FX settlement risk:

To PvP or not to PvP

It is difficult to measure the magnitude of settlement risk in the FX market. Collecting data for further insight from myriad participants in a decentralized global market is no easy endeavor. Moreover, there is no commonly agreed categorization of post-trade settlement practices and their risks. Acknowledging these challenges, this paper[1] contributes to the public and private sectors' ongoing reflections on the extent of FX settlement risk.

[1] Read more from our Shaping FX series; cls-group.com/insights/shaping-fx-ecosystem

Beyond Herstatt: What is FX settlement risk?

FX settlement risk, also referred to as Herstatt risk, is named after the failure of Herstatt Bank in 1974, then the 35th largest bank in Germany. It is remarkable that an event that occurred almost five decades ago at a medium-sized German bank left such an enduring legacy. The Herstatt Bank crisis was a watershed moment for the global regulatory and central bank community that highlighted the need to tackle settlement risk.

At the time, Herstatt Bank had speculated in an environment with high US dollar volatility and accumulated losses that substantially exceeded its own capital.[2] When the German regulator closed it down, counterparties incurred losses because the bank had already received payments in Deutsche marks but not yet sent US dollar payments. This is the essence of FX settlement risk: the risk of a bank paying the currency it sold but not receiving the currency it bought.[3]

While the Herstatt collapse is illustrative,[4] a variety of factors could trigger FX settlement failure, ranging from counterparty default over operational problems to market liquidity constraints.[5]

In fact, there are manifold 'trigger' events that could lead to the failure of market participants and cause contagion threatening the entire financial ecosystem.[6] Ultimately, the lack of synchronization between payment legs of currency trades creates settlement risk which, if realized, can have systemic implications across borders.

What is settlement risk?

To settle an FX transaction, counterparties exchange principal (value of the trade) in two currencies. Settlement risk is the risk that one party to an FX transaction delivers the currency it sold but does not receive the currency it bought. The result is a loss of principal.

[2] In 1974, Herstatt Bank had accumulated 470 million DEM/Deutsche marks (ca. EUR240 million) in losses, compared with capital of only 44 million DEM.

[3] Settlement risk comprises credit risk (risk of default on a debt that may arise from a borrower failing to make required payments) and liquidity risk (inability to make payments due to a shortage of liquidity arising from a counterparty not settling an obligation when due). The analysis in this paper focuses on a form of credit risk that is realized when one party to a trade gets paid while the other does not. This risk of outright loss of the full value of a transaction is often referred to as principal risk.

[4] Herstatt Bank was not an isolated case. There have been further failures and near misses in the 1990s. For example: (i) Following the collapse of its parent group, unjustified concerns emerged over the solvency of Drexel Burnham Lambert Trading (DBLT) London. In February 1990, the Bank of England had to make available a settlement facility for DBLT to avoid gridlock. (ii) In July 1991, UK and Japanese FX counterparties incurred losses following the appointment of a liquidator for the Bank for Credit and Commerce International in London. (iii) The attempted Soviet Coup d'Etat in August 1991 led to unwillingness of counterparties to expose themselves to risk in FX contracts with Russian counterparties. (iv) The sudden bankruptcy of Barings PLC London in February 1995 caused settlement issues in ECU clearing (which was a set of arrangements for the multilateral netting and settlement of inter-bank payments in the European Currency Unit, the predecessor of the euro).

[5] See also BCBS supervisory guidance for managing settlement risk in foreign exchange transactions (2013).

[6] Notably, in the aftermath of the Herstatt collapse, banks tended to delay payments which in turn created liquidity frictions; see BoE Underground (2015) "BoE archives reveal little known lesson from the 1974 failure of Herstatt Bank".

Towards payment-versus-payment: How to mitigate FX settlement risk

In the late 1980s and early 1990s, the G10 central bank community conducted several studies on how to address FX settlement risk.[7] In 1996, industry groups were encouraged to develop and provide risk-reducing multicurrency services.[8] The private sector established CLS in 2002 as a direct response to these public sector clarion calls.

CLSSettlement, the world's largest multicurrency settlement system, mitigates settlement risk by synchronizing the settlement of payment instructions for the two currency legs of a trade. It does this by providing payment-versus-payment (PvP) functionality in which a party's payment instruction in one currency is not settled unless the corresponding payment instruction in the counter currency is settled.

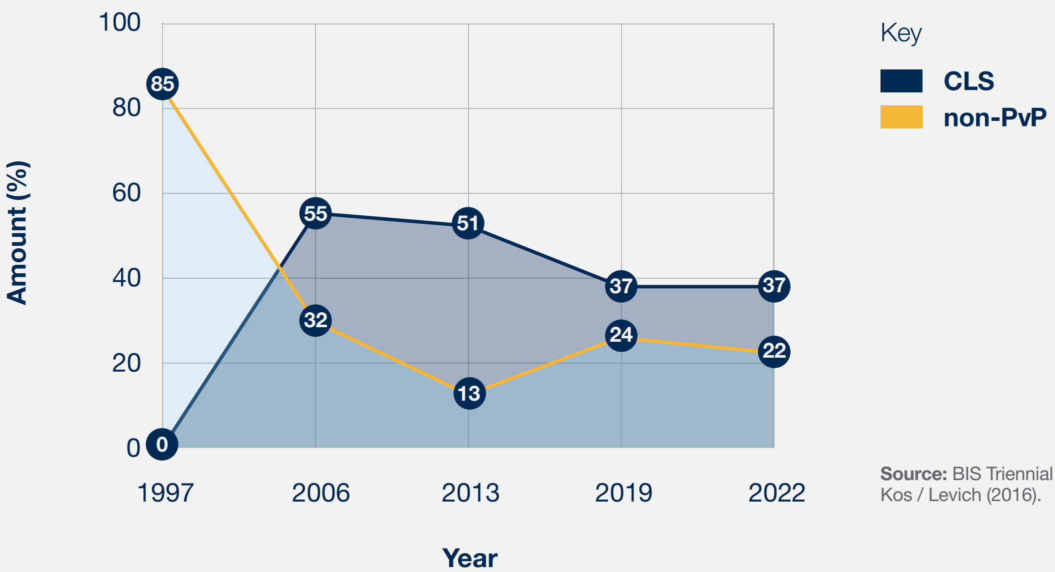
Today, the PvP service offered by CLS is considered the *de facto* market standard for tackling FX settlement risk. PvP's importance is widely recognized by public and private sector initiatives such as the Basel Committee on Banking Supervision (BCBS), which recommends using PvP settlement where practicable,[9] the G20 Roadmap for enhancing Cross-Border Payments, which *inter alia* aims to facilitate increased adoption of PvP,[10] and the FX Global Code.[11]

Before CLS was established, the payments for two currency legs underlying an FX trade were predominantly settled by correspondent banks, typically leading to unsynchronized processing chains across different time zones with different banking practices. The reliance on non-PvP settlement has decreased from 85% of FX traffic to 22% over the past 25 years, primarily because of CLS.

The market share of CLS's PvP settlement service has stabilized at around one third (see Figure 1). This begs the questions how the remaining ca. 40% of FX traffic[12] is handled, and why PvP is not used for settling all FX trades.

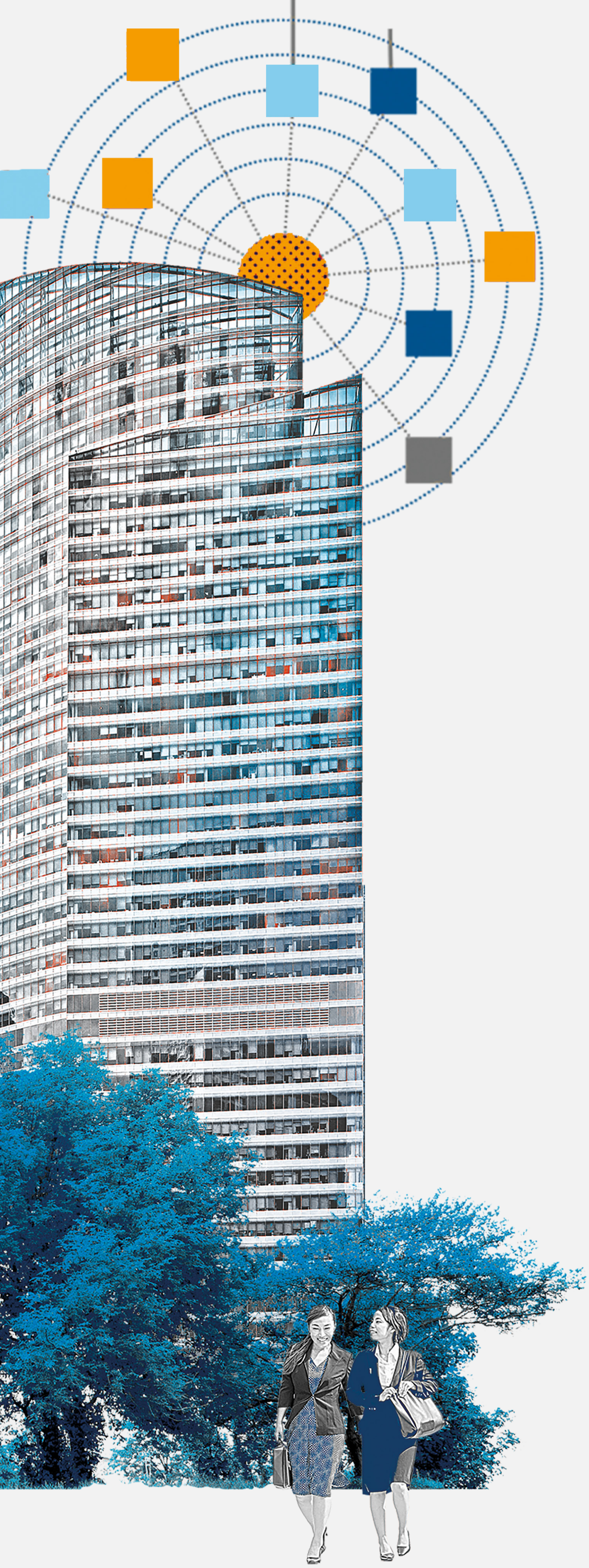
> "Today, the PvP service offered by CLS is considered the *de facto* market standard for tackling FX settlement risk."

Figure 1: **CLS versus non-PVP (% of daily average)**



Source: BIS Triennial Central Bank Survey, Kos / Levich (2016).

7 Bank for International Settlement (1989) "Report on Netting schemes"; BIS (1990) "Report of the Committee on Interbank Netting Schemes of the Central Banks of the Group of Ten countries"; Committee on Payment and Settlement Systems / CPSS (1993) "Central Bank Payment and Settlement Services with Respect to Cross-Border and Multi-Currency Transactions".
8 CPSS (1996) "Settlement Risk in Foreign Exchange Transactions", CPSS (1998) "Reducing Foreign Exchange Settlement Risk".
9 BCBS (2013) "Supervisory guidance for managing risks associated with the settlement of foreign exchange transactions"; see also letter from BCBS and CPMI Chairs (2020): bis.org/press/201217_letter.pdf
10 FSB (2020) "Enhancing Cross—border Payments: Stage 3 roadmap"; FSB (2022) "G20 Roadmap for Enhancing Cross-border Payments: Consolidated progress report for 2022"; FSB (2023) "G20 Roadmap for Enhancing Cross-border Payments - Priority actions for achieving the G20 targets".
11 GFXC (2021) FX Global Code; globalfxc.org/fx_global_code.htm; principles 35 and 50.
12 Total traded gross notional.



Beyond PvP: Other arrangements and their risks

The magnitude of FX settlement risk can be seen as a combination of the value at stake (i.e., the bank's exposure deriving from a trade) and the possible delivery lag (the time between initiating payment in one currency and receiving payment in the other currency).[13] The actual risk levels vary considerably, depending on the post-trade arrangement used.

The upper end of the risk spectrum

In non-PvP arrangements, FX settlement risk is high because the two counterparty payments are not directly linked and the underlying correspondent banking arrangement is complex. The exposure can be 100%, and the delivery lag can be significantly beyond 24 hours.

The lower end of the risk spectrum

In a PvP settlement mechanism, the final transfer of a payment in one currency occurs if and only if the final transfer of a payment in the counter currency also occurs. PvP eliminates the time lag and mitigates the underlying settlement risk. CLS provides PvP on a global scale, and there are other PvP arrangements with a more regional footprint.[14]

[13] Technically, it is the time between when a payment in one currency cannot be revoked and when the counter currency payment is received with finality.
[14] B3 Foreign Exchange Clearinghouse (B3) in Brazil and Forex Settlement (CCIL) in India each provide central clearing with net settlement in one currency pair in their respective regions; and the PvP arrangement in Hong Kong (CHATS) conducts simultaneous gross settlement for nine currency pairs across seven different currencies.

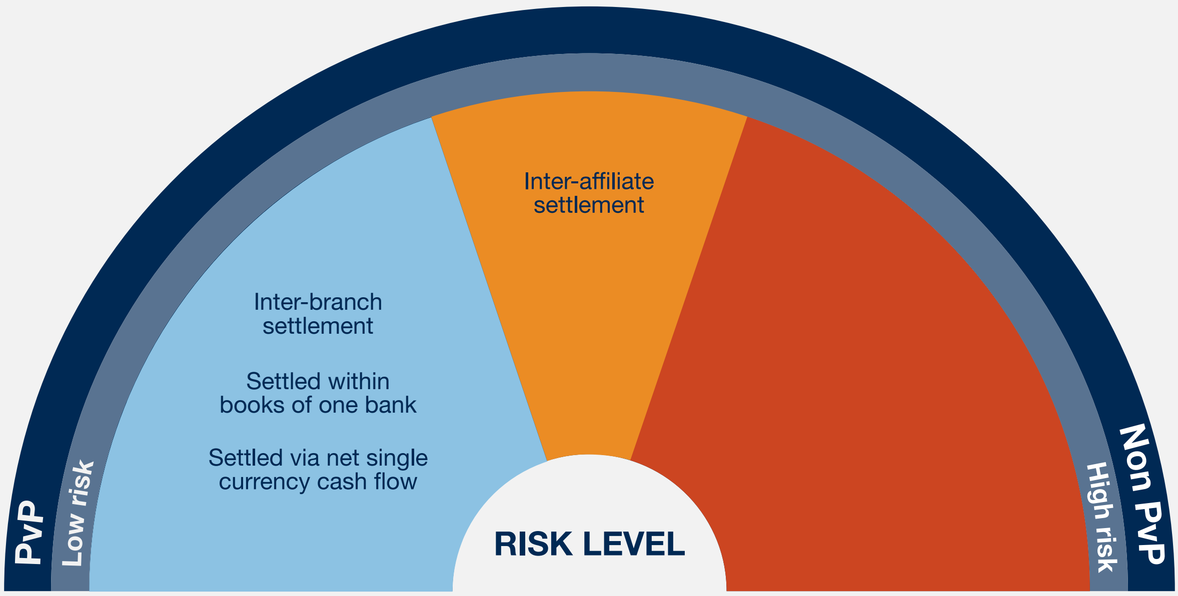
Other arrangements

There are a spectrum of other settlement practices besides PvP and non-PvP. CLS collaborated with several global settlement member banks to investigate these other practices and determined the following categories and considerations to assess settlement risk:

- **Trades settled via a net single currency cashflow:** For certain trades including some prime brokerage activities,[15] clients close out any open market risk with FX banks daily. The resulting net single currency cash movement represents realized profit and loss from the day's trading activity. As there is no exchange of one currency for another, there is no settlement risk arising from this arrangement.
- **Trades settled within books of one bank:** Trades may be debited and credited on accounts that are fully controlled by one bank. This means that payments are booked simultaneously (without time lag) across the bank's own ledger. In principle there is no settlement risk deriving from such an arrangement.
- **Inter-branch settlement:** The two payment obligations underlying an FX trade may be transferred between branches of the same legal entity and therefore can settle across the books of a single institution. As settlement occurs simultaneously, there is no time lag between payments and no settlement risk.[16]
- **Inter-affiliate settlement:** The two corresponding payment obligations may be settled between two subsidiaries or affiliates of a banking group. As such entities normally have their own accounting system, settlement of the two payment legs may not be synchronized, resulting in time lags. Depending on the precise set-up and underlying legal structure, this arrangement could entail some degree of settlement risk.

Where there is some degree of settlement risk, reducing payment obligations through bilateral netting before settlement may reduce settlement risk. On average, bilateral netting can help decrease settlement risk exposure by approximately 69%.[17]

Figure 2: **FX risk spectrum**



Source: CLS survey conducted with several settlement members.

15 Prime brokerage emerged in the late 1990s and is mainly offered by large FX banks to their clients, allowing the clients to make trades in the name of their respective FX banks. This enables hedge funds to reach more counterparties in the FX market while leveraging (often more favorable) credit ratings of the FX banks that provide the service.
16 Inter-branch settlement and inter-affiliate settlement can also be characterized as 'on-us' settlement; see, e.g., Glowka, M., Nilsson, T. (2022) "FX settlement risk: an unsettled issue," BIS Quarterly Bulletin December 2022.
17 CPSS (2007) "Progress in reducing foreign exchange settlement"; however, it should be noted that the bilateral netting ratio is often far higher for inter-group trades.

Survey results: How much FX settlement risk remains?

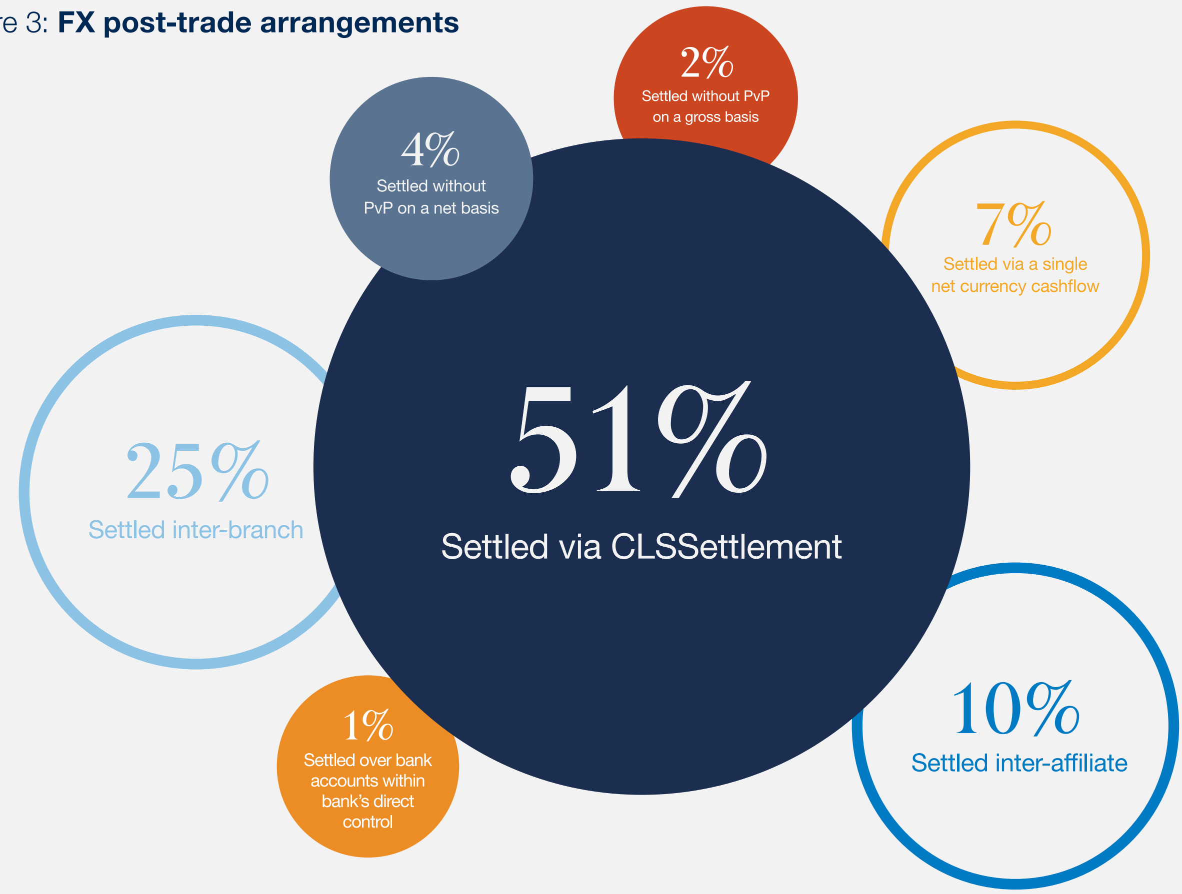
A study with CLS settlement members analyzed their traded notional settled (see Figure 3).

Analyzed data included payments that would be eligible for CLSSettlement based on currency pair[18] and term. Trades where at least one currency is not supported by CLSSettlement were not considered. The survey findings are complementary to – but not entirely commensurate with – the BIS Triennial Central Bank Survey of foreign exchange and over-the-counter (OTC) derivatives markets,[19] which has a wider scope and includes both CLS-eligible and -ineligible currencies.

The analysis with settlement members indicated that settlement practices with a low degree of settlement risk are used for around 85% of traded notional.[20] CLS found that only around 6% of all CLS-eligible traded notional was subject to substantial FX settlement risk.[21] A significant portion of this 6% comprises the 'long tail' of market participants that do not trade in high volume.

> "The challenge to reduce settlement risk primarily lies beyond CLS-eligible currencies."

Figure 3: **FX post-trade arrangements**



Source: CLS survey conducted with several settlement members.

[18] The 18 CLS-eligible currencies are AUD, CAD, CHF, DKK, EUR, GBP, HKD, HUF, ILS, JPY, KRW, MXN, NOK, NZD, SEK, SGD, USD and ZAR.
[19] bis.org/statistics/rpfx22.htm
[20] Includes notional that is settled via CLSSettlement, settled inter-branch, settled via a single net currency cashflow, and settled over bank accounts within a bank's direct control.
[21] Includes notional settled without PvP on either a net basis or gross basis.

Further FX settlement risk reduction: Challenges ahead

Whereas CLS's analysis (which was limited to the 18 CLS-eligible currencies) found that the non-PvP share in overall FX turnover is approximately 6%, the 2022 BIS Triennial Survey (covering both CLS-eligible and -ineligible currencies) found that share to be considerably higher at 22%, representing a total FX settlement risk exposure of USD1.6 trillion per day. How should the remaining settlement risk be addressed?

With respect to CLS-eligible currencies, CLS is working with its members and third-party community to capture the remaining 6% in CLSSettlement. In the last three years, there has been an increase of over 20% in the number of third-party legal entities settling through CLSSettlement, and work is ongoing to further expand adoption. However, the absence of a clear incentive to move away from current banking arrangements may prevent a material shift in traffic towards CLS.

Therefore, the challenge to reduce settlement risk primarily lies beyond CLS-eligible currencies. In other words, solutions are needed for emerging market currencies, which have gained considerable traction in recent years.[22]

Adding new currencies to CLSSettlement is a complex endeavour. It requires ongoing support from central banks on both sides of the currency flow, and crucial legal, risk and liquidity standards must be met in the jurisdiction of onboarding.[23] Against this background, CLS has been exploring, with strong industry support, new PvP mechanisms for emerging market currencies.

Beyond PvP, CLS is exploring the possibility that emerging market currencies can benefit further from CLSNet,[24] CLS's automated bilateral payment netting calculation service across 120 currencies. CLSNet facilitates the use of netting and thereby helps reduce the total payment obligations exposed to settlement risk.

Settlement risk remains high, particularly for emerging market currencies. As the FX market continues to evolve, CLS stands ready to work on solutions to mitigate settlement risk with the community of regulators, central banks and its clients.

[22] Share of non-CLS eligible currencies in overall FX turnover: 2010: USD0.2 trillion (ca. 5.5% of trades); 2022: USD0.7 trillion (ca. 8.5% of trades); Source: BIS Triennial Central Bank Survey.
[23] Work is ongoing towards the onboarding of the Chilean peso to CLS.
[24] cls-group.com/products/processing/clsnet/

FX Global Code

Using CLS products and services plays an integral part in helping you comply with the FX Global Code. Find out more at cls-group.com

For more information please email info@cls-group.com

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