DTCC

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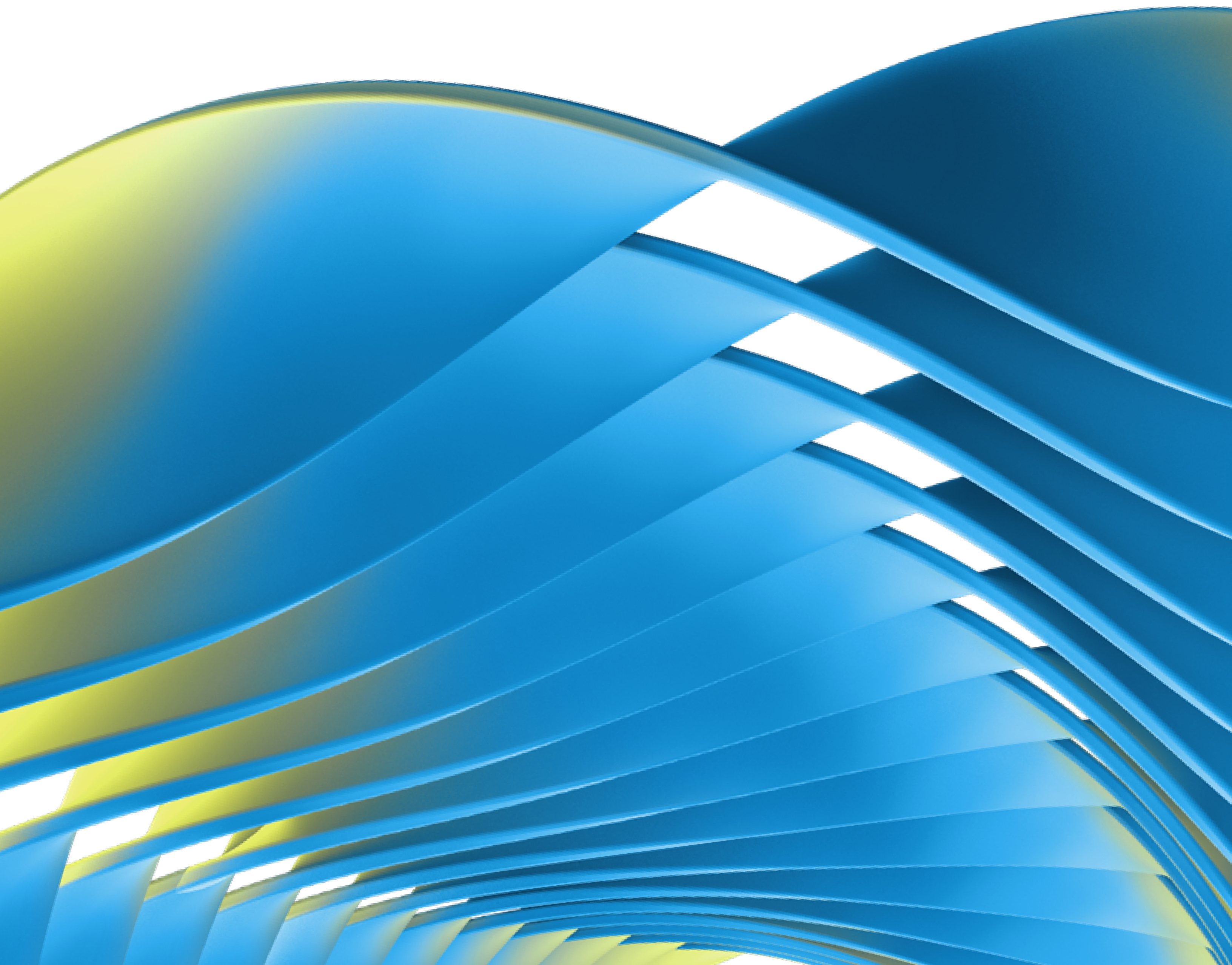
DTCC:
PROVIDING A PUBLIC SERVICE



In the words of The Atlantic, **"[i]f the economy were a house, The Depository Trust and Clearing Corporation [DTCC] would be the plumbing."**[1]

DTCC clears and settles millions of securities transactions, valued in the billions, every day. For nearly 50 years, DTCC has done this seamlessly, without much fanfare, but the benefits it provides to investors, companies and the global markets are tremendous. By any measure, the United States has the most liquid, efficient and cost-effective capital markets in the world. The critical role that DTCC plays in the market may not be well-known outside the financial services industry but it fundamentally benefits everyone who participates in capital markets, ranging from the largest public companies to main street investors who rely on markets to help fund their retirements, raise capital to start a business, buy insurance or obtain loans to purchase a house or car.

This overview describes the purpose that capital markets serve, market challenges that created the need for centralized clearing and the eventual rise of DTCC. It reviews the key advances in clearance and settlement and how they have benefitted the markets, and it illustrates how the firm provides stability in times of crisis, from the terrorist attacks of 9/11, to the 2008 financial crisis and the global coronavirus pandemic.

I. THE PURPOSE OF THE CAPITAL MARKETS

Capital markets serve two sides of the same coin—investors (both retail and institutional) and companies (from start-ups to mature enterprises). On one side, the capital markets exist to help entrepreneurs and businesses raise funds to grow their companies; on the other, investors put their savings to work in providing the capital for those growing companies.

Wall Street history is filled with examples of companies making the journey from start-up to public company to leaders in their sectors—familiar names include Apple, Microsoft, Netflix, Facebook, Amazon, Google, Walmart Inc. and so on. It is easy, however, to lose sight of how this journey is made and the infrastructure that makes it possible. The Federal Reserve Bank of St. Louis uses a straightforward example of a successful ice cream company whose business is going so well that needs more money to invest in hiring more people, and buy more ingredients and equipment to keep up with growing demand.[2] The ice cream company ultimately goes public to raise the money it needs to keep up with demand. While overly simplified, the story illustrates how companies can leverage the capital markets to finance and grow their businesses. Companies raise money through financial instruments including securities, such as common stock and bonds, and use the funds to invest in equipment, technology, workers and other needs. Investors, meanwhile, seek returns on their investments through increased share prices, dividends or other payments. Without robust capital markets, companies may be limited in obtaining new funding, and institutional and retail investors could lose opportunities to earn returns on their savings.

[1] Jonathan Rauch, *Post-9/11, Financial Security Has a Whole New Meaning*, The Atlantic (July 1, 2004).

[2] *Understanding Capital Markets*, Federal Reserve Bank of St. Louis, available at https://www.stlouisfed.org/education/tools-for-enhancing-the-stock-market-game-invest-it-forward/episode-1-understanding-capital-markets.

In 2018, the United States total market capitalization—the total value of all listed shares on U.S. stock exchanges—was approximately $30 trillion, compared to Hong Kong with $3.8 trillion, the United Kingdom with $1.8 trillion and Germany with $1.7 trillion.[3] Moreover, the U.S. capital markets are global, with U.S. securities held by investors all over the world, including U.S. Treasury securities, almost 40% of which are held by investors from outside the U.S.[4] The significance is difficult to overstate as it impacts nearly every aspect of our financial lives—from jobs that are created, the availability of loans to buy a house or car, funding for new roads and bridges, and retirement savings to insurance plans.

Solid regulatory frameworks and market infrastructures underpin the investment process and enable entrepreneurs and investors to transact in secure, safe and transparent markets. Every day, brokers, exchanges, clearinghouses, and other intermediaries facilitate the buying and selling of securities and other financial instruments that propel the U.S. and global economy forward. From the brokers that meet electronically on exchanges to trade securities, to the clearinghouses and depositories where ownership of securities is processed and recorded, market infrastructures perform roles that are easily overlooked because their work is seamless, enabling capital markets to grow.

As an industry-owned and governed entity, DTCC's clearinghouses and depository help ensure investors' stock transactions are completed, dividends paid, and ownerships records are maintained. The result? Investors and companies alike are assured that the markets are efficient, safe, resilient and transparent. That confidence is the result of decades of work, as market infrastructures have evolved to help meet the demands of investors and businesses.

II. HISTORY OF CLEARING IN THE U.S. AND THE RISE OF DTCC

In the U.S., certificated securities have been issued since the 1700s, providing essential evidence of ownership of a security. The federal government issued the first major American publicly traded securities in 1790 to refinance federal and state Revolutionary War debt. In 1792, five securities began trading on what was to become the New York Stock Exchange (NYSE). Methods for buying and selling securities have evolved dramatically to meet the needs of market participants. As the financial markets have grown, so has the need for infrastructure that can help simplify, streamline and ensure the effective transfer of securities.

Initially, every transaction on the NYSE had to be paid for in full and the physical shares delivered within one business day. This meant that buyers and sellers had to exchange cash (or collateral if self-financed) and certificates. To execute this, messengers delivered checks and certificates throughout lower Manhattan.[5]

As markets grew, increased trading strained the funding markets and trading infrastructure, spurring advances in clearing in the equity markets, including the introduction of netting to the settlement system. In 1920, NYSE established the Stock Clearing Corporation (SCC), which acted as a counterparty to every buyer and seller. This simplified the clearing process and reduced demands on the funding markets. Firms could now pay or receive money from SCC rather than having to issue checks to all its counterparties in a transaction. In other words, the clearinghouse could net down purchases and sales conducted on the exchange among participants, greatly

[3] "Market capitalization of listed domestic companies," The World Bank (Accessed February 1, 2021), available at https://data.worldbank.org/indicator/CM.MKT.LCAP.CD?view=chart.

[4] As of October 2018, non-U.S. investors owned $6.2 trillion of U.S. debt, or approximately 39 percent of the debt held by the public of $16.1 trillion and 28 percent of the total debt of $21.8 trillion. Monthly Statement of the Public Debt (MSPD) and Downloadable Files, TreasuryDirect (Accessed February 1, 2021), available at https://www.treasurydirect.gov/govt/reports/pd/mspd/mspd.htm

[5] Buyers without cash in hand could secure a loan of the purchase price, using the shares themselves as collateral. In short, every single exchange of cash for shares had to be independently financed, via cash or secured loan.

reducing the need for funding. Many manual processes, however, remained in the clearing system, and physical securities still had to be moved from the sellers to buyers.

In the 1960s, the increased volume of securities trading overwhelmed the complex and largely manual processes of the settlement systems. Deliveries to customers of cash and securities were frequently late, and stock certificates often were lost (i.e., "settlement failures"). Consider, in 1967, trading averaged 10 million shares per day—and just three months later that number doubled to 20 million shares per day. The sheer volume buried workers in paper and resulted in hundreds of thousands of transactions remaining unsettled every day. The exchanges had to cease trading on Wednesdays, shorten trading hours on other days, and extend settlement by a day to trade date plus five business days (T+5) to catch up on the backlog of paper. The result was a loss of investor confidence in the reliability of the securities markets.

To address settlement failures and restore confidence in the markets, the securities industry—in partnership with Congress, state and federal regulators—created the foundation for the clearing and settlement system that exists today. In the 1960s and early1970s, the industry established several new central securities depositories (CSDs) and clearinghouses. NYSE established a CSD for storing stock certificates that eventually was spun-off in 1973 to become The Depository Trust Company (DTC), an industry-owned and governed utility. DTC allowed custodian banks to join as participants, thus including securities transacted by institutional investors.[6] All printed certificates were deposited in a DTC vault, and also were "dematerialized"—meaning they were recorded in electronic form to make processing transactions faster and simpler. Instead of having someone run printed stock certificates up and down Wall Street, participants' accounts could be debited and credited to reflect transactions (e.g., "book-entry settlement"). In 1976, the industry moved to address trade failures by combining several clearing facilities to create the National Securities Clearing Corporation (NSCC), which provided clearing, settlement, risk management, and other services, including continuous net settlement of trades and payments, to its participants.

Throughout the 1980s and 1990s, the industry experienced a wave of consolidation. By the late 1990s, the other regional CSDs in the U.S. were consolidated into DTC to become the U.S. national CSD,[7] and the NSCC was the largest clearing agency in the United States. Eventually DTC and NSCC merged into DTCC to enable U.S. equity clearance and settlement to take place in a single industry-owned and governed entity.

DTCC has a market neutral horizontal framework that allows all marketplaces registered with the U.S. Securities and Exchange Commission (SEC) to have open access to clearing. As investors were given the ability to trade into a position on one exchange and out of it on another—with both trades clearing and settling via the same system—the entire equity market could be thought of as a national market system. This market neutral open access model enables innovation in trading and drives down the costs of trading for all market participants.

Throughout these market developments, Congress and the SEC took steps to help bring greater oversight to this evolving piece of the market. Congress passed the Securities Acts Amendments of 1975 as the basis for the creation and oversight of a national system for the clearance and settlement of securities transactions. The implementation of these amendments, along with consolidation in the industry, helped pave the way for the eventual formalization of exchange competition via the SEC's Regulation National Market System (NMS).

[6] Initially, the entity was named Central Certificate Service (CCS). It eventually changed its name to DTC.

[7] The Federal Reserve operates a second CSD in the U.S. focused on U.S. Treasury, Government Agency, and mortgage-backed securities issued by Fannie Mae and Freddie Mac.

III. ADVANCES IN CLEARANCE AND SETTLEMENT

As a result of centralized clearing and settlement, markets are more efficient, reliable, and nimble, and DTCC has been at the forefront of this transformation. In addition to streamlining systems, DTCC's industry ownership and governance structure and role as the clearinghouse for securities marketplaces helped drive competition in the markets.

DTCC's core functions serve a unique role in promoting competition, safety and soundness in equities markets.

Clearance and Settlement

Depository: DTC is DTCC's central securities depository subsidiary. It provides depository, vault and book-entry services, and operates a securities settlement system. DTC holds eligible securities on behalf of its clients; its activities include transfers and pledges of securities, as well as the settlement of transactions by book-entry, free of payment or delivery versus payment.[8]

Securities Immobilization: DTCC's Fast Automated Securities Transfer (FAST) program minimizes certificate movements and streamlines transfer processing by recording the securities in book-entry form on the books and records of the issuer's transfer agent.[9] This reduces the risks associated with lost securities and eliminates the costs of insuring, handling and shipping physical certificates. FAST was an important step in helping the industry reduce the number of physical certificates being created and shipped between DTCC and transfer agents. As the physical securities market consolidated around DTCC as a central depository, benefits to market participants included cost savings, efficiencies and reduced operational risk.

Centralized Clearing and Settlement: After counterparties agree to the terms of a trade, the clearinghouse steps in to guarantee that the buyer gets its shares and the seller its cash. Initially, clearing and settlement was done bilaterally between two parties. Today, DTCC serves as the central third party that guarantees completion of the trade, greatly reducing counterparty risk. DTCC's clearinghouses also have introduced risk-reducing practices, such as multilateral netting (discussed below), that significantly reduce the value of trades that are settled each day. The rise of DTCC (and its predecessor clearing agencies) also helped eliminate operational risks associated with messengers running stock certificates up and down Wall Street to settle every trade individually through the exchange of paper certificates.

FAST is a contract between DTC and transfer agents that eliminates the movement of physical securities by allowing agents to act as custodians for DTC. With FAST, transfer agents maintain a jumbo balance certificate—one for each issue—registered in the depository's nominee name, Cede & Co. Balances are automatically adjusted each day based on deposit and withdrawal activity at DTCC, and FAST transfer agents electronically confirm balances daily. A transfer agent for a DRS-participating security that is listed on an exchange is not required to maintain a jumbo balance certificate for Cede & Co.

[8] There are three ways in which a DTC-eligible security can be held:

- *Street name:* When an investor holds shares this way, the investor's name is listed on its brokerage firm's books as the beneficial owner of the shares. The brokerage firm's name is listed in DTC's ownership records. DTC's nominee name (Cede & Co.) is listed as the registered owner on the records of the issuer maintained by its transfer agent. DTC holds legal title to the securities and the ultimate investor is the beneficial owner.
- *Direct Registration:* If an investor purchases securities and wants to hold them electronically in its own name rather than in street name, the investor can do so through the direct registration system (DRS). DRS allows an investor, as the owner of the security, to be the registered holder directly on the issuer's books and records, maintained by its transfer agent
- *Physical certificate:* Investors also can hold shares in physical form. Holding shares in the form of a certificate is the most cumbersome, expensive, and highest risk option for investors. Physical certificates can be lost, stolen or damaged, and replacement costs are high and take time to complete.

[9] Transfer agents act as agents for issuers, fulfilling a role that is distinct from CSDs. Generally, transfer agents record changes of ownership, maintain the issuer's security holder records, cancel and issue certificates, and distribute dividends. In some marketplaces such as the U.S., they have a key role in the securities settlement process and may be subjected to regulatory obligations.

Reducing Settlement Times: Settlement finality occurs when the parties to a transaction fulfill their obligations under a trade by exchanging funds for delivery of the securities. As clearing became more centralized, settlement times have been drastically reduced. For many years, the markets operated on a T+5 settlement cycle—meaning trade date plus five business days to settlement. In 1995, U.S. regulators reduced the settlement cycle from five business days to three business days. In 2017, after many years of a wide-reaching, extensive technology and operational effort—coordinated and harmonized across global markets and regulatory bodies—another day was removed from the settlement cycle. Today, the industry completes settlement for trades in equities and certain debt securities on the second business day after a trade is executed, T+2. NSCC has long supported processing trades on T+0 or T+1 for participants that request it, all while leveraging existing technology. Moving from T+3 to T+2 resulted in reducing the average daily capital requirements for clearing trades through NSCC by approximately 25 percent from 2017 levels, saving the industry $1.36 billion in margin requirements.[10]

Accelerating settlement for the market to T+2 was a complex and time-consuming initiative that reinforced the biggest challenge was not technology—DTCC's current infrastructure supports T+1 and limited T+0 settlement cycles today—but rather process and procedure. For example, market behavior, legacy infrastructure and operational processes at client firms make it challenging to accelerate further without a coordinated industry effort. The potential benefits of further accelerated settlement, including reduced market risk and lower margin requirements, have reignited industry discussions about ways to achieve additional value. Initiatives under review include settlement optimization, as well as the possibility of intraday movement and settlement of money and securities instead of the traditional focus on end-of-day settlement. In January 2020, DTCC implemented changes to the settlement night cycle, further increasing processing efficiencies. DTCC continues to closely collaborate with the industry to evaluate opportunities that would accelerate settlement beyond T+2, including potential support for varying forms of settlement such as real time gross.[11] However, real-time gross settlement could potentially require that transactions in the U.S. market be funded on a transaction-by-transaction basis, and thus lose the liquidity and risk-mitigating benefits of today's netting features.[12]

In February 2021, DTCC released, *Advancing Together: Leading the Industry to Accelerated Settlement*, that outlines a two-year industry roadmap for shortening the settlement cycle for U.S. equities to T+1. We look forward to advancing this important work in partnership with our clients, the regulatory community and key stakeholders, as we have done for decades, to deliver greater value and risk reduction for the benefit of clients and ultimately the end investor.

Reducing Risk and Increasing Liquidity in the Market

Trade Guarantee: The clearinghouse interposes itself as the buyer to every seller and the seller to every buyer to guarantee that a trade eventually will settle, even if the original buyer or seller defaults.

Netting: Through multi-lateral netting, NSCC reduces the total value of trades that will be settled by an average of 98% each settlement day. At the end of each trading day, netting consolidates the amounts due from and owed to a firm across all the securities it has traded to a single net debit or a net credit position. To illustrate, over a 28-day sample in the months of November and December 2018, the average gross settlement balance was $326 billion, and the net was $32 billion, 90% of the funding needs were eliminated via netting. When combined with other DTCC margining and risk management protocols, the $5.1 trillion in gross notional daily settlements were reduced

[10] Press Release, T+2 Industry Steering Committee, *Financial Services Industry Shortens Trade Settlement Cycle in the U.S., Marking the Most Significant Change in Two Decades* (September 5, 2017), available at https://ust2.com/pdfs/T2-Steering-Committee-Joint-Release-on-Launch.pdf.

[11] See DTCC White Paper, *Modernizing the U.S. Equity Markets Post-Trade Infrastructure* (Jan. 2018), available at https://perspectives.dtcc.com/downloads/whitepaper/modernizing-the-u-s-equity-markets-post-trade-infrastructure.

[12] See DTCC Q&A, *What You Need to Know About Real-Time Settlement* (Feb. 18, 2021), available at https://www.dtcc.com/dtcc-connection/articles/2021/february/18/what-you-need-to-know-about-real-time-settlement.

to a net daily obligation of almost $400 billion. As a result, faster settlement times reduced the amount of margin required, improving market efficiencies.

Driving Competition

Ownership Structure: DTCC is user-owned and governed by its user members, sometimes called "participants." All participants commit capital as owners, pay fees for services and ultimately benefit from the safeguards, efficiencies and risk mitigation that DTCC provides. This ownership structure drives DTCC's culture. Everything from new technology initiatives to pricing decisions and the development of new products is overseen and driven by the needs of our participants. Uniquely, DTCC's central role helps mutualize industry challenges, creating efficiencies and enabling participants to focus on differentiating services and capabilities to service their clients.

Open Access: By acting as a neutral, central depository and clearinghouse for all registered securities exchanges that wish to participate, DTCC helps drive competition in the marketplace to the benefit of retail investors.[13] Under this structure, there is greater head-to-head competition at the exchange level, resulting in greater innovation in marketplace systems, lower trading spreads and lower fees for trade execution, and increased price competition and higher trading volume.[14]

IV. DTCC DURING MARKET TURMOIL

The critical nature of DTCC's role in the markets becomes most apparent in times of market stress or crises, when DTCC has proven its ability to withstand turmoil and provide financial markets with stability and resilience. Below are several well-known crises examined through the lens of DTCC's role and performance:

9/11 Terrorist Attack

The epicenter of the 9/11 terrorist attack on the World Trade Center took place only blocks away from DTCC's headquarters at that time, 55 Water Street. While most of Wall Street was forced to shut down, DTCC opened the next day and employees spent four days and three nights at 55 Water Street, helping the industry recover thousands of lost trades. DTCC successfully cleared and settled $1.8 trillion of securities transactions during the volatile week, enabling the markets to re-open the following Monday. Jill M. Considine, DTCC's chairwoman at the time, said it was "a case of ordinary people doing extraordinary things."

Tremendous business changes resulted from the terrorist attack, completely transforming the industry's understanding of business continuity and DTCC helped lead that change. Three weeks after the attack, DTCC presented its Board with the next generation of our business continuity plan, incorporating the initial lessons learned from the experience of 9/11. The Board approved the plan, demonstrating its understanding of the importance of business continuity planning for market infrastructure.

[13] In comments on the Department of Treasury's request for comments on the Regulatory Structure Associated with Financial Institutions, 72 F.R. 58939 (October 17, 2007), the Department of Justice noted that "equity and options exchanges do not control open interest, fungibility, or margin offsets in the clearing process. This lack of control appears to have facilitated head-to-head competition between exchanges for equities and options, resulting in low execution fees, narrow spreads, and high trading volume."

[14] "Competition has directly benefitted retail investors in a number of ways, including by making prices generally more efficient and driving commission rates to historically low levels." SEC Commissioner Luis A. Aguilar, *U.S. Equity Market Structure: Making Our Markets Work Better for Investors* (May 11, 2015) (citations omitted).

2008 Financial Crisis

Amid the unprecedented turmoil that engulfed DTCC's customers and the financial services sector in 2008, DTCC continued to deliver the highest levels of risk management and reliability despite the chaos. It was one of the most challenging years, and one of the most successful, in DTCC's history.

As financial markets reeled, DTCC successfully protected participants and the nation's securities clearance and settlement system throughout the crisis, especially in the days following the Lehman Brothers' bankruptcy. DTCC resolved $500 billion in equities exposure, the largest liquidation of a financial services firm in U.S. history, without having to draw upon our other participants' clearing fund deposits. DTCC also leveraged its central role to help counteract misinformation and calm market unease. The liquidation of Lehman was complex, involved multiple asset classes and required a methodical approach to mitigate potential losses from outstanding trading obligations. At the time of the Lehman bankruptcy, DTCC's rapid public correction of rumors that Lehman's exposure in the credit default swaps (CDS) market could reach $400 billion—in fact, our Trade Information Warehouse (TIW) records suggested Lehman's net exposure was closer to $6 billion—significantly helped to calm the financial markets.

The TIW also successfully managed 11 credit events in the over-the-counter derivatives markets in 2008, including Lehman Brothers Holding Inc., Fannie Mae, Freddie Mac and Washington Mutual. Approximately $285 billion (in aggregate gross notional value) of CDS contracts were netted down to $12 billion in actual payments.

DTCC also helped steady the industry during the March bailout of Bear Stearns. DTCC supported the transfer of Bear Stearns' deal book of about 150,000 open CDS contracts to multiple JPMorgan Chase subsidiaries, most of which were handled in 48 hours over a weekend, eliminating uncertainty in the market and operational risk for our participants.

In another example of DTCC's capabilities, NSCC took responsibility for all trades that participants had open with Bernard Madoff Investment Securities through December 12, 2008—the firm's last trading day—and closed all those trades with no loss to participants firms.

Throughout all these extraordinary events, DTCC processed more than $1.88 quadrillion in securities transactions in 2008 without interruption.

Knight Capital (2012)

During the first 45 minutes after the market opened on Aug. 1, 2012, Knight Capital lost $460 million when a technology glitch resulted in the transmission of a large number of erroneous trades to the NYSE and then to DTCC. The error, which sent a shudder through the industry, had the potential to create chaos in the equity markets and negatively impact clients as Knight Capital lost about $10 million a minute.

Across four days, DTCC worked closely with Knight Capital, our Board Risk Committee and our regulators to protect our clients and DTCC from any potential losses, while also mitigating systemic risk. In addition, we worked together with Knight Capital to manage settlement of the erroneous trades. The result of these efforts was a speedy resolution that averted a full-blown, cascading crisis and helped keep Knight Capital solvent in the days immediately following the crisis.

Superstorm Sandy (2012)

Superstorm Sandy devastated New York and the tri-state area and created unprecedented challenges for DTCC. On the night of Oct. 28, 2012, millions of gallons of contaminated water overflowed the seawalls in lower Manhattan and filled the basement and sub-basements at DTCC's headquarters at 55 Water Street, flooding DTCC's main securities vault. The water wreaked havoc, strewing more than 1.7 million water-logged certificates and millions of other documents throughout the vault. The flood forced DTCC from the building, displacing some 2,300 employees and the company's operations.

DTCC's clearing and settlement activities, however, continued to operate without interruption during and after Sandy's landfall. Relying on the firm's well-tested business continuity plans and procedures, DTCC shifted key processing and operations to its Tampa, Dallas and Brooklyn sites before the storm landed.

Two weeks later, teams of recovery experts trekked down five flights of stairs into the DTCC vault to begin the largest and most expensive vault recovery ever undertaken. The securities were flash-frozen and shipped across the country in container trucks. As part of the recovery process the water was vaporized and the securities were exposed to radiation to sterilize them. The securities were then shipped back to DTCC to be cleaned and reconciled. After six months of 10-hour shifts, six days a week, 99.9% of certificates were recovered and restored—an unprecedented $1 trillion vault recovery effort.

COVID-19 (2020)

DTCC's responsibilities have been magnified during the market volatility associated with the spread of the COVID-19 pandemic across the world. Trading activity flowing through DTCC systems set record levels four times since mid-March. On March 12, DTCC set a new single day record, processing more than 363 million equity transactions, 15 percent more than at the height of the 2008 crisis. On the last day of February, 19.3 billion U.S. shares were traded, more than twice the average daily volume of 7.0 billion shares over 2019. The 10 highest volume days for U.S. shares by notional volume or trade count of all time occurred in 2020.[15]

During each of these crises, amid extraordinary circumstances, financial markets continued to function. Thanks to the heightened risk management standards required of Systemically Important Financial Market Utility (SIFMUs)[16], including risk-based margin requirements, clearinghouses are well capitalized and able to measure risk exposure, including making adjustments in real-time, to protect market stability in the event of a firm failure.[17]

V. LEADING INNOVATION AND MODERNIZATION

DTCC continues to invest in research and experimentation with emerging technologies, understanding their potential to enable new and existing opportunities. As technology evolves and matures, DTCC continually revisits current processes and capabilities to determine if adopting newer technologies can drive additional client and business value.

[15] *See* SEC Chair Jay Clayton Remarks to the Financial Stability Oversight Council, 14 May 2020.

[16] On July 18, 2012, the U.S. Financial Stability Oversight Council (Council) designated, among others, DTCC subsidiaries NSCC, DTC and Fixed Income Clearing Corporation (FICC) as Systemically Important Financial Market Utilities (SIFMUs) under Title VIII of the U.S. Dodd-Frank Act. This designation was made on the basis that a failure or a disruption to any one of these DTCC subsidiaries could increase the risk of significant liquidity problems spreading among financial institutions or markets and thereby threaten the stability of the financial system in the United States. This designation requires the company to meet prescribed risk management standards and subjects it to heightened oversight by U.S. regulatory authorities.

[17] For additional discussion on this topic, see DTCC's recent white paper, "COVID-19: Impact and Implications for Financial Market Infrastructures" (Jan 13, 2021), available at http://perspective.dtcc.com/articles/covid-19-impact-and-implications.

Innovative Technology: Since the immobilization of securities into book-entry form, DTCC and the industry have come a long way. For example, DTCC is now leveraging cloud processing for distributed computing, artificial intelligence (AI) and machine learning (ML) for risk management and data insights, and launched an application programming interface (API) marketplace to provide clients, partners and internal developers with a single, central location for APIs, which in turn allow for optimal access to DTCC services.

DTCC is closely monitoring distributed ledger technology (DLT) for potential application in the future capital markets ecosystem. Since DTCC's first whitepaper on blockchain in 2016, it has been evaluating DLT to assess its maturity and potential timeframe for mass market adoption.[18]

> **Project Ion:** As part of DTCC's accelerated settlement and settlement optimization efforts, DTCC announced Project Ion in May 2020 to explore whether the digitalization of assets using DLT can provide additional benefits in the acceleration of settlement for the U.S. equities market. DTCC is exploring a future vision of an alternative digital settlement service, and its potential to offer the benefits of accelerated settlement, retain the advantages of central netting and prevent fragmentation of the clearing and settlement ecosystem. DTCC is developing Ion as a fully functional clearing and settlement prototype, built as a digital asset processing model on DLT, to allow the industry and regulators to experiment and evaluate different future-ready options for simplifying, and further accelerating, the settlement process.
>
> **Project Whitney:** Recognizing that companies are staying private longer and continue to see increased investor interest, Project Whitney was developed into a functional prototype to explore the potential for a digital infrastructure to support private market securities that are exempt from registration with the U.S. SEC. While public markets are highly efficient, that same efficiency is not enjoyed in the private market, where many operating functions are still dominated by manual processes and the few digital solutions that are available exist in silos.

VI. CLOSING

DTCC is proud to be a premier market infrastructure in the most vibrant capital market in the world. The efficiencies, resiliency and innovation that DTCC brings to the markets is fundamental to enabling the core function of capital markets to help businesses grow and investors achieve their financial goals. The behind the scenes work of DTCC and others will remain critical to helping bring the benefits that capital markets provide to so many industries, businesses and individuals.

[18] *See generally* DTCC Drives Advancement of Distributed Ledgers, https://www.dtcc.com/blockchain.

For more information on our products and services, visit DTCC.com

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