Countdown to T+0 -- Further Improvements in the Settlement Process

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Summary

- On September 5, 2017, the U.S. officially transitioned from Trade+3 days settlement to Trade+2 days settlement cycle.
- The SEC will prepare a report by September 5, 2020 analyzing the various impacts with movement to a shorter settlement cycle.
- There is a demand in the industry to accelerate the settlement cycle beyond Trade+2.
- No consensus for an industry-wide move to Trade+1.
- DTCC is exploring approaches to settlement cycle reduction that allows institutions seamless access to optional shortened settlement processing and could be implemented sooner.
- Shortening the settlement cycle further will require tremendous changes/upgrades/revisions to regulations, technology and processes.

The Settlement Cycle Transition (in the U.S.)

1920's

Financial transactions cleared and settled in one day (low volume helped!)

1960's

SEC forced the exchanges to close every Wednesday to help the complex clearing and settlement processes

Consequently, the settlement process moved to a T+5 cycle (almost 40 years later)

1990's

SEC adopted Rule 15c6-1 under the Securities Exchange Act

This resulted in moving the settlement cycle from T+5 to T+3 (approximately 30+ years later)

2017

SEC adopted revisions to Rule 15c6-1

Industry moved from T+3 to T+2 settlement cycle effective September 5, 2017 (after 20+ years)

SEC's Commitment

The SEC's staff will submit to the SEC, by September 5, 2020 a report including:

- The impact of the amendments to Rule 15c6-1 establishing a T+2 standard settlement cycle on market participants;
- The potential impacts associated with movement to a shorter settlement cycle;
- The identification of technological and operational improvements that can be used to facilitate a movement to a shorter settlement cycle; and
- Cross-market impacts (including international developments) related to the shortening of the settlement cycle to T+2.

Current Settlement Environment

Securities in the U.S. settle and clear:

- Over different periods of time
- Through different clearinghouses and depositories
- Based on category of security which also determines process flow
- T+2 for stocks and corporate and municipal bonds
- T+1 for Government securities and stock options
- T+0 for trades in some classes (i.e., Commercial Paper)

Factors Leading to T+2 Implementation

DTCC hired the Boston Consulting Group ("BCG") to explore feasibility

Initial cost of moving to T+2 = $550MM vs. T+1= $1.8B

Annual recurring savings for T+2 = $195MM vs. T+1 = between $175MM and $370MM

Migrating to T+2 would allow recovery of initial investment in 2.5 to 3.5 years

After much debate the industry agreed that move to T+2 was more manageable and would produce more benefits

Benefits of Moving to T+2

- Increased efficiencies by reducing funding requirements and better and more efficient utilization of capital
- Improved liquidity due to reduced liquidity needs for NSCC
- Resulted in reduction in operational risk and operational incidents, and improvements in operational controls
- Some decline in counterparty risk and exposure
- Accomplished global harmonization by alignment of settlement cycles across geographies
- Reduction from 65% to 13% for those on T+3 settlement globally

Benefits of Moving to T+2 (continued)

- Reduction of exposure to credit, market, and liquidity risk, as well as related reductions in systemic risk by:
  - Decreasing the total number of unsettled trades, as well as the total market value of unsettled trades
  - Reduction in operational costs
  - Fewer unsettled trades and a reduced time period of exposure to such trades reduced the central counterparties ("CCP's") credit, market, and liquidity risk exposure to its members
  - Reducing liquidity and other risks for funds that must satisfy investor redemption requests
  - Reducing margin charges and other fees that clearing broker-dealers pass down to introducing broker-dealers, institutional investors, and retail investors
  - Reducing trading costs and freeing up capital for other strategic deployment

The Journey to T+2

The T+2 initiative started almost three years ago and was not driven by regulatory mandate

DTCC has worked in close collaboration with several industry organizations and trade associations

Numerous industry working groups were assembled for this initiative

All through the journey the working groups kept the regulators well informed

In 2014, the DTCC (in collaboration with industry participants) formed an Industry Steering Committee ("ISC")

The ISC created a T+2 Industry Working Group

The Journey to T+2 (continued)

The ISC provided overall direction and guidance to the T+2 project

ISC was co-chaired by representatives from SIFMA and ICI and was comprised of representatives from many trade associations and each of the impacted market segments

The T+2 Industry Working Group was responsible for evaluating the changes that were needed for the move to T+2

The ISC published a requirements document in early 2015

ISC released its T+2 plan in December 2015

The Journey to T+2 (continued)

In December 2015, the MSRB published updated rule changes to facilitate the T+2 settlement cycle

In March 2016, FINRA published its rule changes in support of T+2

In September 2016, NASDAQ issued T+2 rule changes to facilitate moving to a shorter settlement cycle

In September 2016, the SEC issued its proposal to shorten the settlement cycle from T+3 to T+2.

On March 22, 2017, the SEC announced it had amended Rule 15c6-1(a) to shorten the standard settlement cycle for broker-dealer transactions from three business days after trade date to two business days after trade date

The Journey to T+2 (continued)

On June 9, 2017, the OCC issued Bulletin 2017-22 – “Securities Operations: Shortening the Settlement Cycle”

On September 1, 2017, the OCC and FDIC issued “Notice of Proposed Rulemaking: Securities Settlement Cycle

On October 6, 2017, the OCC and FDIC issued Bulletin 2017-39 – “T+2 Securities Transaction Settlement Cycle”

T+2 Change Impacts

- There were several technological and operational changes necessary to support a two day settlement cycle
  - Impact on operating business model
  - Coordination with vendors and service providers
  - Impact on trading and other operating systems
  - Oversight of operation policies, procedures, and processes
  - Impact on internal and external customers
  - Impact on agreements

T+2 Change Impacts (continued)

- Certain steps related to the allocation, confirmation, and affirmation of trades needed to occur earlier in the settlement cycle
- Revised regulatory changes impacted compliance elements
- SEC believed that no amendments to other SEC rules were required

T+2 Change Impacts (continued)

- Ancillary consequences for how market participants comply with existing regulations
- Shortening the standard settlement cycle to T+2 reduced the timeframes to effect a close-out under Rule 204 of Regulations SHO
- Impacted “deemed to own” provision in Regulation SHO

T+2 Change Impacts (continued)

- Impacted “promptly transmit funds” and “promptly deliver securities” within Exchange Act 15c3-1
- Impacted Exchange Act Rule 10b-10
- Impacted 12 CFR 12.4
- Impacted certain asset classes
- Benefit or burden to retail investor
- Impacted prospectus delivery obligations

Clearing and Settlement in the World

Currently, there are three principal models for clearing and settlement in the world's major stock markets:

Stock Exchange Only:	Exchange and Depository:	Exchange, Depository, and Clearinghouse:
• Has no centralized depository • Has no independent clearinghouse • The exchange performs most of the clearing and settlement functions • U.K. is an example	• Has a centralized depository with trade matching and confirmation services provided by the exchanges • Settlements occur at the depository • Germany is an example	• The exchange and clearinghouse provide trade matching and confirmation • The depository provides settlement services • U.S. is an example

Settlement Process Overview

- Securities Settlement = Exchange of payment to the seller and the transfer of the securities to the buyer in that trade. There are three stages:
    1. Input
    2. Processing
    3. Settlement
- In the US, the Depository Trust Company ("DTC") is the central securities depository ("CSD") for equities, municipal and corporate debt securities, and money market instruments. The DTC also processes other types of securities movements like, institutional deliveries, stock loans and financing transactions, and pledging of securities to the Federal Reserve, commercial banks or the Options Clearing Corporation. DTC and National Securities Clearing Corporation ("NSCC"); both subsidiaries of Depository Trust & Clearing Corporation ("DTCC"), settle transactions collectively at the end of day.

Settlement Process Overview (continued)

INPUT

- **NSCC**: Serves as the central counterpart for exchange transactions in the US. It provides clearing services for broker-to-broker equity, listed corporate and municipal debt and unit investment trust transactions.
- **DTC**: Receives instructions from NSCC to move client securities positions and facilitates the book-entry movement of securities for various NSCC services.
- **P&I Cash Processing**: Interacts with over 7,000 paying agents and issuers to facilitate the allocation of P&I entitlements to DTC participants on the scheduled payment date.

Settlement Process Overview (continued)

DTC Client Input: DTC acts upon instructions received directly from its clients and/or their service providers. The main transaction types processed by DTC on behalf of its clients include Delivery Orders, bank-to-broker customer transfers, Payment Orders, and Collateral Loans.

DTC Pledge System: DTC's Collateral Loan Service allows its clients and their customers to pledge securities as collateral for a loan or for other purposes to the Federal Reserve Bank, the Options Clearing Corp., and commercial banks with pledge accounts at DTC.

Settlement Process Overview (continued)

Corporate and Municipal New Issuances: DTC's New Issue Eligibility program allows underwriters and other DTC participants to submit eligibility requests for new and secondary security offerings. Once DTC makes an eligibility determination and accepts the securities for depository and book-entry services, the securities can be distributed quickly and efficiently.

Money Market Instruments ("MMI") Issuances and Maturities: DTC accepts 14 types of MMIs for settlement including: Corporate Commercial Paper, Municipal Commercial Paper, Medium Term Notes, Institutional Certificates of Deposits, etc. They are subject to DTC's Risk Controls. Key participants in the MMI process include: Issuers of Debt, Issuing and Paying Agents, Brokers and Dealers, Investors, and Custodians.

OMGEO Institutional Deliveries ("ID"): Are deliveries that have a "trade match" between a broker and either an investment manager or the investment manager's custodian.

Settlement Process Overview (continued)

PROCESSING

Inventory Management System ("IMS"): Provides a warehouse and staging area for a client's future-dated transactions.

Reintroduced Drops: Allows a participant to instruct DTC to automatically attempt to redeliver a transaction that did not process due to insufficient position or risk management controls.

Account Transaction Processor ("ATP"): Is a critical transaction processing system and has been the core books and records of DTC for over 30 years. This mission-critical application maintains industry participant positions and risk management controls for the US marketplace.

Settlement Process Overview (continued)

Continuous Net System ("CNS"): Settles trades from the major exchanges, markets, and other sources in the US and nets these transactions into one position per security, per client, per settlement date.

Settlement Progress Payments ("SPP"): Are intraday money transfers sent by clients to fund their DTC accounts utilizing the Federal Reserve's wire payment process.

Settlement Process Overview (continued)

END OF DAY SETTLEMENT

NSCC Settlement: DTC and NSCC post debits and credits for the various transactions they process throughout the day by clients into the settlement system. DTC's settlement system rolls up these balances to a client's settling bank.

Federal Reserve Net Settlement Service ("NSS"): After acknowledgement of balance by each settling bank, NSS will posts the applicable net-net debit or credit to the settling banks. Once all payments are confirmed by the Federal Reserve, settlement is complete.

Countries and their Settlement Period

Prior to October 6, 2014, Germany, Slovenia, and Bulgaria operated on a T+2 settlement cycle

On October 6, 2014, Austria, Belgium, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary, Iceland, Italy, Ireland, the Netherlands, Latvia, Lichtenstein, Lithuania, Luxembourg, Malta, Norway, Poland, Portugal, Romania, Slovakia, Spain (certain fixed income trades only), Sweden, Switzerland, and the United Kingdom moved to a T+2 settlement cycle

Australia and New Zealand transitioned to a T+2 settlement cycle in March 2016

Israel, Chile, and Saudi Arabia are on a T+0 settlement cycle

China is on a T+1 settlement cycle

India is on a T+2 settlement cycle

USA and Canada are on a T+2 settlement cycle effective September 5, 2017

Countries Considering T+2 or T+1 Migration

Currently Singapore, South Africa, and Indonesia are considering a transition to T+2 settlement cycle

Japan is planning its migration to T+2 or T+1 by 2019

Why Stop at T+2?

- There is recognition that shortening the settlement cycle further than T+2 could potentially result in further risk reduction
- Successful transition to a settlement cycle shorter than T+2 would require larger investments by market participants
- Transitioning to a settlement cycle shorter than T+2 would require real-time capabilities for certain settlement processes
- Time of coordination would be much longer
- Would increase funding costs for market participants who rely on the settlement of foreign currency ("FX") transactions, since FX transactions occur on T+2
- Moving to T+2 in the U.S. market has harmonized with non-US markets that have already transitioned to a T+2 settlement cycle
- Post move to T+2 an average of $5 billion is still held in margin and NSCC still requires additional liquidity resources for peak settlement days
- The SEC staff will submit a report by September 5, 2020 examining the impact of adoption of a settlement cycle shorter than T+2

DTCC Floats T+1 1/2

While the industry waits for the coordinated progress toward shortening the settlement cycle further, the DTCC published its proposal to help reduce the settlement cycle from T+2 to T+1 ½.

In its paper, the DTCC proposes four projects that could remove additional operational risk out of the settlement process:

- Implement an expedited settlement model
- Develop and alternate settlement model
- Create an end-to-end “match-to-instruct” workflows
- Deploy DTCC’s new Exception Manager platform

DTCC's White Paper-January 2018

In January 2018, DTCC published its paper titled, "Modernizing The US Equity Markets Post-Trade Infrastructure". DTCC continues to explore several opportunities to optimize and accelerate settlement beyond T+2, enabling participants to reduce risks associated with settlement time while preserving the resiliency of the current infrastructure and reducing systemic risk.

The paper introduces two major proposals:

- Accelerated Time To Settlement -- Requires a balanced approach so that settlement can be achieved as close to the trade as possible without creating capital inefficiencies and market risk.
- Settlement Optimization -- Will complement Accelerated Settlement by improving clearing and settlement processing efficiency, promote settlement finality, reduce equity clearing margin requirements, and provide participants with liquidity enhancements.

What should We Expect?

Achieving a dramatic acceleration in settlement from T+2 to T+1 to T+0 may require new technology like Distributed Ledger Technology (“DLT”), Quantum Technology (“QT”), etc.

Continue to minimize time to market

Active Industry engagement

Engagement of Regulators

Minimize Market Disruption

Global coordination

Impact of Shorter Settlement Cycle

Unclear who really wants T+1 or T+0

Buy side impact:

- Securities Lending
- Repo market
- Short-term derivatives contracts
- FX settlement cycle

Sell side impact:

- Revamp of Technology and systems
- Revision to laws and regulations
- Re-engineer workflows

Will Technology Help?

- Technology has evolved to allow trade settlements to be executed in real-time and in most cases country market processes and associated regulations require time to conduct the settlement process.
- Recent innovations, such as distributed ledgers technology ("DLT"), cloud computing, quantum technology, big open-linked data ("BOLD"), artificial intelligence and robotics, have the potential to produce significant changes to post-trade processing.
- The most prominent DLT we hear about is "Blockchain".
- The idea of DLT has been around for a long time. However, it was in late 2000s that the development of the connectivity needed for a public distributed ledger protected with cryptography was accomplished.
- Current environment called volatile, uncertain, complex, and ambiguous ("VUCA").
- New technology applications can begin life as "hammers looking for a nail".
- Many believe that DLT will be a major force in the industry.
- While DLT is of keen interest to the industry, key challenges with the platform will need to be overcome before it can be widely adopted.

Limitations In Current Environment

The infrastructure we have has a proven record of providing stability, reliability and certainty. However, there are certain limitations:

- Multiple version of truth: Financial market systems are layered, siloed, and contain minimal transparency.
- Vulnerability to technology threats: Potential for data compromises due to system vulnerability exists.
- Unnecessarily complex: There are minimal widely used standards, lack of systems integration, and many manual processing steps.
- Not equipped for 24/7/365 Processing: Mostly configured to operate within domestic requirements and prior to globalization.

Blockchain Headline News

Recent Headlines

- Blockchain sets its sights on the OTC market
- Global regulators attuned to blockchain technology
- Treasury's turn to study blockchain technology
- Blockchain and T2S: a potential disruptor
- How the technology behind Bitcoin could revolutionize Wall Street
- SETL launches Blockchain powered platform
- Sydney Stock Exchange develops blockchain settlement system
- ASX pioneers blockchain technology
- GMEX adopts uClear Blockchain for Real Time Clearing and Settlement
- Euroclear announces new Blockchain-based Gold settlement
- Hong Kong and Singapore agree to work together on Blockchain technology
- Financial Settlement Board studies taxonomy of fintech applications

DTCC on Embracing Disruption

- Firms are experimenting with new technologies to stay competitive in a dynamic environment where they face regulatory demands and cost pressures.
- Issued a paper discussing tapping the potential of DLT to improve the post-trade landscape.
- Fintech initiatives include DLT, Cloud Computing, Robotics and AI.
- Believes financial services industry has a once-in-a-generation opportunity to reimagine and modernize its infrastructure to address long-standing operational challenges.

DTCC on Leveraging DLT

DTCC considers the following five features as most essential that DLT has to offer:

- Standards: Does the use of DLT help enforce industry standardization of data formats and contractual rules?
- Efficiencies: Can DLT eliminate manual interactions, data exchanges, data format conversions and reconciliations with other systems?
- Faster Processes: Does DLT provide a platform to reduce time and risk to complete a transaction?
- Transparency: Does transparency provided by DLT benefit the business use?
- Security: Does the inherent authorization and encryption of DLT improve the overall security of the business process and its data?

The belief is that while DLT has the potential to change the processes, it will not have an immediate impact. Big limitation of DLT is scale.

Finally…..on Technology

- Buyside delays blockchain adoption due to:
  - Fears over significant regulatory change
  - Need to reassess timescales for adoption
  - Existing legislation mandates a pre-blockchain model for markets
  - Unwinding the existing regulatory framework would take years and cross-jurisdictional cooperation

- Spotlight! BNP Paribas Asset Management recently completed a full end-to-end fund transaction test using blockchain in partnership with LUX partners

Conclusion

Transitioned successfully to T+2 on September 5, 2017 without any concerns or issues

Industry will adjust settlement processes further working with DTCC

SEC has committed to an assessment of the industry's readiness to move to T+1 by September 5, 2020

Transition to T+1 or T+0 is onerous and needs a global level coordination

Reference materials are listed in the Appendix

Use the FIRMA resources as an additional resource to prepare for the inevitable shortening to the settlement cycle

Q & A

- Wake up call?
- Clear priorities?
- Drive development?
- Focus on DTCC initiatives?

APPENDIX A

- **<u>List of Rules and Regulations impacted with change to T+2 implementation:</u>**

SEC Rule 15c6-1(a)
MSRB Rule G-12(b)(ii)(B)
MSRB Rule G-15(b)(ii)(B)
NYSE Rule 64(a)
NASDAQ Rule (11329(b)
OCC Regulations, Part 12.9 (a)
FDIC Rules and Regulations, Part 344.7(a)
FINRA Rule 11860(a)(4)
MSRB G-15(b)(ii)(C)
Regulation SHO Rule 204
Letter of Free Funds (b-d)

FINRA Rule 11140(b)(1)
NASDAQ Rule 11140(b)(1)
NYSE Rule 235
NYSE Rule 236
FINRA Rule 11150 (a)
NASDAQ Rule 11150 (a)
MSRB G-12(b)(ii)(C)
MSRB G-12(b)(ii)(D)
FRB Regulation T
SEC Rule 15c3-3(m)
Rule 10b-10

APPENDIX B

More on the Risks identified on Slide 2:

- **Liquidity risk**

  The risk that a firm unwinding a portfolio of illiquid instruments may have to sell them at less than their fair value. An illiquid market may be defined as one characterized by wide bid/ask spreads, lack of transparency and large movements in price after any sizeable deal.

- **Market risk**

  The risk that value will be lost due to a change in some market variable, such as commodity or equity prices, interest rates or foreign exchange rates. The market risk of a derivatives position may arise from a change in the value of the underlying or from other sources such as implied volatility or time decay (theta).

- **Systemic risk**

  The risk that the financial system as a whole may not withstand the effects of a market crisis. In recent years, attention has been focused on emerging derivatives markets, where a handful of players dominate trading. The concern is that the failure of any of these might have serious and widespread consequences for others in the market. The economic crisis and credit market contraction that developed in 2008 raised concerns about financial institution collapses and resulting systemic risk.

APPENDIX B (Cont.)

- **Operational risk**

  The risk that a firm's internal practices, policies and systems are not adequate to prevent a loss being incurred, either because of market conditions or operational difficulties. Such deficiencies may arise from failure to measure or report risk correctly, or from a lack of controls over trading staff. Although operational risk is harder to define precisely than market or credit risk, it is considered by many to have been a contributor to some of the highly publicized losses of recent years. Along with market risk and credit risk, operational risk is one of three components of the first pillar of capital requirements for credit institutions (banks) under Basel II.

- **Counterparty risk**

  The risk that a counterparty to a transaction or contract will default (fail to perform) on its obligation under the contract. Counterparty risk is not limited to credit risk (the risk that the counterparty cannot fulfil its contractual obligations for payment) but may also result from other problems associated with a counterparty unwilling to honor the contract.

APPENDIX C

- **List Of Reference Materials:**

- T+2 Industry Implementation Playbook (12/18/2015)
- CAPCO T+2- Are You Ready? (2016)
- MSRB Regulatory Notice 2016-15
- PwC- Shortening the Settlement Cycle: The Move to T+2 (2015)
- HSBC Client Guide- EU Industry Wide Shortened Settlement Cycle For Securities (2014)
- FINRA Regulatory Notice 16-09
- CAPCO-Where Do We Go From Here?
- CAPCO Journal: Time is Risk : Shortening the U.S. Trade Settlement Cycle
- T2 Settlement Overview FAQs
- DTCC Shortened Settlement (T+2) (March 2016)
- T2 Settlement-Cash Products In Scope for T+2 (August 2016)
- DTCC T+2 Test Approach: Detailed Testing Framework
- The Shortened Settlement Cycle **I** How it Will Impact You (March 1, 2017)
- SEC Release # 34-80295 (Amendment to Securities Transactions Settlement Cycle) (March 22, 2017)

APPENDIX C

- **List Of Reference Materials (continued):**

- BIS-Recommendations for Securities Settlement System
- DTCC-A roadmap for promoting Intraday Settlement finality in the U.S. Markets
- DTCC-Fintech and Financial Stability
- The ClearingHouse-Is Blockchain Technology Right for Banking?
- DTCC-Embracing Disruption
- Deloitte: Six Control Principles for Financial Services Blockchain
- Lysis: Distributed Ledger Technology-An Emerging Consensus on the Buy-Side
- PwC: Embracing Exponential Change
- Settling Down: How the U.S. Finally Embraced T+2
- DTCC-Modernizing the U. S. Equity Markets Post-Trade Infrastructure (January 2018)
- Various news articles