the ValueExchange

The Numbers Behind Tokenisation

How tokenisation can deliver USD 2.4 billion to the US market

In partnership with

Digital Asset

Contents

USD 2.4 billion

Total market opportunity for tokenisation of US securities and cash margin.

58%

Of market participants are facing issues in the management of their collateral and margining today.

97%

Of market opportunity is based on Treasury benefits - with only 3% of efficiencies benefiting Operations.

7,000

New clearing participants expected as a result of mandatory US Treasury clearing.

USD 300 million

Estimated mobilisation opportunity for cryptocurrencies.

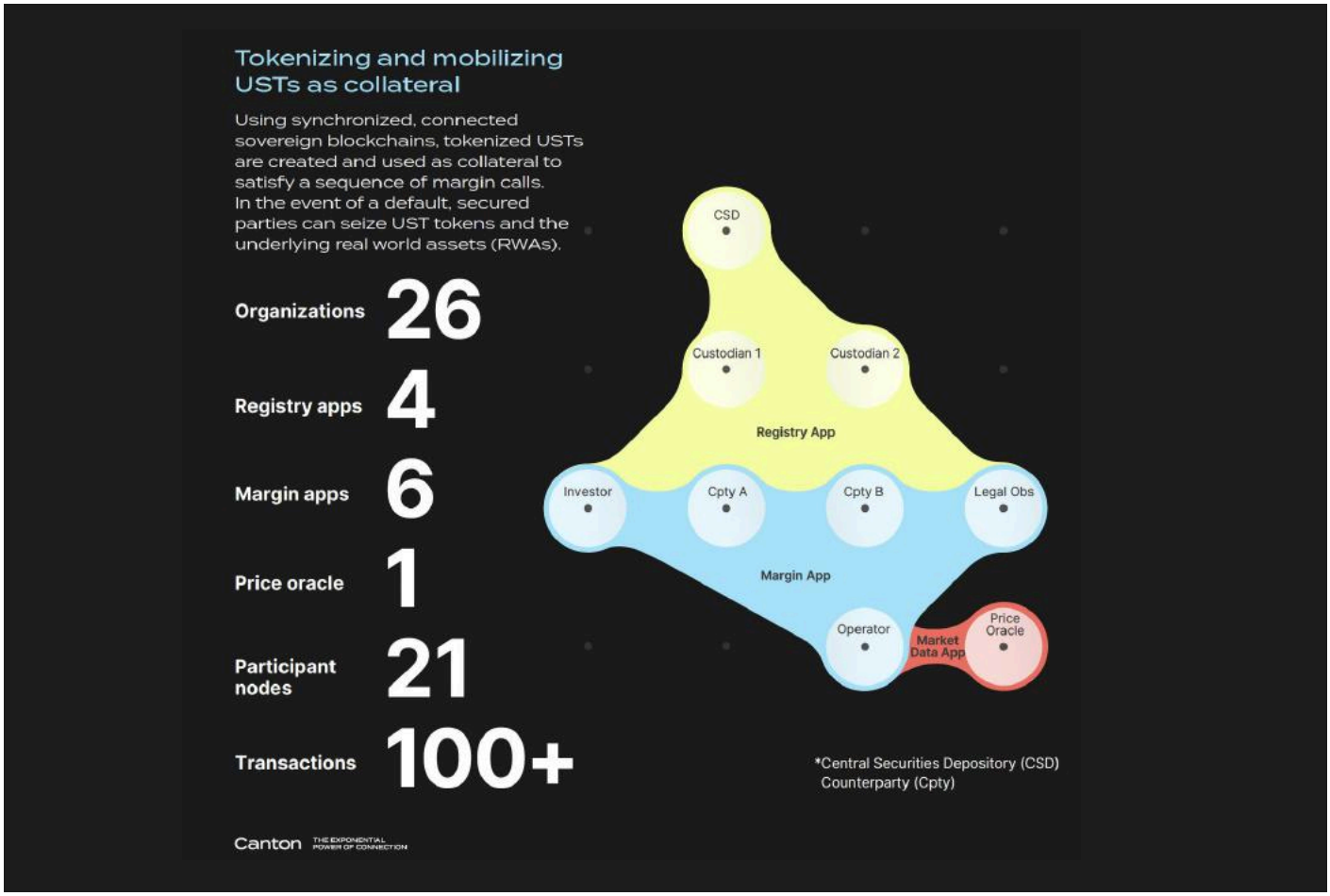
1. Overview

a. Introduction

Today's US securities market infrastructure is full of opportunity. With the clearing and settlement of more than 75% of US Treasury bills and listed equities all consolidated under a single company, the opportunity for transformational liquidity efficiencies in these markets stands at **USD 2.4 billion annually.**

In 2024, Digital Asset and DTCC undertook a joint pilot together to explore the scope for tokenisation in the context of collateral and margin optimisation. Working with partners across the industry, this pilot provided clear evidence not only of the viability of tokenisation in a collateral context, but also helped to underline the transformative impact that this technology can bring.

This paper is intended as a continuation of that exploratory work. Drawing on extensive market interviews with US market participants and statistical insights, it is designed to provide a clear, statistical basis for the business case that will support the transformation of collateral and margining in the US.



b. The challenge

In clearing and settling these securities today, investors and their clearing brokers face a series of hitherto unavoidable frictions across the trade cycle – which combine to create a drag on investment performance by triggering a series of operational and treasury costs.

Most notably, these frictions include:

Key frictions in US clearing and margining today

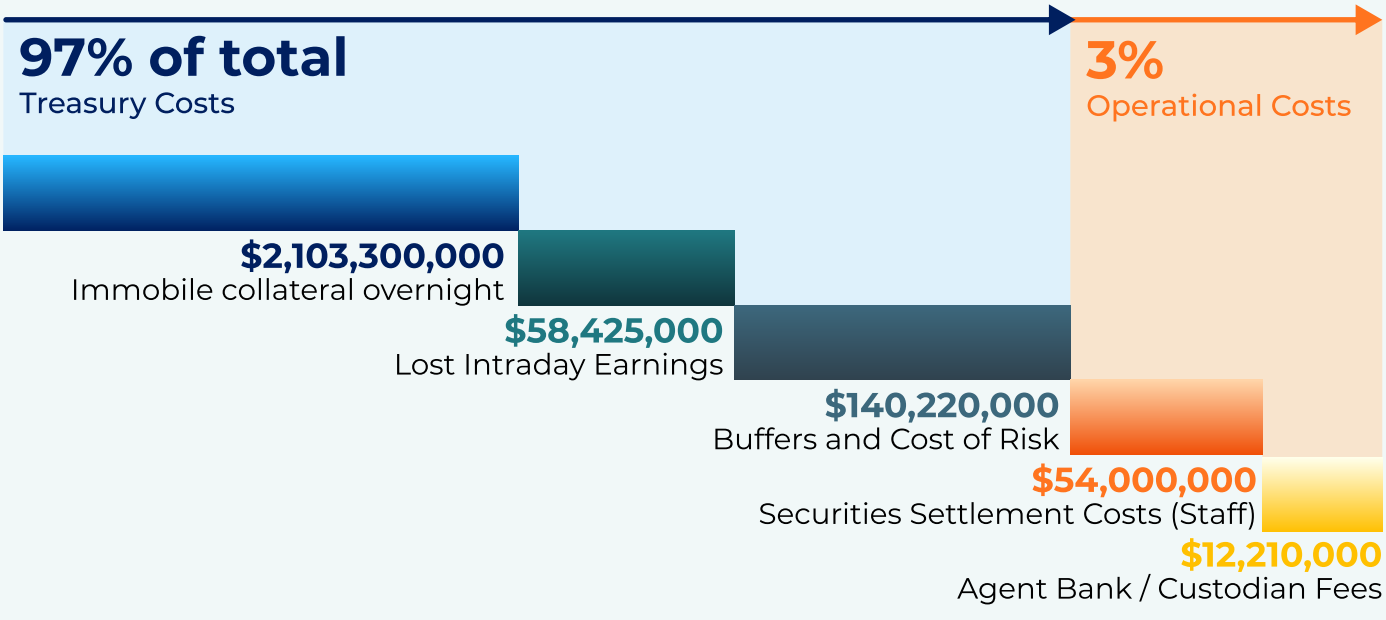
Mismatches in securities and cash transfer deadlines: these create a need for firms to pre-position collateral margin at clearing houses (i.e. FICC and NSCC) overnight.

Operational complexities in the smooth transfer of securities and cash margins: these trigger a need for extra staff to manage the timely delivery (and receipt) of collateral.

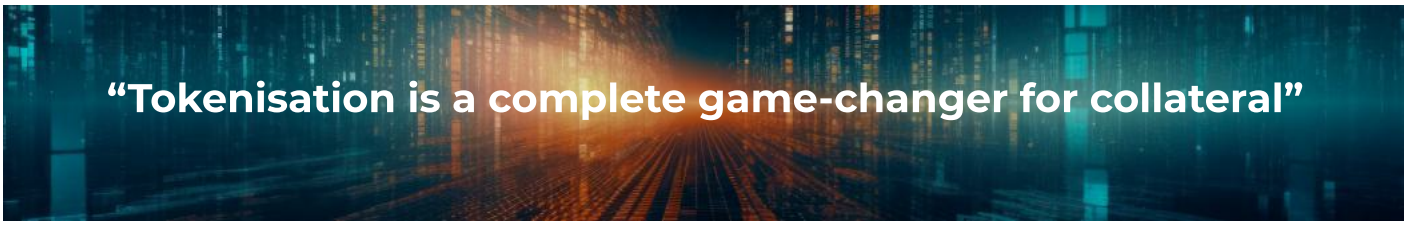
External transfer costs in moving collateral between counterparties and CCP margin accounts, ahead of multiple margin cut offs through the day.

Looking ahead, the transition to mandatory clearing for US Treasuries (where over 7,000 new firms are expected to connect to up to three CCPs) is certain to further exacerbate these challenges.

Potential opportunities in the clearing and settlement of US Treasury Bills and Equities
(USD per annum)



c. The Opportunity



Today, over **USD 4 trillion a month** is being transacted using tokenised cash and securities collateral – and over **60% of all ongoing DLT exploration** in the capital markets is focused on collateral mobility across cash and fixed income assets. Continued development by Central Banks (such as the **European Central Bank** and Hong Kong Monetary Authority) and leading banks (such as JPMorgan) has also highlighted the increasing visibility of tokenisation in the collateral space.

Using tokenisation, the frictions that exist today in the US market can be seamlessly removed in a transition to real-time margin calculation and delivery. In practice, tokenisation of US securities and cash would enable:

- Real time, instant collateral delivery (on-demand)
- Elimination of settlement risk
- Elimination of reconciliations
- Reductions in 3rd party custodian charges

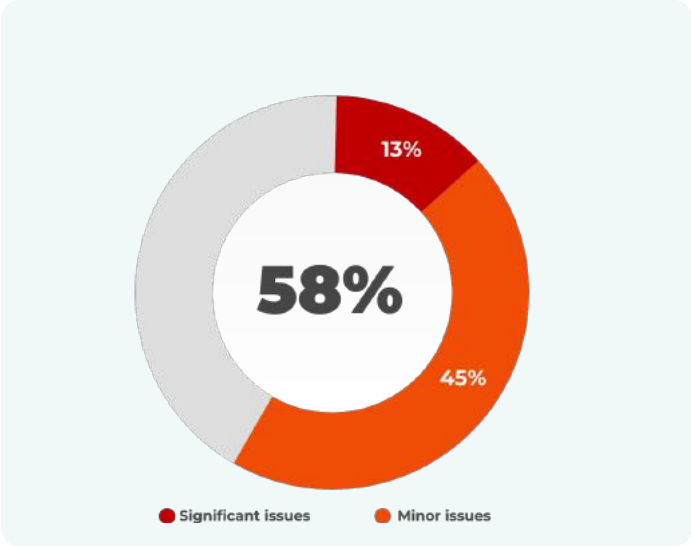
By removing latency, settlement risk and costs, the tokenisation of US-issued fixed income, equities and cash collateral can return billions of dollars to end investors through improved treasury management, greater collateral utilisation and increased investment returns.

2. US Clearing and Settlement Today

Opportunities abound

Today's market structure for US securities means that two CCPs (FICC and NSCC) need to be supplied with initial and variation margin funding at several times throughout the day. However, a lack of alignment between payment mechanisms, custodians and market infrastructure deadlines means that the smooth flow of collateral is interrupted in several ways.

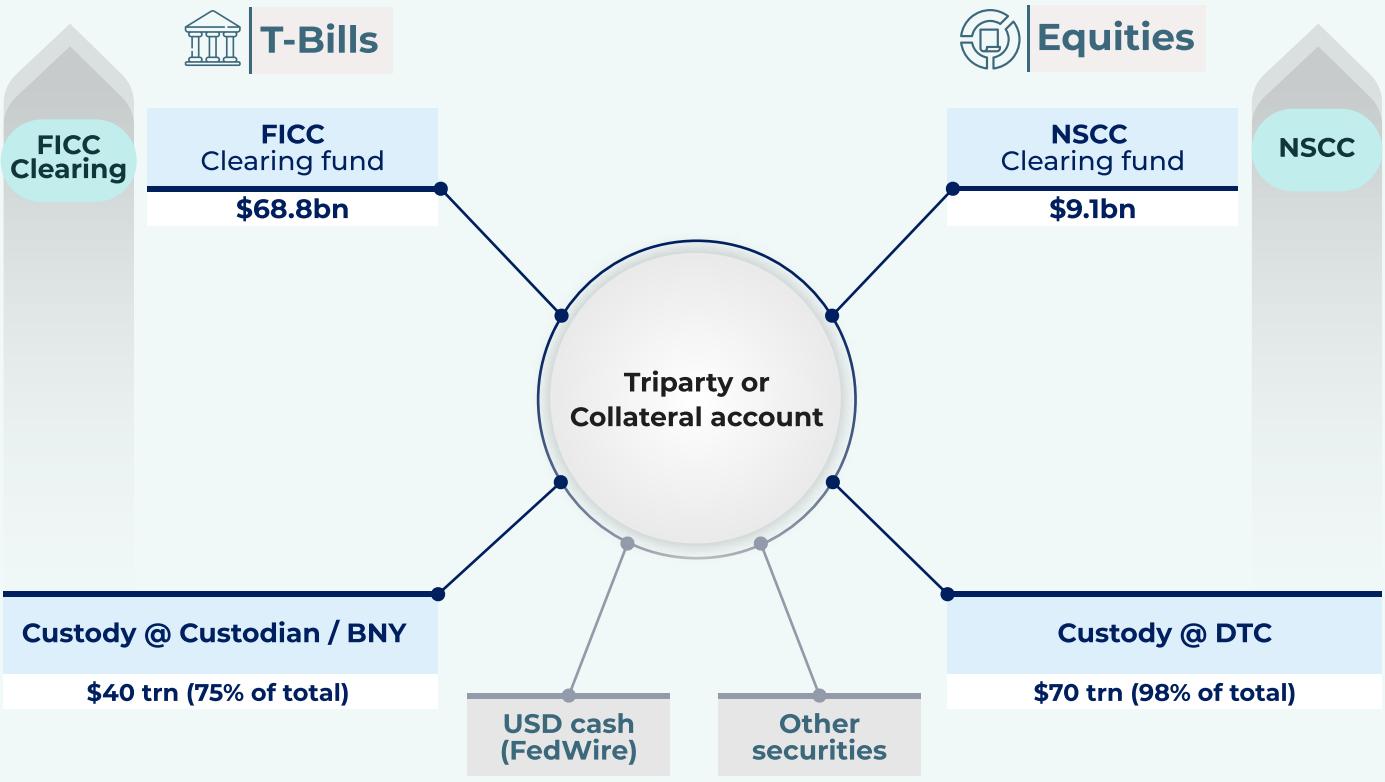
Owing to these challenges, **58% of market participants are facing issues** in the management of their collateral and margining requirements.



Source: Securities Finance Transformation, ValueExchange report

These challenges are manifest in several key ways on a daily basis:

US securities clearing today: A complex operating model



2. US CLEARING AND SETTLEMENT TODAY: OPPORTUNITIES ABOUND

	Today	Industry benefits
1. Securities settlement costs	· Given that the movement of collateral is a highly manual process today (for settlements, exception handling, substitutions, etc.), the operational overheads and costs for firms managing their margining is significant. · This is particularly so given multiple margin calls today, split across two clearing houses (FICC and the NSCC). · Anecdotally, this manual processing can require up to 0.5 full time headcount just to manage collateral movements for US securities on a daily basis.	0.5 FTE dedicated to collateral movements and reconciliations = USD60k per firm / USD. Total costs of managing collateral for the 200 clearing brokers today who clear through the FICC = USD12 million per annum. Total costs of managing collateral for the 3,500 non-clearing firms who clear through the NSCC = USD42 million per annum. Total headcount costs for margining **USD 54 million per annum**
2. Agent bank / Custodian charges	· In addition to the operational resources required to manage margins and collateral, every movement of securities triggers a fee from custodians (usually per CUSIP, per movement). This can mount up across multiple margin calls each day.	Total, annual costs of all firms moving one security, for each margin call, per annum **USD 12.2 million per annum**

3. Immobile collateral overnight	· Approximately 60% of FICC clearing margin is posted overnight – owing to challenges in market timings and settlement risks. For many firms, it is impossible to move collateral in time for morning margin deadlines – especially when collecting from the buy-side.
	  · For cash collateral (approx. 50% of total margin is posted as cash overnight): FedWire operating hours (9am-6:30pm) combine with a 9am FICC margin call (for cash) to mean that most firms have to post their cash collateral overnight.
	  · For securities (approximately 10% of total margin is posted overnight as securities): concerns around securities settlement mean significant overnight deposits.
	· All of these overnight collateral deposits entail a significant opportunity cost of lost liquidity and utilisation.
	· These opportunity costs multiply when calculated across weekends (i.e. when funding is sent on Friday night, to be ready in time for a Monday morning margin call).
		Total cost of lost earnings by FICC clearing participants (in posting overnight collateral) USD 5.1 million per day.
		
		Total cost of lost earnings by NSCC clearing participants (in posting overnight collateral): USD 607k per day.
		
		Total opportunity cost of posting overnight collateral at FICC and NSCC
		USD54 million per annum

4. Lost intraday earnings	· The remaining 40% of collateral is posted intraday – which is more liquid but can potentially still carry an (intraday) opportunity cost. · For every hour that this is posted before the collateral cut off time, there is an opportunity cost of liquidity, equal to the value of an intraday repo for the same period.	Total cost of lost intraday earnings, when FICC clearing participants post collateral early: USD 140k per hour. Total cost of lost intraday earnings, when NSCC clearing participants post collateral early: USD 19k per hour. Total cost of lost intraday earnings (assuming 1 hour per day for 220 days) **USD58 million per annum**
5. Buffers and cost of risk	· All of the above processes imply risk. · First is the risk that the collateral may not arrive on time or at all – owing to challenges in the settlement process between counterparties (especially for securities collateral). · Second is the risk that a spike in volatility or volumes could trigger a short term shortage of collateral, before participants have time to call for more collateral from their clients or treasuries. · Given this lack of predictability, firms are compelled to leave more collateral than needed - by up to around 4%. · These collateral "buffers" also carry an opportunity cost – set against the inability to re-use these securities for funding or collateral elsewhere · As with overnight collateral, the opportunity cost of these buffers multiplies exponentially across weekends.	Total value of collateral buffers held by FICC and NSCC participants: USD 3.12 billion per day. Total opportunity cost of lost liquidity, due to buffering **USD 140 million per annum**

Today, these costs are an inevitable part of trading activity for the thousands of firms who face the FICC and NSCC today for their clearing. But outside of normal processing, other critically important risks are also at play:

"What about when things aren't fine?"

Recent cases (such as the Silicon Valley Bank crisis in 2023) highlighted an important mismatch in the management of margins.

Today, legacy technology limitations (and the issues cited above) create a critical lag for margin calculations today, with the gap between market activity and margin delivery exceeding one day in many cases:

First CCPs calculate margins based on current or historical market volatility.

CCPs then post their margin calls to participants.

Margin payments and deliveries are then made.
(up to 18 hours after the margin call on weekdays and 64 hours on weekends).

Whilst this is manageable during normal market conditions, the quantum of margin obligations can escalate significantly during periods of volatility, creating a major funding risk for participants and clearing houses alike.

As we saw during the Silicon Valley Bank crisis, margins accumulated from Friday into the following week, with participant obligations leaping quickly and firms unable to manage their margin and funding on an ongoing basis.

From an investor perspective, the clear preference is to avoid the kind of accumulation in margin obligations that we have seen historically, in favour of a more incremental, real-time margin cycle.

Not only would this eliminate the potential for major swings in margin calls, it would potentially reduce haircuts on collateral (i.e. cost of reselling collateral). Today, these haircuts risk being over-inflated to take into account major swings in valuations during periods of volatility. If collateral assets could be disposed of quickly and incrementally then haircuts could be reduced and capital efficiency further increased.

However, a move to real time (or even more frequent) margining relies on all parties having certainty of collateral delivery throughout the funding cycle – which can prove problematic given the issues cited above.

In the face of key limitations in existing processes and platforms across the industry, the certainty remains elusive today and, with it, the opportunity for real time treasury efficiencies.

Mandatory US Treasury Clearing: 7,000 new participants expected and 3 more CCPs

Based on the current schedule, 2025 will see the transition of around USD 15 trillion in daily turnover into a cleared environment, adding to the USD 10 trillion that is already cleared by FICC (as of October 2024).

This transition will have three key implications for market participants:

84% of firms expect their collateral requirements to increase (to support the growth in cleared volumes); with 38% expecting to see their margin calls grow by over a quarter (according to a ValueExchange research).

7,000 new accounts are expected to be opened during the transition (according to SIFMA) – creating a major connectivity challenge and potential blockage for firms in 2025.

With three new CCPs potentially entering the US Treasury clearing market (notably CME, ICE and LCH), this connectivity challenge will only become more acute – as existing clearers also begin to connect to new venues.

Put together, the advent of mandatory US Treasury clearing in the US looks set to:

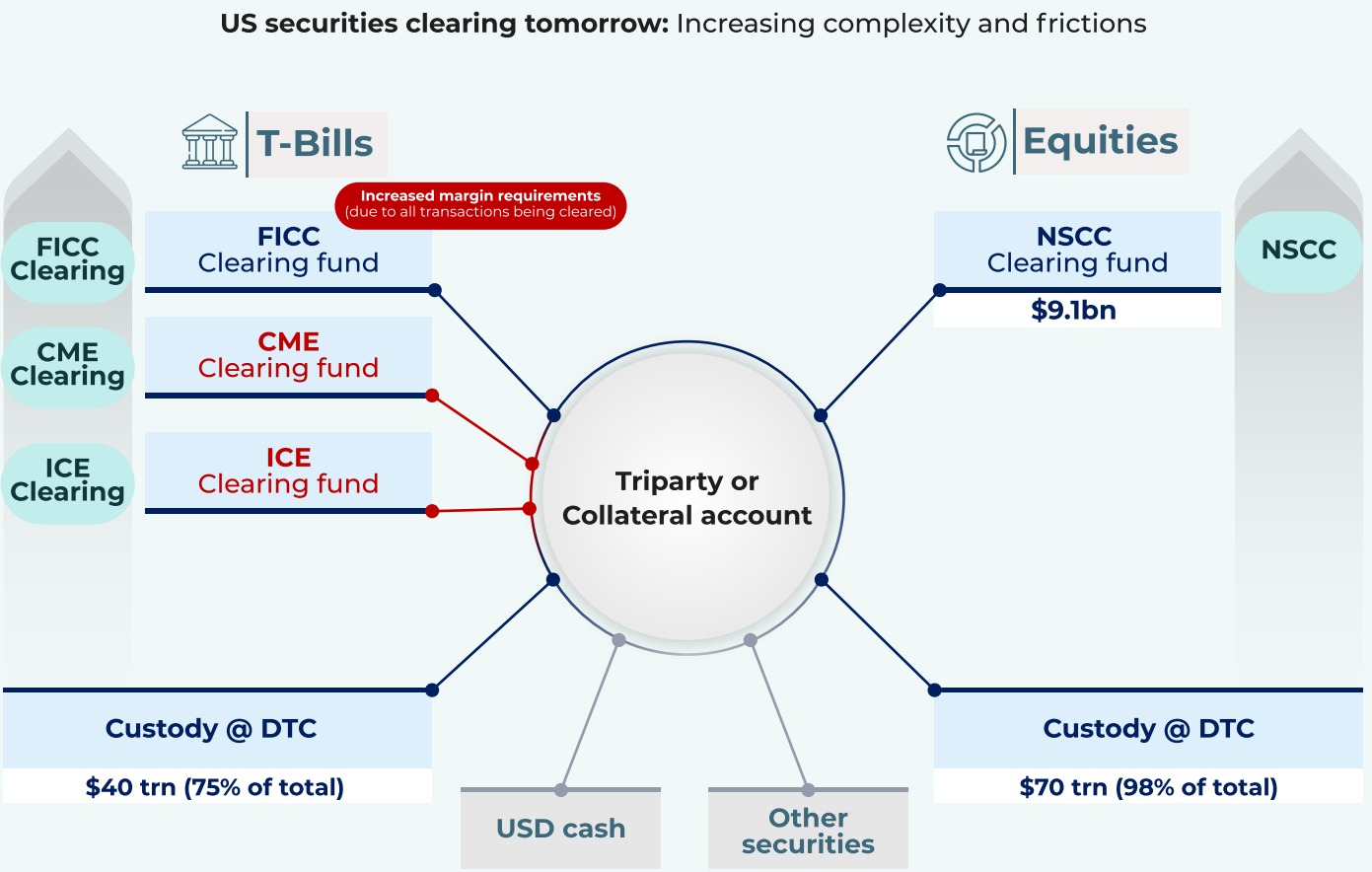
Create **new connectivity pressures:** requiring greater resources to manage and sustain multiple points of connectivity.

Reduce existing risk netting benefits, as participants begin to spread their clearing from one to (up to) four clearing houses in the future.

Increase the costs of moving collateral: As margin needs to be posted across multiple CCPs in the near future (instead of only FICC and the NSCC today).

Increase pressures on collateral utilisation and efficiency: as margin calls grow in the face of higher cleared volumes and less netting.

If today's management of collateral margins is complex and frictional, it looks set to be significantly more so in 2025 – at the cost of treasurers and operations heads across the industry.



Crypto repos

As cryptocurrencies become increasingly liquid in the institutional markets, the need to mobilise and finance these assets is growing – driving an increase in demand for crypto-repos and lending.

However, the above frictions create a core asymmetry in today's markets. Cryptocurrencies can be moved instantly, whilst the underlying (traditional) securities or cash collateral can take hours or even days to arrive.

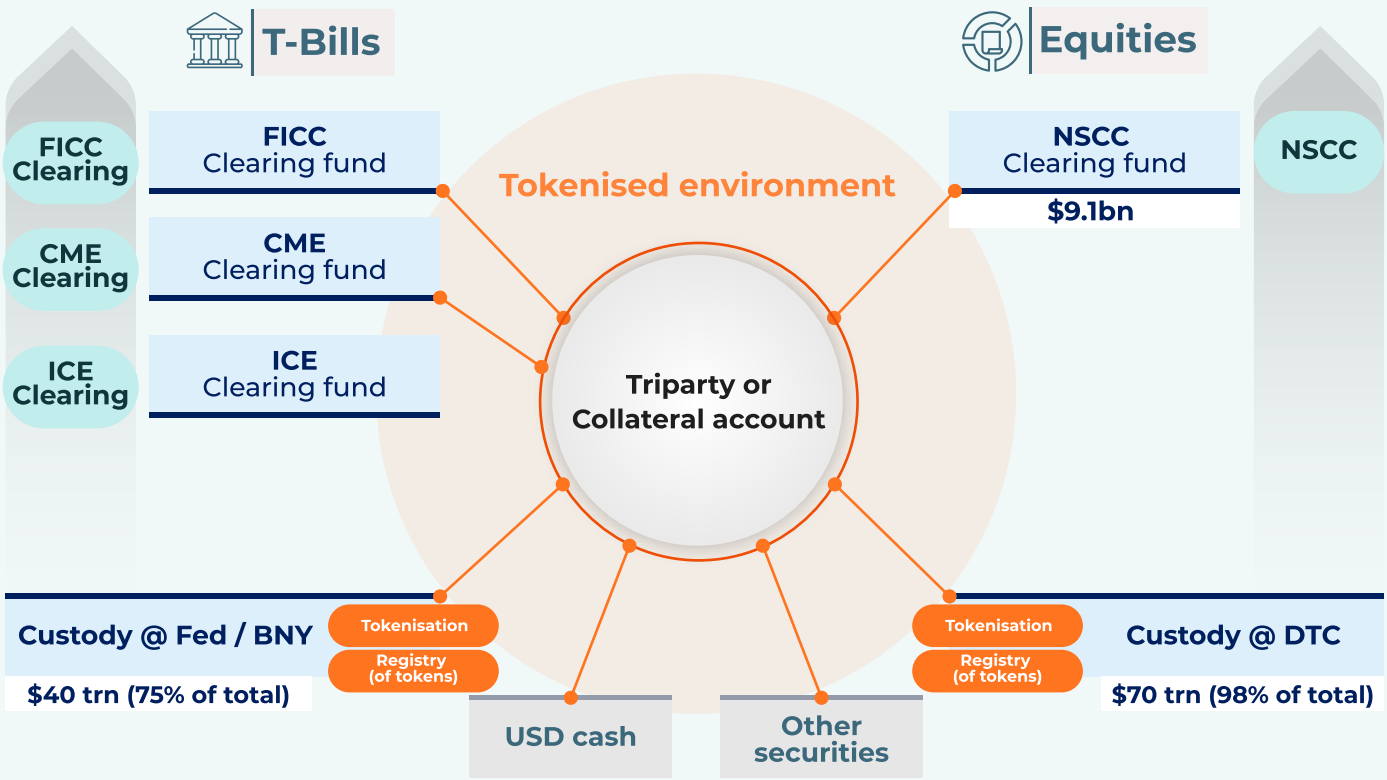
This challenge puts an artificial limit on the viability of cryptocurrencies as an institutional asset today. With USD 218 billion in global stablecoin holdings today, the funding opportunity for pledged or lent cryptocurrencies is estimated to be in the tens of millions of dollars today, scaling to a maximum USD 300 million per annum in the future.

With institutional investors already losing valuable investment performance for all of their cryptocurrency holdings today, the opportunity to bring these assets into a highly liquid and real-time US market structure is vast.

3. A new operating model for US securities

The tokenisation of debt, equities and cash collateral has the power to remove a significant volume of the above inefficiencies. By bringing all assets into a single, integrated environment, all profiles of collateral could be transferred in real-time with no settlement risk, no need for reconciliations and no buffers. More importantly, this single environment also has the potential to significantly improve market resilience – by facilitating a move to real-time margin management.

US securities clearing: A new, tokenised operating model



This new, tokenised environment would have the following impacts on market providers and participants:

Participant	Roles	Industry benefits
1. Investors	Could keep their collateral assets in a 'lock box' (custody account) as they do today – accessible by Clearing Participants and/or directly by CCPs.	✓ Minimal change versus today. ✓ Seamless connectivity to other counterparties. ✓ Real-time margin delivery – triggered by CCPs.
2. Clearing Participants	Clearing Participants could also keep their collateral assets in a 'lock box' (custody account) as they do today – accessible by CCPs. As recent trials (in Europe) have demonstrated, these assets could then be tokenised and transferred in real-time (using a Power of Attorney structure) as and when margin is required by the CCP. Leveraging this automation, substitutions and ongoing collateral maintenance could also then be automated (as smart contracts), providing further risk and cost efficiencies	✓ **Elimination of USD 2.4 billion per annum in settlement latency, risk, and buffers.** ✓ Total automation of margin management (and elimination of human risk). ✓ Real-time margin delivery – as required by CCPs. ✓ Seamless integration of traditional and cryptocurrencies – enabling up to **USD 400 million** in financing benefits for stablecoins.
3. Clearing Houses	Faced with certainty of real-time collateral delivery throughout the day, CCPs could then enhance their risk offerings to include real-time margin calculations: eliminating the above risks and dislocations involved in market volatility (thereby also reducing collateral haircuts).	✓ Real-time margin calculations – and instant margining. ✓ Improved market resilience.
	Leveraging instant and secure settlements, CCPs could also begin supporting cleared, intraday repos – and hence deliver major efficiencies in risk-weighted-asset (RWA) requirements for participants in today's bilateral intraday repos market.	✓ RWA efficiencies from cleared intraday repos.
4. New CCPs (and their participants)	Leveraging standardised connectivity and processes, clearing participants and new CCPs could connect seamlessly and with significantly lower costs.	✓ Minimal cost of change for market participants. ✓ Cost-efficient, risk diversification across the industry.

Key considerations

Inevitably, there are core challenges and considerations in the realisation of this new, operating model. These include:

Market awareness

Levels of awareness vary greatly across the US market, in terms of how readily these costs can be addressed. Whilst investors are acutely aware of the performance cost of existing frictions in margining, many financial institutions that we have interviewed are unaware of the opportunity for this level of transformative change in their clearing and margining.

Tokenised collateral needs to be recognised

Regulation and CCP rules need to be updated to ensure that all tokenised forms of securities can be recognised as high-quality liquid assets. Ongoing initiatives at the CFTC and by the European Central Bank make this step very likely in the next 12-18 months (albeit potentially under pilot conditions to begin with).

Tokenised cash

Firms and service providers need to agree on what forms of digital cash can be used in this environment (potentially including stablecoins and connectivity mechanisms to legacy RTGS platforms).

The operating model needs to be consistent with global regulations

Any new infrastructure will need to be consistent with the requirements of global rulebooks such as EMIR and SFTR (for example).

Participant adoption

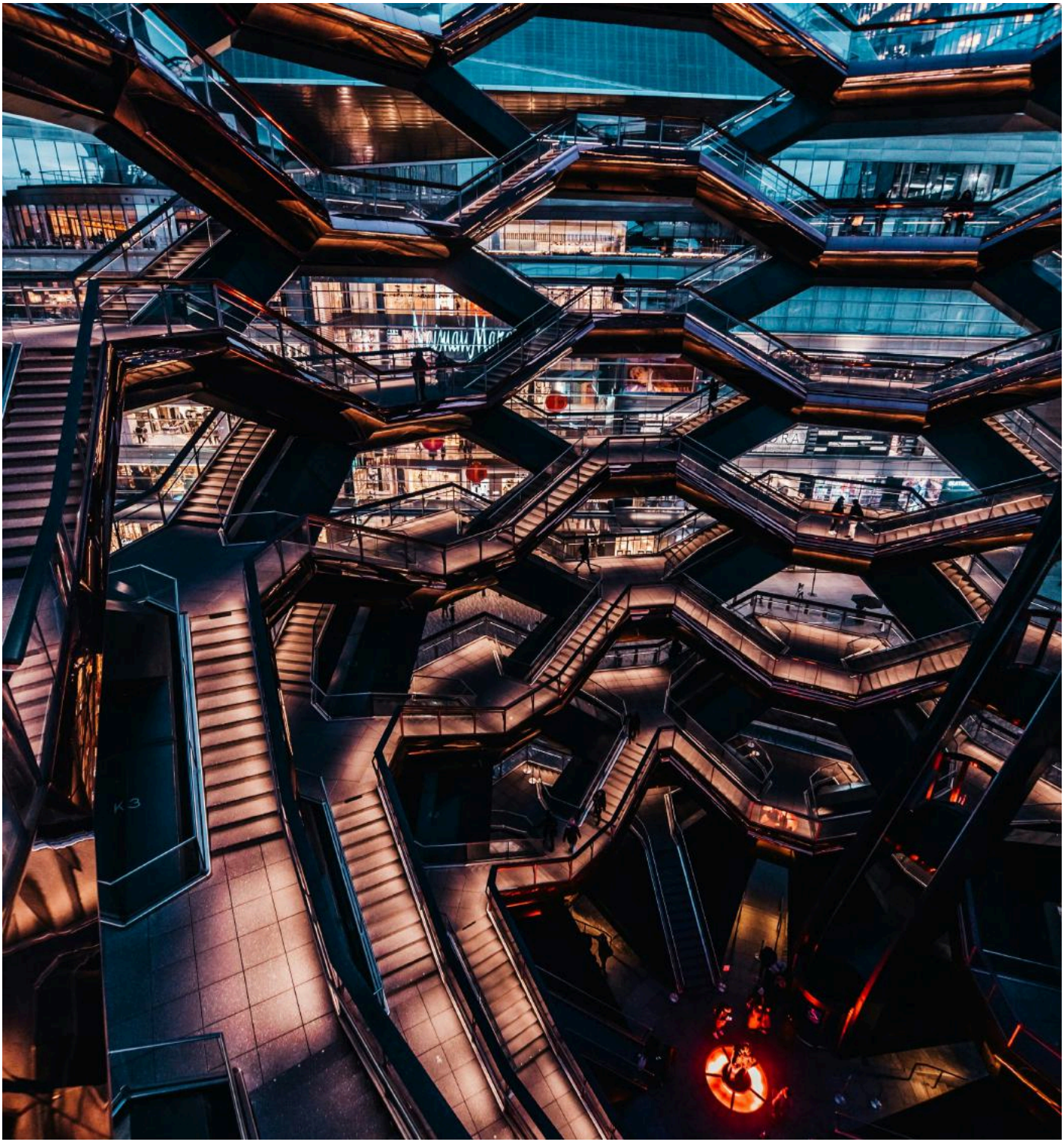
Inevitably take-up will not be instant by all firms, faced as they are with legacy technology and risk control challenges among others. Those that do move quickly to adopt the benefits of this new technology will have an ongoing competitive advantage versus their peers.

Needs to be seamless to investors

Experience has shown that, no matter how profound this change may be for CCPs and clearing participants, it is critical that any move be entirely seamless and invisible to investors (in terms of technology costs and adoption effort).

Summary

The opportunity to return USD 2.4 billion in annual performance to US investors is not only compelling – it is immediately viable. By tokenising US cash, equities and bonds in a single environment, CCPs, clearing participants and investors could see their treasuries super-charged through improved utilisation and reduced settlement risk, added to the significant capacity gains in operations.



4. Appendix

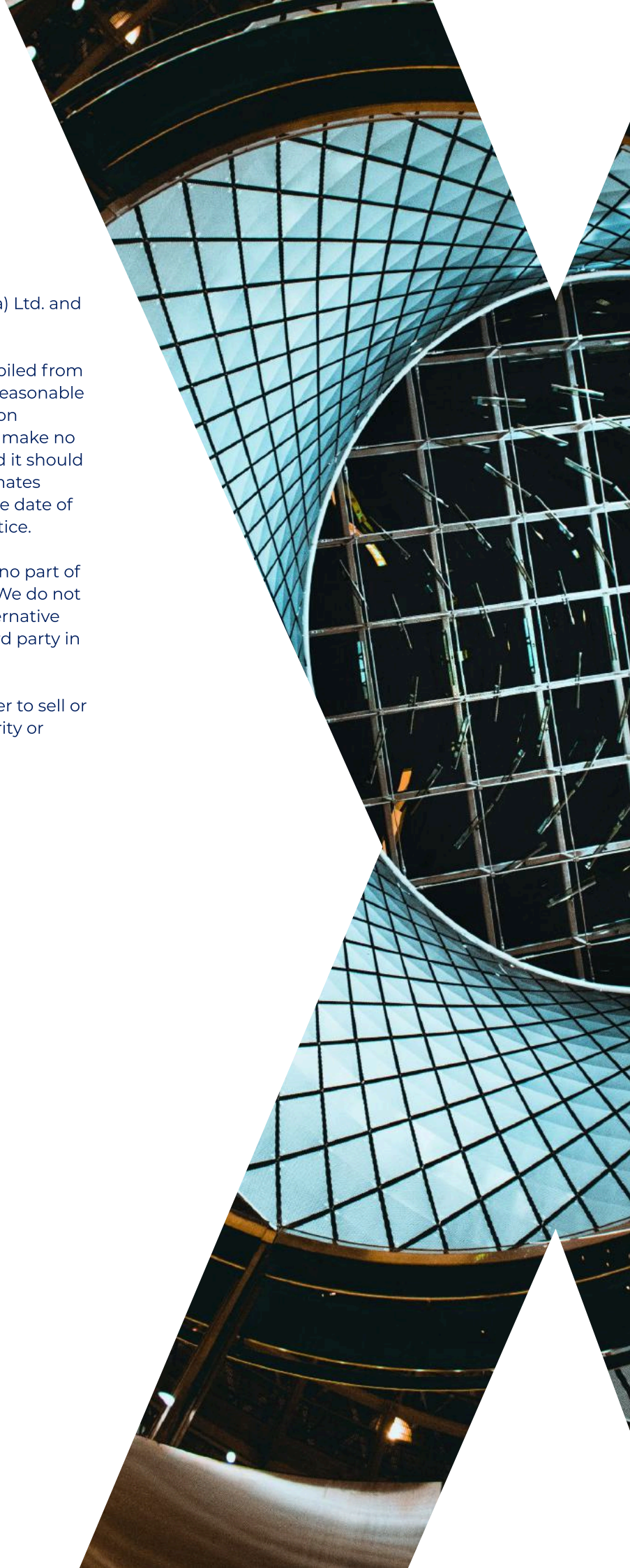
The Business Case for Change in numbers

	Unit	Amount	Source
1. Immobile collateral overnight			
FICC			
Total clearing fund	USDbn	$ 68.80	DTCC
Total cash collateral posted overnight	%	50%	Interviews
Total securities collateral posted overnight	%	10%	Interviews
Sub-total: value of collateral being posted overnight in FICC	USDbn	$ 41.28	Calculated
4.5% overnight rate equivalent	%	0.012%	Calculated
Sub-total: lost earnings from overnight collateral being posted at FICC (per day)	USDbn	$ 0.0051	Calculated
NSCC			
Total clearing fund	USDbn	$ 9.10	DTCC
Total cash collateral posted overnight	%	50%	Interviews
Total securities collateral posted overnight	%	10%	Interviews
Sub-total: value of collateral being posted overnight in NSCC	USDbn	$ 5.46	Calculated
4.5% overnight rate equivalent	%	0.012%	Calculated
Sub-total: lost earnings from overnight collateral being posted at FICC (per day)	USDbn	$ 0.0067	Calculated
Total			
Lost earnings from overnight collateral being posted at FICC/NSCC (per day)	USDbn	$ 0.00576	Calculated
Lost earnings from overnight collateral being posted at FICC/NSCC (per year)	USDbn	**$ 2.10**	Calculated

	Unit	Amount	Source
2. Lost intraday earnings			
FICC			
Total clearing fund	USDbn	$ 68.80	DTCC
Total intraday collateral	%	40%	Calculated
Sub-total: value of collateral being posted intraday in FICC	USDbn	$ 27.52	Calculated
4.5% overnight rate equivalent per hour	%	0.00051%	Calculated
Sub-total: lost earnings from intraday collateral being posted at FICC (per hour)	USDbn	$ 0.0014	Calculated
NSCC			
Total clearing fund	USDbn	$ 9.10	DTCC
Total intraday collateral	%	40%	Calculated
Sub-total: value of collateral being posted intraday in NSCC	USDbn	$ 3.64	Calculated
4.5% overnight rate equivalent per hour	%	0.00051%	Calculated
Sub-total: lost earnings from intraday collateral being posted at FICC (per hour)	USDbn	$ 0.0002	Calculated
Total			
Lost intraday earnings from collateral being posted at FICC/NSCC (per hour)	USDbn	**$ 0.00016**	Calculated
Lost intraday earnings from collateral being posted at FICC/NSCC (per year, assuming 1 hour per day)	USDbn	**$ 0.06**	Calculated

	Unit	Amount	Source
3. Securities settlement costs			
Headcount costs (clearing firms)			
FTE required for clearing participants to manage collateral movements, substitutions and reconciliations	% FTE	50%	Interviews
Total cost of FTE	USD pa	$ 120,000	Interviews
Sub-total: Cost per clearing participant of managing collateral movements	USD pa	$ 60,000	Calculated
# of Clearing brokers at FICC	#	200	https://www.sifma.org/wp-content/uploads/2024/11/USTC-ConsiderationsReport_SIFMA-EY.pdf
Sub-total: Total cost for clearing brokers of managing collateral	USD pa	$ 12,000,000	Interviews
Headcount costs (non-clearing firms)			
FTE required for clearing participants to manage collateral movements, substitutions and reconciliations	% FTE	10%	Interviews
Total cost of FTE	USD pa	$ 120,000	Calculated
Sub-total: Cost per clearing participant of managing collateral movements...	USD pa	$ 12,000	Calculated
# of Clearing brokers at FICC	#	3500	https://www.sifma.org/wp-content/uploads/2024/11/USTC-ConsiderationsReport_SIFMA-EY.pdf
Sub-total: Total cost for clearing brokers of managing collateral	USD pa	$ 42,000,000	Calculated
Total			
Operational headcount cost of managing collateral	USDbn	**$ 54,000,000**	Calculated

	Unit	Amount	Source
4. Agent bank / custodian fees			
Custodian fees			
Costs per settlement	USD/CUSIP	$ 5	Interviews
Total # of firms moving collateral	#	3700	https://www.sifma.org/wp-content/uploads/2024/11/USTC-ConsiderationsReport_SIFMA-EY.pdf
Total # of margin calls per day	#	3	DTCC
Total days per year	#	220	Calculated
Total			
Total costs of moving one CUSIP per margin call, per year	USD pa	**$ 12,210,000**	Calculated
5. Buffers and cost of risk			
Buffering			
Total value of collateral at FICC	USDbn	$ 68.80	DTCC
Total value of collateral at NSCC	USDbn	$ 9.10	DTCC
Total estimated buffers held	% of total	4%	Interviews
Total value of buffers held	USDbn	$ 3.12	Calculated
4.5% overnight rate equivalent (i.e. daily opportunity cost)	%	0.012%	Calculated
Total			
Total opportunity cost of collateral buffers (per day)	USDbn	$ 0.0004	Calculated
Total opportunity cost of collateral buffers (per year)	USDbn	**$ 0.1402**	Calculated



This report has been prepared by The VX (Canada) Ltd. and is provided for information purposes only.

The information contained herein has been compiled from sources believed to be reliable, but, although all reasonable care has been taken to ensure that the information contained herein is not untrue or misleading, we make no representation that it is accurate or complete and it should not be relied upon as such. All opinions and estimates included herein constitute our judgment as at the date of this report and are subject to change without notice.

Unless we provide express prior written consent, no part of this report should be reproduced or distributed. We do not accept any liability if this report is used for an alternative purpose from which it is intended, nor to any third party in respect of this report.

This document must not be considered as an offer to sell or a solicitation of an offer to buy any product, security or service.

the ValueExchange

In partnership with

Digital Asset