



# **SWIFT INSTITUTE WORKING PAPER**

## **INDUSTRY PREPAREDNESS FOR ACCELERATED SETTLEMENT**

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# Industry preparedness for accelerated settlement

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## Abstract

This paper discusses the progress made towards T+1 and instantaneous settlement in financial markets, and industry preparedness for such a change. We cover the various equity settlement technologies and analyse how collateral, stock lending and margin requirements can impact the settlement processes. The debate on shortening the equity settlement cycle is discussed, along with potential policy recommendations based on industry preparedness. The paper draws on 44 unstructured interviews and two focus group workshops with key stakeholders in the financial industry. This sample represents firms with total assets in the tens of trillions. The paper provides a comprehensive overview of the issues surrounding accelerated settlement and offers insights for industry practitioners. It was clear from our research that there is a perceived trade-off between the benefits of improving market efficiency and infrastructure and the increased risk of settlement failure. As our interviews were focused on those with settlement and operations functions, the tone of the responses was biased towards the latter. The findings of this study will help stakeholders identify gaps in their current settlement processes and develop strategies to meet the demands of accelerated settlement.

*Keywords:* , Settlement cycle, T+1, Swift

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<b>5 Factors affecting industry preparedness</b>	<b>6</b>	This paper investigates industry preparedness for shorter equity settlement cycles. Since 2018 the US's Depository Trust & Clearing Corporation (DTCC) has been exploring the benefits of accelerating the US and Canadian equity settlements system (Abel (2022)). In 2021 the DTCC published a white paper calling for the US securities industry to come together and explore shortening the North American equity settlement process from the current two-day to a one-day cycle DTCC (2023).	
<b>6 Settlement failures</b>	<b>6</b>	The tempo of change towards accelerated settlement in the US has increased. In February 2023, the Securities Exchange	
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Commission (SEC) published its rules for one-day settlement to be the standard settlement cycle for equities by May 2024 SEC (2023). This followed a series of short squeezes and market disruption events. These were the results of collusion by amateur traders to disrupt short sellers (eg Gamestop and Robinhood). Institutional market participants blamed slow settlement cycles for the difficulties they experienced.<sup>1</sup>

The adoption of one-day settlement (T+1) in North America is the most significant global move towards an accelerated settlement cycle. It impacts all participants in the trading cycle and requires custodians to be ready with robust systems. The US represents the primary non-domestic investment location for the world's savers, investors, pension funds and investment firms, to such a degree that by one calculation, international ownership of US equities, combining both portfolio and direct investments, now represents 40% of US corporate value. Importantly for this paper, half of this overseas ownership of US shares, was through portfolio investment. The Federal Reserve noting that in 2021 foreign purchases of US stocks amounted to \$30.615 trillion while selling \$30.567 (Federal Reserve April 2022). The US represents 46.2% of the global equity market. Therefore, how the US and Canada structure their markets matter to the rest of the world and North America's move to accelerated settlements during 2023 and 2024 has wide-ranging consequences across the globe.

In the past, paper intensive systems and manual processing meant that settlement periods of up to T+10 were not that uncommon, technological enhancements and innovation at the custody level. This has made reducing settlement times a possibility. These enhancements have facilitated reduced risk, margin and capital throughout the settlement chain. We note, however, that recording change of ownership at a securities registrar remains a slow part of the post settlement process. Likewise, as detailed later, our interviews show that timeliness can also be impacted by human factors, especially where manual paper processes persist.

The progression to T+1 settlement in financial markets, as depicted in the timeline below, has been driven by several factors. One of the primary reasons for the shift is the reduction in risk exposures. A shorter settlement period means that market participants are exposed to the counter-party risk for a shorter duration, reducing the chance of default and consequential settlement failure. This reduction in risk leads to a reduced need for margin in the settlement system and therefore lower capital requirements for brokers and custodians.

June 1995	5 + 3 day rolling settlement
Jan 2001	IOSCO call for accelerated settlement
Oct 2014	Europe migrates to T+2
Sept 2017	US and Canada migrate to T+2
Dec 2021	SIFMA, ICI and DTCC paper on T+1
Feb 2021	India begins migrating to T+1
Feb 2023	US and Canada announce timeline to T+1
May 2024	US and Canada T+1 proposed implementation

The debate on the move to accelerated settlement is important because settlement failure has direct consequences for the parties directly involved. Indeed, systemic failure could lead to gridlock. That would impact liquidity and smooth functioning of financial markets.

When initially arguing the case for moving US equity markets from T+2 to T+1, the DTCC argued that the reduction in the volatility element of central counter-party clearing margin requirements would be 41%, itself representing 60% of overall margin requirements (DTCC (2021)). Additionally, a shorter settlement period can lead to increased liquidity in the market, as investors can quickly reinvest the funds received from selling securities.

However, as we found in our interviews, there are potential drawbacks to accelerating settlement cycles. Not least of which is the increased operational burden on market participants. Increasingly participants are having to execute sometimes quite complex instructions in a very short time period. With a shorter settlement period, there is less time to complete the necessary paperwork and processes to settle a trade, and this can be challenging for some market participants. This is particularly the case for smaller firms.

There is also a risk of increased errors in settlement as the settlement cycle shortens, which can lead to delays and additional costs. This challenge is even greater for firms in mismatched time zones where time sensitive settlement activities could take place into the early hours of the morning. In such instances, there is no flexibility to delay these functions until normal office hours as the slot for that activity (for example matching and affirmations of trade) will be closed.

The North American region are not the only regimes which have or are moving to an accelerated settlement environment. The Indian market began the transition to T+1 in February 2022, the phased approach began with the smallest 100 stocks of its 5200 listed stocks and finished with the transition of the largest 500 in January 2023. This was a deliberate process choice based on the concept that only the top 500 shares were traded on international markets and bought by non-domestic customers (Krishman (2015)). Mainland China currently operates a T+0 settlement cycle for large entity "A" shares while still operating a T+1 cycles for cash (Paribas (2021)).

Our fundamental research questions are:

1. What are the general attitude to accelerated settlement across buy-side and custodial institutions?
2. How well prepared are global wealth and fund management institutions and global custodians for accelerated securities settlement?
3. What are the post implementation challenges and changes facing international investors in the context of accelerated settlement in the largest international investment market, North America?

In summary, the progression to accelerated settlement in financial markets has been driven by several factors, including the reduction of risk and technological advancements. While T+2 settlement is currently the industry standard in many financial markets, T+1 and even T+0 are likely to continue to

<sup>1</sup>Fox, M., 9/2/2022. The SEC consequently decided to overhaul the controversial trade-settlement rule at the centre of the issues. Business Insider

displace the older settlement cycle structures, with the globally important North American market setting the pace (Burns et al. (2017)). We now investigate whether industry is prepared for this to become the operational norm.

## 2. Literature

From an academic point of view, the literature on accelerated equity settlement encompasses several key themes, including market efficiency and market stability. Supporting this is the literature on the economies of scale that the settlement industry enjoys (Schmiedel et al. (2006)). That said, a settlement institution is treated the same as any other multi-product firm that incurs operating costs based on its inputs and outputs (Gehrig (1998)).

One of the central concepts is market efficiency, which refers to the extent to which security prices fully reflect all available information. Accelerated settlement has the potential to enhance market efficiency by reducing the time between trade execution and settlement, which can lead to faster dissemination of information and quicker price adjustments. This, in turn, may result in improved price discovery and more accurate valuations of securities, benefiting investors and market participants. Lin and Chen (2019) hypothesize that with accelerated settlement (in the derivatives market), price manipulation is prevented but only at the expense of market quality.

Another key theme in the literature is that of financial stability. Settlement failures, delays, or disruptions can have adverse consequences for the stability of financial markets and institutions. Asmar and Trimbath (2022) investigated failed trades and showed that regulatory improvements in the settlement process reduced these. There is also scholarly concern on the risks of concentrated central clearing Mills Jr and Nesmith (2008).

Accelerated settlement is therefore seen as a way to reduce settlement risks, such as counterparty credit risk, liquidity risk, and operational risk. The argument is that it minimizes the time window for such risks to materialize (Karpoff (2021)). That said, the authors caution that should fraud arise, there is also less time in which to detect and mitigate the impact.

The literature on accelerated equity settlement also explores various other dimensions, such as the impact on market liquidity, transaction costs, operational processes, and risk management practices. For example, faster settlement may impact market liquidity by altering the availability and utilization of collateral, affecting market participants' funding and financing strategies. Walley (2023), meanwhile, argues that embracing accelerated settlement is an opportunity to modernize the settlement process. It may also influence transaction costs, including settlement fees, and positively impact operational processes related to trade confirmation, affirmation, and settlement instructions. Moreover, it may require adjustments to risk management practices, including credit risk assessments, collateral management, and settlement risk monitoring. Knieps (2006) highlights that there is a competitive market in settlement approaches, as highlighted previously.

## 3. Settlement protocols

The equity settlement process refers to the transfer of ownership of securities from a seller to a buyer. It is depicted in figure 1 with a worked example in the insert. In the past, the settlement process took several days to complete. The process is commonly referred to from the trade day, namely T+1 for one day, T+3 for three days and T+5 for five days. This means that the buyer received the securities on day one, day three, or day five (after the transaction date). T+1 is fast becoming the industry standard and/or target.

The key difference between a T+1 trade and an atomic trade is the settlement period (Lee et al. (2022)). In the former, there is the aforementioned one day between the trade date and the settlement date, whereas in the later, the transfer of ownership and payment occurs immediately.

The advantage of an atomic trade is the total elimination of counterparty risk (Bech et al. (2020)). Its simultaneous nature means there is a very low likelihood of settlement failure or default. However, atomic trades require a payment provider, such as a central counter-party (CCP), to facilitate the transfer. Although common in the futures markets, as CCP may not be available for all types of securities or financial markets, especially cross border. As a result, counterparty trades are more widely used. They do not require a payment provider. As a result, such trades carry more specific counterparty risk and require a longer settlement period (Mills Jr and Nesmith (2008)).

### 3.1. Settlement worked example

We now produce two examples, a T+2 trade and an atomic trade. In both scenarios, there is a linear process where any failure in any stage leads to a fail of the whole process. Assume that Buyer A wants to purchase 100 shares of XYZ stock from Seller B at a price of 50p per share.

#### 3.1.1. In a T+2 trade:

On Day 1 (trade date), Buyer A and Seller B agree to the terms of the trade.

On Day 2, Buyer A's and Seller B's custodians send settlement instructions to the Central Securities Depository for matching.

On Day 2, Once the seller B's custodians has sent its settlement instruction to the CSD, it will wait for the settlement matching results. If it matches, nothing will be done and the trade will settle on the agreed settlement date. If there is a mismatch, the seller's custodian will work either directly with the buyer's custodian or will tell the seller what the miss match is so he can contact the buyer and agree on new terms that will eventually match.

On Day 2, The matching or miss match will be handled as above. The payment will be done by the CSD on settlement date. The buyer's custodian needs to have enough cash posted on his account at the CSD (or at the bank where the CSD has a power of attorney with) in order to settle the trade. .

In this scenario, the settlement process takes two days after the trade date (T+2) for the transfer of ownership and payment to be completed.

### 3.1.2. In an atomic trade:

On Day 1 (trade date), Buyer A and Seller B agree to the terms of the trade.

At the same time, a payment provider, such as a central counter-party (CCP), receives the trade details and executes a simultaneous transfer of ownership and payment between Buyer A and Seller B.

In this scenario, the transfer of ownership and payment occurs immediately, and the settlement is completed in real-time.

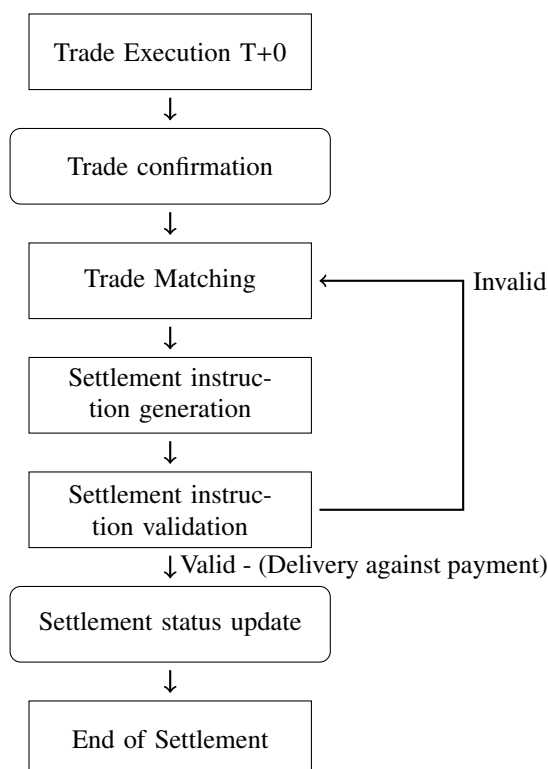


Figure 1: Equity Settlement Flowchart

The connectivity of database remains one of the challenges. Financial markets are built on multiple databases, many of which find it difficult to communicate with each other. Priem (2020) suggest the adoption of DL technology can help address this, although of course all participants would have to do this.

## 4. Settlement processes, technologies and ways to achieve operational efficiencies

There are several equity settlement processes and technologies that are currently in use, or being developed, by the financial sector (Panourgias (2015)). Each of these technologies has its own advantages and disadvantages and indeed, these technologies may be used in combination. The choice of technology by a counterparty depends on various factors such as the size and complexity of the transaction, the desired speed of the trade, the parties involved, and regulatory requirements.

It goes without saying that both counter-parties should be using the same technology. Some of the most common ones include:

### 4.1. Delivery versus Payment (DVP)

This technology ensures that securities are delivered only when payment is made and vice versa (Patrikis (1997)). It reduces the risk of settlement failure by ensuring that securities and payment are exchanged simultaneously.

Increasingly, DVP is a three-step process. A sale is reconciled against the seller's securities account balance and is then, if given a go ahead, routed to the trading book. Upon trade execution, securities are flagged with "pending out settlement" status. These flagged securities are effectively blocked in the seller's account so they cannot be sold twice.

### 4.2. Continuous Linked Settlement (CLS)

This technology is used for foreign exchange transactions Ledrut (2007). It helps eliminate settlement risk by ensuring that payment and currency exchange occur simultaneously. It operates on a real-time gross settlement basis, which means that each payment is settled individually.

The CLS payment system eliminates much of the counterparty settlement risk. That said, the risk is actually transferred to one of two companies, CLS Bank International, a New York-based bank authorised under the Edge Act), and CLS Services. Kahn et al. (2003), however, points out that net settlement is more optimal than gross settlement, even taking account of the credit risk of the central counter-party.

### 4.3. Central Counter-party Clearing (CCP)

This technology facilitates third-party inter-mediation between the buyer and seller. This ensures that trades are settled even if one party defaults (Kroszner (2006)). It reduces counterparty risk and enhances market stability.

A CCP combines the exposures of all open trades on its balance sheet. If its clearing members can meet their obligations, these are matched. If a counter-party defaults, it assumes the rights and obligations of the failed clearing participant (BIS (2015))

### 4.4. Automated Clearing House (ACH)

This technology is used for electronic fund transfers between bank accounts (McAndrews et al. (1994)). It can help to reduce settlement time and costs, increase efficiency, and reduce errors.

ACH transactions typically involve batch processing and are not designed for real-time or immediate settlement.

### 4.5. Straight Through Processing (STP)

STP is a fully automated process for settlement, from trade execution to settlement (Hee et al. (2003)). It eliminates the need for manual intervention and can help to reduce settlement time and costs, increase efficiency, and reduce errors, no matter the fundamental structure of the settlement process.

STP replaces paper-based processes with electronic data exchange and automated workflows. This eliminates the need for physical documentation and hence paper checks or faxed instructions. As a result, there are less errors and omissions than the use of the later.

#### 4.6. Distributed ledgers (DL)

This technology results in a shift in digital records of transactions, distributed across a network of computers, rather than being stored in a centralized location. They are increasingly being used in securities settlement despite only gaining in popularity in the last fifteen years (Pinna and Ruttenberg (2016)). DLs are designed to be transparent, secure, and tamper-proof, making them well-suited for recording and tracking financial transactions. Distributed ledger technology is built using blockchains. DLs can facilitate atomic settlement, making them the preferred technology for simultaneous settlement. Using DL, transfer of ownership and payment can be completed in real-time, without the need for intermediaries or clearinghouses.

In a DL-based atomic settlement, the trade details are recorded on the distributed ledger, and the ownership of the asset is transferred to the buyer simultaneously with the payment being transferred to the seller (Lee et al. (2022)). The DL ensures that the trade is transparent, secure, and irreversible, eliminating the risk of settlement failure or default. DLs also enable the automation of settlement processes, reducing the time and costs associated with manual processes. Smart contracts, which are self-executing contracts with the terms of the agreement written directly into code, can be used to automate the settlement process and ensure that the transfer of ownership and payment occurs automatically and simultaneously, assuming that all participants use the same DL or interoperable ledges..

Overall, distributed ledgers can facilitate atomic settlement by providing a secure, transparent, and tamper-proof record of transactions that enables the simultaneous transfer of ownership and payment. DL based settlement processes can improve efficiency, reduce costs, and eliminate counter-party risk, making them an attractive option for financial market participants.

### 5. Factors affecting industry preparedness

We now discuss the steps that can be taken by market participants to prepare for accelerated settlement and the factors that impact their preparedness. These include investing in new technology infrastructure, improving risk management processes, and enhancing regulatory compliance. These should be understood in the context of the industry pressures to improve services and reduce costs (Exchange and House (2000)). These factors form the basis of our interview, which we expand on in section 7.

The key factors that affect industry preparedness are regulatory environment, market structure, corporate and technological readiness (Webster and Gardner (2019)). Corporate readiness is influenced by human factors, hence the need for our interviews. Further, the technology and regulatory environment shape the internal controls and procedures. Similarly, the overall market structure defines the nature of the counter-parties. The connectivity of database remains one of the challenges. Financial markets are built on multiple databases, many of which find it difficult to communicate with each other. Priem (2020) suggest the adoption of DL technology can help address this, although of course all participants would have to do this.

Regulatory compliance issues can arise if the parties involved in the settlement process fail to comply with the relevant regulatory requirements (Iglesias-Rodríguez (2012)). This can result in fines, penalties, or legal action against the parties involved. Further, different legal jurisdictions often have different settlement protocols. For example, some countries impose foreign ownership caps, and the settlement process has to ensure checks on compliance.

### 6. Settlement failures

Settlement failures occur when either the buyer or seller fails to deliver the securities or payment on the settlement date (Boni (2006)). Settlement failures can occur due to errors in trade matching, processing delays, insufficient funds or deliverable securities. This represents the biggest concern in any move to accelerate settlement practice.

There are several the key points in the settlement process where failures are most likely to occur (Milne (2007)). These include trade matching, payment processing, foreign exchange, and custody. One of the biggest issues, which impacts all global markets and settlement systems, is the different time zones that markets operate under Freund (1989)).

The potential impact of settlement failures on market participants can result in not only the risk to the capital in the trade, but also to regulatory censure and a fine. Potentially, even the company could be at risk if the capital of the trade come close to or exceeds the capital on its balance sheet. As a result, with large failures, there is also the potential for systemic risk.

#### 6.0.1. Delays in trade confirmation:

Delays in trade confirmation can occur if the parties involved in the trade fail to confirm the details of the trade in a timely manner (DeGennaro (1989)). Delays in trade confirmation can cause delays in settlement, which can increase the risk of settlement failures.

#### 6.0.2. Errors in trade matching

Errors in trade matching can occur if the details of the trade do not match between the buyer and seller. This can result in delays or failures in settlement and therefore impact cost (Bessembinder (1997)).

#### 6.0.3. Custodial errors

Custodial errors can occur when the custodian of the securities or funds makes an error in the settlement process (Chan et al. (2007)). This can lead to delays or failures in settlement and can cause financial losses for the parties involved.

#### 6.0.4. Operational errors

Operational errors can occur due to a variety of reasons, such as system failures, human errors, or cyber-attacks (Broby (2010)). Operational errors can cause delays, errors, or failures in settlement, and can result in financial losses for the parties involved.

### 6.0.5. *Insufficient funds/securities*

Failure to get the required funds or securities in place for final settlement will cause a trade to fail. This can occur when a buy is made requiring funds to be made available from a sell order but which itself does not complete, or a sell order has been placed, but the security itself is not in place, for example it has been loaned out and has not yet been recovered.

### 6.1. *Mitigations*

Trade failure can be mitigated by:

- Improving transparency and collaborating with other organizations so as to adapt to new threats and challenges as they arise.
- Leveraging emerging technologies such as blockchain, artificial intelligence, and machine learning.
- Developing more secure, resilient, and efficient messaging services.
- Improving the data exchange protocol and methodology.
- Removing or reducing reliance on paper-based systems, including physical stock certificates.
- Removing or reducing reliance on signature-based authorization.
- Addressing the need for physical documents for regulatory compliance.
- Improving liquidity management and use of tools such as stock borrowing to ease funding and stock short falls.

In summary, the equity settlement process is a complex process involving multiple parties, systems, and processes. Each one of these interlinked part of the chain can increase the risk of errors, delays, or failures. It is therefore important for market participants to have robust processes and systems in place to mitigate these risks and ensure timely and accurate settlement, especially if shortening the settlement cycle. This is because in that scenario there is less time to correct anything that goes wrong.

## 7. **Challenges to industry preparedness**

It would be wrong to suggest that the settlement industry has not had time to prepare. The various securities settlement systems that exist are based on both international initiatives and industry requirements developed over decades. For example, the criteria developed in 2008, a four-level system to ensure securities markets effectiveness (De Visscher et al. (2008)). These give guidance for the operation and supervision of netting systems. The Bank for International Settlements (BIS), as well as the DTCC have also published various reports on securities settlement systems (BIS (2015), DTCC (2021), DTCC (2023)).

Advocates of shortening the settlement cycle, such as Thomadakis (2022), argue that it can reduce risk and increase

efficiency. Shorter settlement times can reduce counterparty risk by minimizing the exposure that buyers and sellers have to each other in the time between trade execution and settlement. This can also reduce the need for collateral and margin requirements, which can lower costs and increase liquidity. Additionally, shorter settlement cycles can improve market efficiency by allowing investors to deploy capital more quickly and reduce the time that their funds are tied up in trades.

However, opponents of shortening the settlement cycle argue that it can increase costs and operational risks (AFME (2022b)). Shortening the settlement cycle may require significant investment in technology and infrastructure by market participants. Additionally, some market participants may struggle to adapt to the new settlement cycle, leading to increased operational risks and potential disruptions in the market. This may also increase the risk of settlement failures and market-wide disruptions.

The Association for Financial Markets in Europe (AFME) have estimated that the real reduction in time available to settlement trades in a T+1 environment vs a T+2 environment is much more dramatic than it appears to be and in reality reduces the settlement operations window by 83%. “In a T+1 environment settlements teams only having 2 core business hours between the end of the trading window and the start of the settlement window, compared to 12 core business hours in a T+2 environment” (AFME (2022a)). In a T+2 environment many trades are using overnight batch processes as there is a day available to process trades after the initial deal is struck. This is not the case in T+1 environment. This is because T+1 requires an accelerated affirmation process confirming trades and then rapid movement into the settlement process itself.

This time challenge is exacerbated by time zone challenges where in the case of cross-border securities transactions the chain is complex and has a long series of intermediaries. Indeed, in such cross-border activity, . Indeed, the role of precision timing recording of each stage of the trading cycle becomes more pertinent (Broby et al. (2019)). The North America T+1 settlement cycle will require trade affirmation (matched and confirmed as correct and ready for settlement) by 9pm Eastern Time to prepare for the settlement process (DTCC (2023)). The challenge for non-domestic investors into the US is in large part to do with this timing. For example, 9pm Eastern Time equates to 3am in Frankfurt, any exceptions which occur will be difficult to solve as, while it may be possible to establish a night shift for settlement staff, any exceptions which may need to be discussed with say a fund manager who initiated a trade, will be very difficult to resolve at that time of the morning.

There is also a debate around the appropriate length of the settlement cycle. While some argue for a T+1 settlement cycle, which would settle trades one day after the trade date, others suggest that even shorter cycles, such as T+0 or same-day settlement, may be possible with the use of new settlement technologies like blockchain and distributed ledger technology.

Shortening the equity settlement cycle has the potential to increase efficiency and reduce risk, but it also comes with potential costs and operational risks. As the financial industry continues to evolve and new settlement technologies emerge, it is likely that the debate around the appropriate settlement cycle

length will continue.

Identify the challenges that market participants may face in achieving industry preparedness, such as cost and resource constraints, technology implementation challenges, and lack of standardization. Discuss potential solutions to these challenges, such as collaboration among market participants and regulatory authorities, and the adoption of industry-wide standards.

### 7.1. Margin and collateral

Collateral and margin requirements can delay the settlement process by requiring additional steps to manage risk and ensure that there is sufficient collateral to cover margin loans. While these requirements are important for managing risk, they can also increase complexity and delay settlement in some circumstances. Here is an illustration of how this can happen:

Assume that a retail investor wants to buy 100 shares of a company's stock. The investor does not have enough cash on hand to pay for the shares outright, so they decide to buy the shares on margin, which means that they borrow money from their broker to complete the purchase. The broker will require the investor to provide collateral, which is usually in the form of cash or securities, to secure the loan. Such a process could well extend to institutional clients in a T+1 scenario to facilitate pre-funding (see below) in a tighter settlement cycle where putting full funding in place may become more complex.

In order for the trade to settle, the broker will need to ensure that the investor has sufficient collateral to cover the margin loan. If the investor's collateral falls below a certain threshold, the broker may issue a margin call, which requires the investor to deposit more collateral or sell some of their securities to cover the shortfall.

The process of providing additional collateral or selling securities can delay the settlement process. If the investor is unable to provide additional collateral or sell securities quickly, the broker may need to take additional steps to manage the risk of the trade, which can further delay settlement. For example, the broker may need to buy securities in the market to cover the shortfall, which can take time and may incur additional costs.

### 7.2. Prefunding

We now turn to the cost of pre-funding. In the context of settlement, this is a process in financial transactions where funds are required to be available in advance to ensure the successful completion of a settlement. In international investing, settlement pre-funding may be necessary when buying or selling securities or assets across different countries or currencies, where currency exchange (FX) transactions are involved requiring careful management for FX spreads and overall liquidity management.

Based on our empirical work, we suggest a formula to calculate the approximate cost of settlement pre-funding in a shortened settlement cycle in the international investing market. It delivers the approximate cost of settlement pre-funding in a shortened settlement cycle in the international investing market

$$\pi = \alpha \cdot \theta \cdot \nu \cdot \left( \frac{\text{Spread at T+1} - \text{Spread at T+2}}{\text{Spread at T+2}} \right)$$

Where:

$\alpha$ : The annual foreign investment into the US.

$\theta$ : The cost of FX transaction, represented as a percentage.

$\nu$ : The number of transactions that would require an accompanying FX transaction.

Spread at T+1: The spread (difference between bid and ask prices) in the FX market for a currency pair at the T+1 settlement cycle.

Spread at T+2: The spread in the FX market for the same currency pair at the T+2 settlement cycle.

Pre-funding arrangements need to be made in advance of any settlement to ensure that the necessary funds are available when the settlement obligations arise. This requires timely coordination and communication among the involved parties, including investors, brokerage firms, custodian banks, clearing houses, and settlement agents. With shorter settlement cycles, pre-funding arrangements must have to accommodate the compressed timeline. Proper coordination, communication, and adherence to cut-off times, deadlines, and operational processes are essential.

While some issues can be engineered out, at a price, challenges such as foreign exchange and the potential cost of pre-funding (or the costs of deciding not to pre-fund and have periods out of the market often imposed on their customers), cannot be readily engineered out of the business. The challenges of time zone also prevail. The benefits of reduced broker and custodial costs in terms of lower margins, counterparty risk and capital could only percolate down through competition and such a process was not one which wealth and fund managers expected to happen.

How non-domestic buy-side firms manage the challenge is still unclear. European concerns are that some operations and even some trading activity will move to the US or Canada given that wealth and fund managers cannot simply ignore the US market. One German fund organisation noted that the industry in Germany has larger investments in US equities than in German equities. The concertation of "growth" stocks, such as technology firms, in the US means it cannot be simply excluded as a destination for funds simply because it is more expensive to operate there. Such a migration of activity to the US would not be popular among European politicians and would create strange split where customer funds would be covered by one set of regulators and the consequential trading covered by another regulatory regime.

One option for accelerated settlement regimes which wish to encourage international portfolio investment is to offer some flexibility to international investors when accessing their markets. For example:

- A short-term solution may be to copy the India approach and have a phased migration, starting with smaller stocks and moving to internationally traded stocks as a second phase. This would allow for testing and for standards to be fully established which international investors can more easily add to their processes.
- A longer-term approach could be a dual settlement window. Currently the securities processing service of the



Trans-European Automated Real-Time Gross Settlement Express Transfer (TARGET2) system has two securities settlement windows, a real-time window, and an overnight window. Adding a settlement window which better allows for non-domestic time zones to settle may ease non-domestic market participation.

- Allowing for netting to take place during each window would potentially add more windows to approach near real-time processing, but with multi-batch netting windows still possible.
- Better alignment of foreign exchange settlement timetables with T+1 and other accelerated securities settlement cycles by shifting foreign exchange markets to a normal cycle of T+1 or T+0.

These moves would not necessarily deal with the pre-funding and time zone challenges which investor may have encountered when engaging with accelerated settlement trading regimes, but they could be explored as a way of at least minimising the impacts.

Along a similar line of thought, the Canadian Capital Markets Association (CCMA 2023) has suggested a small change which could be of great benefit to international investors.

- The overnight cut off time for settlement input be 4am on T+1.

This means that instead of by 9:00 p.m. ET at the end of trade date, either the threshold should be up to 3:59 a.m. ET on T+1, just before the 4:00 a.m. ET start of the next-business-day settlement process, 9am in London, 10.am in Frankfurt. While the window to resolve exceptions and perform reconciliations would be early and more compressed, it would nevertheless be more accessible for international investors, at least until multiple cut-off times can be introduced to the system allowing near real-time settlement.

Not surprisingly there are moves in Europe to migrate to an accelerated settlement cycle. The UK has established the Accelerated Settlement Taskforce (HM Treasury December 2022) with the aim of accelerating UK settlement, a possibility our interviewees thought relatively possible given the central nature of the UK markets and the CREST settlement system.

In mainland Europe, The Association for Financial Markets in Europe has set up a working group to look into T+1 settlement (Asgari, FT, March 2023), however, our interviewees saw European migration as the much greater challenge given the number of execution markets and securities depositories. In addition, while such an acceleration would bring benefits to the European markets in terms of reduced counter-party risk and access to funds for clients, it would only partially deal with the pre-funding issue faced by investors selling European stocks and buying T+1 US stocks. The pre-funding gap could be reduced by a day, but there would still be a next day settlement of a trade and then a wait for currencies to be converted into dollars on the current standard T+2 cycle.

### 7.3. Reducing the paper trail

We now address the legacy of paper-based payment instructions. While payment instructions are increasingly being transmitted electronically, some payment instructions may still require paper-based checks or other physical payment methods. This clearly stands in the way of accelerated settlement.

Some issues are obvious, such as the physical mailing of documents. While many documents are transmitted electronically, some settlement processes still require physical posting, such as stock certificates, trade confirmations, and delivery instructions.

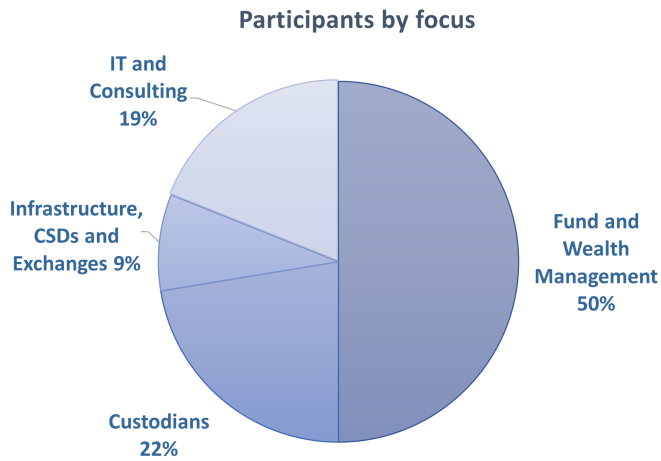
These paper-based systems can slow down settlement processes and increase the risk of errors or fraud. However, efforts are being made to digitize these processes and reduce the reliance on paper-based systems going forward. In particular, the increased use of electronic signatures (Warasart and Kuacharoen (2012))

## 8. Methodology

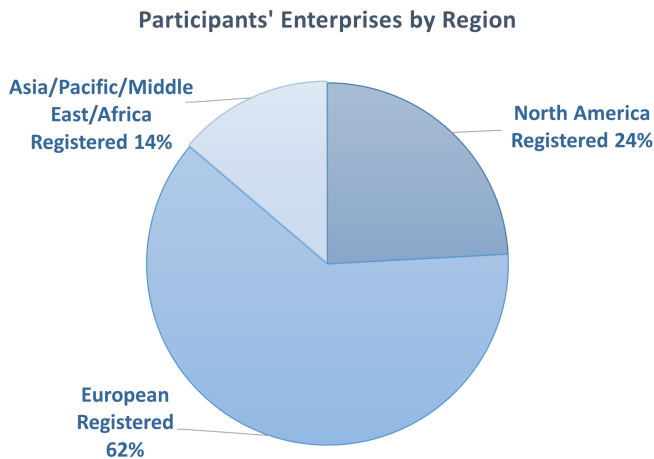
The research team adopted a two-stage qualitative research process comprising unstructured interviews followed by focus group workshops. The research team conducted 44 unstructured interviews with key stakeholders in the financial industry to gather insights on industry preparedness for accelerated settlement. The interviews were conducted from a cross border perspective (as distinct from a US domestic perspective). The interviews were further supported by two workshops. The themes explored with participants in the focus group workshops were derived from both the literature and findings from the unstructured interviews. One workshop was held in London (18 attendees) and Edinburgh (28 attendees). London was chosen as it plays a key role in global market decision making, Edinburgh because of its high concentration of wealth and fund management firms and their key service providers, global custodians. In addition we spoke with 5 people who did not wish to be interviewed either because they were unsure about procedures to be allowed to or because they had little insight into accelerated settlement but did share useful background information on settlement environments as they currently stand. These views were gratefully accepted as informing the research team but were excluded from the formal research.

Across the interviews and workshops undertaken for this research, participation included a wide range of investment fund managers and wealth managers (44 interviews and participants), custodial firms (14 interviews and participants) and the balance being key infrastructure providers (such as central repositories), technology providers and knowledge providers (key consultants).

The focus of our research was on the fund management and wealth community, with interviewees representing firms with \$13.9 trillion of funds under management and the custodians with assets under custody of a combined \$57.4 trillion. Firms representing an additional \$35 trillion of funds under custody and management attended the workshops, excluding firms which took part in both the interviews and the workshops.



Wealth and Fund managers and global custodians were identified as the key stakeholders. The wealth and fund managers directly make decisions about which stocks they wish to hold and initiate trades, while their custodial service providers provide both traditional custodial services of safekeeping and asset servicing (including the collecting of dividends, executing corporate actions) as well as providing other vital services to their customers from middle office risk management data through to funding and foreign exchange services, depending on the level of service the fund or wealth manager requires. It should be noted that while 24 percent of participants worked for North American firms, most respondents were European-based some with global management responsibilities, some with regional responsibilities.



With respect to the sample the interviewees were sourced using a convenience sampling methodology, utilizing the network of the International Securities Association for Institutional Trade Communication Europe CIC (ISITC Europe). ISITC Europe is a non-profit Community Interest Company for capital markets standards and operations. ISITC Europe has deep links with operations departments across the European and the global financial service industry and was able to bring together a wide

range of participants. Further, two of the directors (co-authors) of ISITC Europe facilitated interviews so that a peer-to-peer discussion was possible where all participants in the interviews had equal knowledge of securities operations in this complex area, allowing for a flexible interview where unexpected issues being raised could be pursued in some depth. The academic interviewer supported the interviews and guided them back to the core subject as and when needed.

The data collected from the interviews and workshops is kept in Otter transcripts and a Taguette tags file. These tools allow for easy organization and analysis of the data, with the Taguette tags file serving as a tool for identifying and categorizing themes and patterns within the data. The results are then synthesized in an Excel spreadsheet built from the tags.

Overall, the unstructured interview method provided a valuable tool for gathering in-depth, qualitative data on a specific topic. The informal and conversational nature of the interviews allows participants to share their perspectives and insights in a more natural and unrestrained way, leading to a rich and nuanced dataset that can be used to inform decision-making and policy development.

Thematic coding of unstructured interviews is highly time consuming given the in-depth nature of the interviews, nevertheless it was an essential component of the research.

In total 81 different tags were used identifying positive and negative sentiment across 30 themes with a total of 1007 in-depth statements from wealth and fund management and custodial interviewees being tagged. The statements were categorised according to whether they represented positive or negative sentiment to the theme. This provided a rudimentary ability to produce sentiment indicators on each theme, the coding being an inductive process with tags developed from interview interpretation (see for example Linneberg and Korsgaard (2019)). Sentiment indicators have become a key form of research method in recent years, often using unstructured data, such as web reviews, to draw out overall meaning. Often this form of discourse analysis drills down to counts of individual positive and negative words. Here we do not mean this automated analysis of individual word meaning, but instead a full appreciation of the interviewee's full statement and its meaning.

Indeed, we compared our overall sentiment findings to that produced by Microsoft's Azure Machine Learning Sentiment Analysis tool. While others have found this tool to be effective in building sentiment analysis from unstructured texts, we found that the automated tool was producing false positive indicators. The reasons for this seem clear and related to using expert peer-to-peer interviewing techniques. During the interviews a lot of positive statements were made which were directed at the type of discussion underway. A question on, for example, the impact of T+1 settlement on the availability of foreign exchange to settle a trade. The usual foreign exchange settlement time is T+2. As a result, any selling an equity listed outside of the US will mean a natural delay in making funds available to purchase an equity in the US dollars. The mention of this would often elicit a positive initial statement. For example, "that's a very good issue to bring up", but then the respon-

dent would then say something negative about this. Machine learning sentiment analysis tools not only capture the negative sentiment, but also the positive regarding the direction of the conversation. We have therefore used sentiment indicators to show the simple balance of negative views versus positive view when understanding the full meaning of the statement which has been tagged.

There are of course weaknesses in the unstructured interview, especially using expert interviewers to lead the discussions. As the interviewers became familiar with the initial interviewee's views, these naturally guided future discussions, drilling down into views already expressed to see if they were common to later interviewees thinking. This made interviews efficient at getting to the core points, but somewhat lacks the non-linkage of thinking which traditional survey has but allows much deeper discussions about the key themes as they emerge.

Using expert interviewers produces an unexpected challenge as several interviewees used the interviews as an opportunity to gather information themselves from people with greater expertise on some of the issues and some of the changes currently underway. As in the results, this was a particular issue for small wealth and fund managers in the UK, Europe and Asia where some interviewees noted that their first knowledge of T+1, or their first research into the timetable and challenges of T+1, was initiated by the invitation to be interviewed on the topic. This can mean that on occasion, the interviewers were producing as much transcribed material as the interviewee as the interviewees took the opportunity to gain insights and indeed free consulting from then interviewers.

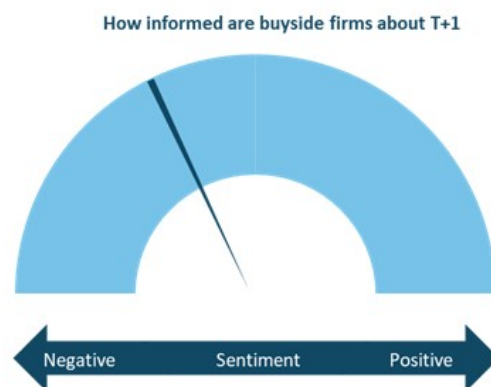
The final challenge of the method use was the quality of the Otter AI transcripts. Unfortunately, with very technical terms being used, the AI interpreter was often inaccurate. Terms such as automatic buy-in, where a firm has to buy-in a stock where the initial trade has failed to be delivered, was usually transcribed as "automatic Biden", and the exchange Eurex as Urine-X. For the researchers this was a time-consuming issue where the original recordings often had to be referred to so as to verify the meaning. It has been agreed that the transcripts be manually updated so as to make them of accessible to future scholars.

## 9. Results and discussion

We now present edited highlights of our interviews and results.

### 9.1. Information and Technology

Our analysis shows that technology barriers were not initial seen as a significant challenge by the sector in the advancement of accelerated settlement, though challenges clearly existed and as we drilled down, it became more apparent that challenges existed. Comfort was taken by wealth and fund managers that they had systems which to a large degree they saw as capable of real-time reporting, primarily because they had real-time position keeping capability providing a real-time overview of their portfolios and trades. Further they took comfort in the current



ability to trade in established T+1 markets such as US Treasuries, though these are relatively simple products with a high level of standardisation. Very much for the same reason, T+1 markets needs to be at or near real-time. This is to facilitate internal position keeping. Custodial firms and brokers already have well advanced real-time capabilities and believed themselves well set for T+1 equities processing.

One large global fund manager reported that they were ready for accelerated settlement technology wise but suggested that smaller firms were not. "We already have real time communication with custodians, we already have real time communication with the brokers. There isn't really a delay on our processes that we could address that will make the whole process better. There are smaller organisations out there that don't use all the platforms available to make the process more streamlined, and they don't have all the controls and the processes in place like we do" (Respondent Anonymised).

The quote above seems accurate, that while large firms use automation as an where they can and have control mechanisms

to minimise the risk of non-compliant instructions being sent to their custodians, many small wealth and fund managers are yet to fully automate trade instructions.

Activities such as reporting trades to custodians for settlement were often not done in real-time and the majority of firms, both on the buy-side and custodial side reported significant use of batch processing and reported that they knew of batch processes existing in other parts of the settlement chain. For many buy-side firms, end of day files of trades were still sent to custodians for overnight batch processing. Some had instead moved to a multi-batch processing system, sending regular batches of trades to their custodians for processing. This was particularly useful in markets where multiple settlement windows exist, such as Target T2S systems with intra-day settlement window and an overnight batching process.

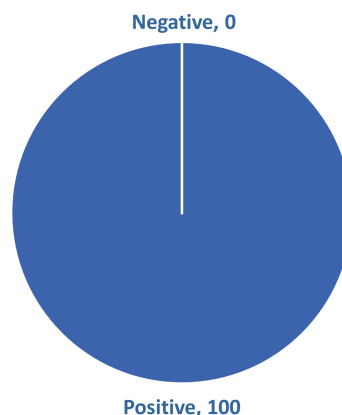
While batch processing clearly still exists and will need substantial re-engineering to remove or at least accelerate massively for accelerated settlement regimes. A number of firms still took instructions through emails, faxes and even through paper orders with physical share certificates to process. One of the clear advantages of moving to accelerated settlement process is the extra pressure to end the use of paper and other non-structured non-straight through process processes, but this is no small challenge.

One custodian confirmed apocryphal information that some customers still make extensive usage of emailed spreadsheets and even faxes, and in exacerbation adding the words “carrier pigeons” to send instructions (Respondent C1, Global). Investment managers and wealth management companies in mainland Europe continue to instruct custodians, fund administrators and transfer agents by fax transmission. The issue is especially prevalent amongst smaller firms which have not invested in technology to automate their instruction processes. They often have a large community of service providers which could be reached via open multi-lateral mechanisms, such as Swift network, but this adoption has not necessarily occurred amongst smaller firms. Custodians will unofficially state that they can receive thousands of faxes per day. Germany and Luxembourg are often cited as the prime source of this issue. The fax recipients are reluctant to challenge this antiquated practice because of the highly competitive nature of the market.

The issue does not attract policy focus because it is effectively unregulated and there is no requirement to disclose detailed costs. Custodians will normally try to disincentivize inefficient forms of communication; both fax and email, by charging higher fees. However, this driver does not appear to work: the additional cost of sending a fax is paid by the fund – not the fund manager – and is hidden within overall post-trade/custody costs. This is a very clear example of what economists refer to as the agency/principal issue. There is no effective incentive for the fund manager, acting as an agent, to automate and become more efficient. The excess cost is paid by the underlying client: the investor.

A large Asia-Pacific based wealth and fund manager foresaw problems with accelerated settlement in those firms still relying on batch processing and re-keying. “The problem with batch processing or manual keying and stuff is you start to get errors

% of Custodians believing T+1 settlement will require improved automation in the settlement chain



coming through and you get differences, and they take people to fix them. . . that takes time. Therefore, your shortened cycle becomes a challenge for them. So yeah, there’s going to be some challenges for some of them. Especially if they’re on antiquated technology as well” (Respondent WFM 6, Asia Pac).

Not surprisingly custodial firms, who so often are the recipients of antiquated formats and instructions are keen to see one outcome from the move to T+1 and that is the forced adoption of improved technology and processes by their buy-side customers.

## 9.2. North American timetable

At the time of interviews, the US and Canada had announced their plans to deploy T+1 settlement and India was in the process of implementation. However, the buy-side sector was in general waiting for details of the US/Canadian process to be formalised and a final date announced before devoting funds to accelerated settlement, even though the full playbook and requirement had been published.

The general attitude to making staff and technology resources available to deal with migration to T+1 was “we’ll deploy resources when we have a firm date”. It was the US which dominated thinking on T+1 as it was the key international investment location, India was seen as a primarily domestic market with some outside portfolio investment, but these investments were often not actively traded.

A lack of dedicated resources for the required change programme made many firms concerned about the North American timetable. Firms expressed both a lack of knowledge of the proposed changes and deep concerns about the timetable. Smaller non-US registered buy-side firms expressed little knowledge about the challenge of T+1 this in turn made them doubtful as to their ability to deliver timely implementation of new T+1 settlement processes for their North American activities.

At the time of interviews, a debate was underway about whether the US and Canada could move to T+1 in March 2024 or Labor Day of September 2024, which is a holiday in both the US and Canada. The strong opinion was that March was

unachievable, and that September 2024 was highly unlikely as well, but was the general default position.

Since the interviews, the US's SEC has determined that the completion date for T+1 migration will be 28 May 2024, not only were firms rejecting March 2024 as unachievable, but most thought September was also difficult to achieve, May 2024 is clearly therefore a date seen by most non-US based operations as challenging to the extreme, creating implementation risks.

While underlying technology was not a key concern, smaller UK, European and Asia-Pac buy-side firms had not yet deployed IT or other resources to work on the project as they were waiting for a firm date and firm set of rules, to work to though larger ones had started the process. One global US owned fund manager noted they had 28 work-streams working on various aspects of the required changes, itself illustrative of the challenge the firms yet to start their projects faced.

However, a smaller UK-base wealth manager recognised they needed time to get their systems in order, even though they saw themselves as reasonably technologically advanced. "There's a lot of technology improvements many firms will have to make. If you go over T+1 you're looking at sort of automation across the board really if you want this to work properly, and I think that will not go in overnight" (Respondent WFM 11, UK). A global custodian thinking about their wealth and fund manager customers and speaking before the North American date for T+1 was formalised noted he had seen very little preparation going on "if the US is serious about bringing this in 2024 or thereabouts, I'm not seeing anybody making dollar investments in their core platforms yet" (Respondent C2, Global).

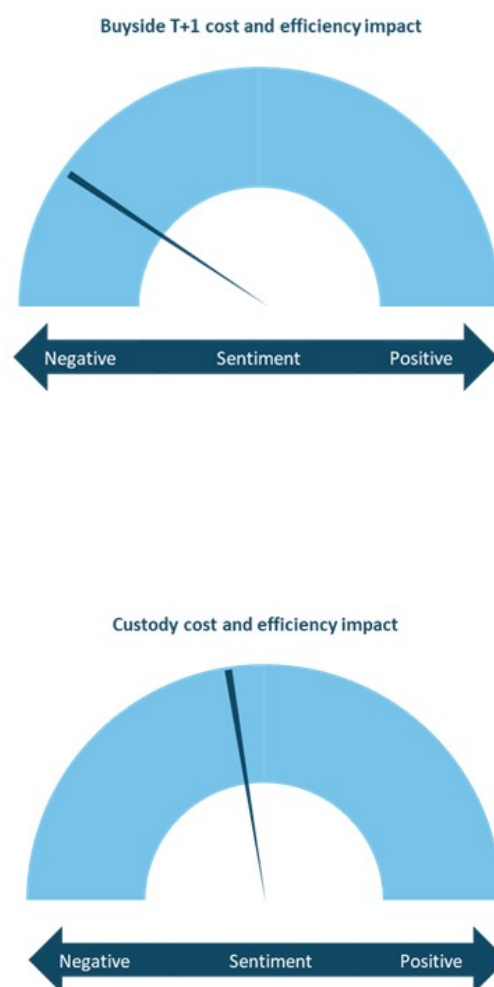
Moves to T+1 in parts of the world were seen as having mixed prospects. India adopted T+1 towards the end of the interview processes, however, as this market is primarily domestic, neither wealth and fund managers or custodian's had major concerns.

In Europe, the challenge of coordinating agreement between countries to consolidate the operations of 41 trading exchanges, 18 central clearing counter-parties and 31 central securities depositories, was seen as daunting, especially with the need to pass legislation to undertake this feat with an EU parliamentary election due in 2024, though some wondered if primary legislation was actually required.

The UK, however, was seen as being in a stronger position to follow the US and Canada and adopt accelerated settlement. There were two primary reasons for this. Firstly, interviewees saw the UK as not too dissimilar to the US with a centralised equity settlement system. Secondly, there was speculation that there was political will behind accelerated settlement to show some post-Brexit benefit. However, as we will discuss in the next section, what those benefits are, whether in the UK or Europe was very hard for several interviewees to identify.

### 9.3. Timezones

The business case for accelerated settlement has been clearly stated, it is that moving to a shortened settlement period, in this case T+1, will lead to dramatically reduced margin requirements within the settlement system and more rapid availability



of funds when demanded by clients on the sale of an equity (see introduction). However, when it comes to the introduction of T+1 settlement in North America, there is a strong sentiment that the international fund management community has had limited input into the discussion and are concerned that the move to T+1 in North America will lead to additional costs, awkward operating challenges and the potential for more failed trades than under the current system. Surprisingly some operational staff at custodians have expressed some concerns about the business case as well, primarily because they see great challenges facing their wealth and fund management customers. One noted "I think the benefits are likely to accrue to the US and not those outside the US" (Respondent C5, Europe).

Both wealth and fund managers and custodians recognise the core benefits of reduced counter-party credit risk because of the reduced exposure to incomplete trades. However, the concern is that this only applies to firms who are very close to the central market, those which have large margin requirements and large capital requirements for counter-party risk – in others words

the large brokers and large custodial banks. Wealth and Fund managers cannot see how this will filter down to them or their clients, while their operational costs will increase, especially for non-US domestic fund managers.

The first question facing non-US wealth and fund managers are the inconvenient deadlines which will come with accelerated settlement. For example, in the US proposals affirmation/matching must be achieved by 9pm US Eastern Time (3am Frankfurt) and authorized trades being introduced to central clearing at 11.30pm E.T. (5.30am Frankfurt). These firms see only extra cost as the outcome. They are challenged as to how they will “follow the sun” to achieve T+1 as it is introduced across the globe, but especially in the US. Some firms were looking to build up their offices in the US, if they already have one. Others could consider putting operational staff on shift work. Others, outsourcing to third parties, noted that many of the custodians undertake much of their work in Asian processing centres.

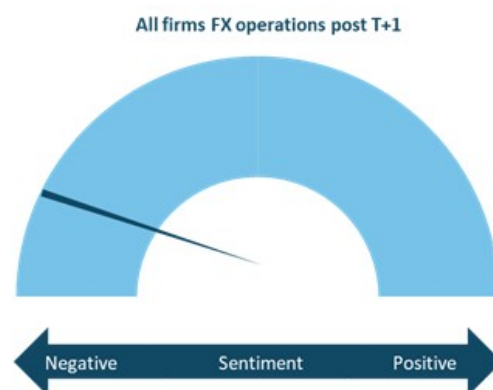
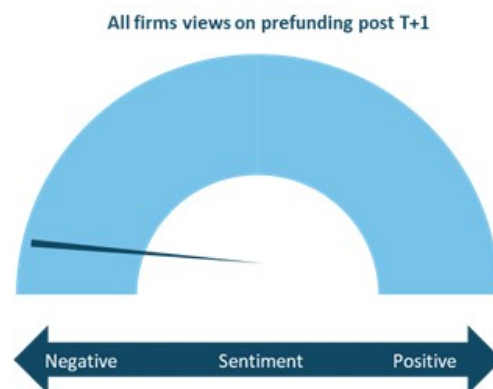
Several the wealth and fund management institutions were taking a passive stance and were looking to their global custodians for a solution as they had not as yet come up with their own strategy.

Many fund managers believed that the current available fixes for dealing with difficult time zones and cut-offs do not fully deal with exceptions occurring which require the input of the original decision maker, for example the fund manager who initiated the trade. If they are required to input, it is most likely they will not be contactable and a trade might then fail. Notably, the firms we spoke to are currently fairly satisfied with the performance of their settlement environment, they all reported settlement efficiency in the very high ninety percent range with very few failed trades. They are concerned in an accelerated environment trade fails will increase with both reputational and financial costs associated, whether these costs are penalties for failed trades or the cost of buy-ins where the trade has to be settled using a different third party. For example, if a fund does not get its sell order.

#### 9.4. Foreign exchange, pre-funding and operational costs

Custodians also recognised these challenges for their customers and operational staff saw increased costs as likely in their area, clearly the financial benefits of reduced counterparty credit risk lie elsewhere in the organisation. It is also the custodians who will directly face penalties and the cost of buy-ins and therefore will have to decide if they will charge buy-side customers for these fails, absorb these costs to keep the business, or even potentially screen out buy-side clients who generate too many fails.

More worrying for wealth and fund managers is that there are costs which they may not be able to engineer out of their processes in a scenario where North America, moves to a T+1 process but other geographies do not. The key problem is moving money from one market regime to another across the globe. If, for example, a fund wishes to re-balance its exposure to the banking sector it may wish to sell Deutsche Bank shares and buy Citi Bank shares. However, they then face a long delay in this process. With Europe on an equity settlement cycle of T+2,

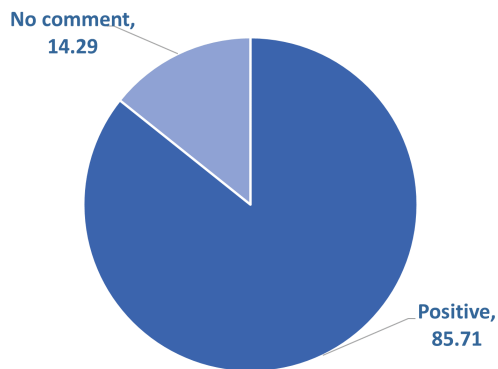


it will take two days for the Deutsche Bank sale to go through, and then on receipt of the Euros, the fund manager will then need to exchange these for US dollars, again the usual cycle is T+2 (it can be done faster but at increased cost). Therefore, there is an out of market risk. Effectively there is now a pre-funding challenge, where buy-side firms will need to make sure US and Canadian Dollars are in place before any purchase is made.

One large European based fund manager was considering increasing the size of its US office which would give it one potential solution, but equally it was also considering the cost of pre-funding and Foreign Exchange services from its custodians. “So currently, it’s an issue where we don’t have a solution yet and we think, potentially [...] we’re going to explore this more [...] Potentially, we’ll look to custodians more [...] but equally, custodian FX rates aren’t always the best” (Respondent WFM

1).

Percentage of custodial firms planning additional services to support T+1



Our interviews with wealth and fund managers suggested they are minded to simply accept the situation and effectively impose the out of market risk on their customers, selling then moving funds into the target currency and then making the buy order. Others, especially funds where their rules require them to be fully invested and firms with large more sophisticated clients, have a bigger challenge. They will need a method of providing pre-positioned funds or face a serious challenge. This could be an arrangement with their banks, with their brokers, or with their custodians. Indeed, most interviewees saw extra service offerings, potentially including funding, as an opportunity for global custodians. However, such funding comes at a price and itself might require fund managers to change their fund rules if they currently exclude them from taking on overdraft or other debt positions.

For many firms, the cost of pre-funding was simply an unknown at the time the interview teams spoke with the interviewees. One large European based fund manager simply asked “What’s the cost to that pre-funding? And what challenges does it bring?” (Respondent C3, Global).

There were other challenges specific to non-domestic firms. For example, if an Australian or Asian fund manager was to commit to a deal in the afternoon of their time zone, US markets would not be open to begin executing the trade. Further, if this trade was made on a Friday afternoon and there was a US bank holiday on the Monday, the ability to process the trade in time for T+1 settlement is clearly impossible. Another issue raised was by a developing world central securities depository which noted that there was an arbitrage opportunity on dual listed shares where a share is listed in a T+2 regime and simultaneously in a T+1 regime. It would be likely that sell orders would favour the T+1 regime if possible where funds would be obtainable more quickly potentially leading to further disconnects between prices between shares traded on a T+1 and a T+2 exchange.

These issues are not seen as insurmountable, but they are seen as adding costs which may well not be recoverable from broker/dealers and custodians who will benefit from their lower

margin requirements. The overwhelming sentiment was very negative on the issues of foreign and exchange and pre-funding costs.

One other sub-sector which was seen as extremely exposed to the timetable restrictions created by accelerated settlement was the stock-lending. Fund managers who lent stocks have a choice of arranging it themselves or through agents. If they choose the latter, either through nominated agents or through automated programmes run by their custodians, agents and custodians can take as much as 80% of the very small revenues stock lending can generate, meaning incentives to continue offering stock for lending are quite low for many smaller buy-side firms. Respondents to our interviews suggested that stock borrowing could aid in overcoming very tight settlement deadlines, allowing stock to be borrowed to cover potential settlement problems. However, they were universally concerned with how they would recall stock if they needed it to cover their own trading activity.

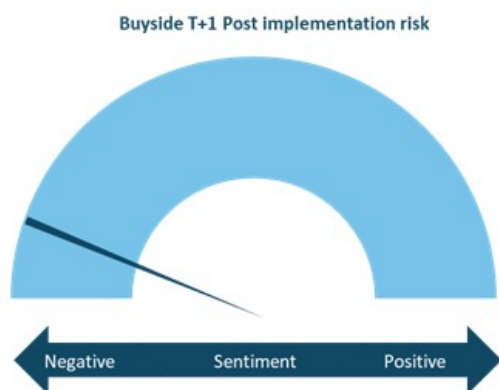
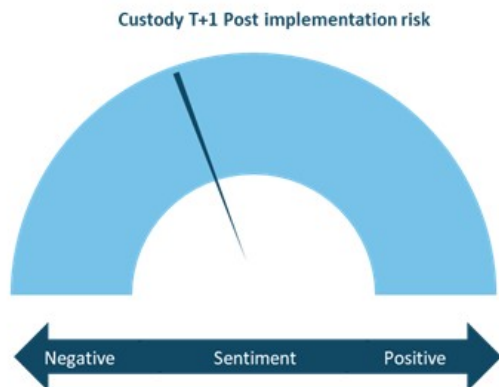
Nevertheless, a global broking house saw opportunity for stock lending playing a role in a shortened settlement period, but with a fair degree of re-engineering. “on a T one basis means there’s still opportunity and scope for lending to have its role. We might need to think about not just loaning positions on an overnight, two day or three day basis, we might have to do loans by the hour.”

However, it is the re-engineering which is important as respondents reported it as a process which is plagued by manual and ad hoc processes, especially if the fund manager is involved directly with stock lending, making recalling stocks from lending programmes a challenging affair. Even if it was left to the custodian and their automated stock lending programmes, problems were still seen as potentially insurmountable given the very tight recall window required and many fund managers doubted their ability to make stock available. One fund manager reports “So all of the time compression that we’ve seen [moves to accelerated settlement], does nothing but make securities lending harder and more expensive and less effective. Right?” (Respondent C6, Global)

This is a potentially perverse outcome where a policy aimed at increasing liquidity, that is an accelerated settlement environment delivering funds and assets more quickly as investors trade them, could undermine another liquidity tool, that is stock lending. Conversely, we see that this as another area where a tight accelerated regulatory implementation timetable may force innovation and automation onto an area of the industry with relatively low levels of straight through processing, even though fund managers were highly doubtful at this stage.

#### 9.5. Risk

Clearly there is a strong recognition that there are powerful risk arguments for accelerated settlement. One point made was the challenge of open positions at the start of the 2022 Russo-Ukraine war and how to resolve trades in which one counterparty no longer had access to the settlement system following sanctions. A Global broking house noted “recently we saw, the unfortunate Russia Ukraine situation and suddenly settlement



halted, right and trades were in flight. And I was thinking actually at that one point in time we had twice the number of transactions open because it was T+2 and that could have been halved” (Repondent C3, Global).

Further, the very great benefits in terms of margin and the forced-use of higher levels of automated affirmation and general straight-through-processing were recognised. Despite this, there was a general concern about transferring risk from well measured and understood financial risks (primarily counterparty credit risk) to less well understood operational risk.

Questions as to exposure to systems failures, exceptions handling, reconciliation handling, central market/settlement downtime were all raised. Concerns about the lack of a recovery period, a day of “grace” to catch up after a disruption, were many. This was especially true for, again, those firms outside of the T+1 jurisdiction who due to the time zone issues will potentially see exceptions arise when key decision makers are not

available.

One global custodian speculated that “[it brings] everything in so tight that is it actually creating risk as well. operational risks instead of credit risk”. They were further concerned about how the Basel capital regime might treat this increased operational risk in the future. Given the operational focus of many of our interviewees, it is maybe not surprising that perceived operational risks would increase as settlement timelines are shortened. However, to achieve accelerated settlement, a forced investment in automated affirmation/matching and an increase in straight through processing will have an impact also, potentially decreasing operational risks.

## 10. Conclusion

We researched industry preparedness for accelerated settlement. Our interviews clearly show that operations staff at wealth and fund managers are less prepared for accelerated settlement than the custodians and regulators. While the clear and measurable benefits of T+1 and other accelerated settlement regimes are not generally disputed, the overall impact of this research is that there are very fundamental concerns.

Benefits accruing to broker/dealers and associated custody businesses from reduced counter-party risk, lower settlement margins and, for wealth and fund managers, the improved access to funds for customers are all recognised. However, wealth and fund managers in general, at least those outside of the T+1 migration regimes, are highly negative in sentiment. They struggle to see how the benefits accruing to brokers and custodians will reach them while and their customers while they see themselves as facing new operational costs and new operational risks.

We identified the costs pre-funding and of operational disruptions as a further area for research. The benefits of reduced counter-party risk and reduced margins have been measured by the organisations supporting the move to accelerated settlement. There is a need for the buy-side industry, especially the non-domestic buy-side firms who so actively buy into and trade the US equity markets, to model the costs of pre-funding to establish what the net improvements from acceleration actually are for them and for the US economy. This research should be coupled to an analysis of the cost of creating real or virtual “follow the sun” capabilities for the securities operations departments of these firms as accelerated settlement expands across the globe. Modelling the impact of operational disruptions and the potential costs these would entail without a “recovery day” is also critical to measuring the net outcome of moving to T+1 and T+0 settlement cycles. From the discussion and comments on pre-funding, policy makers will clearly wish to consider:

- Aligning their settlement systems with the largest market in the world to mitigate discontinuities between markets and to encourage portfolio locations into their own countries.
- Engaging with regimes with accelerated settlement processes to ensure equal access and avoid the migration of key decision makers and processes to offshore locations.



Individual firms will likely wish to:

- Clearly establish for each accelerated regime what the penalties for missing T+1 settlement deadlines are (whether penalty fines or automatic buy-in costs)
- Consider contractual mitigation where possible if they cannot cost effectively meet the settlement deadline by establishing settlement contracts with all counter-parties where compliance with settlement standards can be abdicated by contractual agreement, though such arrangements could put firms with cash arrangements at some disadvantage in some scenarios.

Technology is a key issue that needs to be addressed as the readying of firms for straight through processing is essential for not only improving the ability to comply with accelerated settlements, but also introducing huge benefits in terms of efficiency and operational risk reduction. Shifting as much of the industry to automated matching and affirmation systems as possible, removing unstructured instructions across the board and as soon as possible ending the role of paper certificates and payments from the system will improve compliance and reduce costs.

The US has clearly made the choice to set a firm and challenging deadline to force the industry to make these improvements rather than mandating the changes required first (such as mandating the use of automated matching and affirmation before then introducing an accelerated settlement regime). This is one way of achieving these goals, however, the slow start by non-US firms on project planning to achieve this is very concerning and failure to put in place the changes needed will lead to increased fails and extra costs for international investors in the North American markets.

Clear steps need to be taken to implement the migration to accelerated settlement processes:

- Automated affirmation and straight through processing levels must dramatically increase to ensure that current high levels of settlement efficiency.
- Work to remove batch processes, especially overnight batches which will not meet the new deadlines.
- Remove nonstandard instructions and paper from as much of the system as possible.

Given the key concern of respondents to the interviews about transferring risks from the financial realm to the operational realm, careful re-engineering of systems and processes will be essential to at least minimising the costs of operating in accelerated settlement regimes and avoiding operational risk failures and costs. However, our research shows that acceleration can come with significant costs, and, maybe less intuitively, risks.

The arguments for accelerated settlements are strong, markets such as India are already on a T+1 cycle and mainland China is using a T+0 cycle and the benefits can be seen. However, our research shows that acceleration can come with significant costs, and, maybe less intuitively, risks.

While, T+0 atomic settlement would end netting, which is seen as a valuable capability, T+1, maybe seen as a compromise regime. Nevertheless, it still creates enormous challenges for non-domestic players. The globalisation of markets makes the migration of the US and Canada region to a T+1 regime difficult for investors to comply with, although they must as these markets are essential to the customers of non-North American wealth and fund managers.

Awkward time zone issues and discontinuities between overseas investors' domestic securities markets and the foreign exchange markets can introduce costs difficult to totally remove, even if intermediary firms can help reduce these difficulties, at a price. Concerns over the ability of operations to prepare for accelerated settlement on a very tight timetable (as imposed by the North American change programme) and on-going concerns as to the ability to cope with operational risk failures add to the concerns firms have, especially buy-side institutions outside of the North America.

It is also quite clear that strengthening resilience through more sophisticated backup and disaster recovery strategies would also help ensure that settlement processes can continue even in the face of unexpected disruptions, such as natural disasters or cyber-attacks.

We find that initiatives to improve automated affirmation and straight-through processing have not always met with success with firms taking the attitude that they were optional extras. Regulatory mandating of faster settlement will clearly force the hand of all firms to improve their processes, creating both efficiency, risk improvements and faster access to funds for their customers. The timetable and the potential cost of pre-funding for non-North American investors work against this.

A part of this effort, especially in the US rather than Canada, has been looking for a solution to the "Meme" stock collusion which left new era brokers on the brink of failure. Arguably a domestic challenge involving under-capitalised brokers has forced the SEC and other authorities in the US to look for an operational solution to the challenge, rather than taking an alternative approach. Instead the decision is to make the operational change to T+1 even at the cost of inconvenience for portfolio investment into the US by non-domestic investors (which is worth trillions of dollars and which is essential for a country with significantly negative trade balances – capital flows are important). Nevertheless, while such motivations are clearly a domestic US one, accelerated settlement is becoming a key target for regulators across the world, however, this leaves a number of unanswered questions to be resolved.

In summary, the industry is firmly on the road to accelerated settlement. Our research shows that there are several areas where preparations need to be enhanced, but there are also significant technological solutions that can now be applied. We conclude by reiterating the need for an orderly and smooth transition to instant and ultimately simultaneous settlement. While many firms, especially outside of North America and on the buy-side of the industry are very focused on the costs of implementing T+1 and the operational complexities imposed by inconvenient time zones, the forced adoption of higher levels of automation will in the long run produce benefits. At this mo-

ment for many these seem a distant benefit, but as the rest of the world also moves to accelerated settlement regimes, these are challenges which will need to be addressed,

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Figure 2: Findings Summary: Preparedness

Challenge	Wealth and Fund Managers	Custodians and Brokers
Knowledge of the T+1 challenge	Good among large fund managers – very poor among smaller firms	Good
Timetable North America	Non-US domestic managers are worried about the US timetable	Internally more comfortable with timetable, worried about customer capabilities
Technology challenges	Little resource put into T+1 migration by smaller firms and little analysis of challenges. Larger effort by global fund managers with key challenges identified	Fair levels of confidence in internal change programmes, some doubt as to customer migration speeds.
Batch processing and unstructured instructions	Batch processing still endemic. Even firms which operated with “real-time” position keep still often used batched instructions to custodians. Some still had paper shares to process.	Still high levels of batch processing often driven by customers. Still having to deal with unstructured instruction from client wealth managers including the use of faxes
Timetable elsewhere, UK and Europe		UK T+1 adoption seen as relatively easy as fewer trade and settlement points and a structure not dissimilar to the US as centralised. Negativity towards the ability of Eurozone countries to adopt T+1 because of a plethora of trade and settlement points

Figure 3: Findings Summary: Business Case and the challenge for non-North American firms

Challenge	Wealth and Fund Managers	Custodians and Brokers
Affirmation/matching		A strong feeling that accelerated settlement will lead to a very large increase in the take up of automated affirmation systems and increased level of straight through processing greatly to the benefit of efficiency and risk reduction
Fail rates		Both sets of firms concerned that fail rates may increase undermining currently very high settlement efficiency.
Foreign Exchange	Extremely concerned about how they will match funding when it involved the sale of a security in one currency for purchase of a security in another currency	Recognition of the challenge buy-side firms have, thought the potentially for add on services increases
Pre-funding	An extra cost which may be difficult to impossible for buy-side firms to engineer out without changing fund rules, or passing out of market risks to clients	Recognition of the challenge buy-side firms have, thought the potentially for add on services increases
Follow the sun operations	A choice to be made between shifting some operations to the US/Canada, enabling shift work at the home location or outsourcing decision making to a third party or a custodian	Embedded in all global custodians and potentially a service which could be offered with additional middle-office outsourcing for their customers
Mismatched time zones and public holidays	A key concern raised by several buy-side managers	
Dual listings		Potential price differentiation for dual listed shares where they are listed on both T+1 and T +2 systems

Figure 4: Findings Summary: Risk

Challenge	Wealth and Fund Managers	Custodians and Brokers
Counterparty Risk	Good understanding of the benefits, difficulty in seeing how it will feed down to them	Clear measurable benefits
Transfer of Risk	Concern that shortened settlement puts more pressure on operational systems and a potential increase in operational risk	Fair confidence in internal operating environment, though also worried about transfer of risk to operations.
Operational changes	Wholesale changes to systems and processes required to introduce more automation and straight through processing, especially in the areas of affirmation and matching	-
Lack of recovery time	This is the main concern, no day available to correct errors or reboot processes, especially for those firms outside of the T+1 regimes	Custodians have similar concerns about recovery times if errors occur