# The future of cross-border wholesale payments: Mobilising central bank money across borders

*Received (in revised form): 9th September, 2022*

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**Abstract**

*Large-value cross-border payments constitute the life-blood of international trade and commerce and are thus crucial to national economies. This paper explores this high-value payment ecosystem, which has become more complex and expensive following the prudential regulatory reform rolled out in response to the global financial crisis. Recent technology innovations, in particular the emergence of blockchain and distributed ledger technology, have led to the creation of a parallel system of value transfers based on crypto currencies. The combination of cloud computing, software innovations and the increased use of application programming interfaces has enabled the creation of new business and technology models that are innovating this space. On top of this, the arrival of central bank digital currencies may have the potential to support cross-border payments, both retail and wholesale. This paper explores how far these developments can support a better system for large-value cross-border payments, providing a number of examples of real-world business approaches. A critical lens is applied to gaps outside of the technology field, such as central bank policies and liquidity management, which will need to be closed before true innovation can occur at scale.*

*Keywords: cross-border wholesale payments, correspondent banking, real-time gross settlement system (RTGS), central bank digital currency (CBDC), distributed ledger technology (DLT), high-quality liquid assets*

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## INTRODUCTION

The ability to transfer money across borders in a safe and secure way is essential for the global economy. Indeed, businesses and financial institutions have been engaging in cross-border payments for centuries. Cross-border payments sustain international trade and are a central ingredient to making this globalised world work when it comes to commerce.

Until now, the main method of executing money transfers globally has been via correspondent banking arrangements. Correspondent banking covers three pillars: cross-border payments, foreign exchange (FX) transactions and trade services. More than 11,000 financial institutions engage with each other across more than 1 million bilateral correspondent banking relationships.[1]

Nevertheless, there remain many pain points in cross-border correspondent banking payments. Key risks include: market, FX,

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Journal of Payments Strategy & Systems
Vol. 16, No. 4 2022, pp. 389–398

1750-1806

credit and counterparty and regulatory risk (eg regulation to combat money laundering and the financing of terrorism). Furthermore, technology and operational risks, as well as risks regarding the availability and cost of liquidity to support the business, do arise. In addition, correspondent banking cross-border payments are relevant for financial stability.

In July 2020, a task force coordinated by the Bank of International Settlement's Committee on Payments and Market Infrastructures (CPMI) published a report tabling recommended 'building blocks' for improved cross-border payments.[2] This report was commissioned after a task force on the subject, instigated by the G20 and led by the Financial Stability Board (FSB), had observed four major problems with contemporary cross-border payments, namely that they are slow, expensive, opaque and inaccessible. These deficiencies have negative implications for global growth, trade, development and financial inclusion.

The present paper focuses on the specific area of wholesale cross-border payments. It will begin by discussing the challenges that this sector is still experiencing. Having set the scene, the paper reviews different entities and business models that are operating in the cross-border wholesale payment space. The paper then zooms in on a more recent example of how cross-border wholesale payments can be organised and what the positive implications of such a set up could be. Reference will also be made to the discussions emerging around central bank digital currencies (CBDCs) and how such systems can facilitate interoperability.

There is a clear need for meaningful innovation with traction in the cross-border wholesale payment space, not just to gain efficiencies and create opportunities but also to find viable ways to better manage the associated prudential regulatory requirements facing banks since the aftermath of the financial crisis.

## WHOLESALE PAYMENTS: THE WHAT AND HOW

Wholesale payments, often called large-value payments, are used to settle transactions between banks and financial markets and are by nature high in value, thus representing a higher risk than retail payments. The Bank for International Settlements (BIS) and European Central Bank (ECB) use the terms 'large-value payments' and 'large-value payment systems' in their respective glossaries. Large-value payments cover payments in the real-time gross settlement (RTGS) systems of central banks 'for their own account and for their customers'.

At a national level, wholesale payments are made between banks and settled in central bank money between those banks that directly hold a central bank reserve account (often called an RTGS account). That process implies that the paying bank has to provide liquidity for every payment as a prerequisite to settlement. To secure liquidity on the RTGS account, banks must provide collateral. These types of transactions represent the financial blood-flow of a country's economy.

The traditional method of making wholesale cross border banking transactions then — as now — is correspondent banking, where correspondent banks in different jurisdictions supply commercial bank money to make payments on behalf of their overseas bank customers. In some ways, the picture looks similar to domestic wholesale payments, where the sending bank will also need to have sufficient liquidity in place, either via a positive account balance or equivalent collateral. This is necessary to ensure that settlement risk (Herstatt risk) can be managed effectively and that settlement can take place. The difference here is that cross-border wholesale payments are executed on the basis of commercial bank money, rather than central bank money, and transactions are often based on uncommitted credit lines (ie banks extend credit

lines to one another but these lines may be removed any time). Such transactions therefore carry with them an element of real risk for the foreign bank relying on the credit provided by their correspondent bank.

The other feature of this wholesale market is that it operates across specific currency pairs; for example, one can have a wholesale market in US dollar and euro. Of course, as new forms of currency are added to the market, there may arise a wholesale market for virtual currencies. Still, all wholesale market payments could use the same infrastructure setup and standards.

A further dimension of risk in wholesale cross-border payments emanates from the fact that depending on the origin and destination of a payment, many different banks could be involved in the correspondent banking payments chain — up to eight or ten institutions in some cases. This adds to the risk in terms of the different risk profiles of banks themselves, as well as country risks that will have to be considered and the different regulations that will apply.

When it comes to the policy side, anything cross-border is of course cross-jurisdiction and this by its very nature adds complexity as different regimes and rules translates into costs, thus inhibiting innovation. Central banks have in place domestic policies, which by definition are not designed to facilitate cross-border services. Generally, RTGS accounts are available to domestic credit institutions only and thus not open to foreign banks (credit institutions) and other types of wholesale investors. On top of that, not every domestic credit institution is eligible to hold an RTGS account at the central bank, restricting direct access even further. As long as central banks maintain such restrictive policies, cross-border wholesale participants and certain domestic banks as well as non-banks (such as e-money institutions) are forced to use correspondent banking solutions.

While regulators are working with each other and the industry to align their rules, setting up any type of system that facilitates cross-border payments remains complex and challenging.

## THE CONSEQUENCES OF THE FINANCIAL CRISIS FOR THE PAYMENTS SPACE

The financial crisis of 2008 exposed the inherent risks and interdependencies of correspondent banking arrangements. First of all, there is no cross-border RTGS system that can facilitate settlement finality so transactions are instead subject to interbank risks. Furthermore, many banks operated badly run liquidity management, using Excel sheets. This meant that banks were unsure where their liquidity was — a real problem when things started to break down. This naturally led to correspondent banks pulling these uncommitted credit lines — basically the majority of liquidity — which meant that cross-border payments came to a standstill unless Nostro accounts were pre-funded or credit lines collateralised.

In the aftermath, prudential regulations were significantly tightened on the basis of the BIS introducing the third Basel Accord (Basel 3). This had specific consequences for the field of cross-border correspondent banking as banks were required to maintain an additional capital buffer, so-called 'risk weighted assets' (RWAs), against such interbank exposures. Such measures, however, do nothing to address the root cause. Banks still use commercial credit lines, albeit in some instances to a lesser extent than before, and under the Basel 3 rules these credit lines are factored in to the banks' internal liquidity adequacy assessment process, resulting in significant intraday liquidity buffer requirements. In the absence of credit lines, collateralisation or pre-funding is of course expensive. Thus, correspondent banking has become more expensive and, as

a result, several market players have reduced their services and access — a process often labelled as 'de-risking'.

However, it is also worthwhile noting a study undertaken by Casu and Wandhöfer in 2018,[3] which found that banks relying on correspondent banking services felt most strongly about the lack of visibility of transaction-related costs, followed by the lack of information throughout the life cycle of the payment and lack of data and/or incomplete transaction reference data, which is problematic when it comes to reconciling transactions. Interestingly, the direct costs associated with messaging fees charged by the prominent global correspondent banking messaging network operated by the Society for Worldwide Interbank Financial Telecommunications (SWIFT) were considered the least important. For the study group involved, the pain points related to information and transparency were even more relevant than cost-related frictions, such as liquidity and capital costs, costs for messaging fees and costs charged by providers.

## NEXT-GEN CROSS-BORDER PAYMENT MODELS

With cross-border wholesale payments being ripe for innovation, this paper will now discuss the existing and emerging players in this space.

In terms of types of institutions, there are two established players: SWIFT, the global interbank messaging network, which is a critical service provider and the Continuous Linked Settlement (CLS) Bank, a global interbank FX settlement provider, which is a financial market infrastructure (FMI).

### SWIFT

Via its extensive network that spans over 200 countries and territories across the various continents, SWIFT provides financial institutions and corporates with a dedicated channel for the transmission of payment instructions. On receipt of such instructions, institutions credit or debit their internal ledgers as appropriate. In this way, no money is physically exchanged; rather, it is simply a ledger entry.

Cross-border payments over SWIFT have been slow and problematic for many decades, and for a long time it was difficult to monitor the progress of payments closely and identify any delays/costs picked up along the way. Since the arrival of the Global Payments Innovation (gpi), however, it has become possible to trace transaction messages across the network via an API-enabled cloud infrastructure that functions much like a delivery tracking service. This has resulted in much faster execution times, with more than 90 per cent of transactions executed via gpi, resulting in payments being credited within 24 hours.

In sum, the gpi scenario does address some of the key pain points in the industry but it does not obviate the need for interbank credit and does not connect messaging with liquidity or improve overall liquidity efficiency. Arguably, this is not innovation *per se* but rather an incremental improvement of the workings of a complex system. Reducing the complexity of the payment flow itself is where true innovation lies.

### CLS

Owned by the largest 68 banks in the world, CLS settles approximately 40 per cent of global FX. To use its services, participating banks are required to hold central bank accounts. CLS is a systemically important FMI used by 28,000 institutions, and benefits from high levels of payment netting efficiency to offset it against trade netting solutions. However, the multilateral nature of settlement makes it more complex to add additional currencies and members and the self-collateralising nature of settlement allows for settlement in small windows only. What is more, CLS must hold central

bank reserves in its own name in each of the jurisdictions it services. Although CLS has evolved over the years, it has had limited success in launching settlement services for same-day trades and addressing digital needs, and the delivery of innovative solutions has proven to be rather challenging.

Alternative providers are now emerging to compete in this space.

Conscious of the need to achieve more improvements in cross-border payments — ensuring they are faster, cheaper, more transparent, secure and inclusive — the G20 roadmap, published in 2020, spells out a comprehensive programme across 19 building blocks and five focus areas.[4] The impetus generated by the BIS cross-border payments programme, combined with the improvements made in domestic markets (eg the widespread adoption of real-time-payment systems and the migration to the ISO 20022 message standard), create the ability for global information exchange and interoperability of payments. This brings better and more data, enriching payments information to improve anti-money-laundering (AML) and combating the financing of terrorism (CFT) efforts, as well as fraud detection. Crucially, this 'global' data/messaging language vastly reduces the scope of effort required when looking at synchronisation and other initiatives, such as common platforms, API equivalence and many more. In addition, the creation of omnibus accounts (or the equivalent in other jurisdictions) to allow innovation in payment systems using central bank money has provided the necessary momentum to innovate in this space.

## Fnality

As new technologies come to the fore, new players emerge in cross-border wholesale payments. One of these is Fnality, a company that was initially formed as a project to understand the feasibility of using distributed ledger technology (DLT) and blockchain to settle securities trades. Fnality operates a model that relies on the conversion of fiat currency into stablecoins, surfacing FX risk at this level in addition to general FX movements between national currencies. As anyone who has followed the recent stablecoin fiasco surrounding Terra, with the de-pegging and market value drop of UST and Luna, will know, using such intermediary instruments is far from risk-free. Fnality is naturally underpinned by a complex legal model and requires its own central bank accounts in its own name. Heavy regulatory oversight in every country is a consequence and the ownership and governance model have implications for the speed of change and innovation.

## Ripple

Another player that is leveraging the more recent technologies of crypto assets and DLT is Ripple. With more than 200 members and coverage across 40 countries, Ripple is providing cross-border payment solutions where, in some instances, clients' monies in their local currency are converted to and from proprietary digital asset, XRP. It appears to be a solution that caters for currency corridors that are not covered by CLS. Every flow of funds via Ripple is supported either by commercial bank money or digital assets. With the ongoing evolution of the CBDC debate, Ripple is one player that is likely to expand its capabilities to enable flows via this digital asset class, which may balance the challenges that it has experienced in terms of the regulatory scrutiny of the US Securities and Exchange Commission, given the use of its proprietary crypto currency XRP.

## Baton

Another newer player in the cross-border space is the FinTech Baton. The venture-backed firm was founded in 2016 and

participated in a Bank of England proof-of-concept in 2018 to understand how a renewed RTGS service could support settlement using innovation. Baton projects it will have settled over US$3tn worth of transactions by value by the end of 2022. A key set of tools promoted by Baton (eg the sequencer) is designed to improve post-trade flows and achieve liquidity efficiencies. Baton's core competence lies in identifying 'actionable items', eg to optimise payment/settlement flows with regard to timing and order.

Whereas its settlement method is fairly basic, and not without its risks and complexities (eg it is not clear how a trade will unwind when it has not settled), the appeal lies in the prospect of improving *what* you settle, rather than *how* you settle. Using Baton requires participants to adopt DLT. When it comes to the underlying assets, Baton operates on the basis of commercial bank money, which — as discussed — is capital-intensive; Baton supports the technical settlement of commercial bank liquidity provided by banks. Matching, netting and settlement efficiencies are the main drivers for clients to engage with Baton.

## INNOVATION IN WHOLESALE PAYMENTS BASED ON CENTRAL BANK MONEY

Now that technology exists to enable near-instantaneous bilateral atomic settlement of wholesale foreign exchange transactions in different currencies between different jurisdictions, there is a strong case for moving cross-border flows away from relying on commercial credit or pre-funding using correspondent banks, and replacing this with a system where payments can instead be made bilaterally, point-to-point between parties, underpinned by specified and ring-fenced central bank reserves.

It is not necessary (at least not yet) to construe a future where payments consist of crypto currencies or CBDCs. For regulated financial institutions, the central bank money in use today remains the preferred asset, and recent headlines have once again confirmed the issues and limitations surrounding stablecoins and other digital asset classes.

Rather than compel banks to maintain RWAs and pay capital charges as a costly form of insurance against the financial collapse of other banks, or to have to maintain high intraday liquidity buffers, would it not be preferable to reimagine a system where real-time cross-border payments are made using high-quality liquid assets (HQLAs) that are securely and legally protected on both ends of the transaction? The highest-quality type of HQLA is central bank money, stored in each jurisdiction's own central bank — the US Federal Reserve, or the Bank of England, for example. Using HQLA as the basis for payments between banks in the wholesale space would mean not triggering any RWAs; this would save banks billions of dollars.

Enabling banks to use their central bank monies for cross-border payments rather than needing to rely on commercial bank intermediation and costly forms of commercial bank money (with the additional element of cost of credit) is something that can be achieved by designing and creating the right form of infrastructure. Of course, enabling policy from central banks will have to be part of this.

One player taking such an approach is RTGS.global, which is trying to bridge the old and new world in a way that can truly deliver efficiencies, speed, transparency and security in cross-border wholesale payments.

RTGS.global seeks to enable banks that are holding central bank reserves in their local jurisdiction to deploy the HQLA part of their reserves to settle FX cross-border wholesale payments. RTGS.global considers itself as a global switchboard for interbank liquidity, complemented by a number of

tools that support better payments and banking.

It has built a central ledger that can be used by banks that have central reserves to transact with each other across borders. The system enables banks to exchange liquidity in one currency for that in another, without the liquidity itself actually needing to move over local RTGS rails. Rather than having to extend commercial credit to each other through Nostro arrangements, or pre-fund commercial correspondent bank accounts and bear credit risk, RTGS.global participants can benefit from the combination of its operational design, legal framework and innovative technology, such that liquidity in one currency can atomically settle for that in another using HQLAs, without incurring additional RWA costs. Of course, available HQLA is a prerequisite for this, ie the liquidity must be there.

RTGS.global creates a middle way whereby an immutable ledger manages the ownership of assets on its ledger. The ledger mirrors the asset — which remains held at the central bank in the name of the owner of the funds underpinning the settlement arrangements — and is recognised as a ledger to record the true ownership of the funds (under a trust or equivalent arrangement). The key differentiator here is that ownership is not limited to domestic banks. Through its innovative legal framework and participation agreement complemented by a comprehensive rulebook arrangement the approach connects banks across borders. Whereas a 'pure' synchronisation agreement sees ownership and transfer of funds only between domestic players in the domestic RTGS system, RTGS.global extends the domestic players (in their role as hosts for foreign banks in their jurisdiction) into the ledger underpinning settlement. For this model to work in practice, it will be important that central banks do not restrict beneficial ownership of HQLA-based central bank reserves to domestic banks.

Today, RTGS.global's focus is on settling traditional central bank money transactions, where funds are held with a central bank in a reserve or master account. In the future, where central banks may create wCBDCs as a new digital form of central bank money, such a new version of central bank money could equally be supported by this system. The roadmap will focus clearly on delivering interoperability and 'settle-ability' between traditional central bank money, wCBDCs and any other type of digital money that could be deployed in the wholesale payments space.

## A CBDC FUTURE?

CBDCs are defined as a digital form of central bank money, issued by a central bank and constituting a direct claim on the central bank.

At present, central bank money exists either in the form of physical cash (notes and coins), called fiat money, or in electronic form as reserves balances held by eligible banks in reserve or master accounts at their relevant central bank.

The industry draws a clear distinction between retail CBDCs and wholesale CBDCs.

Retail CBDCs are a digital form akin to physical cash, issued directly or indirectly to individuals and representing a direct liability of the central bank. Retail CBDCs are designed to serve as a store of value and a payment instrument, operated via digital wallets. Given that the majority of money in circulation today is not central bank money (ie cash bills) but rather commercial bank money (a promise to pay by a commercial bank), any shift to the use of central bank money in lieu of commercial bank money could have implications for the commercial banking sector. Individuals might resort to the perceived 'safe haven' of CBDCs by converting their digital commercial bank money to CBDC. This would impair the

ability of commercial banks to offer credit provision/lending. The deployment of retail CBDC could impact a central bank's balance sheet directly as the liability side of the equation could increase quite significantly.

By contrast, wholesale CBDCs (wCBDCs) arguably exist already, as these might be considered the amounts of central bank reserves that commercial banks hold at their relevant central bank in electronic format (as balances on their account with the central bank). The difference between wCBDCs and retail CBDCs is often seen mainly as technological — a new way of holding and moving these reserves, for example via DLT, blockchain or other innovative technologies. DLT still has somewhat different implementations, primarily around the use of a consensus model, and therefore performance and costs of operation need to be explored in greater detail. In many instances, the computational load is significant and, as a consequence, risks to be negative for the environment. The way banks interact with a CBDC would be very different in terms of technology uplift and complexity, no doubt requiring significant integration challenges and operational considerations.

However, as a general point, if the difference between central bank reserves and wCBDCs is specifically focused on technology, no matter which, then one should be able to focus purely on the underlying technology with the objective of enabling more efficiency, automation and the deployment of innovative features, including smart contracts. This is exactly where innovation can start to address the industry problems discussed previously.

Whereas most CBDC-related central bank experiments tend to focus on retail CBDCs, the most recent initiative to explore cross-border settlement based on wCBDC is Project Jura, led by the Banque de France, the BIS Innovation Hub and the Swiss National Bank, together with a private sector consortium. For the purpose of the experiment, a third-party provided DLT-based platform has been chosen as the infrastructure base to execute a direct transfer between euro and Swiss francs, delivering payment-versus-payment (PvP) as well as delivery-versus-payment (DvP), where the foreign exchange transaction was supporting the trade of a tokenised asset. Interestingly, this experiment brought to light new questions that will need to be addressed before the industry can start adopting such technological constructs.

There are some important considerations to be addressed before wCBDCs can be deployed. For example, there is a risk that wCBDCs, if successful in the uptake for cross-border payment purposes, could result in higher demand for and volatility of central bank money intraday.

This could all impact banks' liquidity management in terms of the price of liquidity, and could ultimately impair monetary policy efficacy.

Another question that will need to be considered carefully by central bank policy makers is whether non-resident banks should also have access to wCBDCs. As explained above, central banks around the world tend to have very different access policies when it comes to their payment systems, with some extending access to non-bank payment service providers while others restrict access to regulated banks or even only a subset of regulated banks. Non-resident bank access is traditionally not offered because the foreign banks are subject to different regulations and a central bank may also not be able to rely on a foreign regulator or supervisor when it comes to counterparty credit risk, in particular in the case of a distressed non-resident bank. The mere arrival of CBDCs would not make any pronounced difference to cross-border wholesale payments unless such restricted policies were to be lifted. The same applies to all other current innovation models in this space, as highlighted

above. Lifting those restrictions, however, is likely to remain a practical challenge as central banks would find it difficult to provide full-range currency services in currencies other than their own domestic one. A way where the large clearing banks would obtain beneficial ownership of balances that are held by banks in other countries in the form of wCBDCs would need to be acceptable, such that flows can be executed efficiently between key currency players.

The question as to whether wCBDC would be considered as a true equivalent of central bank reserves in policy terms will also need to be addressed. If so, this could result in an approach where wCBDCs are remunerated akin to reserves.

It is clear that CBDCs, whether retail or wholesale, domestic or cross-border will continue to travel a complex journey. Ultimately, with all the focus on CBDCs, central banks should embrace the opportunity to create an innovation platform, thinking far beyond CBDCs alone.

## CONCLUSION

Since the financial crisis, the world of cross-border correspondent banking payments has been impacted by significant cost increase due to the stringent regulatory capital requirements imposed by Basel 3.

With the onslaught of the FinTech revolution there have been many innovations in payments, including cross-border payments. However, all innovations in the retail payments space are reliant on the 'old rails' and hence are limited in their overall impact on efficiency. At the same time, innovative approaches to the actual cross-border rails are evolving right now. Some have been inspired by the arrival of cryptocurrencies such as Bitcoin and new technologies such as DLT. Others are looking to provide efficiencies to processes ancillary to either payments or securities settlement or both.

We have also witnessed the emergence of the concept of CBDCs, a new form of digital central bank money designed to bring sovereign currencies into the digital age. Analysis and exploration around CBDCs, with the exception of a few countries that have either launched them or are about to, is still ongoing, with many open questions yet to be resolved.

What is clear in all of this is that in the aftermath of the financial crisis, banks operating within the wholesale cross-border payments ecosystem, where large flows are transacted, need an efficient, reliable and less costly global payments system to execute their flows. One cannot simply wait around for the arrival of wCBDCs in the expectation that they will magically solve for all the challenges in cross-border payments. The industry needs a cross-border payments solution that works today, but which can grow and evolve with developments in the future, such as the introduction of wCBDCs. Different experimental solutions are in place and evolving, where many of these operate on completely new types of technology such as DLT, as well as using proprietary types of crypto assets.

Then again, there are approaches such as RTGS.global that aim to enable banks to connect with each other directly, and settle their currency exchange transactions on the basis of the most efficient and cost-effective liquidity, HQLA. It remains to be seen which solutions will win the long-term race and whether they are anchored in the current technical representation of HQLA, crypto, CBDC, or — perhaps most likely — some mix of them all

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