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PIX: explaining a state-owned Fintech

PIX: desvendando uma Fintech estatal

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RESUMO: Este artigo tem como objetivo explicar a atuação do Banco Central do Brasil (BCB) ao criar e operar um novo sistema de pagamento instantâneo, o PIX. Compreendendo que a "financeirização digital" pode assumir diferentes formas, este estudo busca entender os fatores que levaram a escolha do BCB de lançar uma "Fintech estatal". A análise apresenta a complementariedade de três fatores. Em primeiro lugar, a trajetória institucional do BCB o tornou cioso de seu perímetro de poder. Em segundo lugar, as ideias compartilhadas por redes transnacionais justificam o papel ativo dos bancos centrais no tema dos sistema de pagamento instantâneo. Em terceiro lugar, os interesses dos bancos tradicionais não foram significativamente impactados a ponto de vetarem a criação do PIX. Por meio da análise de documentos do BCB e de literatura secundária, este estudo apresenta uma explicação original das motivações e circunstâncias que levaram à criação do PIX no Brasil.
PALAVRAS-CHAVE: Financeirização; financeirização digital; PIX; sistemas de pagamento; Banco Central do Brasil.

ABSTRACT: This paper aims to explain the Brazilian Central Bank's (BCB) decision to create and operate a new instant payment system: PIX. Understanding that "digital financialization" can take different forms, this study sheds light on the factors that led to the BCB's choice to launch a "state-owned Fintech". The analysis considers three complementary factors. Firstly, the BCB's institutional trajectory has made it protective of its perimeter of power. Secondly, the ideas shared by transnational networks support the active role of central banks in managing instant payment issues. Thirdly, the interests of traditional banks were not significantly impacted to the extent that they would oppose the creation of PIX. Through

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examining BCB documents and secondary literature, this study provides a first-hand account of the motivations and circumstances that led to the creation of PIX in Brazil.
KEYWORDS: Financialization; digital financialization; PIX; payment systems; Central Bank of Brazil.
JEL Classification: G18; K23.

1. INTRODUCTION

How can one explain the Central Bank of Brazil's (BCB) decision to create PIX, referred to by the IDB as a "state-owned Fintech" (2022)? PIX is a public payment infrastructure created, run, and regulated by the BCB. Launched in 2020, it offers instant and continuous processing of financial transactions 24/7, every day of the year. PIX has quickly gained considerable popularity due to its efficiency, lack of fees, and ease of use, providing an alternative to payment methods such as DOC, TED, and other private instruments.[1] According to data from the BCB, in 2021, PIX became the most commonly used payment method in terms of number of transactions, surpassing both debit and credit cards.[2] Additionally, evidence suggests that PIX has allowed for the financial inclusion of previously non-banking populations who relied solely on cash for economic transactions.[3]

The development of PIX converges with the growing technological improvement in banking, which has been driving changes across the sector. In many countries, advances in processing capacity, cryptography, big data, and artificial intelligence, coupled with improvements in internet connectivity and increased access to smartphones, have enabled the emergence of innovative financial products and services, a phenomenon known as "digital financialization" (Jain; Gabor, 2021; Ma et al., 2020). The term "digital" emphasizes the difference between current transformations and the former, so-called "analog financialization". Analog financialization is a historical process that can be traced back to the late 1970s, which placed financial institutions and financial instruments at the center of national economies (Epstein, 2005; Krippner, 2011).

In fact, digital financialization has not replaced the analog version but has built

[1] In BCB's (w.d.) words, "non-cash payments are mostly made by means of (1) credit transfers, (2) checks, (3) payment cards, and (4) direct debits". In Brazil, the first type includes, among others, the widespread instruments of TED (Express Wire Transfer), and DOC (Credit Transfer Document). In the case of TED, as BCB (w.d.) explains, "the related funds are made available at the beneficiary's account on the same day that the payer's account is debited", and "the order is executed on the same day". As for DOC, it continues, "funds are made available at the beneficiary's account, for withdrawal, on the following day (T+1)".

[2] Data available at Pix Statistics (bcb.gov.br).

[3] Evidence widely presented in the press, such as: "Pix allowed inclusion of 50.6 million people, says BC" (poder360.com.br) and "Pix is 'public policy' and allowed inclusion of 45.6 million, says BC" (uol.com.br).

upon it. The extensive use of technology allows for collecting, processing, and analyzing a large amount of data from individuals and their financial activities. Such innovations create opportunities to monetize data and to develop more flexible, rapid, and tailored interactions between customers and firms using cell phones or internet-connected computers (Tanda; Schena, 2019). Furthermore, new functionalities can also promote the emergence of new financial players, allowing new entrants into a market previously dominated by established financial institutions – typically the case of Fintechs and Big-techs.

The emergence of these players, Fintechs and Big-techs, has transformed the financial landscape. Fintechs are small companies that leverage technological or digital solutions to provide financial services and products, while Big-techs are large-scale technology-based companies that have expanded into financial activities after achieving success in other industries (Schena et al., 2018; Arner et al., 2017). These new players are challenging traditional financial institutions and opening up opportunities for innovation and competition. In Brazil, some prominent Fintechs include Nubank, PicPay, Stone, B6, Creditas, and Open Co, while examples of Big-techs include Google, Apple, Facebook, Amazon, Baidu, and Alibaba. Regardless of size, entrants are active in various finance segments, such as payment systems, credit both with and without guarantees, insurance, cryptocurrencies, and financial education, to mention some. Undoubtedly, digital financialization points to a reorganization of banking markets.

Yet, the development of digital financialization is even more challenging for governments and central banks, as new entrants provide financial system with new gains but their action require adequate policy responses. For example, Fintechs are a source of financial innovation and might dynamize capital markets by pushing competition. But their success demand a sensible regulation, one that fosters the emergence of a nascent industry, thus not stifling potential innovations, while keeping supervisory attention not to compromise financial stability (FSB, 2019). In turn, Big-techs have the potential to promote financial inclusion of non-banking populations by leveraging their broad customer base and corresponding data oversight. However, technology giants pose equally significant problems, such as the risk of abuse of economic power and invasive surveillance of users' data privacy. Moreover, Big-techs threaten regulators' jurisdiction, as their regulatory power may not be sufficient to discipline agents with global-scale operations.

These challenges, opportunities, and threats presented by Fintechs and Big-techs – especially the latest ones – reposition the state as the architect of digital financialization (Jain; Gabor, 2021). It means that state action increasingly takes on the responsibility of managing new market actors and developing regulatory responses to balance the tensions between market stability and service innovation, or market competition and financial stability (Tanda; Schena, 2019; FSB, 2019; Ketterer, 2017). In this environment, PIX can be understood as the Brazilian state's response to challenges and opportunities brought about by digital financialization.

A functionalist explanation for the development of PIX would conclude that BCB created this payment system because the technology for this step has become

available and has enabled a more socially efficient means of payment than the existing one. However, the question is, how can one explain PIX's particular institutional design and development? After all, creating a state-owned Fintech was only one of many possibilities for the Brazilian regulators to engage in instant payment systems. In other words, financial regulators have paved the way for digital financialization in many other countries, but not necessarily as creators or operators of payment systems. So why did the BCB construct PIX instead of regulating private payment arrangements?

The paper opposes such a functionalist view and develops an institutionalist explanation instead, sustaining that PIX results from complementarities among three factors. First, there is the BCB's strong preference for and significant power to defend its regulatory perimeter. The BCB is a regulatory agency that has consolidated its "in action" legal power after having wagged a protracted political dispute inside the state's bureaucracy. Such a contested origin has made the BCB fiercely protective of its jurisdiction, i.e., highly committed to preserving the power and capacities acquired over time. The empowered BCB, an outcome of inflation control, is a regulatory body that firmly watches over its regulatory prerogatives while striving to keep all competitors away from its remit, be there Congress, Courts, or big-techs, eventually.

Second, the BCB has learned from international experiences with payment systems and has become aware of the potential risks that digital financialization has brought to domestic regulators. This refers especially to threats posed by potential competition presented by Big-techs, as they may undermine regulators' power and the stability of national payment arrangements.

Finally, the BCB has a long-standing and multidimensional relationship with the incumbent banks akin to a "relational contract", i.e., a contract with multiple clauses, successive negotiations, and compensations. This arrangement includes state-owned banks and a set of financial instruments that BCB disposes of, so as to alleviate eventual losses incurred by incumbent banks, either through the use of PIX or other policies. Thus, while state banks acquiesced to PIX, as they are under government control, private banks opted for compensating residual losses with other BCB transactions, while not vetoing PIX. In short, we can attribute the emergence of PIX – as a minimally sufficient explanation – to the regulatory trajectory of the BCB, the ideas from transnational networks, and the relatively unopposed interests of banks in Brazil, which opted not to veto the policy.

The paper proceeds in four sections. The second section provides an overview of the creation and development of PIX, placing this payment system within the history of Brazilian payment systems. It also examines key events and challenges that marked PIX's launch, including the BCB's veto of a competing payment feature developed by WhatsApp. The third section outlines complementary factors that help explain the emergence of PIX. Finally, the fourth section concludes the analysis.

2. PIX AND THE BRAZILIAN PAYMENT SYSTEM

The roots of PIX can be traced back to the institutional architecture of the Brazilian payment system, which underwent two noteworthy changes in 2002 and 2013.[4] In 2002, a reform was implemented to establish a system of instant wholesale payments, enabling real-time, irreversible, and unconditional settlement of interbank transfers in the country. The new system eliminated the time delay between clearing and settlement, which previously resulted in default risks for both, participants and the BCB, which implicitly guaranteed all daily transactions.[5] By the end of a business day, any mismatch between payables and receivables could have created potential inconsistencies in financial governance. Introducing the reserve transfer system significantly reduced this inconsistency, lowered systemic risk, and improved the efficiency of transfers within the payment system.

Following reforms to the wholesale system, institutional changes moved onto the retail payment system, thus addressing a complex set of transactions that involve individuals in the Brazilian economy. In fact, since 2005, the BCB had already identified several issues regarding the retail payment system, including the inefficiency of interoperability among payment arrangements, i.e., the lack of adequate communication among these arrangements, high verticalization between banks and payment card operators, over-reliance on physical currency in comparison to other countries, and regulatory gaps in the retail payments segment (BCB, 2005). A few years later, in 2010, the BCB published a comprehensive report on the payment card industry in collaboration with the Ministry of Finance and the Ministry of Justice, highlighting significant shortcomings in this industry (BCB, 2011). The report recommended broad regulatory changes, such as ending exclusivity between card brands and acquirers, separating the functions of data network service provision and accreditation, and establishing a neutral provider for settlement and clearing functions, to name but a few (Paixão et al., 2021).

Subsequently, in 2013, the Government proposed and the Congress approved Act nº 12.865, which introduced the new Brazilian payment system.[6] The Act provided more precise definitions of the actors operating in the system. It also expanded the regulatory scope of the BCB, which started to oversee not only financial

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[4] Payment systems refer to the "procedures, rules, instruments and integrated operational systems used to transfer funds from the payer to the payee and thereby close an obligation" (BCB, 1999, p. 1). They are part of the infrastructure which makes viable and organized commercial and financial transactions at the domestic and international levels.

[5] Armínio Fraga, former BCB's chairman, ironically summarized: "In Brazil, if a bank failed, the transaction was still concluded by the Central Bank in order to avoid systemic risk [...]. It was jokingly said that the Central Bank was not only the lender of last resort in the system [...], but also the loser of last resort" (BCB, 2019, pp. 131-132).

[6] In a nutshell, a payment arrangement is a procedure that connects buyers, sellers, the actors that make the payment possible (acquirers, i.e., card companies), and the payment institutions, which ultimately provide funds for payment.

institutions, such as banks, but other players, such as stores operating as retail payment institutions. Addressing the innovation goal, the Act introduced a proportional approach to regulation, exempting smaller-scale payment arrangements, unable "to pose a risk to the normal functioning of retail payment transactions" (Art. 6), from regulatory requirements. Lastly, the Act removed the exclusivity between card associations and acquirers, promoting interoperability of payment arrangements. Experts welcomed these changes as they allegedly reduced barriers to entry, and facilitated competition and innovation within the market, particularly by allowing Fintechs to emerge in the banking sector (Le Grazie, 2019).

The incremental reforms of payment system continued its course. In May 2018, the BCB proposed the creation of a Working Group (WG) on instant payments to address pending issues in retail transactions. This WG aimed primarily to discuss with market players and experts the creation of an "efficient, competitive, secure, and inclusive instant payments ecosystem." The WG was an attempt to respond to the agenda presented in the first reform of 2002, which addressed wholesale transactions, but left open some issues on retail transactions – despite all reforms that followed thereafter.

The WG unfolded successfully, with the participation of one hundred and thirty financial institutions in discussions, which addressed the BCB preference for creating a market solution for instant payments. Yet, at the same time, the monetary authority had already signaled to WG participants that its preference for a market solution did not rule out the pivotal role of the BCB case market players were not able to come up with a timely and reasonable regulatory proposal. As the BCB's chairman summarized in the first WG meeting: there is "the possibility of the Central Bank taking a more active role in defining rules and providing infrastructure and other services" (BCB, 2018). Hence, the BCB's preference for a more negotiated, bottom-up proposal would not deter its serious determination to reform the payment system, even if that implied a more top-down policy construction.

The Working Group (WG) concluded its debates and proposals in December 2018 with the release of Communiqué nº 32.927, in which the BCB presented the essential requirements for the creation of an instant payment system. With this Communiqué, the BCB signaled to market players that the monetary authority had the intention of being the operator of the new instant payment system. In other words, the BCB signaled to the banking market its choice for a top-down policy measure. That was a very concrete step toward PIX, which, despite all initiatives related to the WG, started to be conceived by the BCB itself.

Less than two years after the conclusion of the WG, the BCB stepped decisively to create its payment system, which from the beginning implied overlapping the roles of the system's regulator and operator. In February 2020, BCB Vote nº 32 made "mandatory the participation of larger financial institutions focused on retail, offering transactional accounts to their clients" in the new instant payment system. This measure would guarantee that the new program would have access to a vast customer base of more than 500,000 transactional accounts held by these institutions. According to Duarte et al. (2022), in a BIS Bulletin publication, the BCB's

dual role as both operator and regulator of the arrangement ensured the participation of large financial institutions in the new system, which was a key variable in its success. This decision established most of the necessary conditions for launching the new instantaneous payment system, PIX.

Yet, shortly before the launch of PIX, the BCB faced an unexpected challenge. On June 15, 2020, several months before the scheduled start of PIX operations, WhatsApp Pay, a device of Facebook-owned WhatsApp, announced its plans to initiate operations in Brazil. The WhatsApp payment device would enable users to make instant transfers through the app using their registered credit cards. The BCB however, intervened by leveraging its dual role as the PIX operator/creator and payment system regulator. In response to WhatsApp's announcement, on June 23, the BCB suspended the launch of the Big-tech company's activity to evaluate its potential risks. The BCB alleged that the proposed service "could generate irreparable damage to the Brazilian Payments System, notably with regard to competition, efficiency and privacy" (BCB, 2020). On the same day, the Antitrust Tribunal (CADE) also decided to suspend the WhatsApp operation, which included a partnership between Facebook and Cielo (a credit card operator), aiming to investigate potential risks to competition.

By restricting the functionality of WhatsApp's payment system, the BCB took a strategic step. The regulatory action made the assumption that the establishment of a payment system by a Big-tech company would generate network benefits that could be hard to reverse. Network economies have a strong path dependency characteristic. Once users become familiar with a given operating system and are interconnected to a network of suppliers and customers, they have a strong incentive to maintain that usage and not migrate to a competing network. Therefore, the success of the PIX system relied on being the first mover, i.e. the first available alternative, which would profit from the loyalty effects provided by network externalities.

The BCB justified the decision to suspend the Big-tech operation by stating that it aimed to "preserve an adequate competitive environment, which ensures the operation of an interoperable, fast, secure, transparent, open and cheap payment system" (BCB, 2020) – a justification remarkably similar to its own description of PIX. In this context, BCB decided to bring forward the launch of PIX to August 2020 instead of November 2020, as initially scheduled. Since then, the platform has presented itself as an advantageous alternative. In addition to allowing for transactions to be processed 24 hours a day, 365 days a year, it presents a reduction in costs with intermediaries in the payment chain, making it a new competitive lever for the financial segment (Aguiar et al., 2021).

3. UNRAVELING THE STATE-OWNED FINTECH

This section addresses some fundamental questions regarding the BCB's decision to create a public payments infrastructure instead of regulating private alternatives like WhatsApp, and other potential options. Specifically, we explore why the

BCB took the lead in creating PIX and how it managed to avoid pushback from established industry players.

3.1 BCB's preferences and power

The first factor that explains the BCB's involvement in setting up a public payment infrastructure has an institutional nature and concerns with BCB's preferences and power resources that have been historically shaped. We argue that BCB's strongest preference is preserving and expanding its regulatory perimeter, supported by the extensive discretionary power and material and human resources that it has acquired over the last few decades.

The preference to preserve and expand scope of power is a constant among bureaucracies. As Niskanen (1971) points out, bureaucracies are "budget-maximizers", meaning they operate within the state apparatus pursuing further resources and power. However, in the case of the BCB, this preference takes on more intense tones due to its odd institutional construction. The BCB was one of the last central banks to be established in Western capitalism, founded only in 1964. In contrast, other Latin American countries had established monetary authorities in the 1920s (Colombia, Chile, and Mexico) and 1930s (Argentina) (Drake, 1989).

The establishment of a central bank in Brazil was delayed mainly due to opposition from interest groups dependent on state-subsidized credit, particularly the rural sector. Such groups were concerned about creating a bureaucracy capable of imposing restrictive monetary policies (Franco, 2017). This opposition remained successful for several decades, even with the BCB's formal creation in 1964. The BCB did not acquire "de facto" authority until the mid-1990s.

Until the 1990s, the BCB shared the functions of monetary authority with Banco do Brasil (BB) (a Brazilian state-owned bank) through a kind of consortium supported by an unusual institutional arrangement represented by the "movement" account ("conta de movimento"). This account was a monetary communication channel between BB and the BCB. Initially, it provided resources from BB to the BCB, guaranteeing the BCB's initial budget throughout the 1960s. However, progressively its function reversed to serve BB itself, allowing it to grant overdraft loans guaranteed by the BCB. In practice, this implied a sharing of monetary governance, in which the BCB was only partly capable of regulating the money supply in Brazil (Nóbrega, 2005) as BB could print money by lending resources without coverage. Additionally, the creation and structuring of the BCB always depended on BB's institutional apparatus, which provided not only the BCB's initial budget but also its professional staff. However, as the BCB's staff members preserved the legal right to return to their original positions at BB, the newly established bureaucracy was characterized by substantial instability.

The BCB's uncommon genesis has shaped its contemporary performance. Armijo (1988) explains that, since the late 1980s, the BCB has gradually detached itself from BB through a political struggle inside the state, consolidating it as Brazil's regulatory and monetary authority. In fact, the intra-bureaucratic dispute was waged

on different fronts, mainly through three overlapping processes: first, the end of the "movement" account in 1987, which wiped out BB's printing money ability; second, the universalization of public tender for state positions introduced by the 1988 Constitution, which stabilized the BCB's bureaucratic staff; and third, the successful control of inflation and the Real Plan reforms in the 1990s that essentially empowered the BCB as the monetary authority.

Crucially, as a byproduct of inflation control and stabilization of banking market, the BCB gained "de facto" operational autonomy through three institutional changes. The BCB introduced the Monetary Policy Council (COPOM) in charge of defining the official interest rates (SELIC), which has become the main monetary policy instrument. The COPOM was born wrapped in a "technical aura", which proved crucial to ritualize and stabilize monetary policymaking within the BCB. Moreover, under the leadership of the BCB, Brazil adhered to Basel rules ensuring a new rationality for banking supervision as it diluted domestic political influence in policymaking. Lastly, to overcome an exchange rate crisis that erupted in 1999, government introduced the inflation-targeting regime, which defined clear policy targets and instruments for the BCB policies (Franco, 2017; Schapiro, 2020; Schapiro, 2021; Sola; Whitehead, 2006). These combined processes ultimately assured the BCB's centrality in the Brazilian economic bureaucracy.

Such a slow-paced and uneasy process of building a monetary and regulatory authority in Brazil has made the BCB highly protective of its prerogatives, regulatory perimeter, and capacity to shape Brazil's financial system. The BCB's preferences can be clearly seen in its approach to undisciplined financial conducts, which differs from other central banks like the Federal Reserve (FED). While the FED tends to take *ex-post* action on financial innovations (Vogel, 2018), the BCB favors acting *ex-ante* by controlling the behavior of financial agents. For instance, in the US, investors structured the derivatives industry and mortgage securitization without requiring prior authorization from the FED or other regulators. In Brazil, on the other hand, the BCB has acted a priori, tending to reject unregulated financial initiatives. Such a posture revealing the BCB's preference for keeping its regulatory policymaking authority was explicit in three illustrative situations: the emergence of community banks, Fintechs, and the payment instrument that was developed by WhatsApp (WhatsApp Pay).

Community banks are now recognized and supported by the BCB, but they initially faced a fierce resistance from the monetary authority. Community banks are usually depository financial institutions owned and operated by local associations, like NGOs and social movements, aiming at fostering local development. These banks generally issue an alternative currency only accepted by very neighborhood stores. As they did not meet the minimum capital requirements and issued this alternative currency, the BCB deemed them illegal and mobilized a police apparatus to curb their activities (Ferreira, 2014). Only with time and a better understanding of successful cases like Palmas Bank did the BCB learn that community banks were a sort of innovation that merely sought to further impoverished communities, thus not putting the financial system or its authority at risk (Freire, 2011).

Similarly, the BCB banned activities of Fairplace, the first Fintech dedicated to peer-to-peer lending in Brazil. Deemed a type of "online loan sharking", the business was forced to shut down, and its managers were sued.[7] Only in 2019 did the BCB review its attitude towards Fintechs, regulating and allowing their development within the national financial system.

In the same vein, we argue that the emergence of PIX is another illustrative case of the BCB's regulatory stance. Just as in the case of community banks and Fairplace, the BCB followed the same pattern of prohibiting those unknown activities in instant payments. The authority initially restricted WhatsApp Pay and forbade its operation, elucidating the preference to regulate *ex-ante* and keep regulatory control over all sorts of activities in the Brazilian financial system.

The examples illustrate the BCB's preference for maintaining its belatedly obtained control over the country's financial governance. They also reveal the significant power the BCB has acquired throughout its institutional trajectory. The BCB's regulatory powers derive from the 1964 Banking Act, which delegates vast powers to the Executive branch authorities, particularly the National Monetary Council (CMN), to oversee the financial system. As the BCB has taken a more substantial role in financial regulation over the CMN, it has come to rely on the same powers, which were preserved by legislative and judicial powers when keeping the Banking Act in force after the enactment of the 1988 Constitution (Schapiro, 2020).[8] Subsequent acts, such as the 2013 Payment System Act, followed the same pattern of delegating broad powers to the BCB.

While it is common for central banks to have regulatory and policy capacity, BCB's powers are remarkably comprehensive. For instance, in some countries, such as Mexico and Chile, adopting Basel-based, prudential rules, requires legislative approval (Cho, 2013). However, in Brazil, the BCB not only adopted the Basel rules but similarly regulated many other issues in the banking industry through infra-legal norms. Such discretionary space[9] allowed the BCB to create, operate and regulate PIX, including requiring large banks to join it, and temporarily restricting the launch of WhatsApp Pay.

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[7] See, "At the request of the Central Bank, Public Prosecutor opens proceedings against the Fairplace site" (correiobraziliense.com.br).

[8] In ADIN nº 4, the STF decided that until Congress passes a new law, the Banking Act of 1964 (nº 4.595) should be considered a "complementary law" to the Brazilian Constitution, making it the reference act for the financial sector. However, such a legal understanding and the political cost of enacting a single legal act comprising various financial topics have blocked the banking reform agenda in the legislative power.

[9] Such a discretionary space is evident in all the mentioned cases. However, it does not imply that the BCB is an idiosyncratic or overly interventionist regulator. Throughout its institutional building process, the BCB has adhered to international "best practices" and exercised its power commonly based on a market-friendly rationale (Mouallem, 2021). Therefore, the monetary authority's sphere of action must be understood considering the multitude of relationships it keeps with transnational regulatory networks and domestically regulated markets.

3.2 Transnational regulatory networks: the role of ideas

The preference for protecting regulatory perimeter and the regulatory capacity to do so set the background of how BCB joins in digital financialization, but it does not explain its choices when implementing preferences. We argue that institutional learning from other national experiences was critical. The BCB gained a sounder understanding regarding the urgency of promoting an instant payment system, and the need to avoid private monopolies or duopolies in the payment industry through the learning process in transnational networks.

A significant contribution came from the BCB's involvement in international regulatory forums, such as the Basel Committee and the Financial Stability Board, and related network connections. In addition to raising the awareness of regulators worldwide about the emerging issues in retail instant payment systems, transnational regulatory networks supported the outlining of possible roles for central banks in financial digitalization.

For these purposes, the Committee on Payments and Market Infrastructures (CPMI) has been a crucial international forum. It comprises representatives from 28 central banks, including the BCB, and has the Bank for International Settlements (BIS) as its secretariat. The CPMI focuses on monitoring and analyzing issues related to payment and clearing systems across countries. A case in point was the BIS report published in November 2016 detailing the development and relevance of rapid or instant payment systems worldwide (BIS, 2016). The report revealed that the number of countries with payment systems providing real-time or nearly real-time, and continuously available services more than doubled between 2010 and 2016. Table 1 shows instant payment systems implemented by 2016.

The study suggested that instant payment systems could potentially exacerbate existing risks, such as fraud, system security and integrity, as well as consumer protection issues. However, it highlighted that instant retail payments would benefit "various stakeholders and society at large" and should be encouraged. In addition, the CPMI concluded that central banks are key actors in developing fast or instant payments, but can perform multiple tasks in the process. National experiences examined by the committee, illustrate central banks' roles in new payment systems, such as catalysts, overseers, and/or operators.

As catalysts of instant payment systems, central banks encourage and facilitate their development by private actors while ensuring interoperability among systems, particularly in contexts of coordination problems. As overseers, central banks focus on addressing operational risks, such as credit and liquidity risks, experienced in payment systems. Finally, in the role of operators, central banks offer a public infrastructure for instant payment systems, which can take a myriad of configurations, including varying degrees of state intervention.

Table 1: Retail instant payment systems in CPMI member countries by 2016

Country	System	Year	Operator	Regulator
South Korea	Electronic Banking System (EBS)	2001	Korea Financial Telecommunications & Clearings Institute (KFTC)	Bank of Korea
South Africa	Real-Time Clearing (RTC)	2006	BankservAfrica	South African Reserve Bank
South Korea	CD/ATM System	2007	KFCT	Bank of Korea
United Kingdom	Faster Payments Service (FPS)	2008	Faster Payments Scheme Ltd (FPSL)	Bank of England and Payment Systems Regulator
India	Immediate Payment Service (IMPS)	2010	National Payments Corporation of India (NPCI)	Reserve Bank of India
Sweden	BiR/Swish	2012	Bankgirot	Finansinspektionen
Turkey	BKM Express	2013	BKM	Central Bank of the Republic of Türkiye and Banking Regulation and Supervision Agency
Italy	Jiffy – Cash in a flash (Jiffy)	2014	SIA	Bank of Italy
Singapore	Fast And Secure Transfers (FAST)	2014	Banking Computer Services Pte Ltd	Monetary Authority of Singapore
Switzerland	Twint	2015	Twint	FINMA
Mexico	SPEI	2015	Bank of Mexico	Bank of Mexico

Source: BIS (2016).

In another study, CPMI argues that the central lesson to be learned is that countries have adopted a variety of institutional designs, each of which involves a distinct role for local regulators in instant payment system issues. The study acknowledges this diversity but notes that central banks have played limited roles in the operation of instant payment systems in most countries. Against this background, the BCB is one of the few central banks that actively create and operate retail instant payment systems instead of just regulating private alternatives (BIS, 2021).

Transnational regulatory network debates were crucial for the BCB bureaucracy to realize how relevant and urgent it was to create an instant payment system in Brazil. As the BCB payment department head explained in the first WG-Instantaneous Payments meeting, other national experiences helped the monetary authority to understand instant payments as a crucial step in the evolution of retail payments. In his words: "And [such an evolution is happening] not only in Brazil. Instant

payment solutions are emerging and spreading rapidly in several jurisdictions worldwide. Moreover, this has been one of the most discussed topics in international payments forums" (BCB, 2018).

Hence, the BCB drew on institutional learning and global debates to shape its approach toward creating an instant payment system, identifying potential risks and understanding the engagement options. Namely some specific cases, beyond the debates happening around the BIS, one can point to shocking episode of Facebook's announcement of its intention to launch cryptocurrency, which have amplified the warning regarding the risks posed by Big-techs to national regulators. As Jean Pierre Landau, the Central Bank of France's former member, reports,[10] since Facebook announced its intention to create its own currency, central bankers and financial regulators worldwide have started to see Big-techs as a concrete threat to regulatory sovereignty. Another key lesson came from the Chinese experience, where two Big-techs dominated the instant payment system market, posing regulatory and control challenges for local authorities. The Chinese example of a powerful state struggling to regulate private payment systems stresses a potential challenge faced by regulators, especially those protective of regulatory perimeters, such as the BCB. The Chinese case also demonstrates the drawbacks of replicating the poor interoperability among private payment systems in Brazil – an issue the BCB overcame at considerable cost in the early 2010s concerning credit cards.

It is quite revealing that the BCB's former director, João Manuel de Mello, justified creating a public payment system rather than simply regulating private ones, citing the Chinese experience as a cautionary case. Mello emphasized that: "One of the objectives of the PIX is to avoid fragmentation [...]. We have, for example, China, which has made step jumps, from plastic cards to payments through apps (WeChat and AliPay, for example). This [evolution] created value for them, but also difficulties with interoperability, regulation and control [...]".[11]

PIX must then be analyzed against the backdrop of ideas diffused among policymaking circles on instant payment systems, the warning signs presented by Big-techs, and the cautionary case of China. As an engaged participant in transnational networks, the BCB sought to avoid perceived challenges by creating a single, public payment network, that would promote interoperability and be subject to unified regulation and oversight.

3.3 The State-financial institutions' relationships

In addition to BCB institutional preferences and transnational networks, the development of PIX is also an outcome of incumbent financial institutions. After

[10] The statement was featured among the special reports entitled "The future of banking" (www.economist.com).

[11] Mellos' speech was recorded in: "One of the objectives of PIX is to avoid fragmentation, says Central Bank, director" (www.mobiletime.com). On this see also Cernev and Diniz (2021).

all, these players have not used their business power to veto the program's creation. Such incumbents, economically and politically influential players, could have mobilized their resources to oppose the creation of PIX, as it might have been viewed as a potential competitor to some banking transactions. Yet, financial incumbents have opted to preserve their long-standing and advantageous relationship with the Central Bank, thus avoiding displeasing the regulator by imposing a veto on PIX.

Over time, Brazilian banks have developed a complex relationship with the Central Bank that covers many areas of interest, resembling a "relational contract", i.e., a type of contract with many clauses, some written and some non-written, that fosters cooperation and compensation for losses among parties. Taking this "relational contract" into account, one can describe PIX as another contractual clause or an additional chapter in this long-standing relationship between the Central Bank (BCB) and Brazilian banks. Hence, by deciding if they should veto or support PIX, the banks have balanced eventual losses they might suffer from PIX against other gains they make in maintaining their alliances with the CB.

In fact, there are compelling reasons for incumbent banks to adopt a cooperative and non-rivalrous approach toward the BCB. First, there is the fact that incumbent banks are primarily domestically owned and highly vulnerable to local regulation. Of the five largest banks, which account for 85% of assets, two are state-owned (CEF and BB), two are controlled by Brazilian groups (Itaú and Bradesco), and only one is a subsidiary of a foreign bank (Santander). As a result, these banks possess relatively limited structural power to veto policies unilaterally, for example, threats of exiting the country. Since leaving the country is not a simple option, their primary means of influencing policy is through instrumental power, which involves negotiation, lobbying, intervention in public debates, and similar mechanisms of pressuring policymakers.[12]

In addition, Brazilian banks are "multiple banks," i.e., they participate in a wide range of activities, including credit, asset management, insurance, and pension plans. Crucially, one of their multiple activities is very strategic and profitable: REPO transactions, i.e., financial transactions with government bonds. Given that the Brazilian official interest rate (SELIC) used in these operations has historically been high, REPO transactions represent a critical source of income for incumbent banks. Considering banks' many areas of interest, their corresponding interfaces with BCB, and their profitable position in the REPO market, there have been fewer incentives to take on disruptive behavior, vetoing a BC policy like PIX.

Furthermore, there is a cyclical reason as to why banks have not proposed a veto on PIX: it has not yet had a substantial impact on private banks, which are more likely to use their instrumental power to alter policy terms. Given the business model of "multiple banks", coupled with the attractive returns offered by transactions involving government bonds, it is unsurprising that PIX has not yet imposed significant losses on banks, despite its growing volume of transactions. On average,

[12] On structural power and instrumental power, see Fairfield (2015).

revenues from current account services account for only 6% of the total operating revenues of Brazil's largest banks. The five largest banks' balance sheet numbers, shown in Table 1, reveal a negligible impact of PIX so far.

Based on service revenues data,[13] the five largest banks in Brazil experienced a decline of R$ 2.614 billion in revenues from current accounts due to the removal of revenues from transfers, TED, and DOC. All banks but Caixa Econômica reported losses in service revenues in their first quarter 2021 statements due to PIX impacts. However, by the end of 2021, Santander, Itaú, and Bradesco had nearly stabilized this revenue category. Notably, state-owned banks experienced the most significant losses with PIX, but they generally do not tend to oppose government programs.

Table 2: Annual service revenues from current accounts by Brazil's largest financial institutions (in millions of R$)

Institution	2020	2021	Difference	Difference (%)
BB	7.524	6.231	- 1.293	- 17,2%
Caixa	5.498	4.415	- 1.083	-19,7%
Santander	3.966	3.812	- 154	-3,9%
Itaú	7.592	7.455	- 137	-1,8%
Bradesco	7.928	7.981	53	0,7%
Total	32.508	29.894	- 2.614	-8%

Source: 2020 and 2021 banks' performance analysis reports.

It is also worth bearing in mind that PIX has increased the banks' customer base. As Isaac Sidney, president of Febraban, argued, PIX has become a "key tool to boost banking and financial inclusion in the country".[14] As a result, individuals who previously did not utilize the banking system have started using it, providing banks with additional resources to manage.

Undoubtedly, such a circumstance will not prevent banks from opposing PIX in the future or reacting negatively to regulatory onslaughts. It only means their actions must be calculated within the ongoing and complex regulatory negotiations. Until now, the losses incurred by banks thus far from PIX's enactment have not been significant enough to justify the cessation of the relational contract terms.

[13] The accounting unit "service revenues from current account" provides the most accurate estimate for assessing the impact of PIX on banks' accounts. While this unit encompasses accounts beyond TED/DOC and transfers (which would be offset by PIX), financial institutions explicitly refer to these numbers in their balance sheets when disclosing the effects of PIX on their revenues.

[14] Sidney's statement can be found at: "PIX is essential to boost banking and financial inclusion, says Febraban" (valorinveste.globo.com).

3.4 Recent changes in the BCB: A case of political entrepreneurship?

An alternative explanation for the emergence of PIX could be the shifting profile of BCB's policymakers and their political entrepreneurship. According to this explanation, policymakers' exceptional leadership capacities would make room for a new policy agenda focusing on competition and innovation. PIX would express such changes, which have gained momentum since the Temer government assumed power and persisted during the Bolsonaro administration. Despite speculation about how changes in policymakers' profiles could impact policies, analysis of prosopography indicates that there have been no significant shifts, if we analyze BCB directors' educational backgrounds.

Specialized literature suggests that the BCB maintained a consistent profile pattern when appointing directors during the Cardoso, Lula, and Dilma administrations. The economic policy directorships were typically filled by individuals recruited from outside state careers, mainly from financial institutions and academia, and trained in mainstream economic institutions. In turn, the supervisory/regulatory and administrative directorships were typically filled by individuals with state careers, primarily occupying positions in the BCB itself, and with no training in mainstream economic institutions (Olivieri, 2007; Codato et al., 2016; Dantas, 2019). Looking at BCB directors' educational backgrounds, we can conclude that such a profile pattern persisted throughout the Temer and Bolsonaro administrations. In other words, the BCB directors who implemented PIX held the exact same training profiles of previous administrations.

Despite the shifting political landscape after Dilma Rousseff's highly-contested impeachment, and the rise of a liberal agenda during the Temer and Bolsonaro administrations, the BCB has continued to be run by individuals with a profile similar to previous periods. Therefore, these factors cannot be considered explanatory variables for the unique development of PIX.

Table 3: BCB directors trained in the economic mainstream in the BCB (by administration)

Administration	Administration	Supervision/regulation	Economic Policy
Cardoso	0%	40%	90%
Lula	0%	33%	73%
Dilma	0%	0%	50%
Temer	0%	0%	67%
Bolsonaro	0%	66%	83%

Source: The authors.

Policymakers' personal and idiosyncratic characteristics may have contributed to PIX's creation, supporting, or accelerating its enactment. However, counterfactual analysis suggests it is unlikely that the same individuals who launched PIX

could have accomplished it years earlier, before transnational debates over instant payment systems, and the concerns about the threats from Big-techs or before the BCB bureaucracy had advanced such an agenda. Actually, it took five years between the 2013 reform and the working group on instant payment systems, suggesting that the PIX launch arose from a gradual process greatly influenced by international forums. In other words, PIX resulted from a broad context rather than individual political entrepreneurship. Hence, it seems more appropriate to understand PIX as the result of an emergent process triggered and managed by the bureaucracy, according to BCB's own institutional preferences, global debates on instant payment systems, and private interests prevailing domestically.

4. CONCLUSION

The article provides a comprehensive analysis of PIX's creation, a digital financial product that has gained immense popularity among the public and even become a subject of election speeches. And there are good reasons for this. PIX is a valuable piece of infrastructure that serves equally and without cost, from the richest to the poorest. Its success may lead one to adopt a functionalist approach, explaining it as a product of technological advances or social necessity related to financial exclusion.

However, technology and social needs alone cannot fully explain PIX's institutional shaping and operation. There are numerous technology-related issues and persistent social problems that remain unresolved. In the case of PIX, neither technology nor social needs explain the BCB's decision to create, regulate, and operate the new payment system rather than merely regulating private initiatives.

Our account takes a political approach to understand the development of PIX, underscoring the complementarity of three factors. First, the BCB's historically constructed institutional preference for preserving its regulatory perimeter and power. Second, the ideas about states' roles in instant payment systems, especially in the face of Big-techs, formulated and shared through transnational regulatory networks. Third, the non-opposition of the largest banks in Brazil, whose interests have not been severely affected. By examining these factors, the article describes PIX as a political-institutional construct, highlighting the critical role of states in the architecture of digital financialization. It also clarifies that the state's role in digital finance is context-specific, which may vary according to local political-economic issues.

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