



BANCA D'ITALIA
EUROSISTEMA

Mercati, infrastrutture, sistemi di pagamento

(Markets, Infrastructures, Payment Systems)

The Architecture of Cross-Border Finance:
Fifty Years of Evolution from National Segmentation
to Fragmented Globalization

by Cristina Di Luigi and Antonio Perrella



BANCA D'ITALIA
EUROSISTEMA

Mercati, infrastrutture, sistemi di pagamento

(Markets, Infrastructures, Payment Systems)

The Architecture of Cross-Border Finance:
Fifty Years of Evolution from National Segmentation
to Fragmented Globalization

by Cristina Di Luigi and Antonio Perrella

Number 92 – September 2026

The papers published in the 'Markets, Infrastructures, Payment Systems' series provide information and analysis on aspects regarding the institutional duties of Banca d'Italia in relation to the monitoring of financial markets and payment systems and the development and management of the corresponding infrastructures in order to foster a better understanding of these issues and stimulate discussion among institutions, economic actors and citizens.

The views expressed in the papers are those of the authors and do not necessarily reflect those of Banca d'Italia.

The series is available online at www.bancaditalia.it.

*Printed copies can be requested from the Paolo Baffi Library:
richieste.pubblicazioni@bancaditalia.it.*

Editorial Board: STEFANO SIVIERO, PAOLO DEL GIOVANE, MASSIMO DORIA,
GIUSEPPE ZINGRILLO, PAOLO LIBRI, GUERINO ARDIZZI, PAOLO BRAMINI, FRANCESCO COLUMBA,
LUCA FILIDI, TIZIANA PIETRAFORTE, ALFONSO PUORRO, ANTONIO SPARACINO.

Secretariat: YI TERESA WU.

ISSN 2724-6418 (online)
ISSN 2724-640X (print)

Banca d'Italia
Via Nazionale, 91 - 00184 Rome - Italy
+39 06 47921

Designed and printing by the Printing and Publishing Division of Banca d'Italia

THE ARCHITECTURE OF CROSS-BORDER FINANCE: FIFTY YEARS OF EVOLUTION FROM NATIONAL SEGMENTATION TO FRAGMENTED GLOBALIZATION

by Cristina Di Luigi* and Antonio Perrella*

Abstract

Cross-border payments and financial transactions are essential for global commerce, investment, and personal remittances. These flows rely on a network of Financial Market Infrastructures (FMIs) – including payment systems, trading venues, central counterparties, central securities depositories, and securities settlement systems – which have received limited attention in financial history and geography, despite their importance. Together with correspondent and custodian banks, FMIs collectively constitute what is referred to in this paper as the Architecture of Cross-border Finance (ACF). This paper analyzes the evolution of the ACF from the 1971 collapse of the Bretton Woods system to the present, focusing on the US and Europe. Using a historical and qualitative approach, it identifies four phases shaped by technology, policy and regulation, economic and political integration, and geopolitics. The analysis shows how the ACF evolved from fragmented national systems into an integrated global network and now faces renewed fragmentation, driven by strategic and geopolitical concerns. It argues that these developments may signal a transition from a Western-centric asymmetric architecture toward a more multipolar configuration reflecting broader shifts in global power.

JEL Classification: F30; F65; G15; N20.

Keywords: Cross-border finance; Financial Market Infrastructures (FMIs); global financial integration; geopolitics of finance; fragmentation.

Sintesi

I pagamenti e le transazioni finanziarie transfrontaliere sono essenziali per il commercio globale, gli investimenti e le rimesse personali. Tali flussi si basano su una rete di infrastrutture dei mercati finanziari (Financial Market Infrastructures, FMIs) – tra cui sistemi di pagamento, sedi di negoziazione, controparti centrali, depositari centrali di titoli e sistemi di regolamento titoli – che, nonostante la loro importanza, hanno ricevuto un'attenzione limitata nella letteratura di storia e geografia finanziaria. Insieme alle banche corrispondenti e di custodia, queste entità costituiscono collettivamente quella che in questo lavoro viene definita l'“architettura della finanza transfrontaliera” (Architecture of Cross-border Finance, ACF). Lo studio analizza l'evoluzione dell'ACF dal collasso del sistema di Bretton Woods nel 1971 fino a oggi, concentrandosi sugli Stati Uniti e sull'Europa. Adottando un approccio storico e qualitativo, individua quattro fasi plasmate dalla tecnologia, dalle politiche pubbliche e dalla regolamentazione, dall'integrazione politica ed economica e dalla geopolitica. L'analisi

* Banca d'Italia, Directorate General for Payments and Market Infrastructures.

mostra come l'ACF sia evoluta da un insieme di sistemi nazionali frammentati a una rete globale integrata e come tale assetto si confronti oggi con nuove spinte alla frammentazione, alimentate da considerazioni strategiche e geopolitiche, e sostiene che tali sviluppi possano segnalare una transizione da un'architettura asimmetrica incentrata sull'Occidente verso una configurazione più multipolare, riflettendo più ampi mutamenti negli equilibri di potere globali.

CONTENTS

1. INTRODUCTION	7
2. ANALYTICAL FRAMEWORK	8
3. TECHNOLOGY	10
4. PUBLIC POLICY AND REGULATION	12
5. POLITICAL AND ECONOMIC INTEGRATION	14
6. GEOPOLITICS	18
7. EVALUATION AND FUTURE OUTLOOK	21
8. CONCLUSIONS	23
REFERENCES	25
TABLES	31

1. Introduction¹

For many businesses, individuals and government agencies, engaging in financial transactions across borders and currencies is a vital activity. Investors from one country who wish to invest in assets located in another must be able to transfer funds across borders and receive the selected securities. Companies serving international customers and sourcing goods from overseas suppliers need to receive payments from those customers and make payments to those suppliers. Similarly, many people rely on the ability to readily send or receive cross-border payments, such as migrants who send money to families in their home countries or individuals who make online purchases from foreign retailers.

Since the 19th century, all of this has been made possible by the operations of a few major global institutions acting as correspondent and custodian banks and leveraging key Financial Market Infrastructures (FMIs) – including payment systems, which enable the transfer of funds among participants; trading venues, which facilitate the buying and selling of financial instruments and support price discovery; central counterparties (CCPs), which centralize and manage counterparty risk in derivative and securities markets; central securities depositories (CSDs), which ensure the safekeeping and transfer of securities; and securities settlement systems, which finalize the settlement of securities either free of payment or against payment.

Notwithstanding their key role in the functioning of the global financial system, FMIs have received scant attention in financial history and geography so far. This paper aims to shed light primarily on their evolution, focusing on the US and Europe given the centrality of their currencies in global finance.² Also integral to the analysis are correspondent and custodian banks, which, though not FMIs themselves, play a central role by offering accounts and indirect access to FMIs for other financial intermediaries. In this paper we collectively refer to all these entities as components of the “Architecture of Cross-border Finance” (ACF, hereinafter).

We analyze the period following the 1971 collapse of the Bretton Woods system, identifying four key phases in the evolution of the ACF. The first, from 1971 to 1989, marked a shift towards a more flexible, market-driven global financial system. The second, from 1990 to 2008, was characterized by the development of global and regional FMIs and increasing concentration, leading to more seamless interconnection in the global financial system but also culminating in the 2008 Global Financial Crisis (GFC) as a manifestation of rising systemic risks. The third, from 2009 to 2019, saw growing concerns about these risks and increased awareness of the geopolitical relevance

¹ Any views expressed in this paper are the authors’ and do not necessarily represent those of the Bank of Italy. We are grateful to (in alphabetical order) Luca Arciero, Federico Barbiellini, Emanuela Cerrato, Luca Filidi, Luca Filippa, Giuseppe Grande and Barbara Lupi, for their valuable comments and suggestions. We express our sincere gratitude to the participants of the 2025 International Conference on Cross-Border Payments in Historical Perspective at the University of Oxford, and to the participants of the Consob-Sapienza Academic Seminar on New Frontiers in Financial Markets and Regulation, for their comments and suggestions. All the errors are our own.

² The dollar continues to occupy a structurally dominant position in global money and finance. Its share of global foreign-exchange reserves stands at 58%, dwarfing that of the euro at 20%, and underscoring the absence of any credible rival at the top of the international monetary hierarchy. Moreover, it leads across virtually every dimension of international financial activity – international bond and loan issuance, foreign-exchange trading, global exports invoicing – followed by the euro (European Central Bank, 2025).

of FMIs. The last, covering the 2020s, has been marked by the interplay of disruptive global events, rapid technological advancement, and efforts to foster trade development and financial inclusion.

Drawing on a historical and qualitative approach that relies on content analysis of a wide range of sources (spanning governmental reports, policy documents, academic literature, and industry analyses), we trace how four key factors shaping the ACF – namely, technology, public policy and regulation, political and economic integration, and geopolitical dynamics – have played out over time and demonstrate that the evolution of FMIs has followed a trajectory from fragmented, nation-based systems to a more integrated global network, with recent years showing new signs of fragmentation driven by geopolitical considerations. More to the point, the analysis leads us to argue that the ACF may be transitioning from a global asymmetric network, where financial flows, and hence power, were concentrated in the hands of a few financial institutions and infrastructures, primarily in the US and Europe, to a more multipolar network shaped along geopolitical lines. Compared to other studies that focus specifically on payment systems (Brandl and Dieterich, 2023; Schenk, 2024) or trade exchanges (Petry, 2021; Camboni and Porcellacchia, 2021), our analysis takes a broader view of financial infrastructures, thus providing a more comprehensive perspective on the evolution of FMIs. Further to this, by synthesizing the evolution of FMIs with geopolitical analysis and focusing on the tension between integration and fragmentation, we offer fresh insights into how FMIs have been shaped not only by economic and technological forces, but also by strategic geopolitical considerations.

The rest of the paper is structured as follows. Section 2 outlines our analytical framework. Sections 3 to 6 are devoted to each of the four key factors mentioned above, highlighting key related developments in the period under analysis. Taking a more holistic perspective, Section 7 assesses how these factors have interacted over time and identifies key trends likely to influence the future development of FMIs. Section 8 concludes.

2. Analytical framework

Exploring the evolution of FMIs over a period exceeding five decades presents significant analytical and methodological challenges. To render this broad inquiry tractable, we adopt a structured periodization approach and identify four key factors that have shaped the development of FMIs over time.

Periodization is a fundamental tool in historical research as it allows organizing complex and often overlapping developments into coherent analytical units (Lieberman, 2001). It facilitates the identification of patterns of continuity and change, as well as the establishment of causal and comparative relationships across time. While such divisions are inherently interpretive and risk oversimplification, we ground our periodization in widely recognized shifts in the global economic landscape. The year 1989 marks the onset of a new phase of globalization following the collapse of communist regimes in Eastern Europe, a transition extensively documented in the literature on post-Cold War economic integration and the expansion of global value chains (e.g., Sachs and Warner, 1995; Baldwin, 2016). The 2008 GFC represents a second structural break, widely treated as a watershed moment exposing the fragilities of finance-led growth and triggering lasting changes in

trade, capital flows, output and employment (Reinhart and Rogoff, 2009; Obstfeld, 2012; Ball 2014). Finally, the period beginning around 2020 is defined by the onset of the COVID-19 pandemic, which acted as a powerful exogenous shock accelerating the reconfiguration of global value chains, prompting a partial retreat from "hyper-globalization" toward greater emphasis on supply chain resilience and reshoring (Antràs, 2020; Baldwin and Freeman, 2022). At the same time, the pandemic functioned as a catalyst for digital transformation, compressing years of technological adoption into a matter of months. These developments unfold against the backdrop of the growing maturity and diffusion of distributed ledger technologies (DLT) applied to finance – from asset issuance and trading to post-trade clearing and settlement – marking one of the most significant structural innovations of the period (BIS, 2022; 2025).

Therefore, the four sub-periods covering 1971-1989, 1990-2008, 2009-2019 and 2020 to present day provide the heuristic framework enabling our structured analysis.

Across these sub-periods, we examine four interrelated factors that have significantly influenced the trajectory of FMI evolution: technology, public policy and regulation, political and economic integration, and geopolitics. Rather than ranking these factors in terms of relative importance, our objective is to trace their development across the identified sub-periods and examine their combined implications for the ACF. A particular contribution of this framework is its explicit incorporation of political and geopolitical dimensions – factors often underexplored in more technical analyses of FMIs.

Underlying our work is the hypothesis that, while the ACF remains highly concentrated, it has become less asymmetric over time. Since the 18th century, the financial infrastructure underpinning cross-border payments has been dominated by the correspondent banking model (Schenk, 2021), which is based on an arrangement whereby one bank (correspondent) holds deposits owned by other banks (respondents), and provides those banks with payment and other services (CPMI, 2016a). From the 1970s to the 2000s, as international trade expanded, correspondent banking became crucial for facilitating cross-border payments, foreign exchange transactions, and trade finance. Major correspondent banks, especially in New York and London, became hubs for global transactions, forming relationships with smaller or local banks in different countries. Just as cross-border transactions have largely been facilitated by such a small, core group of large financial institutions, the infrastructure supporting payments, settlement, and the clearing of cash and securities has been likewise highly centralized, relying on a few critical platforms (CPSS, 2008; IMF, 2010)³. This configuration has made countries exposed to specific financial hubs or "nodes" within the ACF. In the aftermath of the GFC, however, signs have emerged of increasing multipolarity and decline in structural asymmetries, such as the creation of new national financial messaging systems, the consolidation of regional FMIs, and the development of arrangements to facilitate cross-border payments.

³ For example, the Clearing House Interbank Payments System (CHIPS) in the US, the Clearing House Automated Payment System (CHAPS) in the UK, and T2 (previously called TARGET/TARGET2) in the EU play a central role in high-value payment processing (see Section 4); Payment vs Payment foreign exchange transactions are concentrated in CLS (Section 4); in the US, DTCC plays a crucial role in settling trades for both equities and bonds, while Clearstream and Euroclear are key infrastructure providers for securities settlement and safe-keeping in Europe (Section 5); and SWIFT provides standardized messaging across platforms (Section 6).

Table 1 summarizes the key trends in the evolution of the ACF before and after the GFC, providing empirical context for our hypothesis. The following sections examine this transformation in detail, analysing each underlying factor in turn.

[Table 1]

3. Technology

Technology has continuously shaped FMI's evolution, driving efficiency, security, and accessibility in financial transactions. Since the invention of the telegraph and the laying of the first transatlantic cable, technological innovation has played a crucial role in accelerating the flow of financial information, transactions, and payments. This trend has further intensified since the 1970s with the advent of electronic trading, automated clearinghouses, and more recently, digital fast payment systems.

The shift to electronic transactions in the capital markets began in the 1960s, marking a transition from traditional trading based on shouts, telephones and telegraphs to digital pricing and improved communication. One early provider of electronic quotes was Scantlin Electronics, allowing brokers to access market information via telephone or internet (Levecq and Weber, 1995). Before automation, markets relied on paper-based processes, leading to severe backlogs that could cause exchanges to shut down one day per week to manage delayed trades (ibid.). Technology became crucial for enabling higher trading volumes while maintaining market efficiency, automating clearing and settlement, and securely storing stock ownership records, with the dematerialization of securities significantly contributing to the rise of electronic trading systems (Hadad and Bratianu, 2019). NASDAQ pioneered electronic trading in 1971. In the 1980s, trading on digital platforms began to replace trading floors (Angelini, 2023), and other major global stock exchanges went full electronic in more recent times: the Tokyo Stock Exchange in 2003 and the New York Stock Exchange only in 2014. In the late 1990s, the electronification of markets, combined with major developments in information technology, led to the rise of high-frequency and algorithmic trading (HFT) (Brogaard, Hendershott and Riordan, 2014). By 2012, HFT trading had increased fivefold since the beginning of the century and accounted for around 50% of all US stock exchange trading volume (Goldstein, Kumar and Graves, 2014); similar growth was seen in the EU and Japan, where it accounted for 45% and 40% respectively (Popper, 2012).

Advances in information technology have also led to technical improvements in payment systems, beginning with the development of real-time gross settlement (RTGS) systems⁴ for large-value interbank funds transfers. Although this process gained momentum in the 1980s, the US was an early pioneer, launching its automated RTGS system, Fedwire, in 1970. By the end of the 1980s, six G10 countries had introduced RTGS systems or large-value transfer systems with an RTGS

⁴ A set of instruments, procedures and rules that allows the real-time settlement of payments, transfer instructions or other obligations individually on a transaction-by-transaction basis (CPMI-IOSCO, 2012).

facility (BIS, 1997)⁵, and additional RTGS systems were implemented in the 1990s, partly because having such a system became a prerequisite for joining the Economic and Monetary Union of the EU. With the start of the new millennium, the push for speed in payments extended to the retail segment, reflecting growing demand for quick transactions in a fast-paced environment. As of the early 2000s, retail fast payment systems started to emerge, allowing the availability of final funds to the payee in (near) real-time and on a 24/7 basis (CPMI, 2016b). Unlike the spread of RTGS systems, the early adoption of retail fast payment systems has not been dominated by advanced economies. Rather, emerging market economies appear to be embracing fast payments at a diffusion pace broadly comparable to that of advanced economies, likely due to the absence of legacy electronic retail payment infrastructure, which both raises the expected net benefits of implementation and simplifies decision-making lowering barriers to adoption (Bech, Shimizu and Wong, 2017). This interpretation is supported by comparative case studies, which show that several fast payment systems developed in emerging economies have achieved significant scale, promoted financial inclusion, and, in some instances, evolved into international reference models (Aurazo and Gasmi, 2024)⁶. Moreover, there is evidence from emerging economies of a causal link between fast payment systems roll-outs and stronger digital finance adoption (Cornelli et al., 2024)⁷. According to Frost et al. (2024), more than 100 jurisdictions have at least one fast payment system in operation.

More recently, the development of distributed ledger technologies (DLTs) has opened up new opportunities to redesign, innovate and improve the efficiency of FMIs, while also introducing a range of potential risks. DLT holds particular promise for payments and post-trade processes by streamlining workflows, lowering costs and improving both efficiency and security (Benos, Garratt and Gurrola-Perez, 2019) – an outcome achieved in part by reducing the number of intermediaries involved and the need for reconciliation between those that remain (Bech et al., 2020). For example, a DLT-based payment system enables transfer of money between participants by maintaining and updating a synchronised, distributed ledger, rather than relying on a central ledger maintained by a single institution. In such a system, participants can submit, validate and record transfers on the distributed ledger with little or no need for special intermediaries (Bech, Shimizu and Wong, 2017). Concerning risks, some of them are common to traditional market infrastructures – such as governance, legal, credit and liquidity, as well as custody and operational risks – others are intrinsic to the technology itself, including reduced transaction privacy due to high transparency, legal uncertainty (e.g. settlement finality) and possible regulatory conflicts, and fragmentation stemming from limited interoperability and the absence of common standards across competing systems (Priem, 2020).

One particular application of DLT that has attracted significant market interest relates to the issuance, trading and settlement of tokenized assets (OECD, 2020; BIS-CPMI, 2024; FSB, 2024). According to the Bank for International Settlements and its Committee on Payments and Market Infrastructures, tokenization is defined as the process of “*generating and recording a digital*

⁵ FA in the Netherlands (1985), RIX in Sweden (1986), SIC in Switzerland (1987), EIL-ZV in Germany (1987), BOJ-NET in Japan (1988) and BISS in Italy (1989).

⁶ Aurazo and Gasmi (2024) focuses on four case studies: UPI in India, Pix in Brazil, M-Pesa in Kenya, and Yape in Peru.

⁷ Cornelli et al. (2024) shows that the introduction of fast payment systems has a particularly large impact in emerging market and developing economies, especially when systems feature open membership, real-time settlement, and broad functionality (including person-to-government and business-to-business payments), and when the central bank plays an active operational role.

*representation of traditional assets on a programmable platform”*⁸ (BIS-CPMI, 2024, p. 6) , where the latter refers to the application of DLTs that allow for proposing, validating and recording updates to the ledger to perform specific functions (e.g. *Delivery-versus-Payment*, transfer of ownership). In other words, tokenization is the process of providing non-crypto, tangible or intangible assets with the programmable features typical of crypto-assets (Carapella, Swem and Gerszten, 2023), enabling automation and paving the way for conditional transfer of rights and the composability of transactions via smart contracts (Aldasoro et al., 2023). In the realm of payments, as illustrated by Garratt, Wilkens and Shin (2024), the tokenization of correspondent banking services could facilitate more efficient pre-screening and atomic settlement, while also improving customer verification and strengthening anti-money laundering (AML) processes. Tokenisation is also being explored by central banks, and in particular by the Eurosystem, for the provision of central bank money⁹ (Banu et al. 2026).

Although it remains uncertain whether DLT will see widespread adoption in the financial sector, its potential impact may be more significant – and arguably more likely – in countries with less modern or less efficient FMIs, lower levels of banking penetration, limited access to financial services, and high transaction costs. As observed with the adoption of retail fast payment systems, DLT could similarly act as a leapfrogging tool, enabling less developed markets to bypass certain stages of financial infrastructure development and transition directly to more advanced systems. Overall, this aligns with the view of a financial system in which the development of FMIs is no longer concentrated in a few advanced economies such as the US and Europe, but is instead more broadly distributed across a multipolar landscape.

4. Public policy and regulation

A key driver of the increasing concentration of activity in a few US- and UK-based financial institutions from the 1970s onward was the significant wave of deregulation in financial markets, particularly in the US. The pivotal event was the Nixon Shock of 1971, particularly the unilateral suspension of the US dollar’s convertibility into gold, which marked the end of the Bretton Woods system of fixed exchange rates and led to the rise of floating exchange rates, opening the door for more speculative trading, among other developments. Financial liberalization continued throughout the 1980s, particularly after the drastic monetary policy tightening led by the Federal Reserve to combat inflation in the early 1980s (so-called Volcker shock), which set the stage for a more market-driven approach to banking and lending. The Glass-Steagall Act, which had separated commercial and investment banking in the US, was partially repealed in the 1999 Gramm-Leach-Bliley Act, allowing banks to merge across sectors and take on more complex activities. The 1990s also saw the rise of securitization and a marked shift from “Originate to Hold” to “Originate to Distribute” model, where loans were converted into tradable securities, which became a key source of financial innovation and increased risk-taking. By the 2000s, derivatives markets exploded in size and

⁸ Traditional assets can be “tangible”, such as real estate and commodities, or “intangible”, such as intellectual property rights and traditional financial securities such as stocks and bonds.

⁹ The Pontes project, operating on a short- to medium-term horizon and with a Pilot phase planned for 2026, aims to connect DLT platforms with T2, the wholesale payment infrastructure currently used in the euro area, thus extending the use of central bank money to interbank DLT-based transactions. The Appia project has a broader, longer-term perspective, envisaging the creation of a fully DLT-based ecosystem for settling wholesale transactions in central bank money, including cross-border payments.

complexity, accompanied by the rise of hedge funds who gained a prominent role in capital markets. As the US financial sector became less regulated, institutions like Lehman Brothers took on enormous risks.

While deregulation allowed for more market-driven activities and the proliferation of new, often opaque, financial instruments, it also increased consolidation in financial markets, resulting in the creation of large, multinational financial conglomerates centralizing financial market activities. These institutions were increasingly "too big to fail," meaning their collapse would pose systemic risk to the entire financial system. Large financial institutions were able to lobby for favorable regulations or to bypass restrictions altogether, giving them even more control over financial markets. In parallel, FMIs became more centralized as securities and derivatives markets expanded, with clearing and settlement moving away from individual institutions or bilateral agreements toward more centralized systems. Over time, long and often opaque transaction chains formed, including in the central clearing space, where direct participants in CCPs started to provide client clearing services to their users, which in turn could act for their own clients, and so on (Di Luigi, Perrella and Ruggieri, 2024). The lack of adequate regulation in derivatives and risk management, combined with higher recourse to securitization, contributed to massive instability, culminating in the 2008 GFC.

The crisis brought increased attention to the flaws of centralized financial systems and prompted regulatory reforms aimed at improving their stability and resilience. Stringent international regulation in terms of AML and countering the financing of terrorism (CFT) was implemented to safeguard the integrity of the financial system, imposing higher compliance costs on banks. New regulations, such as those implemented within the Basel III framework, also introduced stricter capital requirements and liquidity standards for financial institutions, with spillover effects on trade finance, contributing to higher costs, reduced provision in emerging markets, and a widening global trade finance gap. While G20 leaders aimed to bring over-the-counter (OTC) derivatives into regulated exchanges and CCPs, FMIs themselves were subjected to stricter international standards, which were later incorporated by jurisdictions into their frameworks, with the adoption of the Principles for Financial Market Infrastructures (PFMIs) in 2012 (CPMI-IOSCO, 2012). These global standards aimed to ensure that systemically important FMIs could withstand economic shocks and operational disruptions, thereby safeguarding financial stability.

Stricter AML and CFT regulation, in particular, resulted in a de-risking process, with major banks withdrawing less remunerative correspondent services, especially toward countries with weaker or opaque governance processes and controls on illicit financing (FSB, 2017). A similar effect can be attributed to the increase in funding and liquidity costs for trade finance associated with Basel III regulations (International Finance Corporation, 2017). As a consequence, cross-border correspondent bank relationships declined significantly as correspondents selectively exited the business or reduced their number of respondents (Liu, 2017). Between 2011 and 2022 the number of active correspondents decreased by 30%, a reduction that in some regions reached almost 50%, while the number of active corridors decreased by more than 16%.¹⁰ Rice, von Peter and Boar (2020) identified three main implications of this process. First, some countries may face inadequate access to the global financial system, with the increased burden being borne by migrants, who would face cumbersome problems in sending remittances, which are a vital source of income for their families.

¹⁰ See [CPMI quantitative review of correspondent banking data – 2022](#).

Second, lower competition in correspondent banking could keep costs elevated. Third, if banks are not providing critical payment services users may resort to less regulated, unregulated or unsecured informal channels bringing significant risks for the financial system. The latter risk was highlighted in June 2019, when Facebook announced the launch of its new crypto-asset called Libra (initially envisioned as a multi-currency stablecoin) for general cross-border payments, which raised significant regulatory and financial stability concerns, as the number of active users at the time exceeded 2 billion.

In response to these criticalities, in 2020, the G20 launched a Roadmap with the goal of making cross-border payments faster, cheaper, more transparent and inclusive.¹¹ The rationale is that efficient cross-border payments could create a virtuous circle by supporting international trade and economic growth, which in turn could improve global development, social welfare and financial inclusion.¹² Due to the strong political will expressed by G20 countries, the Roadmap contributed to spark several initiatives to modernize domestic payment systems in particular in the realm of fast payments, laying the foundation for interlinking payment systems across borders (Di Iorio et al., 2025). In order to interlink, two payment systems have to be interoperable, meaning that they have to be compatible on technical (i.e. message standards and data exchange infrastructures), semantic (i.e. data framework) and business aspects (i.e. rules, rights and obligations) (Boar et al., 2021). Once operational, interlinking arrangements allow banks and other payment service providers to transact with each other, without requiring them to participate in the same payment system or use intermediaries (e.g. correspondent banks). Such arrangements can shorten transaction chains, reduce overall costs, and increase the transparency and speed of payments (CPMI, 2022).

At the time of writing, several bilateral interlinking arrangements are already in operation, particularly within the Asia-Pacific region (Reserve Bank of Australia, 2024) and many others are in an experimental stage. According to a CPMI survey (Lammer, Leppanen and Semorile, 2026), the number of fast payment systems planning to establish new links doubled in 2025, and 75% of these plans were reported by fast payment systems in the Asia-Pacific region, while most of the exploratory work was concentrated in the Middle East and Europe. All of this suggests that the Roadmap has been the catalyst of a positive trend towards harmonization of rules, legal requirements and technical standards, promoting financial integration.

5. Political and economic integration

Since the end of the Bretton Woods period, the world has seen an increasing trend towards integration, both economically and politically. Many countries have gradually moved towards the liberalization of capital controls, especially starting from the 1980s, which has allowed for greater cross-border investment and finance. This shift is even most apparent at the regional level, where countries have progressively formed trade agreements and established legal frameworks to liberalize

¹¹ In February 2020, the Governors and Finance Ministers of the G20 countries requested the Financial Stability Board, the Committee on Payments and Market Infrastructures and other institutions to present a Roadmap for improving cross-border payments, which was later adopted by the G20 Leaders in October of the same year.

¹² To achieve this, standard setting bodies and international organizations have brought forward a massive stream of policy work to progress on three main areas: improving interoperability and extension of payment systems, harmonizing legal, regulatory and supervisory frameworks, and harmonizing data exchange and message standards (see FSB, 2025).

the movement of goods, services, capital, and labor across borders. The 1990s were particularly crucial in this regard. Between 1990 and 1994, the World Trade Organization (WTO) was notified of thirty-three new regional trade agreements (RTAs), which almost doubled the total number of RTAs to sixty-eight. From 1995 and 2001, another 100 RTAs were formed, further emphasizing the momentum toward regional economic cooperation (Duina, 2006). Today, nearly every country is a member of at least one RTA, a testament to the widespread commitment to economic integration.

Economic and political integration have naturally paved the way for financial integration – a concept without a universally accepted definition or benchmark in the international finance literature. In practice, financial integration is most commonly understood in terms of the extent to which cross-border capital controls are relaxed or eliminated, allowing investors to operate more freely across jurisdictions. Conceptually, this process is often associated with the idea of increasingly complete markets, in which participants can access a broad range of financial instruments to manage risks irrespective of location. A complementary benchmark is provided by the “law of one price”, according to which, in more integrated and efficient markets, identical assets should not exhibit persistent price differentials beyond those justified by risk or transaction costs.

Donadelli, Gufler and Paradiso (2024) categorize measures of financial integration into two types: *de jure* and *de facto*. *De jure* measures track legal and regulatory changes made by governments to promote financial integration. These include reforms aimed at liberalizing capital controls, enabling cross-border investments, and regulating foreign financial institutions. Many studies that use these measures have found a significant increase in financial integration following the collapse of the Bretton Woods system, particularly from the 1980s to the GFC (Bekaert, Harvey and Lundblad, 2003; Chinn and Ito, 2008; Kaminsky and Schmukler, 2008). On the other hand, *de facto* measures of financial integration assess actual market behavior and the accessibility of financial markets, rather than focusing on legal frameworks. The latter measures can be divided into quantity-based and price-based indicators, both of which track the flow of investments and capital across borders. Studies using these measures similarly show a substantial increase in financial integration during the 1990s and early 2000s, with a marked decline following the GFC, and levels never returning to their pre-crisis highs (Ayuso and Blanco, 2001; Albuquerque, Loayza and Servén, 2005; Carrieri, Errunza and Hogan, 2007; Lehkonen, 2015; Lane and Milesi-Ferretti, 2018; Zaremba, Kambouris and Karathanasopoulos, 2019; Akbari, Ng and Solnik, 2020).

Against the backdrop of such increasing internationalization – though not necessarily full integration – it is unsurprising that Continuous Linked Settlement (CLS) was established in 2002. CLS – a clearing and settlement system that settles foreign exchange (FX) transactions in multiple currencies in central bank money – was created as a response to the increase in FX transactions driven by global trade, investment flows, and the deregulation of financial markets, in a context of floating exchange rates. A defining moment was the emergence of what the financial literature termed “Herstatt risk”, named after the collapse of the German bank *Bankhaus Herstatt* in 1974. The term refers to the risk that, in an FX transaction, one party settles its leg of the payment while the counterparty defaults before delivering the corresponding currency. CLS provided a solution to this type of risk, and therefore represented the banking industry’s contribution to the G10 strategy to reduce FX settlement risk, by offering a mechanism that ensured the simultaneous settlement of both sides of a transaction (*Payment-versus-Payment*, PvP), effectively eliminating settlement risk. The PvP settlement of FX transactions takes place through a complex mechanism that utilizes the RTGS

systems of the individual currencies traded, through which the multi-currency balances of the system's participants are settled in several stages. CLS Bank, established in 1999 in New York, was granted a specific banking license to focus solely on FX settlement activities, an arrangement that helped secure the support of central banks. By November 2002, 67 major financial institutions across 17 countries had joined the CLS system and become shareholders. As of today, CLS has 74 participants, enabling 31,000 correspondents, mainly investment funds, to settle their FX operations.

At the regional level, the EU stands as a leading example of economic and financial integration given both the depth and institutionalization of the process, having made remarkable strides in liberalizing the movement of goods, services, capital, and labor across its member states (Mattli, 1999). Between 1990 and 2007, the EU expanded considerably, completing its Single Market in 1992, which allowed for the unrestricted movement of goods, services, people, and capital. Financial integration was further supported by a series of key regulatory initiatives, such as the UCITS Directive (1985) and the Investment Services Directive (1993), which laid the groundwork for cross-border investment and the provision of financial services across the EU, followed by broader efforts such as the Financial Services Action Plan (1999) and the Lamfalussy Report (2001). The Giovannini Reports (2001 and 2003) were also instrumental, identifying barriers to efficient cross-border clearing and settlement and shaping the EU's post-trade policy agenda. Building on this groundwork, in 2004 the Markets in Financial Instruments Directive (MiFID) replaced the Investment Services Directive, significantly expanding the regulatory framework to promote competition and transparency in EU financial markets. In January 2008, the Single Euro Payments Area (SEPA), aimed at streamlining cross-border euro payments, was officially launched, allowing consumers, businesses and governments to make and receive payments under the same conditions across all participating countries. On top of that, a powerful factor of economic and financial integration in the EU was the introduction of the single currency in the euro area (Kalemli-Ozcan, Papaioannou and Peydrò, 2010). Bekaert et al. (2013) offer valuable insight into the EU's integration process from the perspective of financial markets, showing that between 1990 and 2007 EU membership significantly reduced the earnings yield differentials between countries, suggesting a convergence of financial markets within the region. While this convergence occurred within the context of global financial integration, which led to valuation convergence worldwide (Bekaert et al., 2011), their work shows that the strong EU effect is conditional on a variety of cross-sectional and temporal controls, including a control for global integration.¹³

Competition between stock exchanges for non-domestic turnover played also a role in facilitating market integration. From an industry perspective, there were notable signs of consolidation in the same period, with the successful merger of the Amsterdam, Brussels and Paris exchanges in September 2000 to form Euronext. This marked a critical phase of exchange privatization, where exchanges, historically publicly owned and member-controlled, increasingly transitioned to privately held entities driven by profit motives. As exchanges shifted to private ownership, their governance and operational models also changed, focusing on profit maximization and pursuing vertical and horizontal integration within the financial services ecosystem. As a matter of fact, integration processes were more successful in Europe than in the US (Di Noia and Filippa,

¹³ Interestingly, Bekaert et al. provide evidence in support of the finding that, while global financial integration progressed, the introduction of the euro did not substantially contribute to further financial integration in Europe – according to the authors, it is quite conceivable that some of the effects ascribed to the introduction of the euro in the literature are rather induced by EU membership.

2021)¹⁴. While vertical integration remained more pronounced, in the early 2000s both the French and German CCPs underwent some horizontal expansion offering their services to the Euronext markets and to the Eurex exchanges in Frankfurt and Zurich, respectively (European Central Bank, 2001). Horizontal mergers and acquisitions also took place among different securities settlement systems, CSDs and CCPs, leading to the creation of Clearstream, the formation of the Euroclear Group, and the establishment of LCH.Clearnet (as a result of the merger of the UK and French CCPs in 2003).

In parallel with these industry-driven shifts, public sector intervention significantly shaped the FMI landscape. A notable initiative was the creation of TARGET (Trans-European Automated Real-time Gross Settlement Express Transfer system) by the Eurosystem, with the aim to provide a common platform for settling payments in euros and monetary policy operations. While the growing volume of cross-border payments within Europe highlighted the risks of delays and settlement failures – similar to the challenges that led to the creation of CLS in FX markets – TARGET addressed these issues by connecting the RTGS systems of EU countries and the European Central Bank, ensuring immediate and irrevocable settlement. This supported monetary policy implementation and enhanced the stability and efficiency of the Eurozone’s financial system, furthering the goals of economic integration across the region. Building on this foundation, the launch of TARGET2 in 2007 and TARGET2-Securities (T2S) – a pan-European platform for the settlement of securities – in 2015 further strengthened Europe’s financial market infrastructure, modernizing the settlement of payments and facilitating cross-border securities transactions. In particular, T2S – together with the 2014 Central Securities Depositories Regulation (CSDR) – was intended to address persistent post-trading fragmentation in the absence of a private-sector move, as national CSD monopolies applied divergent standards and higher fees for cross-border than for domestic settlement, hindering efficient capital allocation (Mastropasqua et al., 2021). In short, through these initiatives, the public sector helped to bridge gaps in the private sector’s ability to address systemic risks and ensured that Europe’s financial infrastructure could support a growing single market.

Despite these efforts, global financial market infrastructure has not consolidated to the extent expected, with significant fragmentation in the FMI landscape especially in the EU compared to the US (Panetta, 2024a). Fragmentation is also evident in cross-border payment systems, despite recent efforts to promote interlinking under the G20 Roadmap on cross-border payments (see Section 4). This raises the question: why has there been some retreat in the consolidation of FMIs?

Technology provides a partial answer, as the complexity of reconciling and linking diverse legacy systems was (and still is) an obstacle to full integration. Another potential explanation lies in the tension between economic and financial integration, on one hand, and political cohesion, on the other. While financial integration can offer greater diversification opportunities and reduce risks, it can also lead to greater synchronization of business cycles between countries, which could reduce the benefits of diversification. Moreover, theories such as those presented by Alesina, Spolaore and Wacziarg (2000), building on Keynes (1920), suggest that as economic integration progresses, the relevance of national boundaries becomes less important: free trade reduces the significance of a

¹⁴ Since the early 2000s, the consolidation of exchanges has continued, but it has been an up-and-down process. Significant merger attempts have failed both in Europe and across the Atlantic. Around 2015, the Euronext group initiated a new phase of strategic acquisitions in Europe. As a result, the group took control of the Dublin Stock Exchange in 2018, the Oslo Stock Exchange in 2019, and, most recently, the Borsa Italiana group in 2021.

country (or region) size (in terms of land and population) in determining market size and productivity, which could fuel political fragmentation as the incentive to remain within a country (or a RTA) weakens. The increased internationalization and integration of financial markets can spark political separatism, which in turn may hinder further integration. Therefore, the process of financial integration must be understood not just as a technical or economic development but also in the context of its broader political implications. The following section reinforces the argument about the relevance of geopolitical dynamics in shaping the evolution of FMIs.

6. Geopolitics

In the post-Bretton Woods world, the financial sector has relied heavily on international networks – whether economic, informational or physical – that have fostered integration and interdependence (Hausler, 2002; Petry, 2021). Globalization, international cooperation and economic integration have strengthened interdependencies and links between countries and, in particular, between regions. However, such global networks are asymmetric, as they show the presence of central nodes that are more connected than others due to the greater importance of certain currencies and economies. Farrell and Newman (2019) theorize that asymmetric network structures create the potential for “weaponized interdependence”, where those who control or can significantly influence central nodes are able to use this interdependence to coerce others. In a world of growing geopolitical tensions, a country – or a coalition of countries – that can influence a global FMI is less exposed to financial pressure from other countries, because its financial and payment flows do not require the use of alternative routes. While the ability to control payments, clearing and settlement domestically is part of a nation's “strategic autonomy”, being able to exercise influence on a global infrastructure provides similar political privileges of issuing a global reserve currency, therefore it can act as an insurance policy (Panetta, 2024b).

CCPs, CSDs and securities settlement systems have increasingly attracted attention in discussions of economic statecraft and their weaponization has emerged as a potential channel of financial coercion in recent years¹⁵. Restrictions on access to these infrastructures – whether through suspension of membership or limits on clearing and settlement service – can effectively isolate targeted institutions or sovereigns from global capital markets. Moreover, the legal and operational framework governing custodial and settlement systems implies that, in exceptional circumstances and in accordance with applicable legal provisions, securities and cash balances held within these

¹⁵ In Europe, the strategic relevance of CCPs has gained significant attention in the wake of Brexit. The UK’s prominent position as a major hub for CCPs has raised concerns over the EU's dependence on UK-based financial infrastructure. This has prompted discussions on the need for Europe to strengthen its own clearing capabilities to achieve greater independence and resilience in the financial sector, leading to the adoption of new legislative initiatives. In particular, Regulation (EU) No 2024/2987 (so-called EMIR 3) has introduced an “active account requirement” designed to ensure that European market participants actively avail themselves of EU CCPs, at least for certain classes of derivative contracts of substantial systemic importance. While this measure is primarily justified on the grounds of financial stability, its alignment with the “open strategic autonomy” objectives pursued by the European Commission since 2021 has been made very clear (European Commission, 2022): the EU aims to enhance its self-sufficiency and reduce vulnerabilities in the face of external economic or geopolitical pressures.

infrastructures may be frozen or immobilized.¹⁶ Such measures may disrupt liquidity, impede cross-border investment flows, and influence reserve allocation decisions.

While these considerations underscore the strategic importance of post-trade infrastructures, the role of payment systems remains equally – if not more – central in shaping the transmission and effectiveness of financial restrictions. The evolution of the SWIFT financial messaging network is emblematic in this respect (see Dörry, Robinson and Derudder, 2018). In 1973, Citibank, through its subsidiary Transaction Technology Inc, developed a proprietary messaging system to execute financial transactions called MARTI (Machine Readable Telegraphic Input) and attempted to force its adoption by other correspondent banks in the US and Europe. Like SWIFT today, MARTI was promoted to provide two main services to the global financial sector: (i) a network for message transmission between financial institutions, and (ii) a standardized message syntax (Scott and Zachariadis, 2014). Ultimately, this endeavor met with strong resistance from European banks, who feared the establishment of a US-led monopoly for the transmission of financial information (Cipriani, Goldberg and La Spada, 2023). With these geopolitical considerations in mind, the governance model proposed by SWIFT was seen as superior, offering its members a network through co-operative ownership and standards jointly developed by private companies for community purposes. This open model of governance was seen as less risky than leaving power in the hands of a single actor who could then use that power to exert political pressure.

In line with its status of cooperative company, SWIFT should function as a neutral financial service provider in the interest of its entire member community, and should not make policy decisions that exclude users or restrict their access to the platform. While on some occasions it managed to resist political pressure to disconnect a country from its messaging system¹⁷, in other cases it discontinued access to designated financial institutions like Iranian banks in 2012 and Russian banks in 2022.¹⁸ Without the ability to pay, money is useless. If an individual or an institution is prevented from making payments, it is excluded from society as we know it. Unsurprisingly, denying an entity – a government, a company, an individual – access to the infrastructures that exist to make international payments is one of the most effective sanctions for imposing geopolitical dominance (Cipriani, Goldberg and La Spada, 2023; Drott, Goldbach and Nitsch, 2024).

In 2014, in response to the US government threat to disconnect the Russian banks from SWIFT, the Central Bank of Russia created the System for Transfer of Financial Messages (SPFS), an alternative messaging system, and, in 2015, Mir, a card payment system for electronic fund transfers. The development and implementation of Mir was aimed to circumnavigate the reliance on the likes of Visa and Mastercard, which were blocked in Russia at the time. The introduction of SPFS

¹⁶ On 26 February 2022, following the full-scale Russian invasion of Ukraine, the G7 leaders announced their decision to immobilize around €260 billion worth of Russian central bank assets held at Euroclear, a Belgian-based CSD. Discussions on how to leverage these assets continued thereafter. In June 2024, G7 leaders took a further step by announcing a \$50 billion loan to Ukraine, to be repaid using future extraordinary revenues generated from the immobilized assets. More recently, in late 2025, European policymakers debated the use of immobilized Russian central bank assets held at Euroclear to finance a so-called “reparation loan” for Ukraine.

¹⁷ For instance, in 2004, SWIFT resisted the call from human rights groups to remove Myanmar from its network even after the US and the EU had imposed sanctions on the country. In 2014, SWIFT resisted pressure from pro-Palestinian groups to disconnect Israeli financial institutions.

¹⁸ In 2012, several Iranian banks were disconnected from SWIFT following coordinated sanctions by the EU and the US, adopted in response to the expansion of Iran’s nuclear program in contravention of international agreements. Similar actions were taken in 2022, when selected Russian financial institutions were excluded in response to violations of international law and ensuing armed conflicts.

and Mir guaranteed Russia's strategic autonomy to process domestic payments. In 2015, China launched the Cross-Border Interbank Payment System (CIPS) with a stated aim of supporting the internationalisation of the renminbi, as it is meant to facilitate cross-border settlement in that currency. However, the peculiarity of this payment system is that it runs on a dual messaging system: one based on SWIFT standards and one based on a proprietary messaging system.¹⁹ Although the large majority of payments on CIPS use the SWIFT messaging, the alternative proprietary messaging system offers a fallback solution to counter potential exclusion of Chinese banks from SWIFT.

More recently, BRICS members have announced to be working on different multilateral cross-border payment initiatives. On the one hand, the "BRICS Cross-Border Payments Initiative" – by strengthening the interoperability of BRICS payment systems – aims to foster mutual trade and help bridge the financial markets and cross-border payments of BRICS countries²⁰. On the other hand, "BRICS Pay" – a DLT-based, decentralised, multi-layered digital payment system – aims to integrate national payment infrastructures, enabling real-time payments in local currencies among BRICS countries. While the details of the projects have not yet been disclosed, the initiatives aim to support independence from the existing ACF, which is still highly controlled and influenced by Western countries.

Overall, in the past decade, countries in the global South have engaged in projects to develop new cross-border payment systems or alternative financial messaging networks, either as a countermeasure to financial sanctions imposed by Western countries, or with the stated aim of asserting their economic power globally, for example by supporting the internationalisation of their domestic currency. All these initiatives are examples of how geopolitical tensions shape FMIs and, conversely, how the creation of new infrastructures reshapes the geopolitical landscape. The way these new infrastructures evolve – in terms of governance, technical features, and technological design – may enable them to become successful regional and systemic infrastructures, thereby contributing to a further reconfiguration of the ACF. This is why De Goede and Westermeier (2022) introduced the concept of "infrastructural geopolitics", arguing that infrastructures themselves play an active role in reshaping geopolitical power, rather than being just passive tools used in the service of existing hegemonies.

The issue is particularly relevant for global payments. Leibbrandt and De Teran (2022) lucidly describe this trend and draw a stark conclusion: "*changes in payments' power could change everything*" (p. 300), suggesting that a fragmented payment system could significantly reduce the effectiveness of financial sanctions or even reverse the direction in which these sanctions are imposed.

The escalation of geopolitical rivalry and the growing weaponization of financial infrastructures are mutually reinforcing forces that increasingly shape the evolution of the ACF. These dynamics do not reshape the global financial system abruptly; rather, they unfold along possible trajectories, such as those identified by Eichengreen (2024) in his analysis of US–China tensions. In the "status quo" scenario, the renminbi and CIPS gradually expand their market share, yet the global architecture remains anchored to the US dollar and the SWIFT standard. By contrast,

¹⁹ Other examples of proprietary messaging systems are India's Structured Financial Messaging System and Iran's SEPAM.

²⁰ See BRICS (2025).

the “rupture” scenario entails a profound decoupling of the two countries’ financial systems, resulting in the bifurcation of global financial and economic relations.

Across both scenarios, several systemic developments emerge. First, geopolitical rivalry is likely to intensify fragmentation within the global payments, clearing and settlement landscape, as states attempt to shield themselves from extraterritorial vulnerabilities and potential financial coercion. Second, such fragmentation provides fertile ground for the creation of regional or geopolitically aligned networks, with emerging economies actively promoting alternative infrastructures to strengthen their strategic autonomy. Countries that are geopolitically neutral or less influential may increasingly face pressure to channel their cross-border transactions through one network or the other, thus consolidating the formation of financial blocs. Third, the proliferation of multiple infrastructures could gradually reduce existing asymmetries in the current ACF, supporting a shift toward a more multipolar financial system characterised by the coexistence and competition of multiple systemic infrastructures. Finally, this evolving configuration raises nontrivial questions about interoperability, as the efficiency of a more decentralised system hinges on the ability of these infrastructures to operate seamlessly with one another. Ultimately, achieving a sustainable balance between the protection of strategic autonomy and the openness required for international commerce and finance will be essential to preserving economic growth and maintaining the efficiency of the ACF.

7. Evaluation and future outlook

While assessing the relative importance of each of the four factors addressed in the previous sections is beyond the scope of this work, the preceding analysis helps demonstrate that their relevance has varied over time. More to the point, the historical analysis of the four factors leads us to argue that while technology and regulation have shaped the evolution of the FMI landscape over the entire period, political and economic integration, especially at the regional level, were particularly central in the 1990s. On the other hand, geopolitical dynamics have played a more dominant role in the post-Bretton Woods period as well as in recent years. As a result, the evolution of the ACF could be divided into two major phases, with the GFC as the turning point, as summarized in Table 1.

From 1971 to 2008, the ACF experienced a strong integration trend, marked by the growth of correspondent banking and international FMIs, some of them playing a key regional role, as well as the establishment of international financial infrastructures with wider geographical reach (such as SWIFT and CLS). While the ACF was highly integrated during this period, it was inherently asymmetrical, with the presence of central nodes in the US and Europe, reflecting the greater influence of Western currencies and economies. However, in the aftermath of the GFC, this trend began to reverse.

On the one hand, the global payments landscape has become more fragmented. Heightened awareness of the systemic risks posed by financial interconnectedness and the resulting new wave of tighter prudential regulation, including stricter AML/CFT rules, led to a significant decline in global correspondent banking activity, further reducing the efficiency of cross-border payments in terms of speed, access and cost. These inefficiencies have, in part, contributed to the emergence of new infrastructural solutions, such as distributed ledgers, and new products, such as crypto-assets. While

the combination of these new instruments and types of infrastructure is often claimed to offer a better solution to people's payment and trading needs, it also poses a greater risk of fragmentation, as it often leads to the creation of closed-loops that operate in silos, preventing interoperability across loops and with legacy systems. On top of that, the rising geopolitical tensions and the increased use of SWIFT as a geopolitical tool to impose economic sanctions contributed to an increased search for strategic autonomy, which eventually led to the emergence of alternative messaging and payment systems, resulting in a fragmentation of the payments landscape.

Similarly, a more multipolar global financial system is also being driven by a push for the consolidation of regional FMIs. This trend appears to be largely driven by two interconnected forces – first, the strengthening of regional integration efforts, and second, a growing recognition of the strategic importance of financial autonomy amid rising geopolitical tensions. As countries and regions seek to reduce their dependence on a small number of dominant cross-border infrastructures, regional FMIs are increasingly seen as vital tools for enhancing resilience, safeguarding economic sovereignty, and supporting local policy objectives. Besides, the operation of truly global FMIs has become increasingly questioned in the post-GFC landscape, given the systemic risks they would pose and the likely inadequacy of existing safeguards.

All in all, this corroborates the hypothesis that the ACF may be transitioning from a global asymmetric network, with power concentrated in the hands of a few financial institutions, to a more multipolar network along geopolitical lines.

The previous discussion also leads us to identify three key developments that are likely to shape the future trajectory of FMI evolution. The first development, related to technology, concerns the potential success of DLT and tokenization. While the absence of adequate technological solutions may have hindered interoperability in the past, the advances in information technology achieved thus far would allow for greater integration of the ACF. In particular, DLT has the capacity to integrate trading, settlement, and custody functions within a unified platform, thereby mitigating credit risk, minimizing transaction failures, and reducing the need for reconciliation processes. Potentially it could eliminate the need for interoperability as a single platform could dominate the global landscape. However, this latter outcome seems unlikely in the short term, as agreeing on governance rules in such a multilateral framework would be extremely challenging, especially given the geopolitical dynamics we have highlighted.

Relatedly, while we have argued that the G20 Roadmap on cross-border payments has initiated a virtuous cycle for interoperability in payments, its final goals have yet to be realized. Making payment systems interoperable requires not only technological compatibility but also harmonized business rules, regulation and supervisory frameworks. Achieving an agreement on these aspects will be particularly difficult in a world of growing geopolitical tensions. In this sense, we believe that political and geopolitical considerations will prevail over the technological feasibility of solutions. Payment systems, despite the underlying technology serving them, would likely be connected along political, strategic and economic lines. A limited number of jurisdictions with such strong ties could form multilateral agreements, harnessing network effects and effectively creating regional hubs. These hubs could then connect to one another, or to individual jurisdictions, through simpler bilateral agreements.

The final development concerns the prospects for the Savings and Investments Union in Europe. The European Commission is dedicating substantial resources to this initiative, which aims to deepen capital markets integration and strengthen the mobilization of savings across the EU. While the initiative is primarily framed as a means of enhancing economic growth within the Union, it also raises important questions about its broader implications for the ACF. In particular, the consolidation and strengthening of EU-based capital markets and FMIs may significantly reinforce the emergence of a more multipolar ACF, one increasingly structured along regional and geopolitical lines.

8. Conclusions

Over the past five decades, the ACF has undergone a profound transformation, reflecting broader shifts in technology, regulation, political and economic integration, and geopolitics. From the post-Bretton Woods fragmentation of the 1970s to the increasing interconnection of the 1990s and early 2000s, and from the systemic vulnerabilities revealed by the GFC to today's geopolitically charged landscape, FMIs have both shaped and been shaped by the global financial system's evolving dynamics.

This paper shows that the trajectory of FMIs has not been linear. While technological progress and regulatory harmonization have largely driven integration, recent developments underscore a renewed trend toward fragmentation, fueled by strategic concerns and the reassertion of national interests. In this context, the ACF is moving away from an asymmetric structure centered on a few Western institutions towards a more contested, multipolar configuration. This shift carries profound implications, not only for efficiency and inclusion, but also for sovereignty, security, and resilience in the global financial system.

Looking ahead, the balance between integration and fragmentation will hinge on both policy choices and technological pathways. The continued implementation of the G20 Roadmap on cross-border payments, the integration of DLT-based systems, and regional consolidation efforts, particularly in Europe, will be decisive. As FMIs become increasingly central to economic and geopolitical strategy, understanding their evolution is not only a matter of financial history but also a lens through which to view the future of the global order.

As a final remark, the arguments advanced in this paper open up several fruitful avenues for further research. In particular, although public policy and regulation have been treated here as key drivers of the evolution of the ACF, they are unlikely to be fully exogenous. Rather, they may themselves be shaped by the same technological, economic, and geopolitical forces identified throughout the paper. Future research could therefore benefit from examining more systematically the endogeneity of policy formation, with a view to capturing the recursive interactions through which regulatory frameworks both respond to and influence the ACF. At the same time, the predominantly transatlantic focus of this study suggests the need for a broader geographical lens. Extending the scope to other regions, particularly Asia, would allow for a more comprehensive assessment of how different forms of economic and political regionalism are emerging and interacting with financial market infrastructures. Such an expansion would not only enrich the comparative dimension of the

study but also contribute to a deeper understanding of how an increasingly multipolar configuration of the ACF is being shaped across diverse economic and geopolitical settings.

References

- Albuquerque, R., Loayza, N., & Servén, L. (2005), World market integration through the lens of foreign direct investors, *Journal of International Economics*, 66(2): 267-295.
- Alesina, A., Spolaore, E., & Wacziarg, R. (2000), Economic integration and political disintegration, *The American Economic Review*, 90(5): 1276-1296.
- Aldasoro, I., Doerr, S., Gambacorta, L., Garratt, R., & Wilkens, K. (2023), The tokenisation continuum (No. 72). Bank for International Settlements.
- Akbari, A., Ng, L., & Solnik, B. (2020), Emerging markets are catching up: Economic or financial integration?, *Journal of Financial and Quantitative Analysis*, 55(7): 2270-2303.
- Angelini, P. (2023), Speech at the conference on 'The New Frontiers of Digital Finance', Rome 10 March.
- Antràs, P. (2020). *De-globalisation? Global value chains in the post-COVID-19 age* (No. w28115). National Bureau of Economic Research.
- Aurazo, J., & Gasmi, F. (2024). Digital payment systems in emerging economies: Lessons from Kenya, India, Brazil, and Peru. *Information Economics and Policy*, 69, 101113.
- Ayuso, J., & Blanco, R. (2001), Has financial market integration increased during the nineties? *Journal of International Financial Markets, Institutions and Money*, 11: 265-287.
- Baldwin, R. (2016). The World Trade Organization and the Future of Multilateralism. *Journal of Economic Perspectives* 30 (1): 95–116.
- Baldwin, R., & Freeman, R. (2022). Risks and global supply chains: What we know and what we need to know. *Annual Review of Economics*, 14(1), 153-180.
- Ball, L. (2014), Long-Term Damage from the Great Recession in OECD Countries, NBER Working Paper 20185.
- Bank for International Settlements (1997), *Real-Time Gross Settlement Systems*, Report prepared by the Committee on Payment and Settlement Systems of the central banks of the Group of Ten countries, March.
- (2022), *The future monetary system*, Annual Economic Report 2022, June, Chapter III.
- (2025), *Blueprint for the future monetary system: improving the old, enabling the new*, Annual Economic Report 2025, June, Chapter III.
- Bank for International Settlements and Committee on Payments and Market Infrastructures (2024), *Tokenisation in the context of money and other assets: concepts and implications for central banks*, Report to the G20, October.

- Banu, E., Born, A., Evrard, J., Lambert, C., & Spolaore, A. (2026). Towards an efficient and integrated digital capital market in Europe: the role of tokenisation and the Eurosystem's policy response. *Macprudential Bulletin*, 33.
- Bekaert, G., Harvey, C. R., & Lundblad, C. T. (2003), Equity market liberalization in emerging markets. *Journal of Financial Research*, 26(3): 275-299.
- Bekaert, G., Harvey, C. R., Lundblad, C. T., & Siegel, S. (2011), What segments equity markets? *The Review of Financial Studies*, 24, 3841–3890.
- Bekaert, G., Harvey, C. R., Lundblad, C. T., & Siegel, S. (2013), The European Union, the Euro, and equity market integration, *Journal of Financial Economics*, 109(3): 583-603.
- Bech, M. L., Shimizu, Y., & Wong, P. (2017), The quest for speed in payments. *BIS quarterly review March*.
- Bech, M. L., Hancock, J., Rice, T., & Wadsworth, A. (2020), On the future of securities settlement. *BIS Quarterly Review*, March.
- Benos, E., Garratt, R., & Gurrola-Perez, P. (2019), The economics of distributed ledger technology for securities settlement. *Ledger*, 4.
- Boar, C., Claessens, S., Kosse, A., Leckow, R., & Rice, T. (2021), *Interoperability between payment systems across borders* (No. 49). Bank for International Settlements.
- Brandl, B; & Dieterich, L. (2023), The exclusive nature of global payments infrastructures: the significance of major banks and the role of techdriven companies, *Review of International Political Economy*, 30(2): 535-557.
- BRICS (2025), Rio de Janeiro Declaration: Strengthening Global South Cooperation for a More Inclusive and Sustainable Governance, Rio de Janeiro, Brazil, 6 July 2025.
- Brogaard, J., Hendershott, T., & Riordan, R. (2014), High-frequency trading and price discovery. *The Review of Financial Studies*, 27(8), 2267-2306.
- Camboni, M., & Porcellacchia, M. (2021), International Power Rankings: theory and evidence from international exchanges. Available at: [JMIntro_MichaelPorcellacchia.pdf](#).
- Carapella, F., Swem, N., & Gerszten, J. (2023), Tokenization: overview and financial stability implications. *Finance and Economics Discussion Series*, 2023-060. Washington: Board of Governors of the Federal Reserve System.
- Carrieri, F., Errunza, V., & Hogan, K. (2007), Characterizing world market integration through time, *The Journal of Financial and Quantitative Analysis*, 42(4), 915-940.
- Chinn, M. D., & Ito, H. (2008), A new measure of financial openness, *Journal of Comparative Policy Analysis: Research and Practice*, 10(3): 309-322.
- Cipriani, M., Goldberg, L. S., & La Spada, G. (2023), Financial sanctions, SWIFT, and the architecture of the international payment system, *Journal of Economic Perspectives*, 37(1): 31-52.

Committee on Payment and Settlement Systems (2008), *The Interdependencies of Payment and Settlement Systems*. Bank for International Settlements.

Committee on Payments and Market Infrastructures (2016a), *Correspondent banking*, July. Available at: [Correspondent banking - final report](#)

----- (2016b), *Fast payments – enhancing the speed and availability of retail payments*, CPMI Reports, no 154, November.

----- (2022), *Interlinking payment systems and the role of application programming interfaces: a framework for cross-border payments*, July. Available at: [Interlinking payment systems and the role of application programming interfaces: a framework for cross-border payments](#)

Cornelli, G., Frost, J., Warren, J. W., Yang, C. Z., & Velasquez, C. (2024). *Retail fast payment systems as a catalyst for digital finance*. Bank for International Settlements, Monetary and Economic Department.

CPMI-IOSCO (2012), *Principles for Financial Market Infrastructures*. Available at: [Principles for Financial Market Infrastructures \(PFMI\)](#)

De Goede, M., & Westermeier, C. (2022), Infrastructural geopolitics, *International Studies Quarterly*, 66(3), sqac033.

Di Iorio, A., Fitzgerald, E., Lammer, T., Perrella, A., Rice, T., Semorile, F., Siviero, S. (2025), *Acta, non verba: interlinking fast payment systems to enhance cross-border payments*, CPMI Brief, no 7, February.

Di Luigi, C., Perrella, A., & Ruggieri, A. (2024), The fundamental role of the repo market and central clearing, *Journal of Financial Market Infrastructures*, 11(4).

Di Noia, C., & Filippa, L. (2021), Looking for new lenses: How regulation should cope with the financial market infrastructures evolution. In Binder, J., & Saguato, P. (eds). *Financial Market Infrastructures. Law and Regulation*. Oxford: Oxford University Press.

Donadelli, M., Gufler, I., & Paradiso, A. (2024), Financial market integration: A complex and controversial journey, *International Review of Financial Analysis*, 92, 103100.

Dörny, S., Robinson, G., & Derudder, B. (2018), There is no alternative: SWIFT as infrastructure intermediary in global financial markets, *Financial Geography Working Paper Series*, ISSN 2515-0111.

Drott, C., Goldbach, S., & Nitsch, V. (2024), The effects of sanctions on Russian banks in TARGET2 transactions data, *Journal of Economic Behavior & Organization*, 219, 38-51.

Duina, F. (2006), *The Social Construction of Free Trade: The European Union, NAFTA, and Mercosur*. Princeton, NJ: Princeton University Press.

Eichengreen, B. (2024), International finance and geopolitics, *Asian Economic Policy Review*, 19(1), 84-100.

European Central Bank (2001), Consolidation in central counterparty clearing in the euro area. *ECB Monthly Bulletin*, August 2001.

European Central Bank (2025), *The international role of the euro*, June. <https://www.ecb.europa.eu/pub/pdf/ire/ecb.ire202506.en.pdf> [ecb.europa.eu]

European Commission (2022), A path towards a stronger EU clearing system. *Communication from the Commission to the European Parliament, the Council, the European Central Bank and the European Economic and Social Committee*. Available at: [EUR-Lex - 52022DC0696 - EN - EUR-Lex](#).[EUR-Lex - 52022DC0696 - EN - EUR-Lex](#).[EUR-Lex - 52022DC0696 - EN - EUR-Lex](#).[EUR-Lex - 52022DC0696 - EN - EUR-Lex](#).

Financial Stability Board (2017), *Correspondent Banking Data Report*, July.

----- (2024), *The Financial Stability Implications of Tokenisation*, Report to the G20, October.

----- (2025), *G20 Roadmap for Cross-border Payments: Consolidated progress report for 2025*, Report to the G20, October.

Farrell, H., & Newman, A. L. (2019), Weaponized interdependence: How global economic networks shape state coercion, *International security*, 44(1), 42-79.

Frost, J., Wilkens, P. K., Kosse, A., Shreeti, V., & Velasquez, C. (2024), Fast payments: design and adoption. *BIS Quarterly Review*, 31.

Garratt, R., Wilkens, P. K., & Shin, H. S. (2024), *Next generation correspondent banking* (No. 87). Bank for International Settlements.

Goldstein, M. A., Kumar, P., & Graves, F. C. (2014), Computerized and high-frequency trading. *Financial Review*, 49(2), 177-202.

Hadad, S., & Bratianu, C. (2019), Dematerialization of banking products and services in the digital era. *Management & Marketing*, 14(3).

Häusler, G. (2002), The globalization of finance, *Finance and Development*, International Monetary Fund, 39(1).

International Finance Corporation (2017), *De-risking and other challenges in the emerging market financial sector*. IFC Insights.

IMF (2010), *Understanding financial interconnectedness*. IMF Policy Paper.

Kalemli-Ozcan, S., Papaioannou, E. & Peydrò, J. (2010), What lies beneath the euro's effect on financial integration? Currency risk, legal harmonization, or trade?, *Journal of International Economics*, 81(1): 75-88.

- Kaminsky, G. L., & Schmukler, S. L. (2008), *Short-run pain, long-run gain: Financial liberalization and stock market cycles*, *Review of Finance*, 12(2): 253-292.
- Keynes, J. M. (1920), *The Economic Consequences of Peace*. New York: Harcourt, Brace and Howe.
- Lammer, T, Leppanen, F. & Semorile, F. (2026), *Enhancing cross-border payments step by step: insights from the 2025 monitoring survey*, CPMI Brief.
- Lane, P. R., & Milesi-Ferretti, G. M. (2018), The external wealth of nations revisited: International financial integration in the aftermath of the global financial crisis, *IMF Economic Review*, 66: 189-222.
- Lehkonen, H. (2015), Stock market integration and the global financial crisis, *Review of Finance*, 19: 2039-2094.
- Leibbrandt, G., & De Teran, N. (2022), *The Pay Off: How Changing The Way We pay Changes Everything*. London: Elliott & Thompson.
- Levecq, H., & Weber, B. W. (1995), Electronic Trading Systems: Strategic Implications of Market Design. *Department of Information Systems Stern School of Business, New York University, STERN# IS-95-19*.
- Lieberman, E. S. (2001), Causal inference in historical institutional analysis: A specification of periodization strategies, *Comparative Political Studies*, 34(9): 1011-1035
- Liu, Y. (2017), *Recent trends in correspondent banking relationships: Further considerations*. International Monetary Fund.
- Mastropasqua, C., Intonti, A., Jennings, M., Mandolini, C., Maniero, M., Vespucci, S., & Toma, D. (2021), T2S-TARGET2-Securities-La piattaforma paneuropea per il regolamento dei titoli in base monetaria.(T2S-TARGET2-Securities-The Pan-European Platform for the Settlement of Securities in Central Bank Money), *Bank of Italy Markets, Infrastructures, Payment Systems Working Paper*, (4).
- Mattli, W. (1999), Explaining regional integration outcomes, *Journal of European Public Policy*, 6(1): 2-27.
- Obstfeld, M. (2012), Financial flows, financial crises, and global imbalances, *Journal of International Money and Finance*, Volume 31, Issue 3, Pages 469-480.
- OECD (2020), *The tokenisation of assets and potential implications for financial markets*. The Secretary General of the OECD, 107.
- Panetta, F. (2024a), Final Remarks of the Governor. Annual Report. Rome, 31 May 2024. Bank of Italy.
- Panetta, F. (2024b), Beyond Money: The Euro's Role in Europe's Strategic Future. Address at the Conference Ten years with the euro, Riga.

- Petry, J. (2021), From national marketplaces to global providers of financial infrastructures: Exchanges, infrastructures and structural power in global finance, *New Political Economy*, 26(4), 574-597.
- Popper, N. (2012), Beyond Wall St., curbs on high-speed trades proceed. *The New York Times*, 26.
- Priem, R. (2020). Distributed ledger technology for securities clearing and settlement: benefits, risks, and regulatory implications. *Financial Innovation*, 6(1), 11.
- Reinhart, C. M., & Rogoff, K. S. (2009). The aftermath of financial crises. *American Economic Review*, 99(2), 466–472
- Reserve Bank of Australia (2024), *Interlinking Fast Payment Systems for Cross-border Payments*, April.
- Rice, T., von Peter, G., & Boar, C. (2020), On the global retreat of correspondent banks. *BIS Quarterly Review*, March.
- Sachs, J.D., & Warner, A.M. (1995). Economic Reform and the Process of Global Integration. *Brookings Papers on Economic Activity*, 1:1995
- Schenk, C. R. (2021), The development of international correspondent banking in the USA 1970-1989, *Global Correspondent Banking 1870-2000 Working Paper Series*, 1(1), University of Oxford.
- Schenk, C. R. (2024), Moving Money – redesigning the global payments system 1969-99, *Global Correspondent Banking 1870-2000 Working Paper Series*, 1(3), University of Oxford.
- Scott, S. V., & Zachariadis, M. (2014), *The Society for Worldwide Interbank Financial Telecommunication (SWIFT): Cooperative governance for network innovation, standards, and community*. Taylor & Francis.
- Zaremba, A., Kambouris, G. D., & Karathanasopoulos, A. (2019), Two centuries of global financial market integration: Equities, government bonds, treasury bills, and currencies, *Economics Letters*, 182: 26-29.

Table 1. Key factors underpinning the development of the ACF

	Technology	Public policy and regulation	Economic and political integration		Geopolitics	Main implications at global level
1971-1989	Introduction of electronic trading systems	Financial deregulation and securitization (<i>especially in the US</i>)	Liberalization of capital controls and internationalization of trade on a global scale		Large cooperative network of banks prevails as a model to set up global messaging standards for payments	• Growth of correspondent banks and international FMIs • Creation of SWIFT and CLS • Emergence of regional FMIs through interlinking and interoperability (e.g. TARGET) → <i>ASYMMETRIC GLOBAL NETWORK</i>
	Development of RTGS					
1990-2008	High-frequency and algorithmic trading			Marked trend toward regional economic and political integration (<i>especially in the EU</i>)		
		New regulation to reduce systemic risk (e.g. AML/CFT requirements, standards for FMIs)		Progress towards a banking union in the EU	Increased use of global FMIs (i.e. SWIFT) as geopolitical tools to impose economic sanctions	• Shrinking in global correspondent banking • Emergence or enhancement of national financial messaging systems • Development of independent arrangements and/or platforms to facilitate cross-border payments • Consolidation of regional FMIs → <i>MULTIPLE (INTEROPERABLE?) REGIONAL or GEOPOLITICAL NETWORKS</i>
2009-2019	Worldwide adoption of retail fast payment systems					
2020 – present	DLT and tokenization	G20 Roadmap on cross-border payments	Prospects of the Savings and Investments Union (SIU) in the EU			

RECENTLY PUBLISHED PAPERS IN THE 'MARKETS, INFRASTRUCTURES, PAYMENT SYSTEMS' SERIES

- n. 52 How important are ESG factors for banks' cost of debt? An empirical investigation, *by Stefano Nobili, Mattia Persico and Rosario Romeo*
- n. 53 The Bank of Italy's statistical model for the credit assessment of non-financial firms, *by Simone Narizzano, Marco Orlandi and Antonio Scalia*
- n. 54 The revision of PSD2 and the interplay with MiCAR in the rules governing payment services: evolution or revolution?, *by Mattia Suardi*
- n. 55 Rating the Raters. A Central Bank Perspective, *by Francesco Columba, Federica Orsini and Stefano Tranquillo*
- n. 56 A general framework to assess the smooth implementation of monetary policy: an application to the introduction of the digital euro, *by Annalisa De Nicola and Michelina Lo Russo*
- n. 57 The German and Italian Government Bond Markets: The Role of Banks versus Non-Banks. A joint study by Banca d'Italia and Bundesbank, *by Puriya Abbassi, Michele Leonardo Bianchi, Daniela Della Gatta, Raffaele Gallo, Hanna Gohlke, Daniel Krause, Arianna Miglietta, Luca Moller, Jens Orben, Onofrio Panzarino, Dario Ruzzi, Willy Scherrieble and Michael Schmidt*
- n. 58 Chat Bankman-Fried? An Exploration of LLM Alignment in Finance, *by Claudia Biancotti, Carolina Camassa, Andrea Coletta, Oliver Giudice and Aldo Glielmo*
- n. 59 Modelling transition risk-adjusted probability of default, *by Manuel Cugliari, Alessandra Iannamorelli and Federica Vassalli*
- n. 60 The use of Banca d'Italia's credit assessment system for Italian non-financial firms within the Eurosystem's collateral framework, *by Stefano Di Virgilio, Alessandra Iannamorelli, Francesco Monterisi and Simone Narizzano*
- n. 61 Fintech Classification Methodology, *by Alessandro Lentini, Daniela Elena Munteanu and Fabrizio Zennaro*
- n. 62 The Rise of Climate Risks: Evidence from Expected Default Frequencies for Firms, *by Matilde Faralli and Francesco Ruggiero*
- n. 63 Exploratory survey of the Italian market for cybersecurity testing services, *by Anna Barcheri, Luca Bastianelli, Tommaso Curcio, Luca De Angelis, Paolo De Joannon, Gianluca Ralli and Diego Ruggeri*
- n. 64 A practical implementation of a quantum-safe PKI in a payment systems environment, *by Luca Buccella and Stefano Massi*
- n. 65 Stewardship Policies. A Survey of the Main Issues, *by Marco Fanari, Enrico Bernardini, Elisabetta Cecchet, Francesco Columba, Johnny Di Giampaolo, Gabriele Fraboni, Donatella La Licata, Simone Letta, Gianluca Mango and Roberta Occhilupo*
- n. 66 Is there an equity greenium in the euro area?, *by Marco Fanari, Marianna Caccavaio, Davide Di Zio, Simone Letta and Ciriaco Milano*
- n. 67 Open Banking in Italy: A Comprehensive Report, *by Carlo Cafarotti and Ravenio Parrini*
- n. 68 Report on the payment attitudes of consumers in Italy: results from ECB SPACE 2024 survey, *by Gabriele Coletti, Marialucia Longo, Laura Painelli, Emanuele Pimpini and Giorgia Rocco*
- n. 69 A solution for cross-border and cross-currency interoperability of instant payment systems, *by Domenico Di Giulio, Vitangelo Lasorella, Pietro Tiberi*
- n. 70 Do firms care about climate change risks? Survey evidence from Italy, *by Francesca Colletti, Francesco Columba, Manuel Cugliari, Alessandra Iannamorelli, Paolo Parlamento and Laura Tozzi*

- n. 71 Demand and supply of Italian government bonds during the exit from expansionary monetary policy, *by Fabio Capasso, Francesco Musto, Michele Pagano, Onofrio Panzarino, Alfonso Puorro and Vittorio Siracusa*
- n. 72 Statistics on tokenized financial instruments: A challenge for central banks, *by Riccardo Colantonio, Massimo Coletta, Riccardo Renzi*
- n. 73 Credit Risk Assessment with Stacked Machine Learning, *by Francesco Columba, Manuel Cugliari, Stefano Di Virgilio*
- n. 74 What if Ether Goes to Zero? How Market Risk Becomes Infrastructure Risk in Crypto, *by Claudia Biancotti*
- n. 75 The Cyber Risk of Non-Financial Firms, *by Francesco Columba, Manuel Cugliari, Marco Orlandi, Federica Vassalli*
- n. 76 Sustainability and financial innovation: The emerging role of Fintech for Good (F4G), *by Alessandro Lentini and Daniela Elena Munteanu*
- n. 77 Hydrogeological and credit risk: the Italian firms' physical risk-adjusted probability of default, *by Manuel Cugliari, Simone Narizzano and Federica Vassalli*
- n. 78 Liquidity Optimization in Gross Settlement Systems with Quantum Reordering: Application to TARGET2, *by Valerio Astuti, Adriano Baldeschi, Luca Bastianelli, Giuseppe Bruno, Ajit Desai, Danica Marsden and Riccardo Russo*
- n. 79 The expert assessment within Banca d'Italia's in-house credit assessment system, *by Lorenzo Esposito, Massimo Guglielmi, Francesco Monterisi, Simone Narizzano and Marco Orlandi*
- n. 80 Digital payments and economic performance: evidence from Italy, *by Guerino Ardizzi, Niccolò Lippi Boncambi, Cristina Demma and Alberto Leorati*
- n. 81 The euro-area repo market: structure, participants and interlinkages, *by Lorenzo Caverni, Annalisa De Nicola and Mattia Persico*
- n. 82 Siamese Networks for AI-powered Automated Banknote Quality Control, *by Salvatore Gentile, Andrea Luciani, Sabina Marchetti, Domenico Pansini and Marco Viticoli*
- n. 83 Private Equity and Innovation in the Euro Area, *by Emanuele Degani, Simone Letta and Tommaso Perez*
- n. 84 Social and Governance Factors in Default Risk Assessment, *by Manuel Cugliari, Stefano Di Virgilio, Enrico Foscolo and Alessandra Iannamorelli*
- n. 85 Household Allocation of the Next Generation of Digital Money, *by Marcello Pericoli*
- n. 86 Are Stablecoins Efficient for Remittances? Evidence from a Mystery Shopping Exercise by Banca d'Italia, *by Alberto Di Iorio, Enrica Di Stefano, Michele Mascioli and Giorgio Trebeschi*
- n. 87 Who uses 'Buy Now, Pay Later' in Italy? Evidence from Household Survey Data, *by Daniele Figoli and Serena Palazzo*
- n. 88 Fee-cap Models for Payment Instruments: a Policy Perspective, *by Nicola Branzoli, Stefano Pietrosanti and Alessia Vita*
- n. 89 Send me money ASAP: Fast Payment Systems and the Cost of Remittances, *by Marco Brandi, Alberto Di Iorio and Andrea Nobili*
- n. 90 Hedging at speed in sovereign bond markets, *by Onofrio Panzarino and Antonio Perrella*
- n. 91 Sentiment analysis with large language models for credit risk assessment, *by Manuel Cugliari and Giulio Gariano*