INTERNATIONAL MONETARY FUND

Global Cross-Border Payments: A $1 Quadrillion Evolving Market?

Eugenio Cerutti, Melih Firat, and Martina Hengge

WP/25/120

2025
JUN

WORKING PAPER

 WP/25/120

IMF Working Paper
Strategy, Policy, and Review Department

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Prepared by Eugenio Cerutti, Melih Firat, and Martina Hengge*

Authorized for distribution by Kenneth Kang
June 2025

ABSTRACT: Cross-border payments are essential to the global financial system, facilitating trade and investment. The global cross-border traditional and crypto payment market approached a value of about one quadrillion dollars in 2024, with crypto payments representing only a small fraction despite their recent surge. Focusing on data from Swift—the largest traditional cross-border financial messaging network—we study the characteristics and evolving patterns of these payments over 2021-24. Notably, payments are predominantly concentrated in advanced economies, and are driven by financial institutions and large transactions. While currency usage remains stable—with the U.S. dollar maintaining the largest share—the Chinese renminbi demonstrates signs of increasing global integration, albeit from a low base. Gravity model estimates confirm that traditional economic linkages, via trade, portfolio investment, and FDI, shape cross-border payments. However, aggregate dynamics mask substantial heterogeneity across message types (customer vs. financial related payments), currencies, and transaction sizes, with information asymmetries playing a diminished role in larger payments.

JEL Classification Numbers:	F30; F36; G15; E42
Keywords:	Cross-Border Payments; Trade; FDI; Portfolio Investment; Networks

Author’s E-Mail Addresses:	ECerutti@imf.org; MFirat@imf.org; MHengge@imf.org

* We are grateful to Wafa Abdelati, Njde Arakellian, Ivailo Arsov, Sofie Van Bragt, Sonia Davidovic, Phakawa Jeasakul, Ken Kang, Jeff Kearns, Kieran Murphy, and Astrid Thorsen for useful comments, and to Wanning Shu for outstanding research assistance.

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1 Introduction

Capital flows across economies have increased in complexity. Policy makers and academics have started progressively to pay more attention to granular capital flow data—moving from "net" to "gross" coverage of FDI, banking, and portfolio flows—over the years to better capture underlying trends and their associated policy implications (Obstfeld 2021). At the same time, fintech-related innovation as well as Bitcoin and other crypto assets are transforming the financial payment landscape faster than ever (Economist Impact 2025). In this context, understanding global cross-border payments—the underlying transactions behind capital flows as well as international trade of goods and services—provides insights not only into the evolution of capital flows, but also into the broader international financial architecture of the International Monetary System (IMS). Despite their significance, empirical research on the characteristics of the global cross-border payments remains limited.

In this paper, we leverage data from the Society for Worldwide Interbank Financial Telecommunication (Swift)—the largest cross-border financial messaging network globally—during 2021-24 to examine the characteristics and evolving patterns of cross-border payments. We begin by presenting key stylized facts on global cross-border payment, the role of intermediaries, and network structures. We then estimate a gravity model to analyze how economic ties and gravity factors shape global cross-border payments. Additionally, we assess the evolving nature of cross-border payments in the context of rising uncertainty and risks. Throughout our analysis, we explore heterogeneity in payment patterns by currency and transaction size, and distinguish between two different message types— financial institution-related payments (message type 202 and ISO 20022 equivalents) and non-financial customer initiated payments (message type 103 and ISO 20022 equivalents). This assessment is based on a careful aggregation of cross-border payment values from originators to beneficiaries, ensuring that transactions routed through international intermediaries are not double-counted.[1]

Combining Swift-recorded values with alternative messaging systems and crypto-related payments—in an attempt to provide comprehensive coverage—suggests that the global market for cross-border payments approached one quadrillion dollars in 2024. While a number of parallel financial messaging systems have emerged in recent years, available evidence suggests that

[1] Imagine a stylized example of a US$500 payment from originator economy i to beneficiary economy j via intermediary economy k. This would involve a first payment of US$500 from i to k and a second payment of US$500 from k to j. Our approach would record a single value of US$500 between economies i and j, without recording any separate payment to/from the intermediary, thus avoiding double counting. Importantly, we do not observe transaction-level data but instead data which are aggregated by originator economy, beneficiary economy, intermediary economies, month, currency, and transaction size.

these traditional systems are much smaller than Swift.[2] Similarly, estimated cross-border transaction values using major crypto assets—such as USDT, Bitcoin, USDC, and Ethereum—remain relatively small at around US$2.5 trillion in 2024, despite their recent surge in relative terms. [3] Our estimated global cross-border payment value is substantially larger than others in the literature. For example, FXC Intelligence—a leading provider of cross-border payment data and intelligence—estimates that the total addressable market for global cross-border payments is about US$194.6 trillion in 2024 FXC Intelligence (2025*a*). This large difference reflects the challenges of accurately estimating the size of wholesale payments—a limitation highlighted by FXC Intelligence (2025*a*) as well as Cerutti, Firat & Perez-Saiz (2025). Interestingly, FXC Intelligence estimates are in an order of magnitude similar to customer-initiated payments. Hence, they would not include financial institution-related payments, which cover financial institutions liquidity management, settlement of FX, or securities flows, among other wholesale payments.

Our findings highlight several key stylized facts about global cross-border payments. First, Swift cross-border payments have remained very stable between 2021 and 2024 and represent the bulk of our estimated global cross-border payment value. Financial institution-related payments account for about four-fifths of the total Swift payment value, significantly exceeding customer payments. Cross-border payments in both message groups are highly concentrated in advanced economies (AEs). Second, currency usage patterns remains rather stable, with the U.S. dollar (USD) maintaining the largest share, while the Chinese renminbi (CNY) shows signs of increasing global integration, amid from a very low base. Third, while the *number of payments* is dominated by small transactions, cross-border payment *values* are dominated by large transactions (US$50 million and above), which comprise approximately 83 percent of financial institution payments and 61 percent of customer payments. Finally, large AEs and financial centers play a central role in global cross-border payment networks, though we observe substantial heterogeneity in the centrality of economies across networks denominated in different currencies.

A gravity model estimation confirms that traditional economic linkages—via trade and capital flows—and gravity factors, including geographical distance, shared language, and colonial

[2] Cipriani et al. (2023) highlight the importance of Swift and also provide a description of alternative traditional financial messaging systems, including the Chinese Cross-Border Interbank Payment System (CIPS), which was launched in 2015 and processed transactions for a total value of around US$12.7 trillion in 2021. FXC Intelligence (2025*b*) provides a list of the 100 most important players in the cross-border payments space, including from long-established remittances players and banks to neobanks, B2B platforms, stablecoin providers and regional specialists. While we do not have cross-border payment data for most of the alternative systems, the available data for the largest ones is substantial–about US$1 quadrillion or US$1,000,000,000,000,000.

[3] The value derived for crypto asset and stablecoin cross-border payments are from Cerutti, Firat & Hengge (2025), based on Chainalysis data.

ties, shape cross-border payments. Our results reveal significant heterogeneity across the two message types (customer vs. financial institution payments), currencies, and transaction sizes. While trade-related proxies are more prominent in customer payments, financial integration measures—such as foreign direct investment (FDI) and portfolio investment—are more closely associated with financial institution payments. Moreover, transaction size plays a critical role. Large-value payments are closely tied to economic fundamentals, whereas gravity factors play a more important role for small-value payments.

Finally, our findings indicate that cross-border payment networks have evolved during 2021-24, by exhibiting greater connectivity and reduced concentration on average. However, rising geopolitical fragmentation may be associated with a decline in cross-border payment values, particularly for large-value financial institution transactions. These dynamics, however, vary across currencies and regions, with USD-denominated and CNY-denominated payments displaying distinct patterns. Additionally, risk considerations appear to influence cross-border payment activity asymmetrically, as heightened uncertainty is associated with an increase in USD-denominated payments in certain corridors.

Overall, our contributions to the broader literature on cross-border flows are threefold. First, we extend and complement existing research by providing new empirical insights from Swift data on the magnitude and structural characteristics of global cross-border payments. Prior studies have primarily focused on currency usage and denomination shares. Perez-Saiz et al. (2023) use Swift data to empirically estimate the importance of legal tender status and geopolitical distance vis-à-vis the large inertia effects for currency usage. Perez-Saiz & Zhang (2023) examine the CNY as an international payment currency using Swift data and find significant regional variations in the use of CNY for cross-border payments. They argue that usage differences can be partly explained by an economy's geographic distance, political distance, and trade linkages with the Chinese mainland. Also focusing on currency denomination shares, Koosakul et al. (2024) study how geopolitical proximity, along with other economic factors, affect the usage of currencies in cross-border transactions. Cook & Soramaki (2014) focus on customer payments and provide a brief summary of the network structure of Swift payments. Our contribution is to directly target the value of payments as well as highlighting the important heterogeneity in payment patterns by currency, transaction size, and message type.

Second, our approach of using cross-border payment data complements the trend towards more granular data in the capital flows literature and facilitates the comparison with the available cross-border flow data for crypto assets and stablecoins. Non-resident capital inflows (usually denominated "gross" capital inflows) started to be separately analyzed from resident capital outflows (denominated "gross" capital outflows) after the Global Financial Crisis (GFC), since they do not necessarily offset each other, and netting them could hide important gross inflow related vulnerabilities (Obstfeld 2021).[4] More recent studies have used more granular data, disaggregating capital flows further by type (Cerutti & Hong 2021, Avdjiev et al. 2022). Our use of Swift cross-border payment data allows to study the important existing heterogeneity in cross-border payment patterns by currency and transaction size. Moreover, the use of cross-border payment data provides the right metric to compare "traditional flows" with crypto asset cross-border flows, which are not netted out (see Cerutti et al. (2024) for the challenges of measuring crypto asset cross-border flow). In this context, the surge in crypto and stablecoin cross-border payments is noticeable, but from a very low base, and thus still accounting for only a very small fraction of the global cross-border payments.

Third, our analysis provides valuable insights into the evolving nature of the cross-border payment network amid an increasingly complex international financial landscape. We complement papers that highlighted the evolving nature of the global banking network after the GFC (Minoiu & Reyes 2013, Cerutti & Zhou 2017, 2018) and more recently due to the effects of geopolitical trends (Casanova et al. 2024, Pradhan et al. 2025). The impact of financial sanctions has also triggered the evolution of the cross-border payment network as highlighted by Cipriani et al. (2023). Gopinath et al. (2024) find that since the onset of war in Ukraine, trade, FDI, and portfolio flows between geopolitically distant blocs have declined, while intra-bloc flows have increased. Additionally, Catalan et al. (2024) provide robust empirical evidence that bilateral geopolitical distance between economies significantly impacts the cross-border portfolio equity and bond allocation of investment funds. Building on existing research, our study advances the literature by demonstrating that traditional economic linkages—such as trade and capital flows—along with gravity factors and rising geopolitical fragmentation, shape cross-border payments across currencies and transaction sizes, offering valuable insights for policymakers.

The paper is structured as follows. Section 2 describes the Swift data and other datasets used in the analyses. Section 3 presents key stylized facts on cross-border payment networks. Section 4 reports the results from the gravity model estimation. Section 5 examines the evolution of cross-border payment networks, and section 6 concludes.

[4] Following Balance of Payments statistics, gross capital inflows and outflows are netting out non-resident and resident transactions, respectively.

2 Data

Our analysis relies on data on bilateral cross-border payments from Swift over January 2021–December 2024. Swift was founded in 1973 to provide secure financial messaging services for cross-border payments. Today, Swift is used by over 11,500 institutions in more than 200 economies around the world. Swift represents the primary communication channel for financial institutions, market infrastructures, corporates, and central banks to transmit messages related to international financial payments, securities, foreign exchange transactions, treasury operations, and trade finance (Swift 2022, 2025).

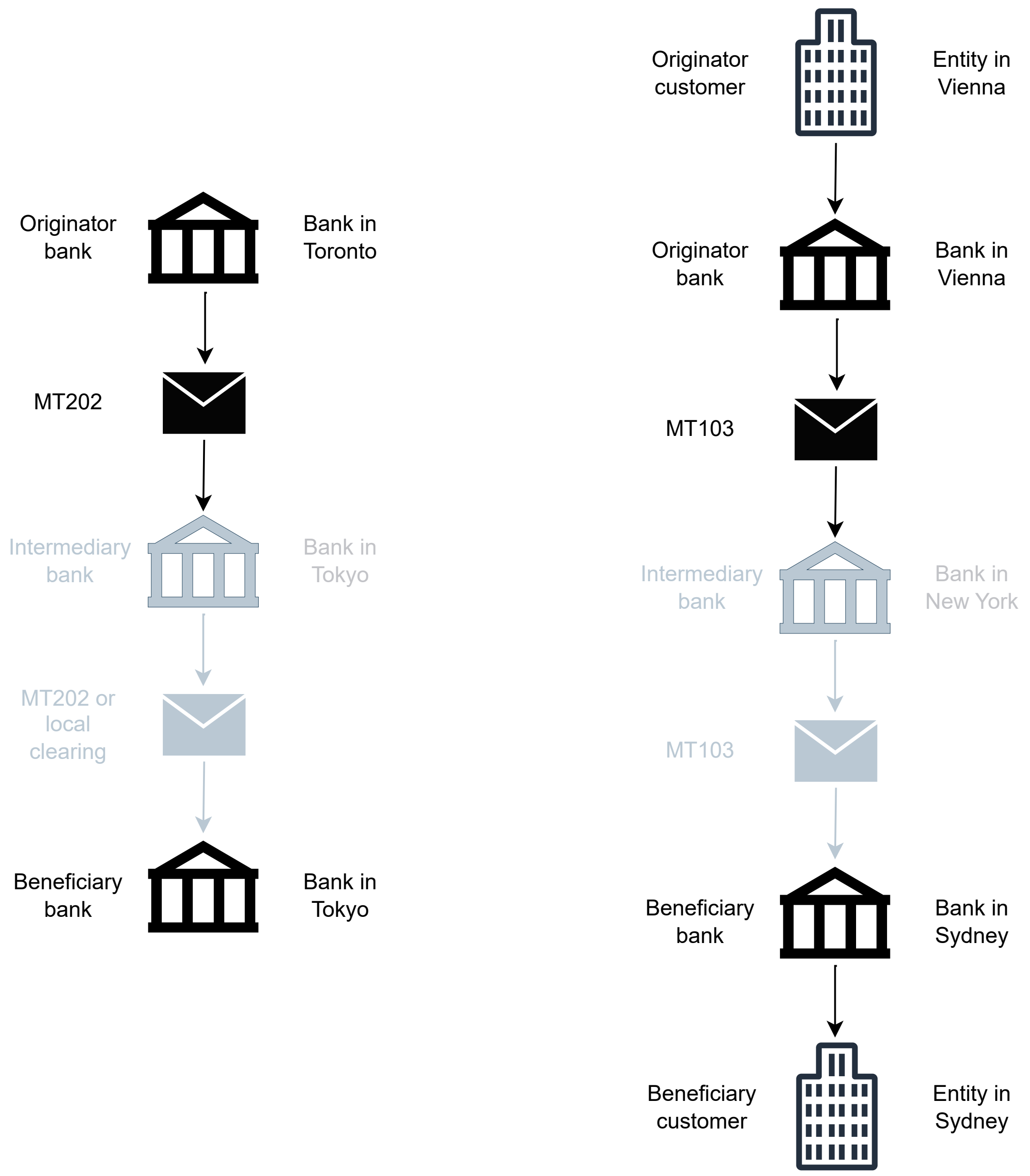
Messages transmitted via the Swift network must adhere to standardized codes to ensure that practices and conventions align effectively across users. Message types (MT) are grouped into nine main categories (Swift 2025).[5] This study concentrates on two main types of Swift messages (and with their ISO 20022 equivalents) that cover cross-border payments: MT 202 (and pacs.009) which captures payments between and on behalf of financial institutions and MT 103 (and pacs.008) which captures customer-related payments.[6] Figure 1 illustrates how these message types facilitate cross-border payments for financial institutions and customers. We focus on international (cross-border) payments for the purpose of our analysis.

Unlike Balance of Payments statistics, where flows are netted out at either the resident and non-resident level, Swift data capture bilateral gross payment flows. There is no netting of flows and all cross-border payments are reflected. The dataset, to which we have access under the Swift Watch solution, aggregates individual transactions at the originator economy–beneficiary economy–intermediary economies–month–currency–transaction size level with complete anonymity of individual service users. Each observation contains the originator and beneficiary economy, sending and receiving economy, amount in US$, size of the transaction (e.g., US$0-500, US$500-2500, ... US$50M-above), currency of the transaction(s), number of transactions, month, and Swift message type (and their ISO 20022 equivalents). This breakdown allows us to provide novel insights into heterogeneity by message type, currency and transaction size. In addition, each observation indicates the role of the sending and receiving economies, i.e., whether they are the originator, intermediary, or beneficiary. Hence, each observation rep-

[5]The nine categories are customer payments and cheques (MT 1XX and pacs.008), financial institution transfers (MT 2XX and pacs.009), treasury markets - foreign exchange, money markets and derivatives (MT 3XX), collections and cash letters (MT 4XX), securities market (MT 5XX), treasury markets - commodities and syndications (MT 6XX), documentary credits and guarantees (MT 7XX), travellers cheques (MT 8XX), cash management and customer status (MT 9XX).

[6]MT 202.COV and pacs.009COV messages are used to order the movement of funds related to an underlying *customer* credit transfer (MT 103 and pacs.008) that was sent with the cover method. We exclude these messages from our analysis to avoid double-counting between MT 202 and MT 103 messages. See Appendix A.1 for details.

Figure 1: Payment values within and across AEs and EMDEs



(a) Financial institutions

(b) Customers

Notes: This figure illustrates examples of messages sent for financial institutions payments (MT 202) and for customer payments (MT 103).

resents one leg of the transaction(s). To illustrate this, imagine a transaction from originator economy i to beneficiary economy j which is intermediated by a financial institution in economy k. This transaction would be represented by two observations. First, an observation reflecting the message from originator economy i to the intermediary k. Second, an observation reflecting the message from intermediary k to beneficiary economy j. For a transaction with two intermediaries, we would observe another observation capturing the leg from the the first intermediary to the second intermediary. Our paper primarily focuses on capturing the flow from originator economy i to beneficiary economy j as recorded in the first observation in this example, which contains comprehensive information on the originator economy, beneficiary economy, and first intermediary (and is aggregated as described above). Appendix A.1 provides further details on the used Swift data, the data cleaning process, and the systematic approach we use to address potential double-counting issues.

To estimate gravity models of cross-border payments, we use a set of standard, annual gravity factors provided by CEPII (see Conte et al. 2022), including geographic distance, common official language, and historical colonial ties. In addition, we incorporate annual bilateral controls for imports, portfolio investment including both equity and debt, and FDI. Data on imports are sourced from the IMF's Direction of Trade Statistics (DOTS). Data on portfolio holdings are collected from the IMF's Coordinated Portfolio Investment Survey (CPIS) while data on FDI positions are obtained from the IMF's Coordinated Direct Investment Survey (CDIS). After merging these datasets, our gravity model estimation sample includes cross-border payments from up to 63 originator economies to as many as 187 beneficiary economies, covering up to 6,496 bilateral corridors.

Finally, to analyze the potential impact of fragmentation and geopolitical risks, we use fragmentation indexes from Fernández-Villaverde et al. (2024) and geopolitical risks from Caldara & Iacoviello (2022). To classify economies into different blocs based on their geopolitical alignment with the U.S. and the Chinese mainland, we rely on voting patterns at the United Nations General Assembly (UNGA). Specifically, we use ideal point distance estimates from Bailey et al. (2017). After merging Swift data with UNGA voting data, our dataset covers up to 24,029 corridors.

Table B.3 provides summary statistics of the variables used in our analysis and their sources.

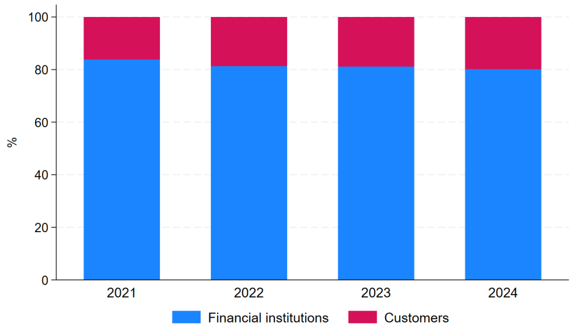
3 Stylized facts

Swift data offer a unique perspective on global bilateral cross-border payment activity, providing detailed insights into currency usage and transaction sizes. In this section, we analyze these data to uncover key patterns and dynamics in cross-border payments.

3.1 Cross-border payment shares

In 2024, financial institution payments accounted for 80 percent of total Swift customer and financial-institution related payments, in line with previous years (Figure 2).[7]

Figure 2: Payment value shares across message types



Notes: Blue and red bars represent the percentage share of financial institution (MT 202) and customer (MT 103) payments in total payments. Monthly payment values under both payment categories are aggregated annually.

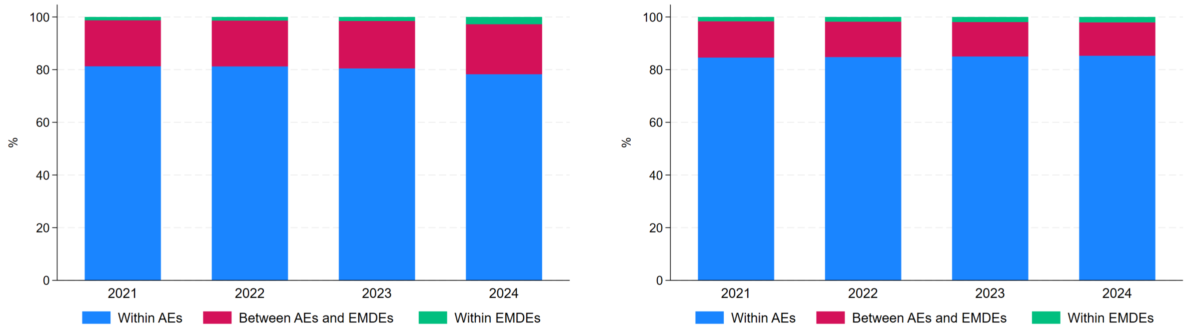
Figure 3 summarizes cross-border payments by income groups. Transactions within AEs dominate, accounting for 80.3 percent of financial institution payments on average over 2021-24. Payments between AEs and EMDEs comprised 18 percent, while within-EMDE transactions accounted for the remaining 1.7 percent (Figure 3a). A similar pattern is observed for customer payments, though with a slightly higher share of within-AE flows (Figure 3b).

A regional breakdown highlights that Europe has the largest share of within-region payments for both customer and financial institution transactions (Figure 4a). Payments within Asia and the Americas are also sizable. While Europe accounts for the largest share of within-region transactions, transactions between Europe and other regions—particularly Asia and the Americas—constitute the bulk of cross-regional payments (Figure 4b). These regional breakdowns provide a high-level view of global cross-border payment networks, a topic we explore in more detail below.

While the literature has established that cross-border payments are dominated by USD and EUR transactions (Perez-Saiz et al. 2023), interlinkages between currency, message types, and

[7] While Swift cross-border payments have remained stable in recent years, crypto and stablecoin cross-border payments have been more volatile, recording an average annual increase of 13 percent between 2021 and 2024, and 218 percent since 2019 (see Figure C.1).

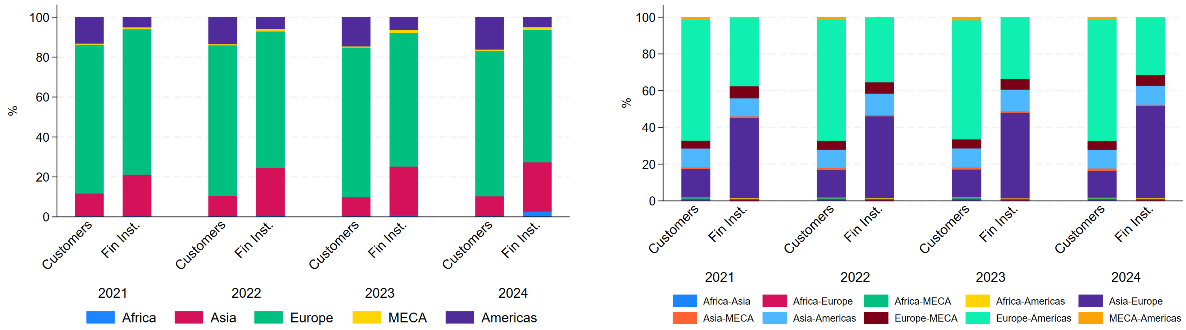
Figure 3: Payment value shares within and across AEs and EMDEs



(a) Financial institutions (b) Customers

Notes: Blue and green bars represent the percentage share of payment values within AEs and EMDEs, respectively. Red bars show the percentage share of payment values between AEs and EMDEs. See table B.1 for the list of economies across income and regional groups.

Figure 4: Payment value shares within and across regions



(a) Within regions (b) Across regions

Notes: Panel (a) represents the percentage share of payment values by message type between economies within the same geographical regions. Panel (b) shows the percentage share of payment values by message type between economies belonging to different regions. See table B.2 for the list of economies across regions.

transaction size have not been studied. Table 1 presents currency shares and changes over time for financial institution and customer cross-border payments with a focus on the five currencies in the IMF's special drawings right (SDR) basket. The USD dominates cross-border transactions, accounting for 53.4 percent of financial institution flows and 55.1 percent of customer flows in 2024. The EUR is the second most widely used currency in Swift cross-border transactions; together, USD and EUR transactions represent over 70 percent of financial institution payments and more than 80 percent of customer payments. The JPY has a higher share in financial institutions payments (5.9 percent) compared to customer payments (1.7 percent), while the GBP maintains a similar share of around 4.5 percent across both categories. Although the CNY has a relatively small share, it experienced the second largest increase, of about 1.5 percentage points, in financial institution payments between 2021 and 2024. In contrast, EUR-denominated financial institution payments declined by 6.6 percentage points over the same period.

Table 1: Currency shares in 2024 and changes between 2021 and 2024

	Financial institutions		**Customers**	
Currency	Share in 2024 (%)	Change between 2021 and 2024 (pp)	Share in 2024 (%)	Change between 2021 and 2024 (pp)
USD	53.4	2.5	55.1	-0.0
EUR	18.0	-6.6	26.2	0.8
JPY	5.9	0.7	1.7	-0.3
GBP	4.3	0.2	4.8	-0.1
CNY	3.7	1.5	1.4	0.2

Notes: This table shows each currency's share in the total financial institutions and customer cross-border payment volume in 2024 as well as the change in the share between 2021 and 2024.

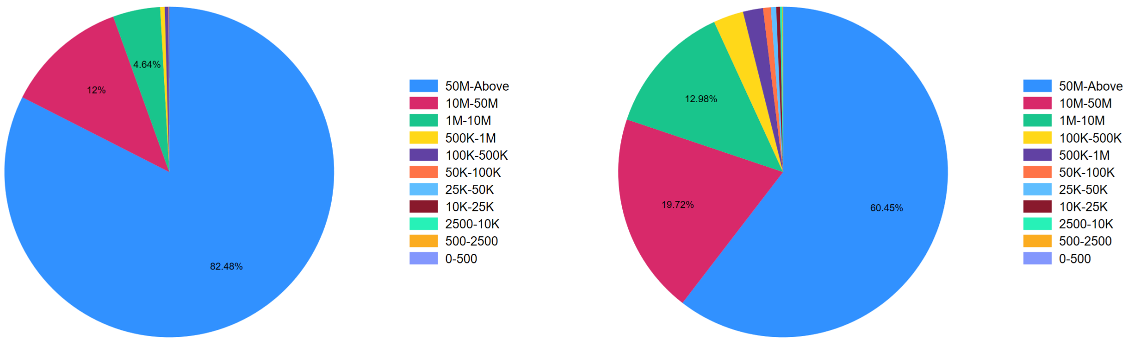
Reflecting the USD's outsized role in financial transactions, a large share of the USD-denominated payments occurs between third-economy originators and beneficiaries—meaning the U.S. is neither the originator nor the beneficiary of the payment (Figure C.2). However, this pattern does not hold for customer payments, where a large share of the USD payments involves the U.S. as either the originator or the beneficiary. We observe a similar trend for JPY and GBP payments. EUR usage, by contrast, remains relatively limited in transactions between third-economy originators and beneficiaries across both message types. The opposite is true for the CNY, which is more frequently used in payments that do not involve the Chinese mainland as either the originator or beneficiary both for financial institutions and customer payments.[8] Furthermore, the rise in the CNY's global share, as shown earlier, is predominantly driven by payments occurring within corridors that exclude the Chinese mainland. This trend highlights the increasing international integration of the CNY in cross-border transactions.

A detailed breakdown of cross-border payments into eleven transaction sizes reveals that the

[8]Most payments in CNY are made via the Hong Kong SAR clearing center, which could contribute to this pattern.

highest value payments (above US$50 million) account for the largest share of the total payment value both for financial institution payments (82.5 percent) and customer payments (60.5 percent) (Figure 5). Payments in the US$10-50 million and US$1-10 million ranges follow in both categories. Collectively, these three transaction sizes (above US$1 million) comprise 99 and 93 percent of the financial institution and customer cross-border payment value, respectively. This finding indicates that cross-border payment values are dominated by large transactions. In contrast, small payments account for a large share of the number of payments. Payments in the range up to US$10K account for 62.6 percent of the total number of transactions for customer payments and for 35.3 percent of financial institution payments. For financial institutions, mid-sized payments also play an important role with payments between US$500K-10M accounting for 36.4 percent of the number of total payments. As we analyze below, the drivers and dynamics of smaller and larger payments exhibit substantial differences value for both customer and financial institution related payments.

Figure 5: Payment value shares across transaction sizes in 2024

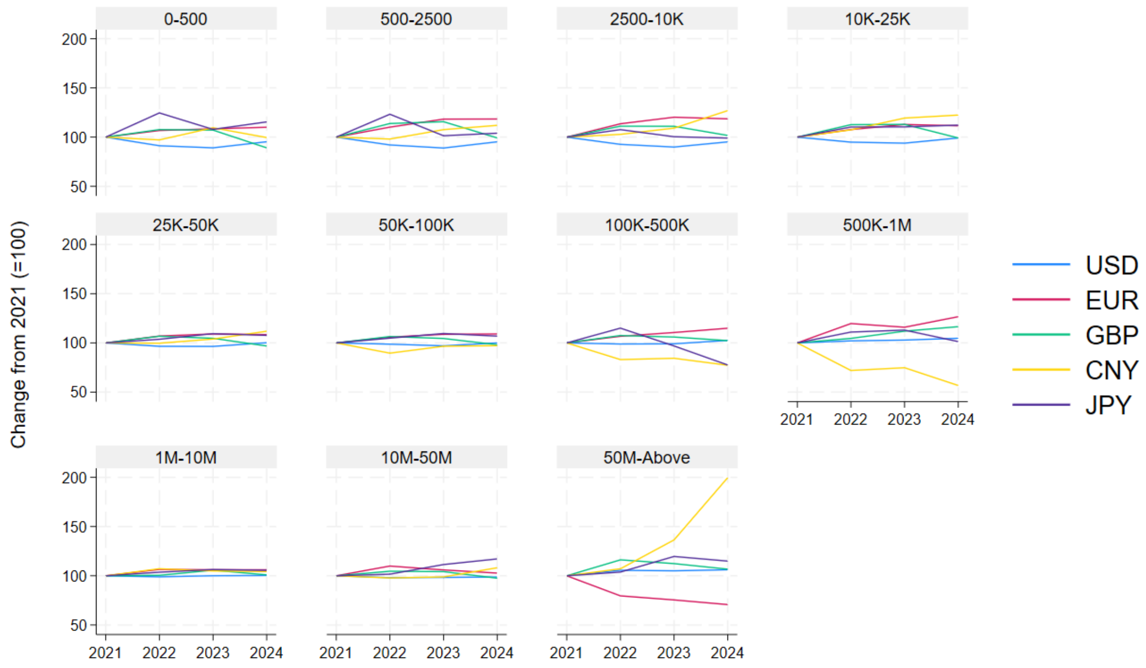


(a) Financial institutions (b) Customers

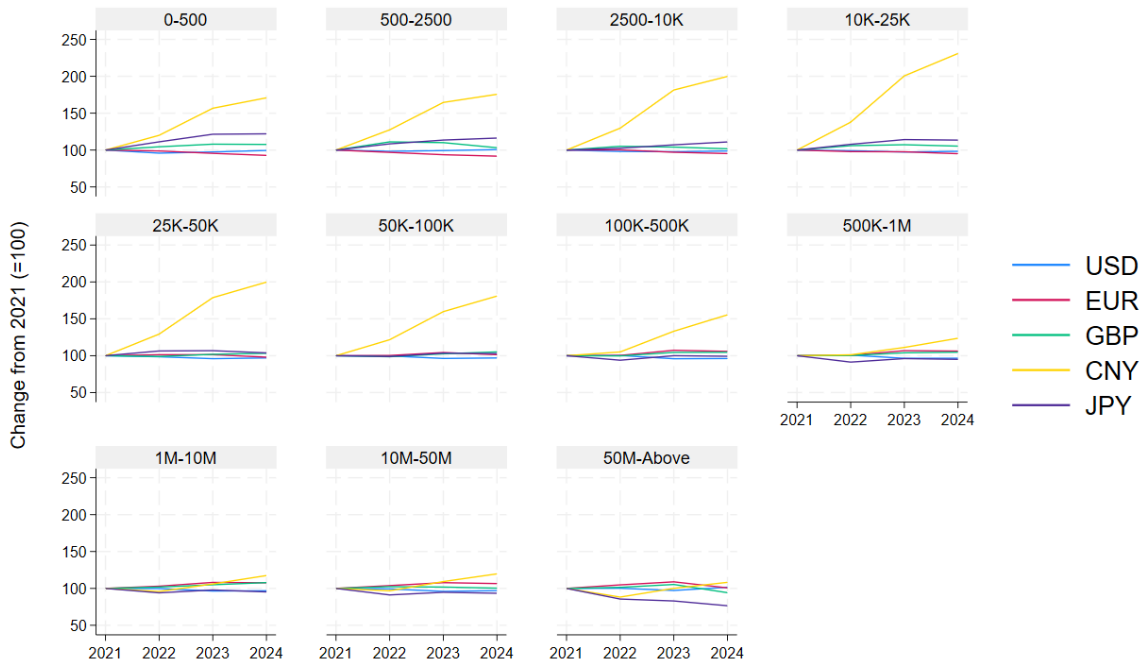
Notes: This figure shows the breakdown of the payment value shares for financial institution (panel (a)) and customer payments (panel (b)) for eleven transaction sizes.

Examining currency share dynamics across transaction sizes shows that USD dominance remains evident across all categories, except for small payments (US$0–500), where the EUR plays an equally significant role (Figure 6). Additionally, the rise of the CNY is most pronounced in customer payments up to US$500,000 and financial institution payments exceeding US$50 million. In contrast, the currency shares of other major SDR currencies remain relatively stable across transaction sizes.

Figure 6: Currency share changes by transaction size



(a) Financial institutions



(b) Customers

Notes: For each currency, the figure presents the annual change since 2021 (normalized to 100) across eleven transactions sizes for financial institution payments (panel (a)) and customer payments (panel (b)).

3.2 Cross-border payment intermediaries

A considerable share of cross-border payments is intermediated by financial institutions in third economies, underscoring their vital role in the IMS. The degree of intermediation differs sharply across message types. For financial institution payments 72.2 percent of the transaction value was intermediated through a third economy compared to 21.3 percent for customer payments.

The data also indicate considerable heterogeneity across currencies. The share of the intermediated payment value exceeded the average for USD transactions but was below average for EUR, GBP, JPY, and CNY transactions. For GBP and EUR transactions, less than half of the payment value (48.9 and 42.3 percent, respectively) was intermediated through financial institutions in third economies in 2024. The degree of intermediation is relatively stables across different transaction sizes, although it tends to be the highest for mid-sized payments both for financial institution and customer payments.

Table 2 presents the ten most frequent intermediary economies and the share of transactions they intermediate.[9] Both for financial institution payments and customer payments, the U.S. intermediates the highest share of payments followed by Germany. Together, third-economy intermediaries in those two economies account for more than half of intermediated payments. Notably, financial centers such as Hong Kong SAR and Switzerland play a more important role in the intermediation of financial institution payments than in the intermediation of customer payments.

Table 2: Third-economy intermediaries

Financial institutions		**Customers**	
Economy	Share of intermediated transactions (%)	Economy	Share of intermediated transactions (%)
U.S.	42.9	U.S.	48.2
Germany	10.9	Germany	18.0
Canada	6.5	U.K.	7.5
U.K.	6.1	France	5.5
France	3.8	Austria	3.4
Hong Kong SAR	3.5	Belgium	2.7
Belgium	3.3	Italy	2.0
Japan	3.0	Ireland	1.3
Australia	2.0	Spain	1.2
Switzerland	1.8	Hong Kong SAR	1.0

Notes: The table shows each economy's share (in percent) in intermediated payments for financial institutions (LHS) and customer (RHS) payments in 2024.

[9] Third-economy intermediaries are derived based on payments from the originator economy to the intermediary economy and payments from intermediary to intermediary economies where applicable.

3.3 Cross-border payment networks

Finally, we present Swift cross-border payment networks in Figure 7. The figure shows that networks of cross-border payments are highly interconnected, characterized by a large number of links connecting each economy node and a core-periphery structure. Node sizes represent each economy's Katz-Bonacich centrality.[10]

Large AEs and financial centers play a central role in global cross-border payments. For financial institution payments (Figure 7a), the U.K. and the U.S. exhibit the largest centrality. France, Germany, and Hong Kong SAR also occupy central positions in the global payment network. For customer payments (Figure 7b), the U.S. ranks highest in centrality followed by the U.K., Germany, Canada, and France. Those patterns remain consistent throughout 2021–2024.

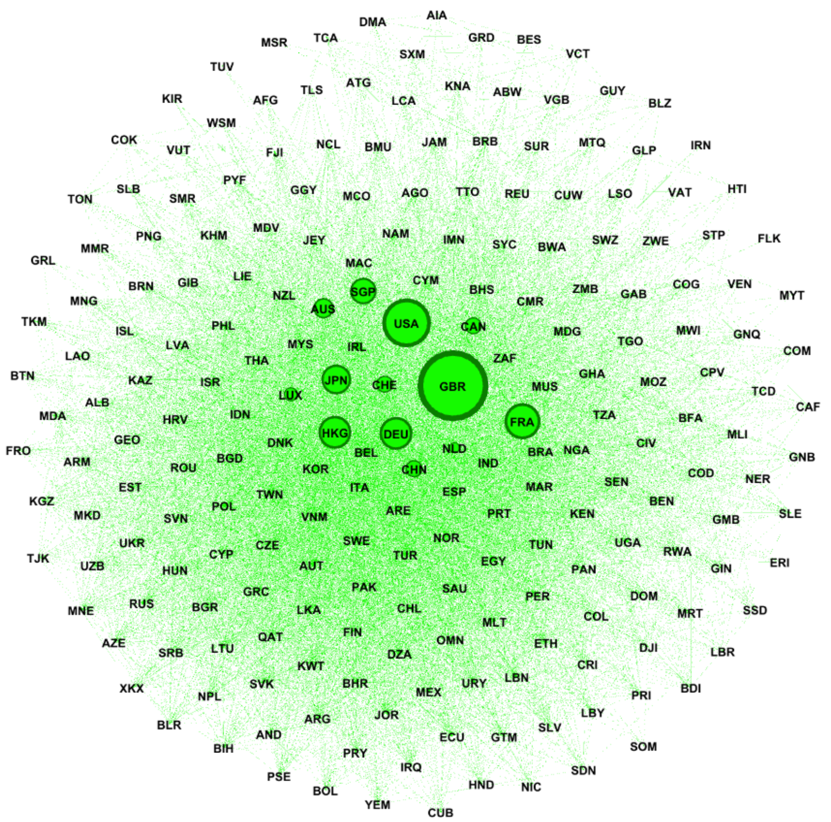
A notable feature of cross-border payments is the substantial variation in network characteristics across currencies (Figures C.6 and C.7). For instance, the USD and EUR networks appear denser than the CNY, GBP, and JPY networks. Likewise, economies' centrality depends on currency usage, with the U.S., Euro Area economies, U.K., and Japan having the highest centrality for USD, EUR, GBP, and JPY payments. The CNY financial institution payment network stands out, as Hong Kong SAR and the U.K.—rather than the Chinese mainland—occupy the most central positions. Notably, the U.K consistently appears highly central across these networks, highlighting its status as a global financial hub, beyond its third economy intermediary role as discussed earlier.

4 Underlying transaction motives and determinants: a gravity approach

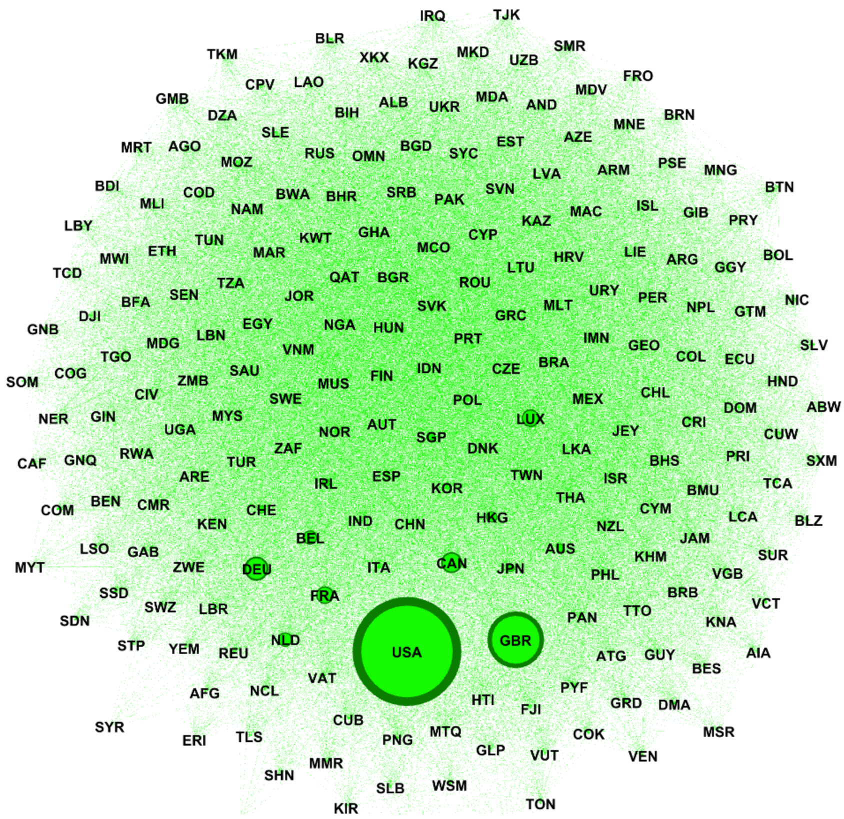
To examine the characteristics—including potential heterogeneity across message types, currencies, and transaction size—of cross-border payments, we estimate a reduced-form gravity equation, building on the theoretical foundation established by Okawa & van Wincoop (2012) for gravity equations in international finance and the empirical approach of Lane & Milesi-Ferretti (2008). Our analysis also draws on recent empirical work by Gopinath et al. (2024), who apply the gravity framework to assess the potential impacts of fragmentation on bilateral trade, FDI, and portfolio flows, as well as Cerutti et al. (2023), who estimate gravity equations to examine the drivers of bilateral cross-border bank claims.

[10] See Katz (1953) and Bonacich (1987). Katz-Bonacich centrality calculations are shown in Appendix A.2.

Figure 7: Cross-border payment networks



(a) Financial institutions



(b) Customers

Notes: The figure illustrates payments from originator to beneficiary economies without depicting intermediaries and is generated using the Fruchterman-Reingold algorithm. Node sizes are determined by the Katz-Bonacich centrality of each economy. Edges between nodes are represented by green lines.

4.1 Aggregate bilateral cross-border payments

We begin by estimating a panel gravity model for aggregate, bilateral cross-border payments between originator and beneficiary economies covering the period 2021-24:

$$Y_{ijt} = \beta_1 ln(Econ_{ij,t-1}) + \beta_2' Gravity_{ij} + \theta_i + \tau_j + \phi_t + \epsilon_{ijt}, \tag{1}$$

where Y_{ijt} denotes the level of bilateral cross-border payments (measured in US$) from originator economy i to beneficiary economy j in year t. To capture bilateral economic ties between the originator and beneficiary economies, our regression specification includes three economic factors ($ln(Econ_{ij})$): the logarithm of bilateral imports, the logarithm of total portfolio investment (the sum of debt and equity portfolio asset holdings), and the logarithm of outward FDI positions.[11] Following the literature (Lane & Milesi-Ferretti 2008, Cerutti et al. 2023, Casanova et al. 2024), we also control for time-invariant gravity factors ($Gravity_{ij}$), including geographical distance, common language, and colonial relationship post-1945.[12]

Our baseline specification includes originator (θ_i) and beneficiary (τ_j) fixed effects to account for all time-invariant originator and beneficiary economy-specific determinants of bilateral cross-border payments, including economic size and global financial center status. Additionally, we incorporate year fixed effects (ϕ_t) to control for global economic conditions and financial market volatility. In the Appendix (Table B.4), we show that our results remain robust under an alternative specification that includes corridor fixed effects which capture all time-invariant characteristics of a given originator-beneficiary economy pair—such as historical ties, long-standing trade relationships, institutional similarities, and persistent financial linkages. This alternative specification also controls for originator economy-year fixed effects and beneficiary economy-year fixed effects to account for time-varying factors specific to each economy. We estimate the gravity model using the PPML estimator. Robust standard errors are double clustered at the originator and beneficiary economy level.

Table 3 presents the estimation results, where column (1) reports findings for total payments, column (2) focuses on financial institution payments, and column (3) examines customer payments. The results in column (1) indicate that imports, portfolio investment, and FDI are positively and significantly associated with bilateral cross-border payments, highlighting the

[11] Since we are analyzing outward cross-border payments, we use imports which prompt outward payments, rather than total trade including exports. However, our results are robust to using the sum of bilateral imports and exports.

[12] The two indicator variables (language and colony) enter the specification in levels; the distance variable enters the specification in logarithmic form.

close connection between cross-border payments and economic ties. Quantitatively, our findings suggest that a one percent increase in imports is associated with a 0.167 percent increase in cross-border payments. The elasticity of cross-border payments is slightly higher for portfolio investment at 0.241 percent and lower for FDI at 0.161 percent, respectively. These findings are consistent with Cerutti et al. (2023) who find that economic ties play a role in cross-border bank lending.[13] Additionally, our results indicate that greater geographic distance between economies is not associated with significantly lower cross-border payments.

The aggregate results in the first column conceal some heterogeneity across message types, as highlighted in columns (2) and (3). While imports are positively associated with both financial institution and customer payments, the relationship is stronger for customer payments. Portfolio investment and FDI are also positively and significantly correlated with both payment types. Distance appears to matter significantly for customer payments but is not a significant factor for financial institution payments, in line with the hypothesis that financial institutions can more easily overcome informational asymmetries than customers.

Table B.4 shows that the relationship between cross-border payments and economic factors is broadly robust to controlling for corridor fixed effects, as well as originator-year and beneficiary-year fixed effects. Furthermore, the results hold when using total trade (imports plus exports) instead of imports as an alternative proxy for trade relationships (Table B.5) or using a sample without intra-EU economies (Table B.6).[14]

[13] The correlation with economic ties does not only reflect underlying trade or investment transactions but also captures a reduction of informational asymmetries.

[14] Intra-EU cross-border flows account for 16.1 percent of total Swift cross-border flows that are financial institution–related and 21.6 percent that are customer-related.

Table 3: Aggregate payments

	Total payments (1)	Financial institutions (2)	Customers (3)
Imports	0.167***	0.153**	0.196*
	(0.064)	(0.065)	(0.100)
Investment	0.241***	0.245**	0.223***
	(0.091)	(0.103)	(0.066)
FDI	0.161***	0.162***	0.146***
	(0.052)	(0.056)	(0.034)
Distance	-0.104	-0.083	-0.248**
	(0.087)	(0.093)	(0.098)
Language	0.040	0.005	0.202
	(0.153)	(0.168)	(0.138)
Colony	0.001	0.009	-0.174
	(0.196)	(0.216)	(0.200)
Originator FE	✓	✓	✓
Beneficiary FE	✓	✓	✓
Year FE	✓	✓	✓
Pseudo R^2	0.934	0.905	0.967
Observations	22018	14934	22018
Originator economies	63	63	63
Beneficiary economies	187	184	187

Notes: This table reports the estimation results from Equation 1 using Poisson pseudo-maximum likelihood (PPML). The dependent variable is the level of bilateral cross-border payments in US$. Except for the gravity indicators (0/1), all explanatory bilateral variables enter in logarithms. The results are for total payments (column 1), financial institution payments (column 2), and customer payments (column 3). Standard errors in parentheses are double clustered at the originator and beneficiary economy level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

4.2 Heterogeneity across currencies and transaction sizes

Next, we examine the heterogeneity in the relationship between economic and gravity-related variables and cross-border payments across different currencies and transactions sizes. Our goal is to identify which currencies and/or transaction sizes drive the results for financial institution and customer payments both qualitatively and quantitatively.

We begin by estimating Equation (1) separately for the five currencies already studied in the previous section. Table 4 presents the results, with Panel A focusing on financial institution payments and Panel B on customer payments. Our results for financial institution payments indicate that imports are strongly associated with payments denominated in USD, GBP, and CNY, and FDI is significantly correlated with all currency denominations, except JPY. Portfolio investment is positively associated with cross-border payments in USD, EUR, and JPY. Overall, this finding suggests that economic ties through trade and investment linkages—either through portfolio investment or FDI—matter across most currencies. The earlier result on the insignificant relationship between distance and financial institution cross-border payments (Table 3) remains across all five currencies. Additionally, we find that (i) a shared language is positively and significantly associated with only CNY-denominated payments and (ii) colonial ties are negatively and significantly correlated with GBP- and CNY-denominated payments. Our next set of results at the transaction size level provides further insights showing significant heterogeneity in the correlation between bilateral Swift flows and the colonial ties dummy.

Turning to customer payments, a different pattern emerges. Imports are a significant determinant for JPY-denominated payments but remain insignificant for payments in the other currencies. Portfolio investment is positively and significantly associated with EUR- and GBP-denominated flows but surprisingly exhibits a negative relationship with CNY transactions.[15] Additionally, FDI is positively and significantly correlated with cross-border payments in USD, EUR, and CNY. Among the gravity variables, we find that greater geographic distance is associated with lower cross-border payments across all currencies, with the strongest negative effect observed for payments in USD and the weakest for payments in JPY. Lastly, colonial ties and a shared language do not appear to significantly affect customer-related payments for any currency, at the aggregate level.

[15] Cerutti et al. (2023) finds similar negative correlations between portfolio flows and Chinese cross-border lending, and they associate this result with Chinese portfolio flows' focus on a few AEs' assets.

Table 4: Payments by currencies

	Panel A. Financial institutions				
	USD	EUR	GBP	JPY	CNY
Imports	0.148**	0.013	0.403***	-0.083	0.188***
	(0.064)	(0.152)	(0.129)	(0.171)	(0.063)
Investment	0.180**	0.324**	0.095	0.267***	0.027
	(0.083)	(0.139)	(0.108)	(0.098)	(0.052)
FDI	0.160***	0.235*	0.342***	0.079	0.076**
	(0.046)	(0.138)	(0.055)	(0.123)	(0.032)
Distance	-0.127	-0.118	0.121	0.035	0.120
	(0.094)	(0.217)	(0.113)	(0.157)	(0.118)
Language	-0.019	-0.315	0.022	0.270	0.220**
	(0.137)	(0.312)	(0.253)	(0.284)	(0.099)
Colony	0.180	0.219	-0.840***	-0.725	-0.356**
	(0.264)	(0.436)	(0.284)	(0.496)	(0.160)
Observations	13271	11969	5878	4419	3462
Originator economies	63	63	59	58	55
Beneficiary economies	177	177	146	127	108

	Panel B. Customers				
	USD	EUR	GBP	JPY	CNY
Imports	0.161	0.051	-0.034	0.153*	0.077
	(0.102)	(0.079)	(0.183)	(0.091)	(0.095)
Investment	0.086	0.188***	0.278***	-0.067	-0.265***
	(0.060)	(0.047)	(0.093)	(0.155)	(0.099)
FDI	0.214***	0.121**	0.123	-0.050	0.176***
	(0.058)	(0.055)	(0.081)	(0.114)	(0.063)
Distance	-0.322**	-0.286***	-0.230**	-0.172**	-0.266**
	(0.133)	(0.111)	(0.100)	(0.068)	(0.106)
Language	0.074	0.078	0.508	0.147	0.208
	(0.210)	(0.299)	(0.319)	(0.362)	(0.309)
Colony	0.004	-0.261	-0.253	-0.341	-0.380
	(0.156)	(0.585)	(0.325)	(0.249)	(0.320)
Observations	21285	19893	10263	4546	2955
Originator economies	63	63	62	60	58
Beneficiary economies	186	186	160	92	92
Originator FE	✓	✓	✓	✓	✓
Beneficiary FE	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓

Notes: This table reports the estimation results from Equation 1 across five currencies for financial institution payments (Panel A) and customer payments (Panel B) using Poisson pseudo-maximum likelihood (PPML). The dependent variable is the level of bilateral cross-border payments in US$. Except for the gravity indicators (0/1), all explanatory bilateral variables enter the analysis in logarithms. Standard errors in parentheses are double clustered at the originator and beneficiary economy level with $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$.

We then examine the heterogeneity in the elasticity of cross-border payments to economic and gravity variables across different transaction sizes. Table 5 presents the results for eleven transaction sizes, with Panel A focusing on financial institution payments and Panel B on customer payments.

Our findings indicate that the association between imports and financial institution payments tends to be stronger for larger payments than for smaller ones, and is insignificant for payments below US$10,000. For portfolio investment and FDI, the significant relationship with cross-border payments holds across all transaction sizes. The estimated coefficients suggest that the relationship between portfolio investment and cross-border payments is stronger for larger transactions (US$500K–50M-above) than for those below US$500K. In contrast, the pattern for FDI appears to be reversed, with a stronger association for smaller transactions. Additionally, we find that distance has a significant and negative association with smaller cross-border payments, but is insignificant for larger transactions. Overall, this finding indicates that informational asymmetries play less of a role for larger payments. We also find that colonial ties have a significant association with payments only for the the smaller transaction sizes. [16]

Focusing on customer cross-border payments in Panel B, we find a strong and significant association with imports across all transaction sizes, except for the largest one. The elasticity governing this relationship increases as transaction size rises up to US$50K, after which it begins to decline. Moreover, portfolio investment exhibits a positive and significant relationship with cross-border payments across all transaction sizes, with the correlation strengthening notably for transactions exceeding US$1M. Quantitatively, a 1 percent increase in bilateral portfolio investment holdings is associated with an increase of 0.038 percent in customer payments for transactions below US$500K. However, the same increase in portfolio investment corresponds to a 0.145 percent, 0.261 percent, and 0.397 percent rise in cross-border payments for transaction sizes of US$1M–10M, US$10M–50M, and US$50M and above, respectively. Larger FDI positions are also positively and significantly associated with customer payments across all transaction sizes, with the effect being stronger for larger transaction sizes. However, the difference in magnitude between transaction sizes is less pronounced compared to the case of portfolio investment. Turning to other gravity factors, we confirm that the negative and significant association between distance and cross-border payments, as reported in Table 3, holds across all transaction sizes, except the largest transaction sizes. Moreover, and in line with the results for

[16] These results appear to be driven by corridors between Asian economies with a historical colonial relationship with the U.K.

financial institution payments, this negative effect is more pronounced for smaller transactions than for larger ones. Finally, colonial ties are only significant for smaller transaction sizes.[17]

Overall, the findings from the gravity regressions provide three key takeaways. First, cross-border payments are strongly correlated with economic ties, including through imports, portfolio investment, and FDI, as well as with some gravity factors such as distance. Second, aggregate flows mask considerable heterogeneity across message types, currencies, and transaction sizes. Particularly the breakdown by transaction size, an aspect which has so far not been explored in the literature, reveals that the elasticity of cross-border payments is different for smaller-value and higher-value payments. Smaller cross-border payments, especially customer-related ones, seems to suffer more from informational asymmetries.

[17] These results appear to be driven by corridors between African economies with a historical colonial relationship with the France.

Table 5: Payments by transaction size

	Panel A. Financial institutions										
	0-500	500-2500	2500-10K	10K-25K	25K-50K	50K-100K	100K-500K	500K-1M	1M-10M	10M-50M	50M-Above
Imports	0.054	0.126**	0.156***	0.205***	0.225***	0.216***	0.206***	0.211***	0.220***	0.193***	0.113*
	(0.063)	(0.059)	(0.036)	(0.044)	(0.048)	(0.044)	(0.048)	(0.062)	(0.060)	(0.067)	(0.062)
Investment	0.127**	0.181***	0.170**	0.115**	0.060*	0.068**	0.136**	0.223***	0.235***	0.197***	0.215**
	(0.051)	(0.067)	(0.067)	(0.055)	(0.031)	(0.030)	(0.059)	(0.072)	(0.076)	(0.069)	(0.108)
FDI	0.232***	0.200**	0.206***	0.202***	0.182***	0.196***	0.229***	0.204***	0.162***	0.124***	0.156**
	(0.071)	(0.080)	(0.078)	(0.072)	(0.061)	(0.059)	(0.057)	(0.058)	(0.047)	(0.040)	(0.064)
Distance	-0.245**	-0.192*	-0.169**	-0.119	-0.138**	-0.104	-0.028	0.124	0.114	-0.032	-0.135
	(0.098)	(0.103)	(0.081)	(0.077)	(0.070)	(0.067)	(0.073)	(0.093)	(0.116)	(0.098)	(0.091)
Language	0.317	0.287*	0.196	0.213	0.217	0.221*	0.342**	0.352**	0.258**	0.279***	0.001
	(0.208)	(0.164)	(0.167)	(0.161)	(0.147)	(0.130)	(0.143)	(0.147)	(0.118)	(0.074)	(0.182)
Colony	0.739**	0.501*	0.497**	0.296*	0.211	0.116	0.014	-0.077	0.063	-0.023	0.058
	(0.288)	(0.292)	(0.213)	(0.174)	(0.157)	(0.143)	(0.137)	(0.174)	(0.155)	(0.121)	(0.231)
Observations	12629	10807	10653	10529	10596	10681	10962	8457	8936	7492	5861
Originator economies	63	63	63	63	63	63	63	63	63	62	61
Beneficiary economies	177	175	176	174	172	170	174	165	163	154	122

	Panel B. Customers										
	0-500	500-2500	2500-10K	10K-25K	25K-50K	50K-100K	100K-500K	500K-1M	1M-10M	10M-50M	50M-Above
Imports	0.174***	0.186***	0.193***	0.243***	0.276***	0.235***	0.212***	0.194***	0.166***	0.141**	0.179
	(0.056)	(0.051)	(0.052)	(0.050)	(0.055)	(0.042)	(0.041)	(0.045)	(0.054)	(0.062)	(0.141)
Investment	0.038***	0.040***	0.036***	0.032***	0.033**	0.029***	0.039***	0.062***	0.145***	0.261***	0.397***
	(0.010)	(0.010)	(0.011)	(0.011)	(0.014)	(0.010)	(0.010)	(0.018)	(0.041)	(0.062)	(0.094)
FDI	0.093***	0.071***	0.055***	0.049***	0.052***	0.057***	0.088***	0.131***	0.160***	0.153***	0.107**
	(0.021)	(0.013)	(0.011)	(0.012)	(0.014)	(0.016)	(0.017)	(0.021)	(0.026)	(0.033)	(0.053)
Distance	-0.354***	-0.303***	-0.285***	-0.278***	-0.246***	-0.293***	-0.318***	-0.304***	-0.252***	-0.209***	-0.191
	(0.077)	(0.057)	(0.061)	(0.052)	(0.059)	(0.040)	(0.044)	(0.057)	(0.065)	(0.064)	(0.119)
Language	0.745***	0.556***	0.443***	0.235**	0.133	0.271***	0.359***	0.396***	0.389***	0.258**	0.064
	(0.146)	(0.127)	(0.122)	(0.107)	(0.142)	(0.091)	(0.106)	(0.131)	(0.144)	(0.131)	(0.134)
Colony	0.377**	0.323**	0.233*	0.134	0.051	-0.060	-0.218	-0.257*	-0.234	-0.135	-0.143
	(0.182)	(0.144)	(0.132)	(0.144)	(0.165)	(0.155)	(0.143)	(0.146)	(0.165)	(0.212)	(0.261)
Observations	20629	21165	21005	20165	19336	18666	18262	14693	13712	7975	4769
Originator economies	63	63	63	63	63	63	63	63	63	62	59
Beneficiary economies	187	186	186	186	186	186	186	186	186	156	119
Originator FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Beneficiary FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: This table reports the estimation results from Equation 1 across eleven transaction size buckets for financial institution payments (Panel A) and customer payments (Panel B) using Poisson pseudo-maximum likelihood (PPML). The dependent variable is the level of bilateral cross-border payments in US$. Except for the gravity indicators (0/1), all explanatory bilateral variables enter the analysis in logarithms. Standard errors in parentheses are double clustered at the originator and beneficiary economy level with $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$.

5 Evolution of cross-border payments over time

Cross-border payments naturally evolve over time, including due to technological advancements and possibly geopolitical trends. To understand recent trends, we examine the evolution of key network statistics and assess how fragmentation and geopolitical risks may have influenced cross-border payment dynamics.

5.1 Cross-border payment network dynamics

Monthly changes in network properties between 2021 and 2024 provide a snapshot of the recent evolution of cross-border payments. Figure 8 illustrates four key network measures over time both for financial institution payments (panel (a)) and customer payments (panel (b)): (i) the numbers of economies each economy is connected to (degree out); (ii) the value of outgoing payments (strength out); (iii) outward network concentration as measured by the Herfindahl-Hirschman Index (HHI out); and (iv) a proxy for regionalization which measures the concentration of payments among sub-regions over the sample period. For the first three measures, we report the median of these statistics across all economies.[18]

The top row in Figure 8 suggests that the median economy's degree out measure increased over the past four years both for financial institution payments and customer payments. This trend indicates greater connectivity and a denser cross-border payment network. Likewise, the second row shows that the median strength out measure rose for both message types. Furthermore, the third row reveals a decline in the HHI out for financial institution payments, suggesting reduced network concentration. Finally, the bottom row does not provide any indication of increasing regionalization in cross-border payments flows over 2021-24.

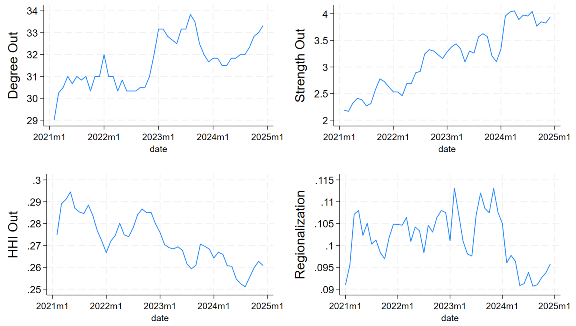
A closer examination of network dynamics by currency (Figures C.3 and C.4) reveals increasing interlinkages—as measured by degree out and strength out—for customer payments across most currencies, with the exception of GBP. The decline in network concentration is particularly evident for USD and CNY payments. For financial institution payments, the picture is mixed, showing stable or increasing interlinkages.

5.2 Fragmentation and risk trends

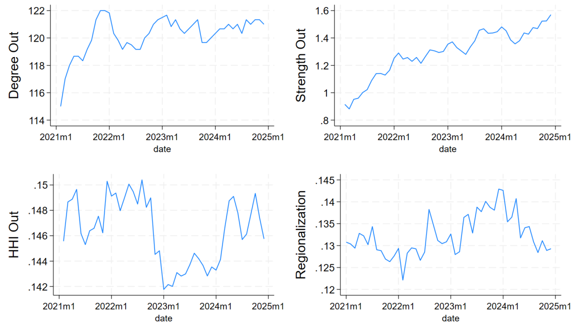
We now examine the potential role of increasing geoeconomic fragmentation and geopolitical risks on cross-border payments. Specifically, we estimate the following specification for the

[18] See Appendix A.2 for further details on network statistics computations.

Figure 8: Evolution of network statistics



(a) Financial institutions



(b) Customers

Notes: This figure presents the median of moving-average monthly degree out, strength out, and HHI out measures across all the economies in the sample. The regionalization measure is calculated using the World Bank sub-region categories.

period 2021Q1–2024Q4:

$$Y_{ijt} = \beta_1 s_{t-1} + \beta_2 s_{t-1} \times InterBloc_{ij} + \theta_{ij} + \tau_{it} + \phi_{jt} + \epsilon_{ijt}, \tag{2}$$

where Y_{ijt} represents the level of bilateral cross-border payments (measured in US\$) from originator economy i to beneficiary economy j at time t. The variable $s_{t-1} \in \{\text{Common Fragmentation, Financial Fragmentation, Trade Fragmentation, Geopolitical Risk}\}$ denotes the fragmentation indexes from Fernández-Villaverde et al. (2024) or alternatively geopolitical risk index from Caldara & Iacoviello (2022). Fernández-Villaverde et al. (2024) construct a common fragmentation index and its subcomponents using a dynamic hierarchical factor model based on widely used empirical indicators. Meanwhile, Caldara & Iacoviello (2022) develop a news-based index of geopolitical risks. To facilitate comparability, we standardize these variables within our sample period (2021Q1–2024Q4).[19] Additionally, we control for corridor-level time-invariant factors (θ_{ij}), as well as originator economy-year (τ_{it}) and beneficiary economy-year (ϕ_{jt}) fixed effects. [20]

To assess whether the impact of rising fragmentation and geopolitical risks on cross-border payments vary across geopolitical blocs, we interact these indexes with a corridor-level dummy variable, $InterBloc_{ij}$. We follow the methodology of Gopinath et al. (2024) to classify economies into three hypothetical blocs based on their geopolitical alignment with the U.S. and the Chinese mainland, using voting patterns at the United Nations General Assembly (UNGA). Specifically, we use *ideal point distance* (IPD) estimates from Bailey et al. (2017) to measure each economy's

[19] Fernández-Villaverde et al. (2024) also construct measures of mobility and political fragmentation. However, for the purposes of this paper, we focus on the common, financial, and trade fragmentation indexes.

[20] To estimate the unconditional effects of fragmentation indexes and geopolitical risk—given the limited sample period—time fixed effects are specified at the annual level rather than at the quarterly level.

geopolitical proximity to the U.S. and the Chinese mainland. Based on the distribution of these distances, we classify economies into hypothetical blocs consisting of U.S.-aligned countries, Chinese mainland-aligned economies, and non-aligned economies. An economy is assigned to the U.S. (Chinese mainland) bloc if its IPD falls within the top 25th percentile in terms of proximity to the U.S. (Chinese mainland). The corridor-level dummy variable $InterBloc_{ij}$ is set to one if economy i belongs to the U.S.-aligned bloc and economy j belongs to the Chinese mainland-aligned bloc, or vice versa, and zero otherwise. Hence, our coefficient of interest, β_2, captures the differential impact of increasing geoeconomic fragmentation and geopolitical risk on cross-border payments between economies in the U.S.- and Chinese mainland-aligned blocs (i.e., inter-bloc payments).

Table 6 presents the results for Equation 2 for financial institution payments (columns 1-4) and customer payments (columns 5-8).[21] Our findings indicate that higher fragmentation is associated with lower cross-border payments for all types of fragmentation (common fragmentation, financial fragmentation, and trade fragmentation) and for both financial institution and customer payments. A 1 standard deviation increase in the common fragmentation index is associated with a 5.5 percent decline in financial institution cross-border payments (column 1). The correlation is somewhat smaller for customer payments, with an estimated decline of 2.2 percent (column 5). The interaction term between geoeconomic fragmentation and the $InterBloc$ dummy suggests that there is no significant differential effect of an increase in fragmentation on aggregate financial institution and customer payments between the U.S.-aligned and Chinese mainland-aligned blocs. Turning to the role of geopolitical risks, we find that there is no significant effect of an increase in geopolitical risks on customer payments (column 8). However, higher geopolitical risks are associated with an increase in financial institution inter-bloc payments (column 4). We conjecture that this finding potentially reflects safe haven dynamics in response to higher geopolitical risk, as we further elaborate on below.

[21] The average effects of different fragmentation indexes and geopolitical risks, without interaction with blocs, are reported in B.7.

Table 6: Geopolitical fragmentation, risks and inter-bloc payments

	Financial Institutions				Customers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Common Fragmentation	-0.055***				-0.022***			
	(0.016)				(0.007)			
Common Fragmentation × InterBloc	0.026				-0.027			
	(0.024)				(0.021)			
Financial Fragmentation		-0.054***				-0.023***		
		(0.013)				(0.006)		
Financial Fragmentation × InterBloc		0.024				-0.026		
		(0.020)				(0.024)		
Trade Fragmentation			-0.056***				-0.022***	
			(0.013)				(0.008)	
Trade Fragmentation × InterBloc			0.024				-0.025	
			(0.027)				(0.020)	
Geopolitical Risk				-0.005				0.000
				(0.004)				(0.004)
Geopolitical Risk × InterBloc				0.027***				0.006
				(0.002)				(0.009)
Corridor FE	✓	✓	✓	✓	✓	✓	✓	✓
Originator × Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Beneficiary × Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Observations	112427	112427	112427	112427	275815	275815	275815	275815
No of Originator	183	183	183	183	184	184	184	184
No of Beneficiary	183	183	183	183	186	186	186	186

Notes: The table reports the estimation from Equation 2 for financial institution payments (columns 1-4) and customer payments (columns 5-8) using Poisson pseudo-maximum likelihood (PPML). The dependent variable is the level of bilateral cross-border payment flows in US$. For comparability, the common fragmentation, financial fragmentation, and trade fragmentation indexes, as well as the geopolitical risk variables are standardized within the estimation sample. Standard errors in parentheses are double clustered at the originator and beneficiary economy level with $^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$.

As discussed in the previous section, aggregate cross-border payments mask important heterogeneity across currencies and transaction sizes. To further investigate this heterogeneity, we estimate Equation 2 separately for five currencies. Table 7 presents the results, with Panel A focusing on financial institution payments and Panel B on customer payments. Given the high correlation among different fragmentation indexes, we focus on the common fragmentation index in this analysis.

The results reveal significant variation, highlighting the differential impact of fragmentation on cross-border payments across currencies. For USD-denominated payments, a 1 standard-deviation increase in common fragmentation is associated with a 4.1 percent decline in financial institution cross-border payments between economies within the same bloc or between U.S.-/Chinese mainland-aligned blocs and non-aligned economies. Moreover, the significant interaction term suggests that this decline is 3.2 percentage points larger for inter-bloc payments (column 1). However, a strikingly different pattern emerges for CNY-denominated payments. An increase in fragmentation is associated with a rise in CNY-denominated payments, with the effect being even stronger for inter-bloc payments (column 5). This finding suggests that geoeconomic fragmentation may be a potential underlying force supporting the growing role of the CNY in cross-border payments. Likewise, inter-bloc payments in EUR and GBP increase in response to higher geoeconomic fragmentation, and offset the negative effect for payments within blocs or between the U.S.-/Chinese mainland-aligned bloc with non-aligned economies (columns 2 and 3). For payments denominated in JPY, our results suggest that increasing fragmentation is negatively correlated with inter-bloc payments (column 4). In the case of customer payments, we do not find any evidence of a differentially negative impact on inter-bloc payments following an increase in fragmentation; for payments in JPY, our results indicate that there is a positive association between higher fragmentation and cross-border inter-bloc payments (column 4).

Regarding the role of geopolitical risks, we observe a reversal in patterns for USD-denominated and CNY-denominated financial institution payments. An increase in geopolitical risks during 2020-24 is associated with a higher value of USD-denominated inter-bloc payments, whereas CNY-denominated inter-bloc payments exhibit a decline. The results also indicate that an increase in GBP-denominated and JPY-denominated financial institution inter-bloc payments offsets lower payments within blocs or between U.S.-/Chinese mainland-aligned economies with non-aligned economies as geopolitical risks increase. Additionally, USD-denominated customer payments within the same bloc or between the U.S.-/Chinese mainland-aligned bloc with non-aligned economies are positively associated with an increase in geopolitical risks, though we find no significant differential effect for inter-bloc payments. In contrast, GBP-denominated customer payments within the same bloc or between the U.S.-/Chinese mainland bloc with non-aligned economies are negatively correlated with geopolitical risk.

Table 7: Geopolitical fragmentation, risks, and inter-bloc payments by currencies

	Panel A. Financial institutions				
	USD	EUR	GBP	JPY	CNY
Common Fragmentation	-0.041***	-0.126***	-0.062***	0.006	0.138**
	(0.015)	(0.044)	(0.012)	(0.020)	(0.060)
Common Fragmentation × InterBloc	-0.032**	0.132***	0.120**	-0.085*	0.676***
	(0.016)	(0.038)	(0.060)	(0.048)	(0.229)
Geopolitical Risk	0.005	-0.025*	-0.018***	0.014*	-0.027
	(0.004)	(0.013)	(0.006)	(0.008)	(0.019)
Geopolitical Risk × InterBloc	0.030***	0.041	0.021**	0.075***	-0.515***
	(0.008)	(0.039)	(0.010)	(0.009)	(0.159)
Observations	93616	70714	24280	16986	11213
No of Originator	181	177	146	131	109
No of Beneficiary	179	180	153	132	110
	Panel B. Customers				
	USD	EUR	GBP	JPY	CNY
Common Fragmentation	-0.042***	-0.006	0.030*	-0.048	0.045
	(0.008)	(0.017)	(0.018)	(0.037)	(0.059)
Common Fragmentation × InterBloc	-0.015	0.016	0.022	0.148*	-0.065
	(0.019)	(0.030)	(0.055)	(0.077)	(0.070)
Geopolitical Risk	0.009***	-0.007	-0.037***	0.007	0.001
	(0.004)	(0.005)	(0.007)	(0.005)	(0.012)
Geopolitical Risk × InterBloc	0.004	0.002	0.055**	-0.076	-0.012
	(0.010)	(0.009)	(0.025)	(0.058)	(0.054)
Observations	250800	190721	50354	18406	9170
No of Originator	183	183	176	160	131
No of Beneficiary	185	183	173	119	92
Corridor FE	✓	✓	✓	✓	✓
Originator × Year FE	✓	✓	✓	✓	✓
Beneficiary × Year FE	✓	✓	✓	✓	✓

Notes: This table reports the estimation from Equation 2 across five currencies for financial institution payments (Panel A) and customer payments (Panel B) using Poisson pseudo-maximum likelihood (PPML). The dependent variable is the level of bilateral cross-border payment flows in US$. For comparability, the common fragmentation, financial fragmentation, and trade fragmentation indexes, as well as the geopolitical risk variables are standardized within the estimation sample. Standard errors in parentheses are double clustered at the originator and beneficiary economy level with $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$.

Examining the results across transaction sizes (Table B.8), we find that the patterns observed in Table 6 are primarily driven by the high-value payments of US$50 million and above. This is the only transaction size for which we observe a negative and significant association between fragmentation and both financial institution and customer payments. For this transaction size, there is no differential effect on payments between blocs, explaining the insignificant interaction term in Table 6. However, for smaller transactions (up to US$50K) in financial institution payments and mid-sized transactions (US$25K–1M), the results suggest that a rise in fragmentation is associated with a disproportionately larger decline in payments between economies in different blocs. Table B.9 further indicates that the divergent effects of fragmentation on USD-denominated and CNY-denominated payments are primarily driven by transactions in the US$50 million and above category.

6 Conclusion

The global cross-border traditional and crypto payment market approached one quadrillion dollars in 2024. While the relative surge in crypto and stablecoin cross-border payments is notable—albeit from a very low base—their 2024 level (about US$2.5 trillion) accounts for a very small fraction of global cross-border payments. Focusing on Swift data, the largest cross-border payment network globally, we study the characteristics and evolving patterns of global cross-border payments and identified several key stylized facts. Cross-border payments are highly concentrated in AEs which, alongside major financial centers, play a central role in cross-border payment networks. While currency usage patterns have remained relatively stable, there is a pronounced increase in payments made in CNY, albeit from a low base, suggesting signs of greater global integration. Moreover, large-value transactions (US$50 million and above) account for over 60 percent of customer payments and over 80 percent of financial institution cross-border payments. However, small-value payments constitute the majority in terms of the *number* of payments.

Employing an empirical framework to analyze bilateral cross-border payments, we find that traditional economic linkages—such as trade and financial flows—and gravity factors, including geographical distance, shared language, and colonial ties, are significant correlates of cross-border payments. Our findings also highlight substantial heterogeneity across payment types, currencies, and transaction sizes. Specifically, while trade-related proxies are more prevalent in customer payments, measures of financial integration—such as FDI and portfolio investment—are more closely linked to financial institution cross-border payments. Moreover, transaction size plays a critical role; large-value payments are closely tied to economic fundamentals, whereas gravity factors—such as distance and a common language, which proxy for information asymmetries—tend to play a more important role for small-value payments.

Finally, our exploration of recent dynamics in cross-border payment networks reveals a trend towards greater connectivity and reduced concentration, on average, over the past four years. However, our estimation results indicate that rising geoeconomic fragmentation is associated with a decline in cross-border payment values, particularly for large-value financial institution transactions. These dynamics vary across currencies and regions, with USD- and CNY-denominated payments displaying distinct patterns. Additionally, geopolitical risks seem to asymmetrically influence cross-border payment activity; heightened uncertainty is associated with an increase in USD-denominated transactions in certain corridors, potentially reflecting safe haven motives.

Looking ahead, further research is needed to examine how evolving financial innovation—particularly the rise of crypto assets and stablecoins—may impact the IMS. As crypto assets and stablecoins gain traction, a deeper understanding of their network dynamics, evolutionary trends, and underlying drivers at both the global and corridor level is essential. Given its important role in facilitating trade and investment, there is a role for policymakers to ensure a stable and well-functioning cross-border payment network.

A Data cleaning and network calculations

A.1 Data coverage and cleaning

Our analysis is based on message types (and their ISO 20022 equivalents) related to general financial institution transfers (MT 202 and pacs.009) and single customer credit transfers (MT 103 and pacs.008).

MT 103 single customer credit transfer. This message type is used to process payments where at least one party—either the sender (ordering customer) or the recipient (beneficiary customer)—is a non-financial institution. It enables financial institutions to facilitate *customer-initiated* fund transfers, either directly or through intermediary banks.

MT 202 general financial institution transfer. This message type is designed exclusively for transactions between financial institutions. It allows banks and other financial entities to move funds between accounts, either directly or via intermediaries. Additionally, MT 202.COV messages are used to process transfers related to *customer* credit transactions executed using the cover method. To prevent double-counting, we exclude MT 202.COV messages from our dataset while implementing further data-cleaning procedures to address other potential instances of duplication.

Swift data provide detailed information on each originator and beneficiary economy, as well as the involvement of intermediary economies. Our data cleaning methodology systematically avoids double-counting payments to/from intermediaries as separate payments to ensure the accuracy of our analysis. Transactions are aggregated at the originator economy-beneficiary economy-intermediary economies-month-currency-transaction size level.

There are two broad cases in these transactions. In the first case, the transaction occurs directly between the originator and beneficiary economy without the involvement of any third economy. These payments are directly included in our bilateral flow calculations, as there is no concern about double-counting. In the second case, one or more economies serve as intermediaries in the transaction. For instance, payments may involve multiple intermediaries, creating multiple transaction legs. To avoid double-counting, when calculating payment values, we retain only the initial leg of the payment, i.e. the leg from the originator to the first intermediary. By summing direct payments and non-duplicated indirect payments, we derive bilateral cross-border values across corridors.

Additionally, we implement several data cleaning steps. First, we exclude domestic flows, as our focus is on cross-border transactions. Second, we drop transactions where the originator or beneficiary economy is recorded as 'Not available', 'Free Format', 'Global IMI', and 'Target 2'. Finally, we drop observations where the currency of transaction is 'Not Available'.

A.2 Network calculations

Katz-Bonacich centrality. Katz-Bonacich centrality measures the influence of a node within a network by considering not only its direct connections but also the importance of the nodes it is connected to. It is calculated using the adjacency matrix $\mathbf{A}$ and a decay parameter α, which controls how much indirect connections contribute to centrality. The formula is:

$$\mathbf{c} = (\mathbf{I} - \alpha\mathbf{A})^{-1}\mathbf{1}$$

where $\mathbf{I}$ is the identity matrix, $\mathbf{1}$ is a column vector of ones, and α is chosen such that the inverse exists (typically $\alpha < \frac{1}{\lambda_{\max}(\mathbf{A})}$, where $\lambda_{\max}$ is the largest eigenvalue of $\mathbf{A}$). A higher Katz-Bonacich centrality score indicates a node's importance in the overall network, incorporating both direct and indirect influences. In our analysis, we compute Katz-Bonacich centrality for each economy across payment types, different currencies and transaction sizes.

Degree-out. The out-degree of a node (economy) represents the number of outgoing connections the node has. In a directed network, this is defined as:

$$D_{it}^{\text{out}} = \sum_j A_{ijt}$$

where A_{ijt} is the adjacency matrix, where $A_{ijt} = 1$ if there is a connection from node i to node j at time t, and 0 otherwise. A higher out-degree suggests that a economy has more counterparties in its transactions networks, indicating a more diversified set of relationships.

Strength-out. Strength-out extends the concept of out-degree by incorporating transaction values rather than just the number of connections. It is defined as:

$$S_{it}^{\text{out}} = \sum_j W_{ijt}$$

where W_{ijt} represents the weighted adjacency matrix, with each entry reflecting the value of payment values from node i to node j at time t. Unlike out-degree, which treats all links equally, strength-out accounts for the intensity of payment relationships.

HHI-out. The Herfindahl-Hirschman Index (HHI) for outflows measures the concentration of payment values among counterparties. It is computed as:

$$HHI_{it}^{\text{out}} = \sum_{j} \left(\frac{W_{ijt}}{\sum_k W_{ikt}} \right)^2$$

where W_{ijt} is the flow from node i to node j at time t, and $\sum_k W_{ikt}$ represents the total outgoing flows from node i at time t. If HHI_{it}^{out} is close to 1, it indicates that most of the transactions are concentrated with a few counterparties, whereas a lower value suggests a more diversified set of financial relationships.

Regionalization. Regionalization quantifies the extent to which financial flows are concentrated within specific geographic regions rather than dispersed globally. It is computed as:

$$R_t = \frac{\sum_i \sum_{j \in \text{region}_i} W_{ijt}}{\sum_i \sum_j W_{ijt}}$$

where $\sum_{j \in \text{region}_i} W_{ij}$ is the total financial flow from node i to other nodes within the same region, and $\sum_j W_{ij}$ is the total financial flow from node i to all other nodes. A higher regionalization score indicates that a economy primarily engages in transactions within its region rather than globally. We use the World Bank *sub-regions* in our regional classification.

B Tables

Table B.1: List of countries/territories

Advanced Economies	Emerging Market and Developing Economies (EMDEs)		
Andorra	Afghanistan	Germany	Palau
Australia	Albania	Ghana	Palestine
Austria	Algeria	Gibraltar	Panama
Belgium	American Samoa	Greenland	Papua New Guinea
Canada	Angola	Grenada	Paraguay
Croatia	Anguilla	Guadeloupe	Peru
Cyprus	Antigua and Barbuda	Guam	Philippines
Czech Republic	Armenia	Guernsey C.I.	Poland
Denmark	Aruba	Guatemala	Puerto Rico
Estonia	Azerbaijan	Guinea	Qatar
Finland	Bahamas	Guinea-Bissau	Republic of Congo
France	Bahrain	Guyana	Reunion
Germany	Bangladesh	Haiti	Romania
Greece	Barbados	Honduras	Russia
Hong Kong SAR	Belarus	Hungary	Rwanda
Iceland	Belize	India	Saint Helena
Ireland	Benin	Indonesia	Saint Pierre And Miquelon
Israel	Bermuda	Iran	Samoa
Italy	Bhutan	Iraq	Sao Tome And Principe
Japan	Bolivia	Isle Of Man	Saudi Arabia
Korea	Bosnia Herzegovina	Jamaica	Senegal
Latvia	Botswana	Jersey C.I.	Serbia
Liechtenstein	Brazil	Jordan	Seychelles
Lithuania	British Virgin Islands	Kazakhstan	Sierra Leone
Luxembourg	Brunei Darussalam	Kenya	Singapore
Macao SAR	Bulgaria	Kiribati	Sint Maarten
Malta	Burkina Faso	Kosovo	Solomon Islands
Netherlands	Burundi	Kuwait	Somalia
New Zealand	Cambodia	Kyrgyzstan	South Africa
Norway	Cameroon	Lao PDR	South Sudan
Portugal	Cape Verde	Lebanon	Sri Lanka
San Marino	Cayman Islands	Lesotho	St. Kitts and Nevis
Singapore	Central African Republic	Liberia	St. Lucia
Slovak Republic	Chad	Libya	St. Vincent and the Grenadines
Slovenia	Chile	Madagascar	Sudan
Spain	The Chinese Mainland	Malawi	Suriname
Sweden	Colombia	Malaysia	Syria
Switzerland	Comoros	Maldives	Tajikistan
Taiwan Province of China	Cook Islands	Mali	Tanzania
United Kingdom	Costa Rica	Marshall Islands	Thailand
United States	Côte d'Ivoire	Martinique	Timor-Leste
	Cuba	Mauritania	Togo
	Curacao	Mauritius	Tonga
	Democratic Republic Of Congo	Mayotte	Trinidad Tobago
	Djibouti	Mexico	Tunisia
	Dominica	Micronesia	Türkiye
	Dominican Republic	Moldova	Turkmenistan
	Ecuador	Monaco	Tuvalu
	Egypt	Mongolia	Uganda
	El Salvador	Montenegro	Ukraine
	Equatorial Guinea	Morocco	United Arab Emirates
	Eritrea	Mozambique	Uruguay
	Eswatini	Myanmar	Uzbekistan
	Ethiopia	Namibia	Vanuatu
	Falkland Islands	Nauru	Vatican City
	Fiji	Nepal	Venezuela
	Faroe Islands	Nicaragua	Vietnam
	French Guiana	Niger	Virgin Islands, U.S.
	French Polynesia	Nigeria	Wallis And Futuna Islands
	Gabon	North Macedonia	Yemen
	Gambia	Northern Mariana Islands	Zambia
	Georgia	Oman	Zimbabwe

Notes: The Advanced Economies classification follows the World Economic Outlook (WEO). Emerging Market and Developing Economies (EMDEs) include EMDEs following the WEO classification and other territories available in the Swift database.

Table B.2: List of countries/territories across regions

Africa	**Americas**	**Asia**	**Europe**	**MECA**
Angola	Anguilla	American Samoa	Albania	Afghanistan
Benin	Antigua and Barbuda	Australia	Andorra	Algeria
Botswana	Argentina	Bangladesh	Austria	Armenia
Burkina Faso	Aruba	Bhutan	Belarus	Azerbaijan
Burundi	Bahamas	Brunei Darussalam	Belgium	Bahrain
Cameroon	Barbados	Cambodia	Bosnia Herzegovina	Djibouti
Cape Verde	Belize	The Chinese Mainland	Bulgaria	Egypt
Central African Republic	Bermuda	Cook Islands	Croatia	Georgia
Chad	Bolivia	Fiji	Cyprus	Iran
Comoros	Brazil	French Polynesia	Czech Republic	Iraq
Côte d'Ivoire	British Virgin Islands	Guam	Denmark	Israel
Democratic Republic of Congo	Canada	Hong Kong SAR	Estonia	Jordan
Equatorial Guinea	Cayman Islands	India	Faroe Islands	Kazakhstan
Eswatini	Chile	Indonesia	Finland	Kuwait
Ethiopia	Colombia	Japan	France	Lebanon
Gabon	Costa Rica	Kazakhstan	Germany	Libya
Gambia	Cuba	Kiribati	Gibraltar	Mauritania
Ghana	Curacao	Korea	Greece	Morocco
Guinea	Dominica	Lao PDR	Greenland	Oman
Guinea-Bissau	Dominican Republic	Macao SAR	Guernsey C.I.	Pakistan
Kenya	Ecuador	Malaysia	Hungary	Palestine
Lesotho	El Salvador	Maldives	Iceland	Qatar
Liberia	Falkland Islands	Marshall Islands	Ireland	Saudi Arabia
Madagascar	French Guiana	Micronesia	Isle Of Man	Somalia
Malawi	Grenada	Mongolia	Italy	Sudan
Mali	Guadeloupe	Myanmar	Jersey C.I.	Syrian Arab Republic
Mauritius	Guatemala	Nauru	Kosovo	Tajikistan
Mayotte	Guyana	Nepal	Latvia	Tunisia
Mozambique	Haiti	New Caledonia	Liechtenstein	Turkmenistan
Namibia	Honduras	New Zealand	Lithuania	United Arab Emirates
Niger	Jamaica	Northern Mariana Islands	Luxembourg	Uzbekistan
Nigeria	Martinique	Palau	Malta	Yemen
Reunion	Mexico	Papua New Guinea	Moldova	
Rwanda	Montserrat	Philippines	Monaco	
São Tomé Príncipe	Nicaragua	Samoa	Montenegro	
Senegal	Panama	Sao Tome & Principe	Netherlands	
Seychelles	Paraguay	Singapore	North Macedonia	
Sierra Leone	Peru	Solomon Islands	Norway	
South Africa	Puerto Rico	Sri Lanka	Poland	
South Sudan	Saint Eustatius & Saba	Taiwan Province of China	Portugal	
Tanzania	Saint Pierre & Miquelon	Thailand	Republic of Serbia	
Togo	Saint Vincent	Timor-Leste	Romania	
Uganda	Sint Maarten	Tonga	Russian Federation	
Zambia	St. Kitts & Nevis	Tuvalu	San Marino	
Zimbabwe	St. Lucia	Vanuatu	Slovakia	
	Suriname	Vietnam	Slovenia	
	Trinidad Tobago	Wallis & Futuna Islands	Spain	
	Turks & Caicos Islands		Sweden	
	United States		Switzerland	
	Uruguay		Türkiye	
	Venezuela		Ukraine	
	Virgin Islands, U.S.		United Kingdom	
			Vatican City	

Notes: The Americas region includes North America, Latin America & the Caribbean. The MECA region includes the Middle East and Central Asia.

Table B.3: Summary statistics for key economic variables

Variable	Mean	Std. Dev.	p25	Median	p75	Source	Start date	End date
Imports (US$ million)	1240	9810	0.611	14.5	174	IMF DOTS	2020	2023
Portfolio Flows (US$ million)	7660	74100	0	5.3	222	IMF CPIS	2020	2023
FDI (US$ million)	4660	39700	0	2	229	IMF CDIS	2020	2023
Fragmentation index	0.41	0.22	0.26	0.31	0.63	Fernández-Villaverde et al. (2024)	2020Q4	2024Q1
Geopolitical risk index	122.9	36.9	102	120.9	135.5	Caldara & Iacoviello (2022)	2020Q4	2024Q4
UNGA ideal point distance	0.89	0.73	0.26	0.68	1.45	Bailey et al. (2017)	2020	2023

Notes: This table presents summary statistics for key economic variables, including Swift payments, trade, portfolio investment holdings, FDI positions, common fragmentation, geopolitical risk index, and UNGA ideal point distance. Values represent means, standard deviations, and percentiles (25th, median, 75th). The source column specifies data origin, while Start date and End date indicate the period covered.

Table B.4: Aggregate payments with alternative fixed effects

	Total payments	Financial institutions	Customers
	(1)	(2)	(3)
Imports	0.039	0.043	0.081**
	(0.028)	(0.034)	(0.036)
Portfolio inv.	0.088**	0.111**	0.029
	(0.040)	(0.050)	(0.017)
FDI	0.031**	0.039***	-0.020
	(0.013)	(0.015)	(0.017)
Corridor FE	✓	✓	✓
Originator × Year FE	✓	✓	✓
Beneficiary × Year FE	✓	✓	✓
Observations	21376	14307	21376
Originator economies	63	63	63
Beneficiary economies	186	175	186

Notes: This table reports the estimation results from Equation 1 using Poisson pseudo-maximum likelihood (PPML). The dependent variable is the level of bilateral cross-border payments in US$. Except for the gravity indicators (0/1), all explanatory bilateral variables enter the analysis in logarithms. The results are shown for all payments (columns 1), financial institution payments (column 2), and customer payments (columns 3). All payments denote the sum of financial institution payments and customer payments in each corridor. Standard errors in parentheses are double clustered at the originator and beneficiary economy level with $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$.

Table B.5: Aggregate payments - total trade

	Total payments (1)	Financial institutions (2)	customers (3)
Total Trade	0.328***	0.324***	0.276***
	(0.070)	(0.070)	(0.106)
Investment	0.204**	0.205**	0.210***
	(0.082)	(0.093)	(0.067)
FDI	0.151***	0.153***	0.132***
	(0.047)	(0.050)	(0.033)
Distance	-0.005	0.023	-0.196**
	(0.081)	(0.088)	(0.099)
Language	0.010	-0.024	0.182
	(0.151)	(0.166)	(0.136)
Colony	-0.054	-0.060	-0.157
	(0.189)	(0.211)	(0.165)
Originator FE	✓	✓	✓
Beneficiary FE	✓	✓	✓
Year FE	✓	✓	✓
Observations	21353	14851	21353
Originator economies	63	63	63
Beneficiary economies	187	184	187

Notes: The table reports estimation results from Equation 1 using total trade (imports + exports) within corridors and using Poisson pseudo-maximum likelihood (PPML). The dependent variable is the level of bilateral cross-border payments in US$. Except for gravity indicators (0/1), all explanatory bilateral variables enter in logarithms. The results are for all payments (column 1), financial institution payments (column 2), and customer payments (column 3). Standard errors in parentheses are double clustered at the originator and beneficiary economy level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B.6: Aggregate payments with no intra-EU flows

	Total payments (1)	Financial institutions (2)	Customers (3)
L.Imports	0.170**	0.131*	0.250**
	(0.069)	(0.077)	(0.098)
L.Investment	0.260**	0.299**	0.071*
	(0.117)	(0.143)	(0.038)
L.FDI	0.212***	0.220***	0.181***
	(0.076)	(0.085)	(0.035)
Distance	-0.058	-0.044	-0.223***
	(0.073)	(0.084)	(0.085)
Language	0.188***	0.185**	0.207
	(0.061)	(0.084)	(0.132)
Colony	0.004	-0.005	0.080
	(0.159)	(0.180)	(0.202)
Originator FE	✓	✓	✓
Beneficiary FE	✓	✓	✓
Year FE	✓	✓	✓
Pseudo R^2	0.951	0.929	0.981
Observations	19624	12569	19624
Originator economies	62	62	62
Beneficiary economies	187	181	187

Notes: This table reports the estimation results from Equation 1 using Poisson pseudo-maximum likelihood (PPML). The dependent variable is the level of bilateral cross-border payments in US$. Except for the gravity indicators (0/1), all explanatory bilateral variables enter in logarithms. The results are for total payments (column 1), financial institution payments (column 2), and customer payments (column 3). Standard errors in parentheses are double clustered at the originator and beneficiary economy level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B.7: Main results without inter-bloc interaction

	Financial institutions				Customers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Common Fragmentation	-0.053***				-0.022***			
	(0.016)				(0.007)			
Financial Fragmentation		-0.051***				-0.025***		
		(0.014)				(0.006)		
Trade Fragmentation			-0.055***				-0.020**	
			(0.013)				(0.008)	
Geopolitical Risk				-0.004				-0.008**
				(0.005)				(0.003)
Corridor FE	✓	✓	✓	✓	✓	✓	✓	✓
Originator × Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Beneficiary × Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Observations	122671	122671	122671	139802	302520	302520	302520	345919
No of Originator	184	184	184	184	185	185	185	185
No of Beneficiary	184	184	184	184	187	187	187	187

Notes: Notes: Standard errors in parentheses are double clustered at the originator and beneficiary economy level with $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$.

Table B.8: Fragmentation across buckets and between blocs

	Panel A. Financial institutions										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Common Fragmentation	-0.001	0.030*	0.004	0.011	0.005	-0.004	0.018***	0.027**	-0.006	-0.011	-0.063***
	(0.015)	(0.018)	(0.014)	(0.015)	(0.016)	(0.006)	(0.001)	(0.012)	(0.010)	(0.009)	(0.018)
Common Fragmentation × InterBloc	-0.117**	-0.179***	-0.139***	-0.113***	-0.098***	-0.016	-0.005	0.056**	0.018**	0.044	0.024
	(0.052)	(0.065)	(0.047)	(0.031)	(0.021)	(0.026)	(0.019)	(0.024)	(0.008)	(0.035)	(0.035)
Geopolitical Risk	0.005	0.009	0.011*	0.009	0.006	0.004	-0.005	-0.008**	0.003	-0.003	-0.006
	(0.004)	(0.006)	(0.006)	(0.006)	(0.005)	(0.004)	(0.003)	(0.004)	(0.003)	(0.002)	(0.005)
Geopolitical Risk × InterBloc	-0.021*	0.001	0.005	0.004	-0.019	-0.006	0.010	0.027**	0.022***	0.030***	0.030***
	(0.011)	(0.017)	(0.015)	(0.019)	(0.015)	(0.012)	(0.009)	(0.011)	(0.006)	(0.008)	(0.002)
Corridor FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Originator × Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Beneficiary × Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	68103	52345	54569	58455	61786	63274	67167	42847	48720	34736	23914
No of Originator	177	175	179	177	176	179	178	171	177	160	127
No of Beneficiary	178	178	177	177	174	178	178	177	175	165	137
Buckets	0-500	500-2500	2500-10K	10K-25K	25K-50K	50K-100K	100K-500K	500K-1M	1M-10M	10M-50M	50M-Above

	Panel B. Customers										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Common Fragmentation	0.006	0.017**	0.012	0.010	0.004	-0.005	-0.005	0.003	-0.001	-0.000	-0.035***
	(0.011)	(0.009)	(0.010)	(0.010)	(0.009)	(0.006)	(0.007)	(0.006)	(0.005)	(0.009)	(0.009)
Common Fragmentation × InterBloc	0.003	-0.007	-0.007	-0.014	-0.023**	-0.021*	-0.028***	-0.024*	-0.022	-0.029	-0.051
	(0.022)	(0.010)	(0.008)	(0.010)	(0.011)	(0.012)	(0.010)	(0.013)	(0.016)	(0.032)	(0.039)
Geopolitical Risk	0.001	0.003	0.004	0.003	0.002	0.003	0.001	-0.002	0.001	0.001	-0.000
	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)	(0.005)
Geopolitical Risk × InterBloc	0.003	-0.003	-0.004	-0.010**	-0.013**	-0.008*	0.000	0.001	-0.009	-0.017	0.023**
	(0.010)	(0.006)	(0.006)	(0.005)	(0.006)	(0.004)	(0.006)	(0.006)	(0.006)	(0.015)	(0.011)
Corridor FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Originator × Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Beneficiary × Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	191897	226812	230997	203160	179134	164714	158572	91457	80681	29981	13286
No of Originator	184	184	184	184	184	184	184	183	179	154	102
No of Beneficiary	185	185	185	185	185	183	184	182	180	149	109
Buckets	0-500	500-2500	2500-10K	10K-25K	25K-50K	50K-100K	100K-500K	500K-1M	1M-10M	10M-50M	50M-Above

Notes: Standard errors in parentheses are double clustered at the originator and beneficiary economy level with $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$.

Table B.9: Currencies and buckets

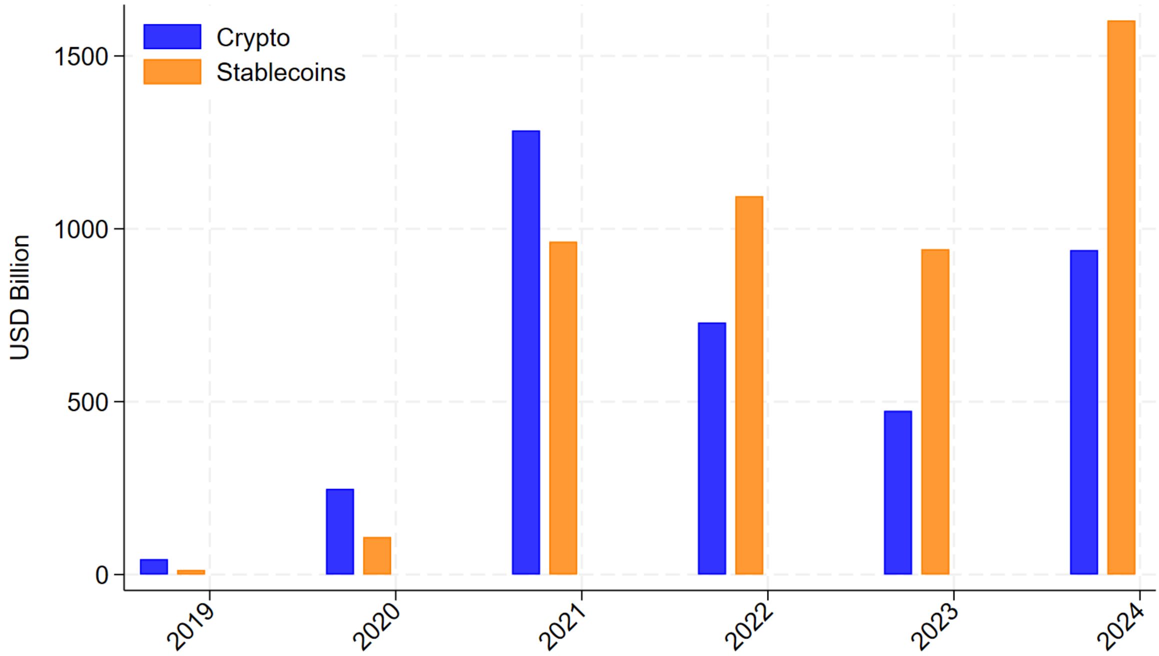
					Panel A. Financial institutions						
					Panel A.1. USD						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Common Fragmentation	0.009	0.035	-0.008	0.021	0.015	-0.004	0.023	0.032	0.008	0.002	-0.052***
	(0.031)	(0.030)	(0.026)	(0.030)	(0.024)	(0.010)	(0.014)	(0.027)	(0.022)	(0.017)	(0.016)
Observations	74368	57108	59543	63618	67076	68687	72992	46742	53260	38024	25986
No of Originator	178	177	180	179	177	180	179	172	178	164	130
No of Beneficiary	180	179	179	178	176	180	179	178	176	167	138
					Panel A.2. CNY						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Common Fragmentation	0.058	0.109	0.117**	0.068	0.023	-0.030	0.148*	0.064	0.029	0.025	0.336***
	(0.071)	(0.067)	(0.057)	(0.044)	(0.031)	(0.046)	(0.082)	(0.040)	(0.038)	(0.025)	(0.111)
Observations	2931	2428	3159	3794	4428	5238	7516	5999	7450	5975	3637
No of Originator	62	52	67	71	73	82	94	74	85	67	48
No of Beneficiary	67	62	79	87	87	91	97	74	77	61	43
Corridor FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Originator × Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Beneficiary × Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Buckets	0-500	500-2500	2500-10K	10K-25K	25K-50K	50K-100K	100K-500K	500K-1M	1M-10M	10M-50M	50M-Above

					Panel B. Customers						
					Panel B.1. USD						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Common Fragmentation	0.018	0.029***	0.015	0.012	0.002	-0.018**	-0.022**	-0.014	-0.011	-0.014*	-0.055***
	(0.013)	(0.011)	(0.011)	(0.010)	(0.010)	(0.009)	(0.011)	(0.010)	(0.008)	(0.008)	(0.012)
Observations	210406	248452	253167	222638	196209	180351	173593	100247	88395	32869	14420
No of Originator	185	185	185	185	185	185	185	184	181	155	104
No of Beneficiary	186	186	186	187	186	184	185	183	182	152	111
					Panel B.2. CNY						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Common Fragmentation	0.213***	0.218***	0.253***	0.257***	0.205***	0.141***	0.085***	0.052***	0.037	0.035	-0.011
	(0.000)	(0.000)	(0.000)	(0.023)	(0.024)	(0.022)	(0.018)	(0.019)	(0.029)	(0.033)	(0.053)
Observations	3118	3845	4597	4502	4343	4419	5668	3534	4234	2304	1334
No of Originator	98	110	117	113	108	108	110	80	79	45	26
No of Beneficiary	56	59	63	65	62	61	68	46	49	32	21
Corridor FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Originator × Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Beneficiary × Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Buckets	0-500	500-2500	2500-10K	10K-25K	25K-50K	50K-100K	100K-500K	500K-1M	1M-10M	10M-50M	50M-Above

Notes: Standard errors in parentheses are double clustered at the originator and beneficiary economy level with $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$.

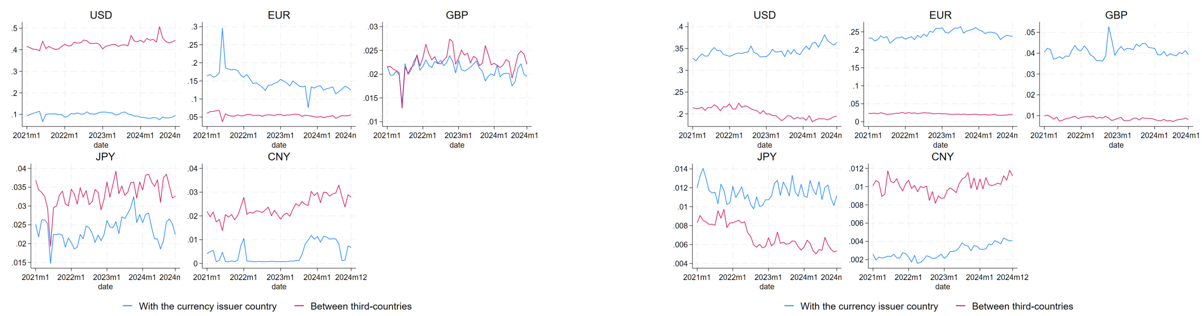
C Figures

Figure C.1: Crypto Assets Cross-Border Flows



Notes: Crypto cross-border payments include Bitcoin and Ethereum; Stablecoin cross-border payments include USDT and USDC.
Sources: Chainalysis and authors' calculations.

Figure C.2: Within issuer vs between third-economy

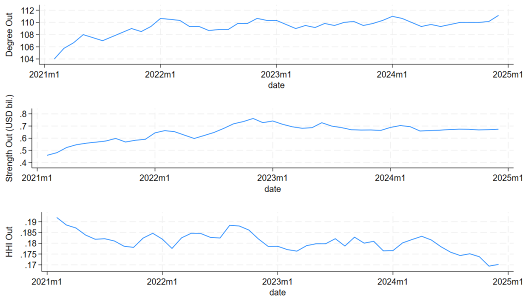


(a) Financial institutions

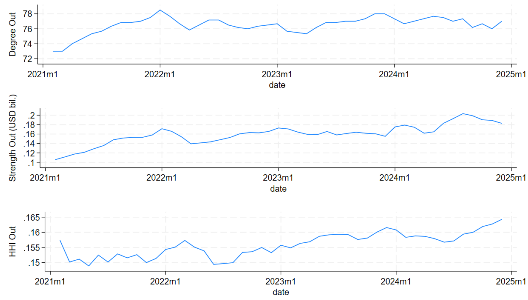
(b) Customers

Notes: The blue line represents the share of a given currency used in transactions with its issuing economy as a percentage of total transactions within each payment type. The red line indicates the share of a given currency used in transactions between third-economy originators and beneficiaries, excluding the issuing economy. For USD, GBP, JPY, and CNY, the issuing economies are the United States, the United Kingdom, Japan, and the Chinese mainland, respectively. For EUR, we consider all Euro area economies as the issuer.

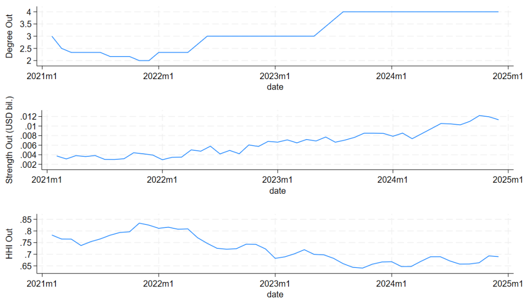
Figure C.3: Evolution of network statistics: customer payments



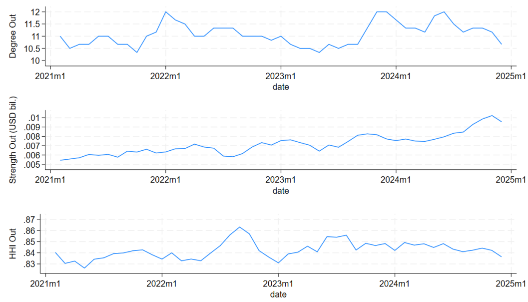
(a) USD



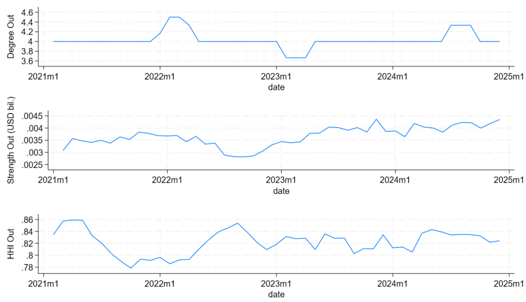
(b) EUR



(c) CNY

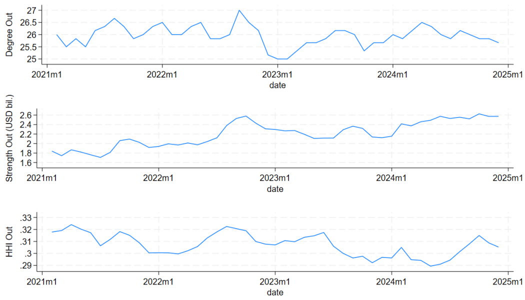


(d) GBP

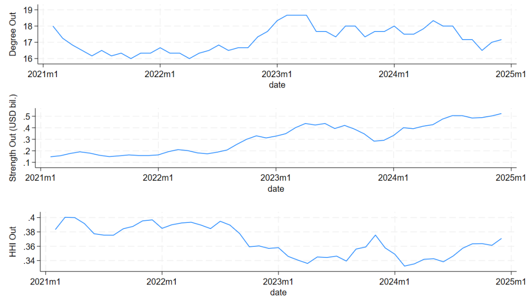


(e) JPY

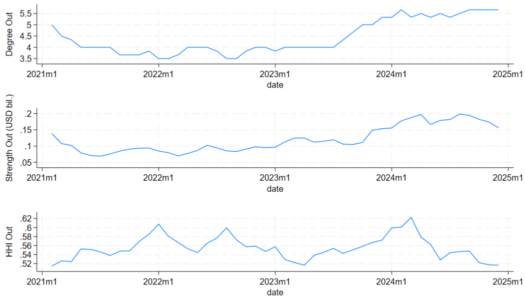
Figure C.4: Evolution of network statistics: financial institution payments



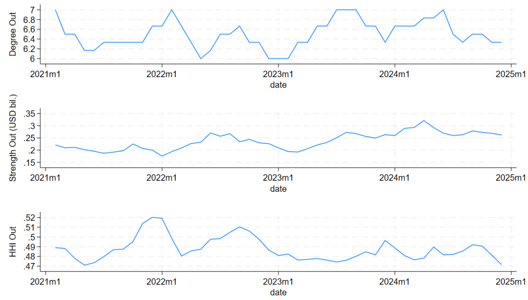
(a) USD



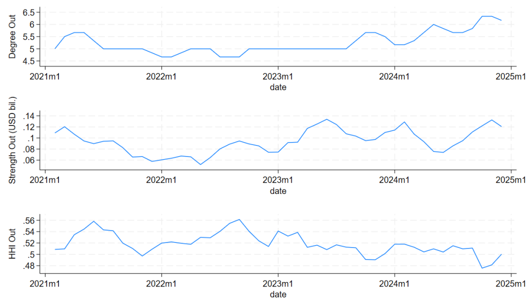
(b) EUR



(c) CNY

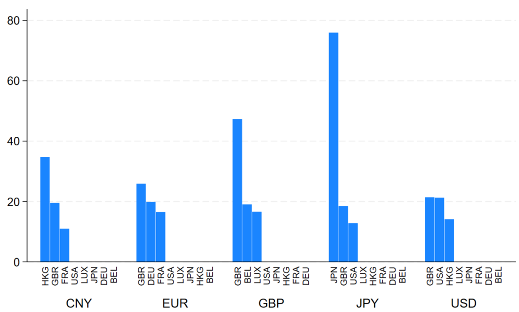


(d) GBP

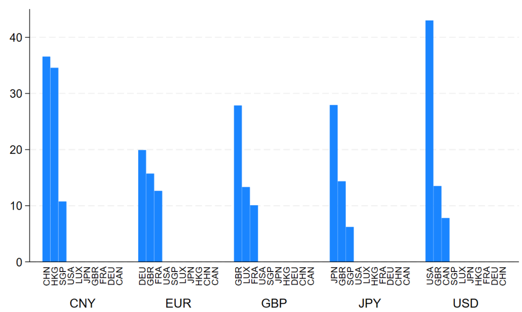


(e) JPY

Figure C.5: Centrality of economies in networks by currencies

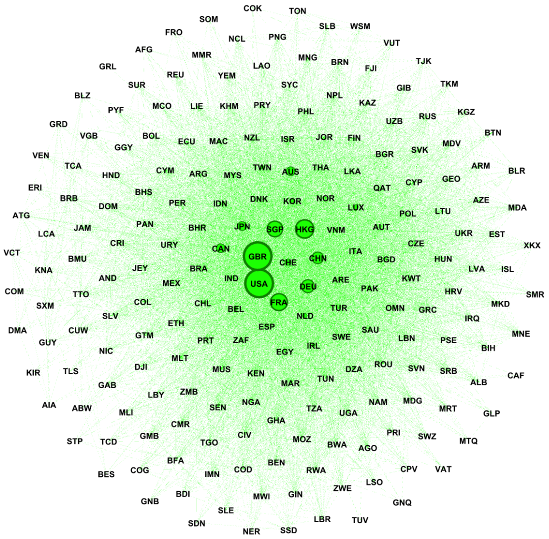


(a) Financial institutions

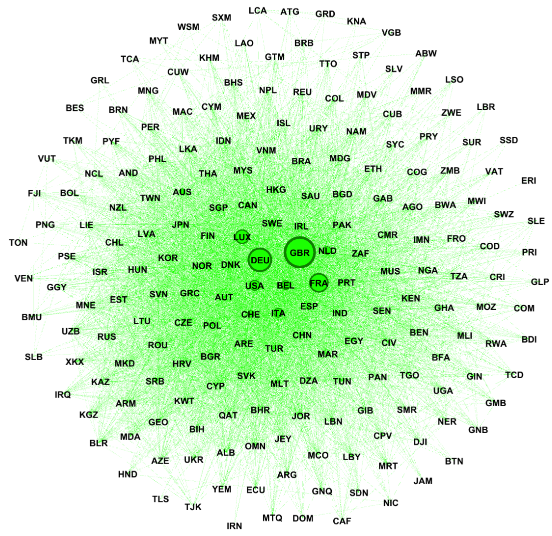


(b) Customers

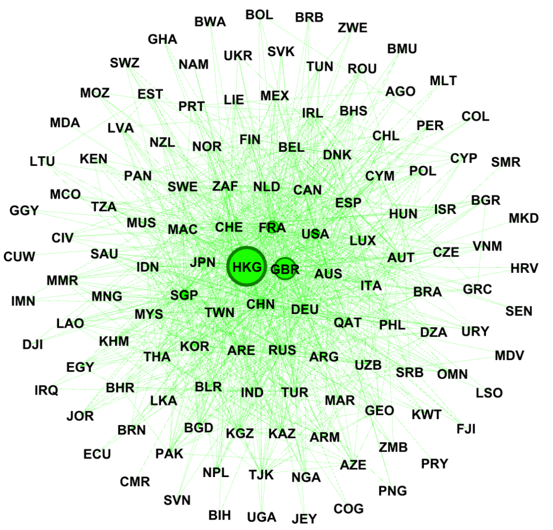
Figure C.6: Networks by currency - financial institution payments



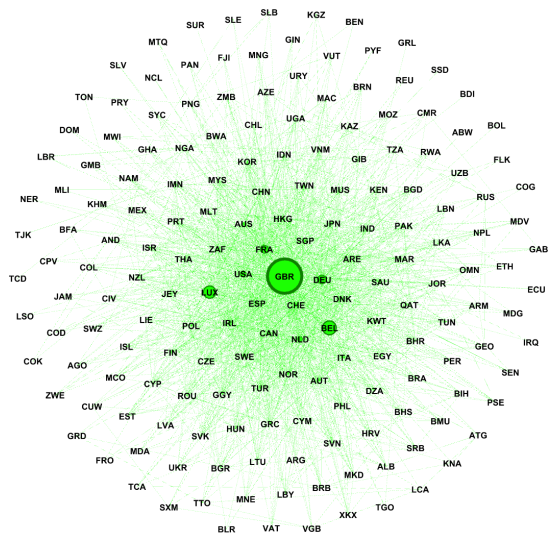
(a) USD



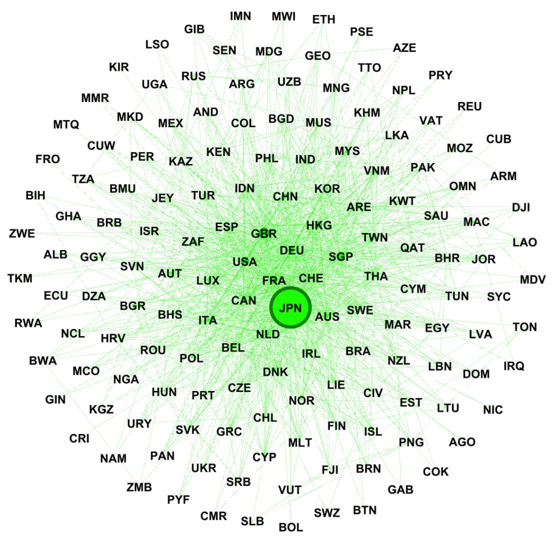
(b) EUR



(c) CNY



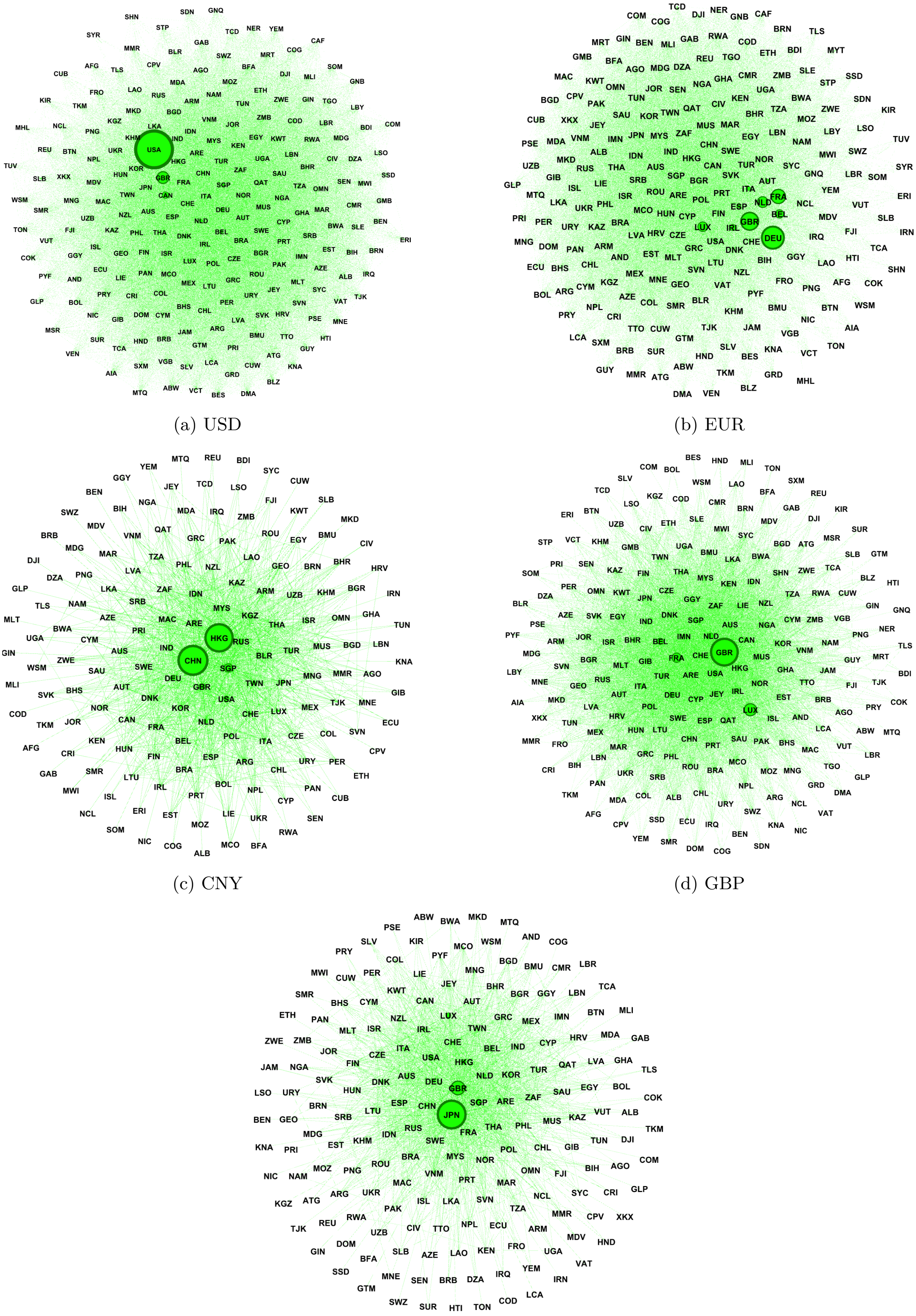
(d) GBP



(e) JPY

Notes: The figure illustrates payments from originator to beneficiary economies without depicting intermediaries and is generated using the Fruchterman-Reingold algorithm for each SDR currencies. Node sizes are determined by the Katz-Bonacich centrality of each economy. Edges between nodes are represented by green lines.

Figure C.7: Networks by currency - customer-related payments



(a) USD

(b) EUR

(c) CNY

(d) GBP

(e) JPY

Notes: The figure illustrates payments from originator to beneficiary economies without depicting intermediaries and is generated using the Fruchterman-Reingold algorithm for each SDR currencies. Node sizes are determined by the Katz-Bonacich centrality of each economy. Edges between nodes are represented by green lines.

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PUBLICATIONS

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Working Paper No. WP/2025/120