Global Foreign Exchange Division
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TO:

monnaie-innovation@banque-france.fr

By email

Date: 15 May 2020

Re: Central bank digital currency experiments with the Banque de France – Call for applications package

Dear Sirs,

The Global Financial Markets Association's (GFMA) Global Foreign Exchange Division (GFXD) was formed in co-operation with the Association for Financial Markets in Europe (AFME), the Securities Industry and Financial Markets Association (SIFMA) and the Asia Securities Industry and Financial Markets Association (ASIFMA). Its members comprise 25 global foreign exchange (FX) market participants[1], collectively representing a significant portion of the FX inter-dealer market.

Both the GFXD and its members are committed to ensuring a robust, open, and fair marketplace and welcome the opportunity for continued dialogue with global supervisors, including Central Banks and National Competent Authorities.

The GFXD has been focused on developments driven by new technologies which increase the levels of automation within wholesale cross-border FX settlements, engaging closely with both the private and public sectors to understand how new technologies could impact the operation of the global wholesale FX market. We have found that such developments are driven by factors that are internal and external to both our members and other market participants, examples being: (i) better management of costs and efficiencies; and, (ii) the desire to reduce the amount of Settlement Risk within the wider system, primarily by promoting an increased use of payment versus payment (PvP) settlement of wholesale cross-border FX transactions.

The BCBS, in their 2013 '*Supervisory guidance for managing risks associated with the settlement of foreign exchange transactions*[2]*'* define Settlement Risk (also known as Principal Risk) as *'the risk of outright loss of the full value*

1 Bank of America, Bank of New York Mellon, Barclays, BNP Paribas, Citi, Credit Agricole, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, JP Morgan, Lloyds, Mizuho, Morgan Stanley, MUFG, NatWest Markets, Nomura, Northern Trust, RBC, Scotiabank, Standard Chartered Bank, State Street, UBS, Wells Fargo and Westpac.

2 https://www.bis.org/publ/bcbs241.pdf

of a transaction resulting from the counterparty's failure to settle. This can arise from paying away the currency being sold, but failing to receive the currency being bought. (Also referred to as "Herstatt Risk").'

Whilst we are not responding to the Banque de France's application per se, given the objectives referenced within the call for applications to:

- *'show how "traditional" interbank settlement could be carried out using CBDC based on different technologies;*
- *identify the benefits of CBDC for the current ecosystem of market and payment infrastructures (including productivity gains) and understand how CBDC could foster financial innovation;*

we thought there would be merit in sharing with you our published thoughts and analysis on new technologies, including central bank digital currencies, and how these could be applied to wholesale cross-border FX settlements.

Several papers have been published which we have found useful in our analysis and we therefore also recommend these to the Banque de France, notably the excellent papers from BIS/CPMI such as the recent paper on the application of tokens within wholesale cross-border FX settlements titled 'Wholesale Digital Tokens'[3] which amongst other topics notes that such tokens, if applicable, would need to comply with the BIS Principles for Financial Market Infrastructures[4].

We also recommend the paper published in November 2018[5] by the Bank of Canada, Bank of England and Monetary Authority of Singapore titled *'Cross-border interbank payments and settlements – emerging opportunities for digital transformation'*. This paper provides a useful summary of how today's wholesale cross-border FX settlements occur, how new technologies such as central bank digital currencies could work as well as a list of challenges for stakeholders, including central banks.

To compliment these papers and to help in the wider industry dialogue by providing a wholesale FX perspective on how new technologies could be considered, we have also published 3 papers in a series examining how new technologies can impact wholesale cross-border FX settlements. We have attached the three papers in an appendix for ease. In summary they are:

1. **Recommendations for the promotion of interoperability between new technologies and service providers**[6], in which we discuss the importance for common understandings of desirable business outcomes and how interoperability between new technologies and service providers within the FX payments space will help to facilitate increased efficiency and cost management.

2. **Considerations relevant to initiatives and developments in wholesale FX settlements**[7], in which we discuss in more detail the typical wholesale FX settlement cycle and considerations for market participants when contemplating any changes to today's wholesale FX settlement process or cycles and how new developments could impact settlement, liquidity and disruption risk.

3 https://www.bis.org/cpmi/publ/d190.htm

4 https://www.bis.org/cpmi/publ/d101.htm

5 https://www.bankofengland.co.uk/news/2018/november/boe-boc-mas-joint-report-digital-transformation-in-cross-border-payments

6 https://www.gfma.org/wp-content/uploads/2018/09/recommendations-for-the-promotion-of-interoperability-between-new-technologies.pdf

7 https://www.gfma.org/wp-content/uploads/2019/09/developments-in-wholesale-fx-settlements-september-2019.pdf

3. **First Steps Towards 24/7 FX Settlement Capabilities - Expanding Payment versus Payment (PvP) opportunities**[8] in which we perform a further deeper analysis on how Settlement Risk can be reduced in the wider ecosystem. Our initial analysis concentrates on the extension of RTGS operating hours in order to provide more overlap between the operating hours of the two central banks in which currencies are settling, thus creating more opportunities for more PvP settlement. We identify a series of dependencies and considerations for both the public and private sector to address in order to take advantage of RTGS extensions as well as other opportunities to address Settlement Risk, such as the use of stable coins or central bank digital currencies.

Finally, following our recent invitation to provide input into the FSB's 2020 workstream on enhancing cross-border payments[9], specifically the Stage 2 exercise led by CPMI titled *'Building Blocks'* (which aims to *'set out areas where further public sector work could assist in moving to an improved cross-border payments system and in public goods or removing unnecessary barriers, and accordingly provide an update to the G20 in July 2020'*) we provided our thoughts on three wholesale cross-border FX settlement topics which we have included below for your reference.

We look forward to continuing our dialogue on this exciting topic and welcome the opportunity to meet and discuss in person, either with yourself or your colleagues.

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The relevance of cross-border wholesale FX payments

The FX market is the world's largest financial market and the effective and efficient exchange of currencies underpins the international financial system. The FX market is also the basis of the global payments system, meaning the volume of transactions is very high, with transactions often executed by market participants across geographical borders.

Sovereign entities, central banks and other government sponsored entities rely on the FX market to be well-functioning and liquid, and corporations and investors regularly participate in the market for important operational needs:

- to reduce risk by hedging currency exposures;
- to pay suppliers and to be paid for services outside their home market;
- to convert their returns from international investments into domestic currencies; and
- to make cross-border investments and raise funding outside home markets.

The settlement of each currency within a FX transaction is a vital process in the global FX market. It is defined by rules and procedures determined within individual Central Banks around the world and is enabled via these Central Banks' real-time gross settlement (RTGS) systems.

<u>Cross border FX payments, in which 1 currency is exchanged for another, are highly relevant to the global wholesale FX market.</u>

According to the Bank for International Settlements Triennial Central Bank Survey of Foreign Exchange Turnover in April 2019, global trading in FX markets reached $6.6 trillion per day, its highest level to date, up from $5.1 trillion three years earlier.

8 https://www.gfma.org/wp-content/uploads/2020/03/expanding-pvp-opportunities-march-2020.pdf

9 https://www.fsb.org/2020/04/enhancing-cross-border-payments-stage-1-report-to-the-g20/

To shape the size of cross border wholesale FX payment activity, the report stated that sales desks in five countries (UK, US, HK, Singapore and Japan) facilitated 79% of all FX trading, with the share of cross border trading equating to 56%, although the report does note that this is down on the 2016 figure of 65%.

In the recent BIS Quarterly Review paper, the section '*FX settlement risk remains significant*' [10] helps to size the wholesale FX market settling on a daily basis, discussing the positive impact on systemic risk of Payment versus Payment (PvP) for such transactions. With reference to the 2019 Triennial survey, the Quarterly Review paper states that the daily gross payment obligations for FX were $18.7 trillion. After bilateral netting, the number was reduced to $15.2 trillion of which approximately $6.3 trillion was settled on a PvP basis, leaving approximately $8.9 trillion which was not.

<u>Cross border FX payments will remain highly relevant for the global wholesale FX market and future developments will focus on reducing Settlement Risk.</u>

FX Settlement Risk, (also known as Principal/Herstatt Risk) as defined by 2013 BCBS '*Supervisory guidance for managing risks associated with the settlement of foreign exchange transactions*' is the risk of outright loss of the full value of a transaction resulting from the counterparty's failure to settle. This can arise from paying away the currency being sold but failing to receive the currency being bought.

Given the very large notional amounts that are exchanged in settlement of FX transactions on a daily basis, Settlement Risk or Herstatt Risk[11] is a major risk with physically settled FX transactions. Beginning in the mid-1990s, Central Banks became increasingly concerned that the high level of risk caused by then-existing FX settlement practices, coupled with an unexpected event or failure, could trigger a serious disruption of the global FX market and financial system liquidity.

In 1996, the BIS recommended that industry groups develop a multicurrency service to protect against the loss of principal in FX settlements. A study by a group of major financial institutions resulted in their establishment in 1999, via a consortium, of CLS Bank International.[12] For the currencies it settles, the CLS settlement service facilitates the simultaneous settlement of both legs of an FX trade with finality on a PvP basis, thus eliminating Settlement Risk.

However, there remains a population of transactions which do not currently settle through CLS or other similar settlement systems, for example transactions with non-CLS participants or in non-CLS currencies and as mentioned previously, this was recently sized to be approximately $8.9 trillion/day.

We therefore believe that cross border payments will remain highly relevant for the global wholesale FX market and future developments will focus on reducing Settlement Risk. Such developments could lead to increased efficiencies with respect to costs, provision of liquidity, the stimulation of the real economy through more effective use of operating capital and more effective risk management with respect to post trade processes.

<u>Future Developments to reduce Settlement Risk are likely to be staggered in adoption, with solutions evolving (e.g. from extended RTGS operating hours, to the use of stablecoins, to the use of wholesale central bank digital currencies) to ultimately result in 24/7 wholesale FX settlement.</u>

We expect those developments which facilitate a reduction in the Settlement Risk of cross-border wholesale FX transactions to continue. This can be expected to be driven by the desire of market

10 https://www.bis.org/publ/qtrpdf/r_qt1912x.htm

11 Also referred to as 'principal risk', see: https://www.bis.org/publ/qtrpdf/r_qt0212f.pdf

12 https://www.cls-group.com/

participants, including Central Banks, to reduce systemic risk, but can also be driven by technical evolutions (i.e. cheaper and more powerful computing power driving new technical solutions) and the wider availability of such technical solutions to a growing number of market participants. Finally, the changing demographics of market participants should be considered, especially the ease at which new technologies are used and expected to be available for use and the knock-on impact these could have on wholesale markets.

Issues in cross-border payments

We believe that there are several issues that would need to be solved to make cross border wholesale FX payments more efficient. The concept of Settlement Date would be an important issue to address for both wholesale and retail payments.

Fundamentally, the coordination between market participants, including Central Banks, will be key to the success of any new solutions. We also believe that new solutions should be interoperable to avoid replicating any of today's inefficiencies.

On a more granular level, there are specific dependencies which can be divided into external (to an organisation) and internal (to an organisation) dependencies.

External dependencies could include the network effect (i.e. is there a sustainable population using a new solution to make it beneficial), the ability to meet existing regulatory obligations (i.e. would any new solutions impact existing regulatory obligations), Settlement Date (i.e. would the industry need to converge on a standardised model to accommodate the different time-zones across the globe).

Internal dependencies could include the impact on legacy systems/processes (i.e. is the cost to migrate to a new solution beneficial) and staffing models (i.e. are the right skills available to benefit from new solutions).

The concept of a standardised Settlement Date to allow settlement on a date shared across global time-zones (e.g. to allow PvP for a trade in Australia Dollars and United States Dollars) will be helpful in both retail and wholesale and could be a good place to start analysis to ensure wider commitment to individual solutions.

We also note the 2018 *'Cross-border interbank payments and settlements'* paper, co-authored by the Bank of Canada, Bank of England and Monetary Authority of Singapore[13] which provides a comprehensive analysis including proposals for new and more efficient models as well as noting requirements such as wider access.

How to improve cross-border payments

A tactical opportunity could be for Central Banks to extend the operating hours of their RTGS systems to allow more overlap and more opportunities for PvP settlement.

13 https://www.bankofengland.co.uk/-/media/boe/files/report/2018/cross-border-interbank-payments-and-settlements.pdf?la=en&hash=48AADDE3973FCB451E725CB70634A3AAFE7A45A3

As noted previously, we see an evolution of solutions, with a potential end game of widespread use of Central Bank Digital Currencies enabling 24/7 wholesale FX settlement.

However, there are tactical solutions which can achieve the same end goal of reducing systemic Settlement Risk. Increased PvP opportunities may be achieved by extending the RTGS operating hours of a single Central Bank, though we note too that increased coordination across Central Banks in extending their RTGS operating hours may also lead to increased PvP opportunities.

It is assumed that such an extension will lead to a greater overlap with the RTGS operating hours of other Central Banks, therefore allowing greater flexibility, where relevant, for market participants to settle both sides of their transactions simultaneously, i.e. on a PvP basis. We acknowledge that the industry may require additional tools to effect the PvP process itself.

It is expected that this analysis of an extension to the operating hours of a RTGS system will be of benefit to those market participants who are considering other technical developments that may ultimately lead to systemic 24/7 PvP settlement within the wholesale FX markets, such as Central Bank Digital Currencies. BIS also made similar reference in their December 2019 paper titled *'Wholesale digital tokens'* [14].

<u>Coordination across market participants, including supervisors, will likely enable a better outcome</u>

Given the highly networked, cross border nature of the global wholesale FX market, any changes to settlement processes will be more effective if there is wide ranging coordination - scale, use and the provision of liquidity are essential to the success of any new solutions. Such coordination could include cost/benefit analysis, legal analysis, supervisory guidance and commitment to activity as well as engagement on such topics as agreeing standards on market parameters such as Settlement Date.

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We greatly appreciate you giving us the opportunity to share our views. Please do not hesitate to contact Andrew Harvey on+44 203 828 2694, email aharvey@gfma.org should you wish to discuss the above.

Yours sincerely,

James Kemp
Managing Director
Global Foreign Exchange Division, GFMA

14 https://www.bis.org/cpmi/publ/d190.htm

Appendix

GFMA Global FX Division

GFXD recommendations for the promotion of interoperability between new technologies and service providers

Version: September 2018

Background to the Global Foreign Exchange Division

The Global Financial Markets Associations (GFMAs) Global Foreign Exchange Division (GFXD) was formed in co-operation with the Association for Financial Markets in Europe (AFME), the Securities Industry and Financial Markets Association (SIFMA) and the Asia Securities Industry and Financial Markets Association (ASIFMA). Its members comprise 25 global foreign exchange (FX) market participants[15], collectively representing around 80% of the FX inter-dealer market[16]. Both the GFXD and its members are committed to ensuring a robust, open and fair marketplace and welcome the opportunity for continued dialogue with global regulators.

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15 Bank of America Merrill Lynch, Bank of New York Mellon, Barclays, BNP Paribas, Citi, Credit Agricole, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, JP Morgan, Lloyds, Mizuho, Morgan Stanley, MUFG, NatWest Markets, Nomura, RBC, Scotiabank, Société Générale, Standard Chartered Bank, State Street, UBS, Wells Fargo and Westpac

16 According to Euromoney league tables

Introduction

FX forms the basis of the global payments systems and as such the number of market participants and transactions are high. It is this diversity of participants that has led to the wide and varied technical solutions across the market.

Given the increased focus on the potential for new technologies to enhance market structure for wholesale global FX and related cross border payments, such as the provision of smart contracts, there is now growing importance to the interoperability of these new technologies and service providers.

In promoting wider interoperability between new technologies and service providers, we believe that a common understanding of the desirable business outcomes will complement ongoing technical developments which are intended to promote the goals of increased efficiency and cost management. This document aims to provide a set of considerations and recommendations in this regard, with the goal of promoting interoperability in mind.

The GFXD is keen to promote interoperability through engagement with the industry including the provision of payment smart contracts, commencing with the publication of this paper. We note that the development of such smart contracts could provide benefits in relation to certain principles referenced within the FX Global Code[17], such as those relating to Confirmation and Settlement, and Risk and Compliance.

In drafting this document, we have identified several assumptions and aspirations which we believe are fundamental in the consideration of new technologies/services within the area of global FX and cross border payments and we draw attention to the strong reliance on effective and interoperable protocols.

Assumptions and Aspirations

- **We believe that there will be multiple ledger-based protocols which will need to be considered as part of a smart contract interoperable framework;**
- **We believe that there will be unique as well as shared use cases and solutions across firms, solution providers and market infrastructures;**
- **We believe that consideration will be required for both asset class and regulatory variances;**
- **Data security and encryption are of the utmost importance;**
- **Market fragmentation can be minimised if interoperability is achieved; and,**
- **The record on the ledger must be immutable.**

17 https://www.globalfxc.org/fx_global_code.htm

Section 1: General Interoperability considerations - *individual solutions will exist, and differing technologies will need to interact*

1. Ledger offerings should be interoperable across technologies and functional layers to ensure maximum efficiency.

2. A single representation of a transaction should be represented in one ledger only. However, firms are likely to use multiple ledgers in totality.

3. To facilitate interoperability across any number of ledger providers/ functionality providers, a standardised set of parameters should be utilized.

4. Interoperability parameters should include, but not be limited to:

    a. Governance of services and provision of consensus/trust;
    b. Smart Contracts facilitating business processes;
    c. Data control including;
        i. Data elements
        ii. Trusted data sources
        iii. Data security
        iv. Encryption
    d. Message types and formats;
    e. Linkage of data across internal and/or external ledgers;
    f. Networks; and,
    g. Business models.

Section 2: Governance protocols – *consistency in rule-books and oversight will promote interoperability and efficiency*

1. Providers recognise and adhere (where appropriate) to the Committee on Payments and Markets Infrastructures (CPMI) Principles for Financial Market Infrastructures (PFMIs)[18].

2. Governance protocols are established to enable:

    a. Appropriate funding;
    b. Oversight;
    c. Current versus future functional development requirements;
    d. Current versus future membership/permission requirements; and,
    e. Regulatory compliance.

3. Protocols are established to determine when and how consensus is reached on the appropriate data and that the data is immutable.

4. Protocols are established to facilitate the linkage of data.

5. Protocols are established to demonstrate legal certainty (including finality of settlement) so that accountability can be apportioned in case of dispute.

18 https://www.bis.org/cpmi/info_pfmi.htm and https://www.bis.org/cpmi/publ/d101a.pdf

Section 3: Smart Contract Functionality – *as firms may use multiple ledgers, efficiencies will depend on interoperable smart contract functionality*

1. Protocols are established for smart contract functionality. Initial expectations are that for FX this will be at a minimum:

    a. The generation of FX payment cash flows; and,
    b. The generation of FX NDF fixes and subsequent cash flows.

2. Protocols are established for FX trade actions, for instance FX NDF fixings.

Section 4: Data Control - *processes are established to ensure that sufficient oversight is developed on the use of and management of the use of data*

1. Protocols are established to define data controls to establish what data is captured, what security processes are in place (e.g. encryption and noting there may be jurisdictional considerations on privacy) and how future use and further processing of data is defined and controlled.

2. Protocols are established to identify where any data resides (e.g. jurisdiction) and who can access the data. It is critical that data ownership is clear.

Section 5: Data elements – *the identification and use of common data standards is fundamental to the promotion of interoperable solutions*

1. Smart Contract Data should consist of a minimum standardised set of data attributes, where preferable taking advantage of already established industry-wide standards.

2. When generating FX payment cash flows and FX NDF fixes, we suggest the following smart contract data attributes as the minimum set of data attributes, noting that this list is not exhaustive:

Number	Spot
1	Product Type
2	Currency 1
3	Currency 1 Notional
4	Currency 1 Buyer
5	Currency 2
6	Currency 2 Notional
7	Currency 2 Buyer
8	Rate
9	Settlement Date
10	Counterparty ID
11	Distribution Channel
12	Timestamp of Event
13	Link to Originating Contract
14	Trader ID
15	Sales ID
16	Sales Trade Mark-up
17	Order Management
18	Ledger ID

Number	NDF
1	Product Type
2	Currency 1
3	Currency 1 Notional
4	Currency 1 Buyer
5	Currency 2
6	Currency 2 Notional
7	Currency 2 Buyer
8	Settlement Currency
9	Forward Rate
10	Valuation Date
11	Settlement Date
12	Settlement Rate Option
13	Counterparty ID
14	Distribution Channel
15	Timestamp of Event
16	Link to Originating Contract
17	Trader ID
18	Sales ID
19	Sales Trade Mark-up
20	Order Management
21	Ledger ID

<u>Section 6: On-chain representations –</u> *whilst being use-case specific, data should be validated before being allowed onto the ledger*

1. For a transaction to be eligible for the ledger ('on-chain'), and therefore be included on a single ledger as a smart contract, the transaction should be initially validated against a series of 'pre-ledger checks'.

2. The data representation for those checks should comply with a pre-defined set of standards.

3. This will enable a consistent understanding of that data between both parties to the transaction and therefore facilitating consensus (trust) and enhanced recordkeeping.

4. The FX Global Code provides in its Confirmation and Settlement and Risk and Compliance sections principles which may be of value when determining pre-ledger checks. Examples of pre-ledger checks therefore include, but are not limited to:

    a. Know Your Client (KYC) and credit limits;
    b. Product and currency;
    c. Trader mandate;
    d. International Swaps and Derivatives Association (ISDA) master agreement;
    e. Sanctions lists;
    f. Standard Settlement Instructions (SSIs); and,
    g. ISDA Credit Support Annex (CSA).

<u>Contacts</u>

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GFMA Global FX Division

Considerations relevant to initiatives and developments in wholesale FX settlements

Version: September 2019

Background on the Global Foreign Exchange Division

The Global Financial Markets Association's (GFMA) Global Foreign Exchange Division (GFXD) was formed in co-operation with the Association for Financial Markets in Europe (AFME), the Securities Industry and Financial Markets Association (SIFMA) and the Asia Securities Industry and Financial Markets Association (ASIFMA). Its members comprise 25 global foreign exchange (FX) market participants[19], collectively representing a significant portion of the FX inter-dealer market. Both the GFXD and its members are committed to ensuring a robust, open and fair marketplace and welcome the opportunity for continued dialogue with global regulators.

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19 Bank of America Merrill Lynch, Bank of New York Mellon, Barclays, BNP Paribas, Citi, Credit Agricole, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, JP Morgan, Lloyds, Mizuho, Morgan Stanley, MUFG, NatWest Markets, Nomura, RBC, Scotiabank, Société Générale, Standard Chartered Bank, State Street, UBS, Wells Fargo and Westpac.

1. Introduction

In September 2018 the GFXD's Market Architecture Group (MAG) published a paper[20] promoting interoperability between new technologies and service providers in the FX market. Based on the GFXD MAG's belief that a common understanding as to desirable business outcomes will complement on-going technical developments, itself intended to promote increased efficiency and cost management in FX, the 2018 paper seeks to engage with the industry in providing a set of considerations and recommendations relevant to interoperability.

Building on this work, the GFXD MAG has since commenced a more focused analysis of global wholesale FX settlements, including today's FX 'settlement cycle', a process which is vital to the global FX market and which is defined by rules and procedures determined within individual Central Banks around the world and enabled by these Central Banks' real-time gross settlement systems (RTGS systems).

The FX market is the world's largest financial market and the effective and efficient exchange of currencies underpins the international financial system. The FX market is also the basis of the global payments system, meaning the volume of transactions is very high, with transactions often executed by market participants across geographical borders.

Sovereign entities, central banks and other government sponsored entities rely on the FX market to be well-functioning and liquid, and corporations and investors regularly participate in the market for important operational needs:

- to reduce risk by hedging currency exposures;
- to pay suppliers and to be paid for services outside their home market;
- to convert their returns from international investments into domestic currencies; and
- to make cross-border investments and raise funding outside home markets.

Given the importance of settlements to the overall functioning of the FX market, the GFXD MAG is keen to promote efficient and "safe" wholesale FX settlements. This paper introduces a series of considerations which should be taken into account by foreign exchange market participants/stakeholders in contemplating, assessing or introducing any change to today's wholesale FX settlement processes. The GFXD MAG recognises that these changes could be prompted by new technologies, operational or cost efficiencies, or other advancements or developments within the FX market infrastructure.

In publishing this paper, the GFXD MAG is also promoting the guidelines in the 2013 BCBS 'Supervisory Guidance for managing risks associated with the settlement of foreign exchange transactions'[21] and the principles and guidelines in the FX Global Code[22], with the desire to reduce any rising systemic risk that may result from either the introduction of new technologies for FX settlements or changes or enhancements to current FX settlement processes. In doing so, the GFXD MAG also acknowledges that additional questions arise, such as the potential impacts on the FX ecosystem of a new technology failing.

The GFXD MAG looks forward to engaging with regulators and supervisors on these types of issues and the other topics raised in this paper.

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[20]https://www.gfma.org/wp-content/uploads/2018/09/recommendations-for-the-promotion-of-interoperability-between-new-technologies.pdf
[21] https://www.bis.org/publ/bcbs241.htm ("BCBS FX Supervisory Guidance")
[22] https://www.globalfxc.org/fx_global_code.htm

2. Wholesale FX Settlements

The settlement of FX transactions can be considered as 'the making of payments or exchange of payments between counterparties on a FX transaction's settlement date'[23].

Usually there are several parties engaged in the process of effecting a payment, and at its most simple this includes:

- the counterparties to the transaction;
- the banks with which the counterparties hold their accounts in that specific currency (also known as the agent or nostro/vostro bank); and,
- the Central Banks whose national currency is involved in the payment.

The payment process is commenced through a process known as 'instructing a payment' in which a counterparty will instruct their agent bank to debit their account and make a payment to their counterparty's account at the relevant agent bank. Once a payment is instructed, a series of messages, usually electronic, will be passed between each party to ensure that the correct details are communicated to result in the correct payment currency and amount being debited from and credited to the right accounts at the right bank at the right time. There then follows an account reconciliation process to ensure the funds have been credited. This process is known as the 'settlement cycle'.

Each Central Bank will have well defined hours of operation in which payments can be instructed and received in their national currency. Likewise, each agent bank will also have well defined hours of operation in which they can instruct and receive payments.

Most Central Banks will operate their wholesale FX payments via RTGS systems, which enables the real time electronic transfer between agent banks in a final and risk-free basis.

As an FX transaction is typified as being composed of two currencies and amounts, each party will therefore make a payment in one currency and receive a payment in another currency. Due to the operating 'windows' being different across Central Banks, it is likely that a counterparty to a trade could be exposed to 'settlement risk', which we discuss in more detail below.

3. Considerations relevant to initiatives and developments in wholesale FX settlements

The GFXD MAG has recognised that potential challenges will likely be faced should market participants either adopt new FX payment/settlement technologies at varying paces or adopt technologies which are unable to connect with each other and thus reiterates the importance of interoperability.

Furthermore, to the extent new initiatives, or changes to existing processes such as RTGS settlement windows are introduced, the GFXD MAG is of the view that these should seek to mitigate risk and not fracture or complicate the FX market, or introduce new risk to the market. The FX market is typified by its high number of participants and deeply connected technologies across geographical borders – consideration is required between the balance of the benefits of new solutions in reducing risk versus any disruption to the existing ecosystem. The reduction of risks within the settlement of FX trades is of paramount importance to the industry and the GFXD MAG recommends that those looking to develop new solutions engage with the industry to ensure the potential risks and outcomes are well understood.

23 https://www.newyorkfed.org/medialibrary/microsites/fxc/files/2016/fxc011916.pdf

The GFXD MAG has assessed several risk areas which could be implicated and impacted as and when changes are made to FX settlement processes or cycles:

1. settlement risk;
2. liquidity risk; and
3. disruption risk.

For each of these risk areas, a series of specific considerations has been highlighted which should be taken into account when contemplating any changes to today's wholesale FX settlement process or cycles.

a. Settlement Risk Considerations

'Settlement risk', for purposes of this paper, is the risk that one party to a physically settled FX transaction pays out the currency it sold but does not receive in full, when due, the currency it bought (the counter-currency)[24].

Given the very large notional amounts that are exchanged in settlement of FX transactions on a daily basis, settlement risk or Herstatt Risk[25] is a major risk with physically settled FX transactions. Beginning in the mid-1990s, Central Banks became increasingly concerned that the high level of risk caused by then-existing FX settlement practices, coupled with an unexpected event or failure, could trigger a serious disruption of the global FX market and financial system liquidity.

In 1996, the BIS recommended that industry groups develop a multicurrency service to protect against the loss of principal in FX settlements. A study by a group of major financial institutions resulted in their establishment in 1999, via a consortium, of CLS Bank International.[26] For the currencies it settles, the CLS settlement service facilitates the simultaneous settlement of both legs of an FX trade with finality on a payment-versus-payment ("PvP") basis, thus eliminating settlement risk.

Considering the FX market's significant international dimension and the magnitude of FX settlement flows, settlement risk can have systemic implications for the financial markets as a whole.[27] Accordingly, the GFXD MAG is keen to promote industry facilitation of greater PvP settlement, as well as enhancements to the safety of settlement for FX transactions not settled on a PvP basis, whether through technology advancements, the extension of Central Bank RTGS windows or other means.

Several concepts and considerations should be borne in mind within the context of FX settlement risk:

- **Settlement date**: The period during which FX payments can be made over Central Bank accounts via RTGS systems is currently restricted to the operating hours of the relevant Central Bank. If it were to become possible to transfer RTGS payments during an extended period, or continuously, moving away from local operating hours to ultimately 24/7, the concept of settlement date may need to be re-considered, potentially aligning with the current market practice of a global trading day. The concept of a global settlement date is considered by the GFXD MAG to be of significant value in mitigating the settlement risk with FX transactions, increasing the opportunity for PvP between parties, and is expected to positively impact the way in which counterparty risk exposure in FX trades is measured and mitigated.

- **Point of settlement**: The point at which an FX transaction has been settled is often determined by the reconciliation of end-of-day agent bank statements, to confirm receipt of

[24] https://www.bis.org/publ/bcbs241.htm
[25] Also referred to as 'principal risk', see: https://www.bis.org/publ/qtrpdf/r_qt0212f.pdf
[26] https://www.cls-group.com/
[27] https://www.bis.org/publ/qtrpdf/r_qt0212f.pdf

funds. If the end-of-day is extended, such that end-of-day statements are received later[28], this may impact the timing as to when settlement can be confirmed, which may have risk management implications. The GFXD MAG however expects that a global settlement date is likely to lead to the development of automated reconciliation processes – with a timestamp - to ensure timely confirmation of settlement. We also recognise that the timestamp could be an important technical development in the management of real-time payments, allowing real-time credit management and ultimately freeing up funds for other purposes, such as investment.

b. Liquidity Risk Considerations

'Liquidity risk,' for purposes of this paper, is the risk associated with the ability of a market participant to fund its FX payment obligations when due (e.g. whether either intra-day or for next-day value).

Whether and how much liquidity risk is present, and is managed, may depend on the ability to prioritise cash flows for specific payments, bearing in mind the challenges arising from the global nature of the FX market where each currency currently has its own individual settlement cycle. Depending on market conditions, or other more proprietary reasons, market participants will also be reliant on the timely receipt of funds in order to manage their liquidity risk.

Several concepts and considerations should be borne in mind within the context of FX liquidity risk:

- **Operational and resourcing considerations**: Market participants will have built their support models - from the location of staff to the performing of functions – based on the existing market ecosystems. Market participants may instead be required to use a 'follow the sun' model in order to accommodate extended RTGS operating hours. As market developments evolve, roles and responsibilities may also be required to evolve to allow, for example, trading/sales to cover extended hours. The GFXD MAG welcomes discussion on this evolution and how it could impact the operation of the market and the operating practices of market participants.

- **Network of new technologies**: An increase in the availability of payment technology solutions will likely lead to a greater number of market participants being active within this part of the FX value chain. Due to the increase in the number of payment technology solutions, market participants will be required to manage credit/debit balances across more payment platforms/systems. In doing so, it is expected that market participants will re-assess their exposures and operating practices by consolidating and actively managing balances across a wider number of platforms, potentially requiring new products and tools to do so. The GFXD MAG also believes that Central Banks, through policy or new processes, can help market participants assess the impacts of such market-structure changes.

- **Intra-day settlement**: Today, intra-day payments for non-CLS trades are generally released based on the order in which the instruction to pay is received at the agent bank. New technologies are expected to allow market participants to actively manage the sequencing of the release of intra-day payments to meet specific requirements. Current operating procedures will also need developing to monitor real-time settlement activity, in turn allowing for more efficient funding for external payments as well as for balances settling cross accounts within an organisation.

- **Allocation of capital**: More precise liquidity risk profiles (as a result of more active account management) will influence capital inputs such as the leverage ratio, which may in turn impact

28 Depending on the currency and geographical location of the recipient, some end_of_day statements may currently be received on a settlement-day + 1 basis

the allocation of capital. Such changes are expected to help free up capital from balance sheets which once re-cycled could be used by market participants, for example promoting more investment within the real economy.

- **Interest calculations/claims**: New models may need to be considered in respect of extended settlement 'windows' e.g. hourly interest instead of daily. Such changes could introduce new liquidity management opportunities as the market identifies where liquidity is 'located' and accessed to meet obligations in a more cost-efficient manner, especially in times of market stress.

c. Disruption Risk Considerations

The GFXD MAG has defined 'disruption risk' for purposes of this paper as the impact of the failure of a new technology or new business model on the existing ecosystem, specifically when the systemic importance of that new technology was not transparent to other market participants.

The expectations, roles and responsibilities of market participants currently involved in the wholesale FX market is well understood, for example as documented in the CPMI-IOSCO 'Principles for Financial Market Infrastructures',[29] a set of international standards for financial market infrastructures (payment systems, central securities depositories, securities settlement systems, central counterparties and trade repositories). Market participants are therefore able to assess and manage their multiple risk exposures accordingly and the transparency afforded through the knowledge that those they interact with comply with industry established principles is of considerable value in promoting the safe operation of the market, including the settlement of wholesale FX.

As changes to today's wholesale FX settlement processes are contemplated, or introduced into the FX market – whether from new technologies or through the evolution of existing technologies e.g. those used in other sectors, such as retail - it is important to ensure that the expected high standards of operation continue, so that participants can successfully assess the risks they are exposed to. Whilst not limited to, some of these parameters could include assessments of exposure to market participants, specific currencies or even the volumes of trades executed.

In the event of a failure, a new risk of contagion could be introduced if the importance of, or known networked exposure to, the technology within the ecosystem was not widely understood.

4. Other Considerations

The FX market is typified by a significant number of participants and over time has evolved considerable levels of interconnectivity. It is widely expected that the level of adoption of new technologies will vary considerably across the market. Further analysis is required to better understand the practical considerations of the adoption of changes to today's wholesale FX settlement processes.

Other risks areas, such as market risk, regulatory risk, legal risk and operational risk were also considered by the GFXD MAG but have not been addressed within this paper.

Both considerations may be topics for future GFXD MAG analysis.

29 https://www.bis.org/cpmi/info_pfmi.htm

5. Glossary

Disruption Risk	The impact of the failure of a new technology on the existing ecosystem, specifically when the systemic importance of that new technology was not transparent to other market participants
Follow the sun	Workflow process where items are passed between offices to ensure continuous coverage
FX value chain	The sequence of processes across the FX model from pre to post trade
Interest	Money charged by a bank for borrowing money
Leverage ratio	A capital adequacy tool that measures a bank's Tier 1 capital divided by its total exposures
Liquidity Risk	The risk associated with the ability of a market participant to fund its FX payment obligations when due (e.g. whether either intra-day or for next-day value)
Payment-versus-payment (PVP)	The settlement mechanism that ensures the final transfer of a payment in one currency if, and only if, a final transfer of a payment in another currency occurs
Real-Time Gross Settlement (RTGS)	The continuous (real-time) settlement of funds or securities on an order-by-order basis (without netting)
Settlement Risk	The risk that one party to a physically-settled FX transaction pays out the currency it sold but does not receive in full, when due, the currency it bought (the counter-currency)

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GFMA Global FX Division

First Steps Towards 24/7 FX Settlement Capabilities

- **Expanding Payment versus Payment (PvP) opportunities**

Version: March 2020

Background on the Global Foreign Exchange Division

The Global Financial Markets Association's (GFMA) Global Foreign Exchange Division (GFXD) was formed in co-operation with the Association for Financial Markets in Europe (AFME), the Securities Industry and Financial Markets Association (SIFMA) and the Asia Securities Industry and Financial Markets Association (ASIFMA). Its members comprise 25 global foreign exchange (FX) market participants[30], collectively representing a significant portion of the FX inter-dealer market. Both the GFXD and its members are committed to ensuring a robust, open and fair marketplace and welcome the opportunity for continued dialogue with global regulators.

Disclaimer

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30 Bank of America, Bank of New York Mellon, Barclays, BNP Paribas, Citi, Credit Agricole, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, JP Morgan, Lloyds, Mizuho, Morgan Stanley, MUFG, NatWest Markets, Nomura, Northern Trust, RBC, Scotiabank, Standard Chartered Bank, State Street, UBS, Wells Fargo and Westpac.

<u>Executive Summary</u>

- **The GFXD Market Architecture Group (MAG) believes that broader availability of Payment-versus-Payment (PvP) mechanisms could meaningfully reduce FX Settlement Risk**
- **For non-PvP transactions, an extension to the operating hours of the real-time gross settlement (RTGS) systems of one or more Central Banks is expected to provide greater overlap for simultaneous settlement**
- **The extension of RTGS operating hours is an important first step to enable an increase in PvP settlement and would also be a step towards 24/7 settlement of FX transactions**
- **Maximum benefits can be expected through coordinated industry action, including by/with Central Banks and RTGS operators**
- **Coordination could include reviewing and revising core operating principles and function of the market – such as the definition of Settlement Date – to enable broader transformation**
- **Market participants would likely migrate to any new solutions at different times, and thus the industry would likely see a phased adoption**
- **Supervisory guidelines promoting the management of FX Settlement Risk should consider the technical evolution of the wider market**

Introduction

This second paper in the GFXD MAG series analysing the developments within the settlement of wholesale FX transactions, is focused on the reduction of systemic Settlement Risk through the promotion of settling wholesale FX transactions on a Payment versus Payment (PvP) basis.

A more widespread use of PvP settlement is additionally expected to increase the availability of credit and liquidity within the wholesale FX market for all market participants, including the buy-side, regional and global banks.

The FX market is the world's largest financial market and the effective and efficient exchange of currencies underpins the international financial system. The FX market is also the basis of the global payments system, generating material transaction volume, with transactions often executed by market participants across geographical borders in support of the real economy.

Sovereign entities, central banks and other government-sponsored entities rely on the FX market to be well-functioning and liquid, and corporations and investors regularly participate in the market for important operational needs:

- to reduce risk by hedging currency exposures;
- to pay suppliers and to be paid for services outside their home market;
- to convert their returns from international investments into domestic currencies; and
- to make cross-border investments and raise funding outside home markets.

The settlement of each currency within a FX transaction is a vital process in the global FX market. It is defined by rules and procedures determined within individual Central Banks around the world and is enabled via these Central Banks' RTGS systems.

Given the importance of settlements to the overall functioning of the wholesale FX market, the GFXD MAG is keen to promote processes which increase efficiency and reduce systemic Settlement Risk, with specific reference to the guidelines in the 2013 BCBS '*Supervisory guidance for managing risks associated* *with the settlement of foreign exchange transactions'* [31] (BCBS Supervisory Guidance) and the principles and guidelines in the FX Global Code[32]. We also recognise the importance of the recent Financial Stability Board's (FSB) work programme for 2020[33] which references cross-border payment systems, specifically a desire to develop and deliver a G20 roadmap to enhance cross-border payments.

Commencing its analysis on developments within the settlement of wholesale FX transactions, the GFXD MAG published its first paper in September 2019 titled '*Considerations relevant to initiatives and developments in wholesale FX settlements'* [34].

That paper raised a series of points the GFXD MAG felt relevant for any market participants considering the introduction of changes to the wholesale FX settlement process, either via new technologies or via the improvement of existing processes, and discussed the potential challenges of the market adopting change at a varied pace. It discussed the systemic benefits of settling FX transactions on a PvP basis, recognising the role of CLS Bank International[35] in addressing Settlement Risk where possible, but also acknowledging that there remains a population of transactions which do not currently settle through CLS, for example transactions with non-CLS participants or in non-CLS currencies.

In the recent BIS Quarterly Review paper, the section '*FX settlement risk remains significant'* [36] helps to size the market settling outside of CLS or other similar settlement systems, discussing the positive impact on systemic risk of PvP for such transactions. With reference to the 2019 Triennial survey[37], the Quarterly Review paper states that the daily gross payment obligations for FX were $18.7 trillion. After bilateral netting, the number was reduced to $15.2 trillion of which approximately $6.3 trillion was settled on a PvP basis, leaving approximately $8.9 trillion which was not.

Such transactions that are not settled on a PvP basis are the focus of this second paper.

The first GFXD MAG paper noted that industry developments to increase the use of PvP in the settlement of wholesale FX transactions are dependent on multiple factors, such as the ability of the wider industry to adopt and use PvP at scale. While some developments may take time and coordination to implement, others may be phased in over shorter timeframes such as those evidenced by the recent publications from several Central Banks on developments to their RTGS systems, as well as developments for faster payments[38,39] and may positively contribute in wholesale markets following trends in retail and micro-payments, for faster, continuous settlement.

This follow-up paper builds on the first GFXD MAG paper, specifically focussing on the post-trade implications for the settlement of wholesale FX transactions should the RTGS operating hours of a single Central Bank be extended, though we note too that increased coordination across Central Banks in extending their RTGS operating hours may also lead to increased PvP opportunities. To achieve the PvP benefits discussed in this paper it is important that the two counterparties to the FX transaction being settled can access the respective RTGS systems.

It is assumed that such an extension will lead to a greater overlap with the RTGS operating hours of other Central Banks, therefore allowing greater flexibility, where relevant, for market participants to settle both sides of their transactions simultaneously, i.e. on a PvP basis, which would have the impact of reducing Settlement Risk. We acknowledge that the industry may require additional tools to effect the PvP process itself and, whilst not a topic of discussion in this paper, the GFXD MAG may look to assess this in future papers.

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[31] https://www.bis.org/publ/bcbs241.htm ("BCBS FX Supervisory Guidance")
[32] https://www.globalfxc.org/fx_global_code.htm
[33] https://www.fsb.org/2019/12/fsb-sets-out-2020-work-programme/
[34] https://www.gfma.org/wp-content/uploads/2019/09/developments-in-wholesale-fx-settlements-september-2019.pdf
[35] https://www.cls-group.com/
36 https://www.bis.org/publ/qtrpdf/r_qt1912x.htm
37 https://www.bis.org/statistics/rpfx19_fx.pdf
[38] https://www.federalreserve.gov/newsevents/pressreleases/other20190805a.htm
[39] https://www.bankofengland.co.uk/payment-and-settlement/rtgs-renewal-programme

It is expected that this analysis of an extension to the operating hours of a RTGS system will be of benefit to those market participants who are considering other technical developments that may ultimately lead to systemic 24/7 PvP settlement within the wholesale FX markets, such as Central Bank Digital Currencies. BIS also made similar reference in their December 2019 paper titled *'Wholesale digital tokens'* [40].

We believe that any migration to systemic 24/7 settlement will be a multi-phased, incremental exercise and that an extension to RTGS operating hours could be considered the first of such phases, noting the importance (and potential challenges[41]) of coordination between market participants, including Central Banks and RTGS Operators[42].

This paper is structured to enable the reader to understand both the dependencies in implementing extended RTGS operating hours and how those points relate to today's post-trade processes.

The GFXD MAG looks forward to engaging with regulators, supervisors and other market participants on these types of issues and the other topics raised in this paper.

1. Dependencies Impacting Increased PvP Settlement

The GFXD MAG assessed the dependencies that could impact the ability of a market participant to benefit from any increased PvP opportunities resulting from the extension of the operating hours of a RTGS system. Such dependencies were identified as being either internal or external in nature.

Internal dependencies, which for the purpose of this paper are defined as those relating to the operations of each market participant.

<u>Process and Technology</u>

The technologies used and the number/types of processes performed will obviously vary from organisation to organisation. A broad impact assessment should therefore be performed. Whilst this paper is focused on PvP benefits, we also suggest that it is worth considering other benefits that may arise from extended RTGS operating hours, which the GFXD MAG may discuss in future papers, such as the impact on credit provision. We note too that the industry could benefit from operating standards/best practices which would enable participants to migrate to any new models.

<u>Location Strategy</u>

It may be necessary for market participants (including the Central Bank whose RTGS hours are being extended) to review the geographical location where their functions are being performed. They may wish to consider the establishment of offices in new locations, or even a network of offices providing a 'follow-the-sun' model. The ability to deliver such change will be dependent on a multitude of factors, including but not limited to: cost, office location, regulation and legal and compliance requirements.

<u>Staffing Model</u>

Market participants will typically have developed staffing models to suit their existing businesses. Market participants may need to re-assess the numbers of personnel and the skills required in each location in order to support this.

[40] https://www.bis.org/cpmi/publ/d190.htm
[41] https://www.bis.org/publ/qtrpdf/r_qt2003.pdf 'Payment without Borders' pages 61 and 62
[42] https://www.bis.org/cpmi/publ/d174.pdf

External dependencies, which for the purpose of this paper are defined as those relating to the wider industry.

Network Effect

Any developments within the global FX market to facilitate wider risk-reduction activities, in this case settling more transactions on a PvP basis, will be dependent on the number and types of market participants who are able to leverage such opportunities. If only a small number of organisations can leverage extended RTGS operating hours, then the benefit will be greatly reduced.

Migration Strategy

Market participants should also be aware of the migration plans of the wider industry, as this will influence the pace at which any benefits of change will be materialised, noting too that alternative solutions (e.g. stablecoins) may be competing for participants' attention to achieve similar outcomes. Impacts across the full value chain, from the provision of liquidity through to achieving settlement finality[43], should be considered. Market participants should also consider the benefits of settling FX and any related transactions within the same settlement model, but we note that this too will be dependent on the migration strategy and that the full benefits may be realised over multiple phases.

Settlement Date

Given that the wholesale FX market is global in nature and operates across borders and time-zones, it may be necessary to reconsider the concept of Settlement Date (Value Date) for certain transactions, potentially even aligning with the concept of a 'global trading date' which is used in trading.

Currently the Settlement Date is applied to the local business day of each currency within the transaction and is therefore especially relevant when considering increased opportunities for PvP settlement, particularly when the Central Bank RTGS systems of the two currencies involved in the transaction may not overlap. For example, considering a transaction in AUDUSD settling on the 1 December, the AUD will settle on the 1 December in Australia, whilst the USD will settle on the 1 December in the United States, which due to the time-zone differences will actually be the next business day (i.e. 2 December) in Australia.

We note too that the challenges created through mismatches in RTGS operating hours was specifically discussed in the November 2018 paper published by the Bank of Canada, Bank of England and Monetary Authority of Singapore[44]. Some of the implications, such as increased liquidity management costs caused through pre-funding, have also been discussed by BIS in their March 2020 Quarterly Review under the section titled '*Payments without Borders*' [45].

Nostro Account Statements

Statements from Nostro providers showing daily activity are usually sent towards the end of Settlement Date and reconciled accordingly to identify any payments which have not been made or received. The point of reconciliation allows the movement of Central Bank monies to be evidenced, enabling the account holder to deem that settlement finality has occurred. Advancements in technologies are expected to enable this process to move towards real-time reconciliation of the movement of Central Bank monies, ultimately building to the determination of real-time settlement finality based on a single, referenceable universal timestamp, which will ensure certainty of money ownership amongst participants in various value chains who may be rapidly transferring goods, service and monies to each other.

[43] https://www.bis.org/cpmi/publ/d101a.pdf
[44] https://www.bankofengland.co.uk/-/media/boe/files/report/2018/cross-border-interbank-payments-and-settlements.pdf?la=en&hash=48AADDE3973FCB451E725CB70634A3AAFE7A45A3
[45] https://www.bis.org/publ/qtrpdf/r_qt2003.pdf

Local Regulatory Obligations

Some jurisdictions currently require the reporting of transactions/ positions to local supervisory authorities, which may be impacted by extended RTGS operating hours, especially if the concept of Settlement Date is harmonised to match the global trading day. Consideration should be given as to how these reporting obligations can be met, especially as the market migrates towards 24/7 settlement, noting that there may be an increase in activity near or at the time at which the reports are due to be generated.

2. Today's Post Trade Processes

In order to consider how an extension to the operating hours of an RTGS system may impact post-trade processes, (especially for those transactions which could be settled PvP) it is helpful first to identify and discuss those generic post trade processes within the wholesale FX markets.

Whilst each market participant will have their own proprietary processes to manage the confirmation and settlement of transactions, there are common types of functions that are performed throughout the day to ensure that the various risks that each participant faces are identified, assessed and minimised as much as possible. We have identified these generic processes in in Table 1.

Table 1: Generic FX post trade processes

When	What	Impacted by RTGS extension?
Value Date (VD)	Non- PvP transaction matching and confirmations	Likely
VD	Non- PvP net and gross settlements	Likely
VD	Intra-day controls and reconciliations	Likely
VD	Intra-day liquidity management	Likely
VD	Final checks prior to cut-off	Likely
VD/VD + 1	Regulatory reporting	Likely
VD	EOD batch processes: ledgers and statements	Likely
VD+1	Nostro reconciliations/EOD statements	Likely
VD+1	Use of funds	Likely

Most of the generic post-trade functions identified in Table 1 are considered to be time-specific in nature, i.e. they were designed to be performed at specific times of the day. These functions are usually driven by the existing RTGS operating hours in the specific currency involved. Transactions are confirmed and processed for settlement in good time to enable monies to be paid/received through the Central Bank system in the relevant currency before the specific RTGS system closes, noting that each Central Bank's RTGS system will have its own individual operating hours.

We therefore believe that it is likely that these functions could be impacted by an extension to the operating hours of a Central Banks RTGS system.

We will now discuss some of those post-trade impacts referenced above.

3. Impacts on Post-Trade Processes

We have identified that there are two considerations which apply to all processes. These are:

- Personnel: Do market participants have the right staffing model and skills in the right location(s) to accommodate a change to RTGS operating hours, especially if a follow-the-sun model is deployed?

- Network effect: It is likely that some market participants will be ready to accommodate extended RTGS operating hours before others and it is therefore necessary to expect some sort of staggered adoption by the market.

Non-PvP Transaction Matching, Confirmation and Settlement

We believe that transaction matching and confirmation processes will be required to be performed for a longer period during the day, essentially to accommodate a longer trading day.

Due to extended RTGS operating hours, transactions executed for same day value, including those eligible for PvP, will be able to be executed later in that day and will need to be confirmed prior to instructing settlement. Such trading activity is expected to be driven by both increased client demand, and the subsequent funding/hedging trading on the interbank market and despite a longer trading day will still require the counterparties to the transaction to confirm in a timely manner.

Intra-day controls and reconciliations

Market participants will be required to implement new controls and reconciliations to accommodate the potential increase in PvP settlement. The development of new controls and processes will be dependent on the migration plans of each organisation but is ultimately expected to require real-time reconciliations.

Intra-day Liquidity Management

We believe that the intra-day management of liquidity will be impacted by the extension of RTGS operating hours, especially as technology develops to enable more efficient recycling of balances following the determination of final settlement. Market participants can also be expected to develop new tools and instruments to project and manage intra-day liquidity.

Final Checks Prior to Cut-off

Due to the longer settlement hours, any final checks to ensure that all payments requiring processing have been made will need to be performed throughout the day, as well as later in the day, and any exceptions escalated for resolution, potentially to other departments. The ability to access staff in other relevant internal departments should therefore be considered.

Regulatory Reporting

Regulatory reporting, depending on the specific obligation, can be required to be performed pre-, at or post-trade; the data and reporting timeframes for the obligation dependant on the specific jurisdictional requirements. Any extension to RTGS operating hours will result in extended trading hours and therefore market participants should be prepared to ensure that their regulatory reporting obligations can be met.

End of Day Batch Processes

Market participants will have well-established and historically integrated processes to ensure that a business day can be deemed closed and the batch process run (e.g. to roll trading positions to the next business day and to send feeds to the books and records of the firm). How this batch process works will be market participant-specific and will depend on many variables, such as the technology used and the location of the entity in question. The batch process will impact many departments within a firm and is highly likely to be impacted by a change in the lengthening of a trading day, itself resulting from an increase in RTGS operating hours.

Consideration should also be made should an organisation be required to be 'offline' (i.e. access to some systems is limited) while the batch process is run and how this may impact any extended trading or settlement processes.

<u>Nostro Reconciliations and End of Day Statements</u>

Depending on the sophistication of the Nostro provider, it may currently be possible to reconcile monies being paid from and received to the Nostro account during the day. However, the majority of account balances are reconciled at the end of the Settlement Date via the statements of activity which are provided to the account holder and used to determine if settlement finality has occurred.

In the absence of additional technical developments, (such as real-time account balance management with universal timestamps) it is highly likely that an extension to RTGS operating hours will result in end of day statements for reconciliation being provided later in the day, and potentially into the next day (noting that this will depend on both the currency and the Nostro provider). This will impact the ability of a market participant to manage their Settlement Risk and could also impact their ability to benefit from increased PvP opportunities such as the management of capital allocated to Settlement Risk and is expected to be a driver for technical developments.

Should such benefits be realised, then there will likely be positive impacts on credit management (and therefore trading), in that client balances will be reconciled more quickly. This will enable faster decisions on extending credit for additional trading activity which, depending on the type of client, could mean that end users, e.g. corporates, have access to increased funds for investment purposes.

<u>Use of Funds</u>

Typically, interest on Nostro account long or short balances (e.g. due to a payment being received after the Settlement Date), is calculated daily and we do not expect that to change in the short-term. However, as technology develops, the market may be able to consider more time-precise, granular funding terms such as the payment of intra-day interest.

4. Open Questions

Whilst preparing this paper, the GFXD MAG identified a series of questions, which, while not addressed in this paper, were deemed to be of value and have therefore been included below. The GFXD MAG may re-visit these questions in further papers.

<u>Market-wide Considerations</u>

- If RTGS operating hours were extended, would the specific RTGS membership policies and procedures require amendments to ensure a steady flow of liquidity throughout the day?
- Are there considerable benefits of scale should multiple Central Banks look to extend their RTGS operating hours?
- Are market participants able to quantify the potential benefits across the whole value-chain (e.g. credit and capital benefits) against the changes which would be required to accommodate such changes (e.g. staffing models)?
- Given the incentives to settle on a PvP basis (e.g. credit/liquidity management), and the potential benefits of wider participation, would market participants look to settle all non-PvP transactions on a PvP basis or a sub-set of transactions and what is the impact of this?
- How to ensue that Nostro providers can take advantage of extended RTGS operating hours?

Funding

- FX as an asset class is often used to fund the purchase or sale of other assets, with the FX transaction normally settling on the same day as the asset. How would the market migrate to facilitate simultaneous settlement of the FX transaction and the underlying asset?
- Are the new solutions which are moving the industry towards 24/7 settlement interoperable, both within FX and cross-asset[46]?

Operating Practices

- Could existing regulatory requirements be accommodated (e.g. same day post-trade reporting), were trading to be extended to later in the day?
- If trading were to continue later in the day, would both counterparties to the transaction have staff available to resolve any issues on trade date, for example ensuring confirmation timeliness?
- Are there additional impacts to other processes e.g.
    - margin/collateral practices: for instance, would it be possible to post margin on the same day as the margin call has been calculated?
    - capital: for instance, how could the capital allocated for Settlement Risk be optimised?
    - liquidity: for instance, are liquidity profiles expected to change as RTGS operating hours extend, and will operational and business tools may be expected to change too?

5. Recommendations

For the wholesale FX market to benefit from developments facilitating increased PvP settlement, the GFXD recommends the following:

Recommendations for Supervisors and RTGS Operators

1. Coordinated Central Bank activity to:
    - identify and develop opportunities to increase the overlap of RTGS operating hours, noting that this may be through earlier opening or later closing times; and,
    - lead discussions on the concept of Settlement Date.
2. That supervisory guidelines promoting the management of FX Settlement Risk consider the technical evolution of the wider market and help promote the interoperability of solutions.
3. A focus on activity-based regulation/supervision to ensure that standards are maintained for new and existing market participants.

Recommendations for the Industry

1. That further analysis is performed to understand the benefits that increased PvP can have across the full FX value-chain and the dependencies (including legacy systems) which may limit/enhance such benefits.
2. That there is coordinated effort on providing new PvP solutions, followed by coordinated migration, thus creating an immediate networked benefit.
3. The promotion of interoperability between those solutions which result in the same outcome, in the case of this paper the outcome being increased PvP settlement.

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[46] See, for instance, GFXD's paper from September 2018 'GFXD recommendations for the promotion of interoperability between new technologies and service providers' https://www.gfma.org/wp-content/uploads/2018/09/recommendations-for-the-promotion-of-interoperability-between-new-technologies.pdf

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Annex: Glossary

Follow-the-sun	Workflow process where items are passed between offices to ensure continuous coverage.
FX Value Chain	The sequence of processes across the FX model from pre to post trade.
Global Trading Day	With respect to each Monday, the period commencing at 05:00 Australian Eastern Standard Time on Monday and ending at the following 17:00 Eastern Time (New York) and (ii) with respect to each other weekday, the period commencing at 17:00 Eastern Time (New York) and ending at the following 17:00 Eastern Time (New York).
Interest	Money charged by a bank for borrowing money.
Nostro Account *	A foreign currency-denominated account (usually at a foreign bank) where a domestic bank keeps reserves to maintain its balance in that currency and to make and receive payments.
Payment-versus-Payment (PvP) *	A settlement mechanism that ensures the final transfer of a payment in one currency if, and only if, a final transfer of a payment in another currency occurs.
Real-Time Gross Settlement (RTGS) *	The continuous (real-time) settlement of funds or securities on an order-by-order basis (without netting).
Settlement Date	The date the Transaction settles and any applicable payment is made by one party to the other party.
Settlement Risk *	Also known as Principal/Herstatt Risk. The risk of outright loss of the full value of a transaction resulting from the counterparty's failure to settle. This can arise from paying away the currency being sold, but failing to receive the currency being bought.

* https://www.bis.org/publ/bcbs241.htm Supervisory Guidance for Managing Settlement Risk in Foreign Exchange Transactions