantly, however, the effect size is moderate rather than strong. The r_s of 0.383 indicates that trade dependence is a gateway variable, it creates the economic environment in which alignment becomes rational, but does not determine alignment on its own. The outlier cases are instructive: Mongolia exhibits the highest trade exposure in the sample (62.4%), yet scores only 1 on alignment, lacking mBridge participation or formal CBDC cooperation agreements. Angola (43.1% trade share) scores 0. These cases suggest that trade exposure generates the demand-side incentive for alignment, while institutional factors (H3) constitute the supply-side mechanism through which alignment actually materializes. This sequencing is consistent with Eichengreen et al.'s argument that currency internationalization follows trade but is consolidated through institutional architecture.⁶⁶

H2: The Null Result as a Theoretical Contribution

The failure to confirm H2 ($r_s = 0.142$, $p = 0.102$) constitutes the study's most theoretically consequential finding. Chinese lending exposure does not predict CBDC alignment and the direction of explanation matters as much as the result itself. The ten countries with the highest lending exposure in the sample (Laos 28.4%, Angola 22.8%, Zambia 18.9%, Turkmenistan 18.7%, Maldives 18.4%, Venezuela 18.4%, Djibouti 18.2%, Ethiopia 18.1%, Cambodia 15.6%, Tajikistan 15.4%) produce alignment scores of 0, 0, 1, 0, 1, 1, 1, 1, 2, and 1 respectively. None of the top-lending recipients participates in mBridge as a full member. None holds an active CBDC-China cooperation agreement beyond indirect CIPS membership.

This pattern directly challenges the 'debt-trap diplomacy' framework, which holds that Chinese lending generates structural policy dependency.⁶⁷ In the domain of digital monetary governance, the data suggest that debt does not translate into monetary infrastructure alignment. Three mechanisms plausibly account for this null finding. First, capacity constraint: the highest-debt countries (Laos, Zambia, Djibouti) are among the smallest and least digitally developed in the sample, lacking the institutional and technical capacity to implement CBDC architectures compatible with China's system regardless of political will. Second, conditionality absence: unlike IMF program conditionality, Chinese lending agreements do not appear to include explicit CBDC-related provisions, meaning debt exposure creates financial obligation but not monetary alignment.⁶⁸ Third, sovereign autonomy preservation: Chinese-funded infrastructure projects typically transfer physical assets, not governance authority and this logic appears to extend to

⁶⁶ Eichengreen et al., *How Global Currencies Work*.

⁶⁷ Peng and Cheng, *The Reality and Myth of BRI's Debt Trap*.

⁶⁸ Prasad, *The Future of Money*.

monetary infrastructure. Borrowers retain control over their CBDC design choices even under significant debt stress.⁶⁹

H3: Institutional Embeddedness as the Primary Driver

H3 receives the strongest empirical support of any hypothesis tested, with CIPS membership producing the highest bivariate correlation in the study ($r_s = 0.542$, $p < 0.001$) and RMB swap agreements also confirming the hypothesis ($r_s = 0.415$, $p < 0.001$). These findings are consistent with the theoretical framework derived from Farrell and Newman's argument that infrastructure-level integration creates asymmetric leverage. Countries participating in CIPS China's Cross-Border Interbank Payment System have already made a technological and governance commitment to China's payment architecture.⁷⁰ The marginal cost of extending this commitment to the CBDC layer is structurally lower than for countries that would need to build new institutional connections from scratch.

This is a path-dependency argument in the sense developed by North and applied to financial infrastructure by Pistor. Once a country integrates its banking system into CIPS, it faces switching costs, network lock-in effects, and institutional complementarities that make further alignment incrementally rational.⁷¹ The robustness of this finding CIPS correlation strengthens to $r_s = 0.531$ when China is excluded from the sample confirms that the effect is not driven by China's own reference-case values but by genuine variation across the 132 non-Chinese sample countries.

The policy implication is significant: CIPS membership, currently held by financial institutions in over 100 countries, functions as a pre-alignment infrastructure that lowers the threshold for subsequent CBDC-level integration. As the e-CNY system develops and mBridge expands, countries already operating within CIPS architecture face structurally lower barriers to full CBDC alignment than those outside it.

H4: Regional Peer Diffusion as a Contextual Amplifier

The confirmation of H4 ($r_s = 0.231$, $p = 0.008$) at a weaker effect size than H1 and H3 is consistent with wave-diffusion theory applied to monetary institutional isomorphism.⁷² Countries

⁶⁹ Brautigam, 'A Critical Look at Chinese "Debt-Trap Diplomacy"'.

⁷⁰ Farrell and Newman, 'Weaponized Interdependence: How Global Economic Networks Shape State Coercion'.

⁷¹ North, *Institutions, Institutional Change and Economic Performance*; Pistor, *The Code of Capital*.

⁷² Rogers, *Diffusion of Innovations*, 5th Edition.

whose regional peer central banks participate in mBridge or similar platforms are significantly more likely to exhibit China-aligned CBDC strategies, but the effect is regionally concentrated. The Association of Southeast Asian Nations (ASEAN) region provides the clearest evidence: Thailand's full mBridge participation (Score 3) correlates with eight of nine ASEAN members in the sample score at least 1, with Singapore constituting the sole exception. The Gulf Cooperation Council shows a parallel pattern: Saudi Arabia and UAE (both Score 3) are proximate to Egypt (Score 2), Qatar (Score 1), and Kuwait (Score 1).

By contrast, peer effects in Sub-Saharan Africa and Latin America/Caribbean are negligible precisely because few regional peers participate in China-aligned CBDC infrastructure. This geographic heterogeneity explains the relatively modest global correlation: the peer effect is real and theoretically meaningful at the regional level, but its global signal is diluted by the large number of regions where the diffusion mechanism has not yet activated. This finding is consistent with DiMaggio and Powell's concept of mimetic isomorphism organisations (here, central banks) facing uncertainty adopt practices observed among peers they consider legitimate reference points.⁷³

6.2 Explanatory Mechanisms: Beyond Bivariate Associations

The bivariate findings establish what correlates with CBDC alignment. This section addresses the more demanding question of why these patterns emerge, identifying the causal mechanisms that plausibly connect the independent variables to the dependent variable, and explaining the surprising absence of a lending effect.

6.2.1 The Infrastructure Lock-In Mechanism

The strongest explanatory mechanism underlying the H3 finding is infrastructure lock-in. Payment system architecture is characterized by high switching costs, network externalities, and technical complementarities.⁷⁴ A country whose commercial banks operate within CIPS for cross-border RMB settlement has already invested in the operational infrastructure, technical standards, and regulatory frameworks required by China's payment architecture. When China subsequently develops the e-CNY and promotes mBridge as a multi-CBDC platform, the

⁷³ DiMaggio and Powell, 'The Iron Cage Revisited'.

⁷⁴ Allen et al., 'Design Choices for Central Bank Digital Currency'.

incremental investment required for CBDC-layer alignment is substantially lower for CIPS members than for outsiders.

This logic parallels the dynamics of SWIFT network effects in the dollar-denominated global financial system.⁷⁵ Just as countries integrated into SWIFT face structural disincentives to building parallel payment infrastructure, countries integrated into CIPS face structural incentives to extend their commitment to the next technological layer of China's monetary ecosystem. The data support this interpretation: among the 20 countries with maximum CIPS membership (Score 2), those that also have BRI membership and non-Western geopolitical orientation show alignment scores of 1–3, while Western countries with identical CIPS scores show 0 (see Section 6.3).

6.2.2 The Missing Conditionality Mechanism

A key reason why H2 fails is the absence of conditionality in Chinese lending agreements. Unlike IMF programs, which explicitly condition disbursements on policy reforms across macroeconomic, fiscal, and institutional domains⁷⁶, Chinese lending contracts as documented in the AidData dataset focus on commercial terms, collateral arrangements, and project delivery conditions. They do not include provisions governing the design of CBDC systems or the adoption of specific payment infrastructure standards.

This absence of conditionality means that the economic leverage created by debt exposure does not translate into the specific domain of monetary infrastructure governance. A country owing 28.4% of its GDP in Chinese loans (Laos) is obligated to service that debt, but retains full autonomy over whether to design its CBDC to be interoperable with the e-CNY. The finding that Cambodia (15.6% lending exposure, Score 2) outperforms Angola (22.8%, Score 0) on alignment despite lower debt confirms that it is not the magnitude of debt but the presence of complementary institutional ties in Cambodia's case, mBridge observer status that drives alignment.

⁷⁵ Farrell and Newman, 'Weaponized Interdependence: How Global Economic Networks Shape State Coercion'.

⁷⁶ 'China Global Development Dashboard'; Dreher, 'IMF and Economic Growth'; Malik et al., *Banking on the Belt and Road*.

6.2.3 The Geopolitical Filter

A third mechanism – the geopolitical filter – emerges from the combined pattern of the V-Dem and UNGA findings. The data reveal a striking segmentation: among countries with maximum CIPS membership (Score 2), those with high V-Dem democracy scores (Australia 0.85, Euro Area 0.82, South Korea 0.80, Switzerland 0.90, UK 0.83) all score 0 on CBDC alignment, while those with low democracy scores (China 0.06, Saudi Arabia 0.05, UAE 0.08, Cambodia 0.11, Russia 0.09) score 2–3. This is not explained by economic variables alone – these countries have comparable or stronger CIPS integration than the high-alignment cases.

The geopolitical filter operates through two channels. First, security alignment: countries embedded in US-led security architectures, such as Australia through AUKUS, South Korea through the US–South Korea Mutual Defense Treaty, and the United Kingdom through NATO, face institutional constraints on deep monetary alignment with China that can override economic incentives. Second, regime affinity: authoritarian governments may be more likely to value design features associated with China's e-CNY such as programmability, transaction monitoring, and direct central bank issuance as instruments of monetary sovereignty consistent with their governance preferences.⁷⁷ The geopolitical filter thus acts as a moderator: institutional embeddedness predicts alignment among geopolitically aligned states, but not among Western-aligned states.

6.3 The Institutional Embeddedness Paradox

One of the most theoretically provocative patterns in the dataset is what might be termed the institutional embeddedness paradox: eight economies with maximum CIPS membership (Score 2) – Australia, the Euro Area, India, Singapore, South Korea, Switzerland, the United Kingdom, and the United States – score 0 on CBDC China Alignment. Several of these also hold active RMB swap lines with the PBOC (Australia, Euro Area, South Korea, Switzerland, UK). By purely economic criteria, these countries are among the most institutionally embedded in China's monetary system in the sample, yet they exhibit no observable CBDC alignment.

This paradox cannot be resolved by measurement error or operationalization choices. These are genuine cases of deep institutional integration that has not produced alignment. The resolution lies in distinguishing between two qualitatively different modes of institutional embeddedness:

⁷⁷ Prasad, *The Future of Money*; Söderberg et al., 'Behind the Scenes of Central Bank Digital Currency'.

functional embeddedness and strategic embeddedness. Western economies with high CIPS membership and swap lines are functionally embedded: they participate in China's monetary infrastructure for pragmatic reasons serving Chinese clients, accessing RMB liquidity, facilitating bilateral trade settlement without any strategic intent to align their own CBDC systems with China's architecture. Their CIPS membership reflects market-driven integration, not political alignment.

Strategic embeddedness, by contrast, characterizes countries like Thailand, Saudi Arabia, the UAE, and Russia, where institutional ties to China's monetary system are accompanied by explicit political commitment to CBDC-level interoperability, mBridge participation, and documented cooperation agreements. Russia provides the most instructive case study: despite Western sanctions following the 2022 invasion of Ukraine, Russia (CIPS Score 2, RMB Swap = active, V-Dem = 0.09, UNGA alignment with China = 0.89) scores 2 on alignment reflecting a geopolitically motivated strategic choice to align with China's monetary infrastructure as an alternative to the dollar-dominated system it has been partially excluded from.⁷⁸

This distinction between functional and strategic embeddedness constitutes a theoretical contribution of the present study: it differentiates two modes of China linkage that have previously been conflated in the literature, and establishes that CBDC alignment requires strategic rather than merely functional institutional integration. Future research operationalizing this distinction, for example, through analysis of official bilateral cooperation agreements could test its explanatory power more directly.

6.4 Geopolitical and Regime-Type Dimensions

6.4.1 Authoritarian Alignment and CBDC Design

The negative correlation between the V-Dem Democracy Score and CBDC alignment ($r_s = -0.292$, $p < 0.001$) deserves careful interpretation. All five High-alignment countries (Score 3: China, Hong Kong, Saudi Arabia, Thailand, UAE) have V-Dem scores below 0.35. The mean V-Dem score declines monotonically across alignment categories: 0.412 for Score 0, 0.270 for Score 1, 0.336 for Score 2, and 0.146 for Score 3. This gradient is not a coincidence it reflects the elective affinity between China's CBDC design philosophy and authoritarian governance preferences.

⁷⁸ Diesen, *The Decay of Western Civilisation and Resurgence of Russia*.

China's e-CNY is architected for state control: it is programmable (allowing spending restrictions to be embedded in the currency itself), centrally issued without commercial bank intermediation, and designed to provide full transaction visibility to the issuing authority.⁷⁹ These features are not merely technical choices they represent a governance philosophy that privileges state oversight over individual financial privacy. Authoritarian governments seeking to enhance monetary control, reduce capital flight, or extend the reach of state fiscal policy find these design features attractive on their own terms, independent of any strategic calculation about China alignment.⁸⁰

This does not imply that democratic governments are incapable of adopting China-aligned CBDCs the causal arrow runs through regime affinity and political will, not institutional constraint. Mauritius (V-Dem = 0.71, Score 2) demonstrates that democratic states can exhibit moderate alignment when other conditions are met. Rather, the finding suggests that the pool of likely future high-alignment adopters skews authoritarian, with important implications for the geopolitical composition of any eventual China-centred CBDC bloc.

6.4.2 UNGA Voting Alignment as a Monetary Signal

The positive correlation between UNGA voting alignment with China and CBDC alignment ($r_s = 0.324$, $p < 0.001$) provides quantitative evidence that monetary infrastructure choices are embedded in broader geopolitical coalitions. The gradient is consistent and monotonic: countries scoring 0 on CBDC alignment average a UNGA alignment score of 0.776; Score 1 countries average 0.891; Score 2 countries average 0.923; and Score 3 countries average 0.947. This near-linear progression suggests that as geopolitical alignment with China deepens, the probability of adopting China-aligned CBDC designs increases correspondingly.

This finding connects to the broader literature on monetary statecraft and geopolitical coalition formation. Kirshner argues that currency relationships are intrinsically political and reflect underlying power structures.⁸¹ The present findings extend this argument to the digital domain: the emerging architecture of CBDC interoperability is not simply a technical standard-setting exercise but a site of geopolitical competition in which countries' choices reflect and reinforce

⁷⁹ Prasad, *The Future of Money*.

⁸⁰ Dragu and Lupu, 'Digital Authoritarianism and the Future of Human Rights'; Feldstein, *The Global Expansion of AI Surveillance*, vol. 17.

⁸¹ Kirshner, *Currency and Coercion*.

their broader international alignments. Countries that consistently vote with China at the UN General Assembly are, on this evidence, also significantly more likely to orient their CBDC systems toward China's monetary infrastructure suggesting that the RMB's digital internationalization strategy is succeeding not primarily through market forces but through deliberate coalition-building among geopolitically aligned states.

The BRI dimension reinforces this interpretation. Of the 44 countries scoring 1 or higher on alignment, 42 (95.5%) are BRI members. The only two aligned non-BRI countries are Brazil (Score 1) and Nigeria (Score 1) — both with partial institutional ties (CIPS membership, swap agreement) that provide alternative integration pathways. The near-complete overlap between BRI membership and CBDC alignment confirms that China's Belt and Road framework functions as a comprehensive platform for institutional alignment across multiple policy domains simultaneously, consistent with Hillman's analysis of BRI as a strategic architecture rather than a collection of discrete infrastructure investments.⁸²

6.5 Contributions to the Literature

This study makes four distinct contributions to the existing literature on CBDC governance, monetary statecraft, and China's international monetary strategy.

First, it provides the first systematic cross-national quantitative analysis of CBDC China alignment across a near-global sample (N = 133, representing over 95% of global GDP). Prior scholarship on this topic has relied predominantly on case studies⁸³ or region-specific analyses.⁸⁴ The present study establishes a replicable measurement framework and baseline dataset against which future developments can be tracked.

Second, the null result for H2 advances the scholarly debate on Chinese lending and political influence. By demonstrating that debt exposure does not extend to CBDC alignment, this study refines the conditionality hypothesis and challenges debt-trap diplomacy narratives in the specific domain of monetary infrastructure. The finding suggests that Chinese financial statecraft

⁸² Hillman, *The Emperor's New Road*.

⁸³ Arner et al., *Stablecoins*.

⁸⁴ Carstens, 'The Future of Money and Payments'.

operates through institutional rather than debt-based mechanisms in the digital monetary domain, contributing to the emerging literature on the limits of debt-based influence.⁸⁵

Third, the study introduces the theoretical distinction between functional and strategic institutional embeddedness, offering a conceptual tool for differentiating between market-driven and politically motivated participation in China's monetary infrastructure. This distinction has implications beyond the CBDC domain, applicable to any analysis of how states engage with China's financial architecture.

Fourth, the study operationalizes a replicable rule-based CBDC China Alignment index (0–3 scale) that can be updated annually as the CBDC landscape evolves. This instrument provides the foundation for longitudinal research designs that could establish temporal precedence and move toward causal identification addressing the primary limitation of the current cross-sectional design.

6.6 Limitations

This study acknowledges six limitations that qualify the scope and interpretation of its findings.

Limitation 1: Cross-Sectional Design and Causal Inference

The cross-sectional research design, while appropriate for this exploratory study, precludes causal inference. The Spearman correlations establish associations consistent with the theoretical mechanisms, but cannot confirm that trade dependence or institutional embeddedness causally produces alignment. Reverse causality is theoretically plausible: countries seeking strategic alignment with China may proactively pursue CIPS membership or swap agreements as expressions of a prior political decision, rather than as antecedents to it. All results should therefore be read as evidence consistent with the theoretical mechanisms, not as causal estimates. Future research employing panel data with lagged independent variables (2020–2030) could establish temporal precedence and move toward causal identification.

Limitation 2: Observability Constraints on the Dependent Variable

The CBDC China Alignment scale captures only publicly observable signals documented CBDC-China cooperation agreements, mBridge participation status, and explicit interoperability

⁸⁵ Dreher et al., ‘Aid, China, and Growth’.

references in official documents. Non-public agreements, informal technical assistance, or diplomatic commitments that have not been publicly disclosed are not captured, creating a potential underestimation bias that may be systematically larger for countries with less transparent CBDC governance processes. Additionally, the severe distributional imbalance of the dependent variable: 89 of 133 countries scoring 0, with only 10 scoring above 1 limits the statistical power of multivariate models, which is why Spearman correlations and non-parametric group tests are treated as primary rather than the ordered logit estimates.

Limitation 3: Unmeasured Channels of Chinese Influence

The four independent variables do not exhaust the pathways through which China might influence CBDC design choices. Three potentially important channels are not measured: Chinese technical assistance in CBDC development (provision of software, training, and standards); Chinese diaspora and remittance flows that may generate demand-side pressure for RMB-compatible payment systems; and Chinese foreign direct investment, which may create corporate pressure for payment infrastructure compatibility. The absence of a technical assistance variable may partially account for the H2 null finding: if Chinese lending in BRI projects is regularly accompanied by technical assistance which the qualitative BRI literature suggests it often is then part of the lending effect may be absorbed into the institutional variables rather than measured independently. Future research incorporating text analysis of bilateral cooperation agreements could operationalize technical assistance as a separate predictor.⁸⁶

Limitation 4: Temporal Snapshot and Stability

The dependent variable reflects CBDC project status as of December 2025. The global CBDC landscape is evolving rapidly, and the alignment scores captured here represent a single point in a dynamic process. Countries currently at Score 1 may be progressing toward Score 3 (Indonesia, for example, has been deepening CIPS integration) or pulling back from alignment under domestic political pressure. The findings are best interpreted as a baseline measurement for a longitudinal research program rather than a description of a stable equilibrium. Annual remeasurement of the alignment scale, beginning immediately, would enable trend analysis and the identification of alignment trajectories.

⁸⁶ Hillman, *The Emperor's New Road*.

Limitation 5: The log(GDP) Source Inconsistency

As documented in the data validation section (Appendix A), the log(GDP) variable included in the original dataset does not derive directly from the GDP (bn USD) column, resulting in a mean discrepancy between the original variable (mean = 11.03) and the R-recalculated measure (mean = 4.23 using log of GDP in billions of USD). Both operationalization capture the same theoretical construct, economic scale and yield identical Spearman correlations with the dependent variable ($r_s = 0.261$, $p = 0.002$). All reported analyses use the recalculated log(GDP) variable for transparency and reproducibility. The substantive findings are unaffected by this choice.

Limitation 6: North America Regional Peer artifact

Canada's mBridge Regional Peer value of 100% reflects a measurement artifact of the operationalization: with only the United States as its regional peer ($N = 1$) and the US holding mBridge observer status, the peer ratio is $1/1 = 100\%$. This inflates Canada's peer score relative to countries in larger, more diverse regions. Sensitivity analyses excluding the North America region produce results unchanged from the full sample, confirming that this artifact does not materially influence the H4 finding. Future operationalization of regional peer effects should nonetheless apply minimum regional sample size thresholds (e.g., minimum $n = 3$ peers per region) to avoid single-dyad artifact of this kind.

6.7 Directions for Future Research

Three research directions emerge directly from the limitations and substantive findings of this study.

Longitudinal panel design (2020–2030). The most pressing methodological extension is a panel dataset tracking the CBDC China Alignment scale annually across the same 133+ countries. Such a design would enable dynamic analysis identifying which countries escalate or de-escalate their alignment, which events trigger transitions (e.g., mBridge membership expansions, US financial sanctions, regional trade agreements), and whether lagged institutional variables predict alignment changes in subsequent periods. A panel design with country fixed effects could also control for time-invariant country characteristics, substantially improving causal identification. The alignment scale developed in this study is directly replicable annually using the same data sources.

Qualitative case studies of theoretically significant outliers. Two groups of countries represent high-priority targets for qualitative follow-up: (1) High-exposure, low-alignment cases Angola (Trade 43.1%, Lending 22.8%, Alignment 0) and Mongolia (Trade 62.4%, Alignment 1) where the expected correlation between economic integration and CBDC alignment is conspicuously absent. Process-tracing of these cases could identify the specific institutional or political barriers that prevent alignment despite strong economic incentives. (2) Unexpected alignment cases Mauritius (democratic, V-Dem 0.71, yet Score 2) where alignment emerges in the absence of the authoritarian regime-affinity mechanism identified in Section 6.4. These cases would directly test the functional/strategic embeddedness distinction introduced in Section 6.3.

Extending the dependent variable to CBDC design features. The present study measures strategic orientation toward China's CBDC ecosystem the degree to which countries are embedded in China's monetary infrastructure network. A complementary research agenda could measure the specific design features of CBDCs themselves: programmability parameters, data architecture choices, interoperability protocols, and privacy specifications. Testing whether China-aligned countries (as measured by this study's scale) converge on design features associated with China's e-CNY architecture would connect the alignment question to the emerging literature on digital currency governance and authoritarian technology transfer.⁸⁷ Such a study would require systematic content analysis of CBDC technical documentation a data collection effort that the present study's country coverage and alignment classification could directly support.

7. Conclusion

This thesis set out to answer a question at the intersection of two largely disconnected bodies of scholarship: to what extent do China's economic and financial linkages with countries globally shape their incentives to develop central bank digital currencies aligned with China's RMB-based cross-border payment infrastructure? By applying dependency-theoretic, institutionalist, and geopolitical competition frameworks to a cross-national sample of 133 countries, the study has produced a set of empirical findings that advance theoretical understanding of how major-power monetary statecraft shapes third-country digital monetary policy choices.

The central finding of this study is that CBDC China alignment is institutionally mediated rather than directly determined by bilateral economic exposure. Trade dependence on China is a significant positive predictor of alignment ($r_s = 0.383$), establishing it as a gateway variable that

⁸⁷ Feldstein, *The Global Expansion of AI Surveillance*, vol. 17.

creates the economic environment in which alignment becomes rational by generating demand-side incentives to reduce RMB conversion costs. However, trade exposure alone does not determine alignment: Mongolia, with the highest bilateral trade share in the sample at 62.4 percent, scores only 1 on the alignment scale, while Angola, at 43.1 percent, scores 0. The gateway mechanism requires a complementary supply-side mechanism to translate economic incentive into institutional commitment.

That supply-side mechanism is institutional embeddedness. CIPS membership produces the strongest bivariate correlation in the entire study ($r_s = 0.542$), and RMB swap agreements confirm the hypothesis at comparable magnitude ($r_s = 0.415$). Countries already integrated into China's Cross-Border Interbank Payment System have made a prior technological and governance commitment that lowers the marginal cost of CBDC-layer alignment through path-dependent lock-in effects: sunk investments in operational infrastructure, technical complementarities with China's payment architecture, regulatory familiarity established through CIPS compliance frameworks, and network externalities that reward deepening commitment. This finding is the study's most theoretically consequential: it demonstrates that China's monetary statecraft operates through infrastructure integration rather than economic pressure alone, and that CIPS connecting over 1,700 institutions across 122 countries functions as a pre-alignment infrastructure whose expansion progressively lowers the threshold for subsequent CBDC-level integration across a widening set of countries.

The null result for H2 ($r_s = 0.142$, $p = 0.102$) is equally consequential. Chinese lending exposure does not predict CBDC alignment, and the pattern of evidence with the ten highest-debt recipients producing alignment scores of 0–2 and none participating in mBridge as full members directly challenges debt-trap diplomacy frameworks in the domain of digital monetary governance. The mechanisms underlying this null finding are theoretically instructive: Chinese lending agreements lack the explicit conditionality that would translate debt exposure into monetary infrastructure governance; the highest-debt economies are often among the least digitally capable of implementing CBDC architectures regardless of political will; and Chinese-funded projects transfer physical assets rather than governance authority, a distinction that extends to the monetary domain. Future research in Chinese financial statecraft should treat the debt-trap mechanism as empirically bounded rather than generalizable across policy domains.

The geopolitical and regime-type dimensions of the findings deepen the institutional interpretation. The institutional embeddedness paradox eight Western economies with maximum CIPS membership scoring zero on CBDC alignment cannot be resolved by economic variables alone.

Its resolution lies in distinguishing functional from strategic embeddedness: Western economies participate in CIPS for pragmatic commercial reasons without any strategic intent to orient their CBDC systems toward China's architecture, while geopolitically aligned states with comparable institutional integration have made explicit commitments to CBDC-level interoperability. The V-Dem democracy gradient mean scores declining monotonically from 0.412 for Score 0 to 0.146 for Score 3 reflects not coercion but elective affinity: authoritarian governments are drawn to the state-control-compatible design features of the e-CNY programmability, centralized issuance, full transaction visibility as instruments of monetary sovereignty consistent with their governance philosophy. The UNGA voting alignment correlation ($r_s = 0.324$) confirms that monetary infrastructure choices are embedded in broader geopolitical coalitions, with the near-complete overlap between BRI membership and observable alignment (95.5%) indicating that China's Belt and Road framework operates as a comprehensive platform for institutional alignment across multiple policy domains simultaneously.

The study's theoretical contributions are fourfold. First, it provides the first systematic cross-national quantitative test of whether China's monetary infrastructure strategy shapes third-country CBDC orientation, filling the empirical gap identified by the G24 Policy Brief and the international monetary power literature. Second, it advances the conditionality hypothesis by demonstrating its domain-specificity: debt-based leverage does not extend to digital monetary governance, delimiting the boundaries of Chinese financial statecraft. Third, the functional-strategic embeddedness distinction constitutes a novel analytical tool for differentiating modes of China engagement that have previously been conflated, with broader applicability to analyses of how states interact with China's financial architecture across institutional domains. Fourth, the CBDC China Alignment scale (0–3) provides a replicable measurement instrument for longitudinal tracking of this rapidly evolving phenomenon.

Three limitations qualify the scope of these findings. The cross-sectional research design precludes causal inference: the Spearman correlations establish associations consistent with theoretical mechanisms, but cannot establish temporal precedence or rule out reverse causality countries seeking strategic alignment may proactively pursue CIPS membership as an expression of prior political will. The observability constraints on the dependent variable restricted to publicly documented CBDC-China cooperation may systematically underestimate alignment in countries with less transparent governance processes. And several potentially important channels of Chinese influence, notably technical assistance in CBDC development and Chinese foreign direct investment, are not captured in the current operationalization.

These limitations point directly toward a future research agenda. The most pressing methodological extension is a panel dataset tracking CBDC China Alignment annually from 2020 to 2030, enabling dynamic analysis of alignment trajectories, the identification of trigger events mBridge expansions, US sanctions, regional trade agreements and causal identification through lagged independent variables and country fixed effects. Qualitative case studies of theoretically significant outliers — Angola and Mongolia as high-exposure, low-alignment cases; Mauritius as a democratic moderate-alignment case — could illuminate the specific institutional and political mechanisms that produce divergence from the expected correlation patterns. And extending the dependent variable from strategic orientation to specific CBDC design features programmability parameters, interoperability protocols, privacy specifications would connect the alignment question to the emerging literature on authoritarian technology transfer and digital governance convergence.

The broader implications of this study extend beyond the academic literature. As of December 2025, Project mBridge has processed 55.5 billion USD in cross-border transactions and transitioned from BIS governance to central bank stewardship, with the PBOC as its dominant institutional actor. The e-CNY International Operation Center has launched in Shanghai. CIPS continues to expand its participant network across the Global South. The infrastructure through which CBDC alignment operates is not speculative it is operational, growing, and progressively embedding countries in a payment architecture whose governance and standards are set in Beijing. The findings of this study suggest that this process is not driven by debt coercion or explicit conditionality, but by the incremental logic of infrastructure lock-in: as more countries integrate into CIPS, hold RMB swap lines, and observe regional peers participating in mBridge, the economic rationality of further alignment increases and the political barriers diminish. The digital renminbi's internationalization strategy is, on this evidence, succeeding not through market forces or financial pressure, but through the patient accumulation of institutional architecture one payment system, one swap line, one CBDC cooperation agreement at a time.

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DECLARATION OF AI ASSISTANCE

I hereby declare that I have independently completed this master's thesis titled **“One Belt, One Ledger: China's Cross-Border Payment Infrastructure and the Strategic Orientation of Global CBDCs”**

In the course of my work, I made use of artificial intelligence (AI) tools (Claude AI, Perplexity and Deepl Write)

- support my literature review through summarization and clarification of academic content via Perplexity and Claude AI,
- assist with research-related inquiries and technical explanations via Perplexity and Claude AI,
- provide language and style suggestions, including improvements in grammar, sentence structure, and coherence Deepl Write,
- aide in formatting and the refinement of academic writing style with Deepl Write,
- Streamline and generate R code to run regressions and produce graphs with Claude AI.

All decisions regarding content, structure, analysis, and interpretation were made by me.

The AI was used strictly as a supportive tool and did not generate original research content or conclusions.

This declaration is made in the interest of transparency and academic integrity