


BUILDING A FOUNDATION FOR THE FUTURE

2018 ANNUAL REPORT

CHAPTER 1

OUR LEADERSHIP

A MESSAGE FROM MIKE BODSON

DTCC PRESIDENT & CEO

Dear Stakeholder,

This past September marked the 10th anniversary of the start of the financial crisis. It's a topic I thought a lot about during 2018 because the milestone of a decade always seems to demand greater reflection. For the industry, the crisis was a global inflection point that literally changed the course of history for financial services. The events of that year were so profound, in fact, that they remain the lens through which virtually every firm operates today, and the impact and fallout continue to reverberate through and shape the marketplace.

For DTCC, the near meltdown of the financial system is the single most important event that has defined our path forward over the past decade. Our strategy, the decisions we've made, the initiatives we've pursued and the actions we've taken have all been deeply rooted in the learnings from that period, which have shaped how we can best help our clients manage in this more demanding and challenging economic and regulatory environment.

Like so many of you, I can vividly recall the harrowing days leading up to the bankruptcy of Lehman Brothers and the exhausting weeks and months that followed. And what still stands out to me is how our people banded together to provide stability and certainty when the industry needed us most. It was an impressive feat, but the reality is that protecting the security of the markets is what we do every day — albeit without the high-wire act of operating amid a global panic.

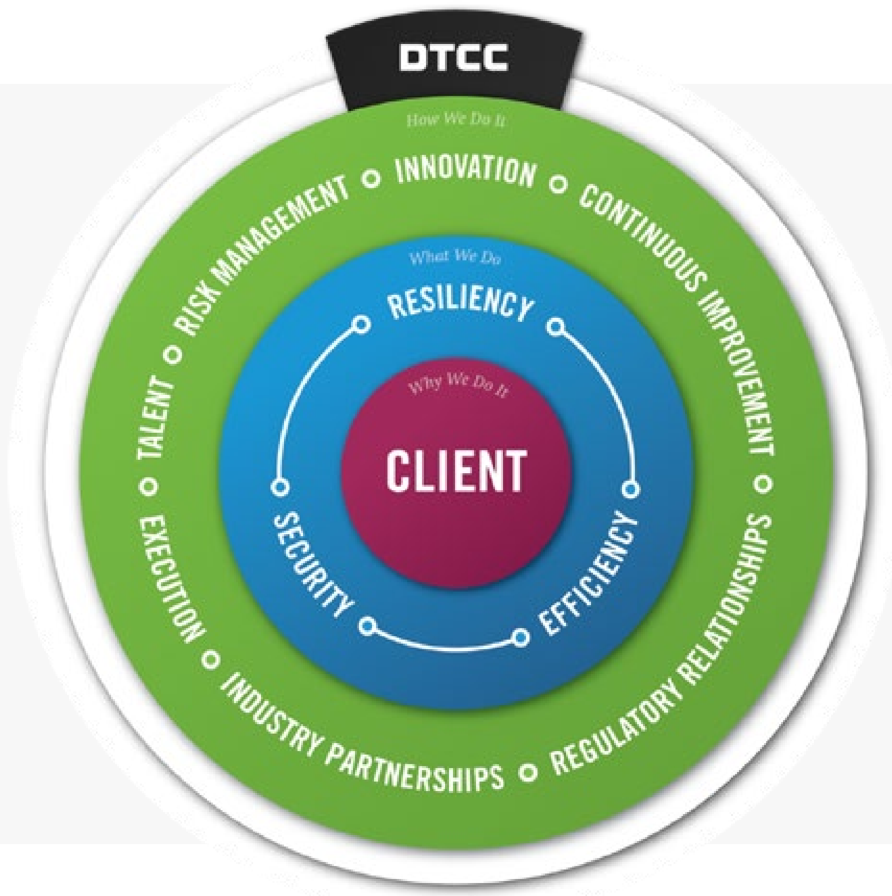
In 2018, we again seamlessly fulfilled our responsibilities even as volatility sparked rapid and unpredictable swings in the markets. This is table stakes for us, but what we do is far from routine. Across the year, we handled spikes in trading with the skill and precision of an experienced hand, processing $1.85 quadrillion in financial transactions — the most ever in our history and a 15% jump over the prior year — as volumes in both equity and fixed income clearing increased. The one constant that connects 2018 to 2008, as well as to every other year since our founding more than four decades ago, is our commitment to delivering on the value of our clients' investment in an industry-owned and governed market infrastructure that manages risk for the global system.

Just like any company, we're here to serve our clients, but the fact is that we're not just like any other company. Because we're industry-owned and governed, we're your company. That means DTCC is an extension of your firm, that our infrastructure is an extension of yours and that our priorities are in lockstep with yours. Our ownership structure and governance are rare in financial services, and it's a powerful differentiator because, unlike our competitors, we don't have to choose between what's best for our shareholders and what's best for our clients — you're one and the same. We've earned your trust because we've proven that you can always count on us to be there when you need us most.

These values are carved deep into the soul of the organization. And they've served as the foundation upon which we've reimagined and redefined DTCC's role in the industry since the crisis. Over the past decade, we've built new layers onto that foundation, leveraging our expertise and new technologies to strengthen our infrastructure, enhance our risk management and broaden our capabilities to include over-the-counter (OTC) derivatives, middle office processing and data services. At the core of our success last year was the execution of our strategy, which reflects the intersection of the external landscape, our clients' needs and our unique capabilities.

DTCC STRATEGY

Foremost, we manage risk for the industry by seamlessly clearing and settling every day. Second, we deliver innovative solutions that enhance and expand our capabilities in cash securities processing and OTC derivatives to support our clients today and in the years ahead. We do this by harnessing our global community, our economies of scale, our expertise in risk management, our understanding of regulations in all parts of the world and our ability to innovate to solve our clients' top pain points.



RISK MANAGEMENT: THE BEDROCK OF OUR FOUNDATION

At the heart of our strategy — and what sits at the bedrock of our foundation — is risk management. For more than 45 years, we've protected our clients, the industry and the global financial system by mitigating market, credit, operating, liquidity and counterparty risk. But as the nature of risk has evolved over the past decade, we've greatly expanded the remit of our risk group to bring a more holistic and coordinated approach to what is our most fundamental responsibility.

In 2018, we continued to make significant investments in risk management, reinforcing our commitment to further elevating our capabilities and enhancing our systems. Last year, for instance, we launched new margining models for two of our clearing subsidiaries, National Securities Clearing Corporation (NSCC) and the Government Securities Division (GSD) of our Fixed Income Clearing Corporation (FICC), completing a multiyear initiative to substantially enhance or replace all the key financial risk models for our clearinghouses.

We also strengthened our stress testing models and continued to advance a major replatforming of our risk management systems, with the goal of creating a single data warehouse so we can analyze exposures across the enterprise — all subsidiaries, all cleared products — in near real time. We see so much value in this platform that we're beginning to make it available to our clients, giving them access to their risk profiles as well as advanced analytics on their trading activity to help them address issues around capital adequacy, liquidity and market transparency.

STRENGTHENING RESILIENCY AGAINST CYBERATTACKS

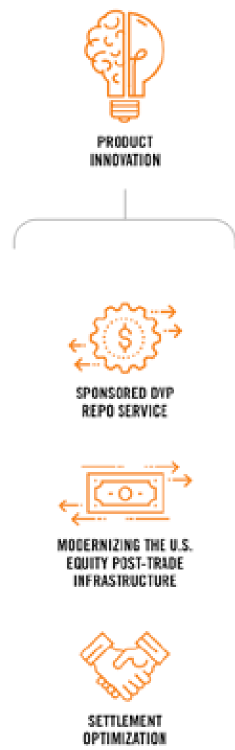
Despite the many enhancements to financial stability that have been implemented since 2008, risk continues to morph in response to changes in market structure, technology, regulation and other dynamics. In addition, new forms of risk have emerged that previously didn't exist or had historically registered low on the threat spectrum. Take cyberattack, for example. It's been around for decades, but its intensity has been growing significantly over the past few years. According to our annual Systemic Risk Barometer, it now consistently ranks as the most serious threat to the financial system. As we outlined in a white paper last year, our strategy leans heavily on developing new or enhanced systems and processes to protect the market infrastructure, as well as strengthening our cyber-resilience. We recognize that as the complexity, sophistication and frequency of attacks continue to increase, we need to be able to defend against the enemy as well as to absorb a shock and recover as quickly as possible while continuing to clear and settle billions of dollars of daily trading activity.

As part of our holistic cyber strategy, we're actively engaging with the industry and public sectors, as well as making the necessary investments in new tools, resources and our people. However, as the threats we face continue to grow, we're also beginning to use fintech to protect DTCC from a cyberattack. For instance, we're actively exploring ways that natural language processing, a branch of artificial intelligence, can help us quickly and efficiently identify risk trends and patterns, with the goal of enabling a more predictive and proactive approach to mitigating or extinguishing potential attacks.

BUILDING A ROCK-SOLID FINANCIAL FOUNDATION

Redefining DTCC's role in the industry and amplifying how we support our clients requires significant investments across all areas of the firm. This has been a priority for us over the past decade, but it's proven challenging at times because our balance sheet didn't always give us the flexibility we needed. We've taken a series of steps in recent years to build financial strength through an $800 million capital raise in 2015 — the first ever in our history — and by shrinking our expense base by more than $100 million over a two-year period ending in 2017. Last year, we registered one of our best years ever as revenues climbed to $1.8 billion — a record for DTCC and about $100 million higher year-over-year — due in large part to heightened market volatility and continued growth in our SIFMU businesses. Our revenue performance, along with continued expense discipline, generated approximately $296 million of net income attributable to DTCC, about $131 million higher than 2017. This sustained focus on reducing our financial leverage and creating a rock-solid financial foundation will allow us to support new strategic investments in products to meet our clients' needs and in modernizing our technology to meet new demands as well as emerging threats.

PRODUCT INNOVATION DRIVES CLIENT VALUE



In today's environment, our clients look to us more than ever before for solutions to the challenges they face. By leveraging our core competencies in risk management, flawless execution, unmatched reliability and battle-tested resiliency, we're tackling some of the biggest issues facing the industry today. We're problem solvers by nature, and our sense of discovery and passion for diving into the weeds of an issue continue to yield innovative solutions for clients.

In our core clearance and settlement businesses, for instance, we opened a new era in buy-side participation in the cleared repo market last year by expanding our Sponsored Service program to a broader array of buy-side firms. Year-end volumes topped $230 billion, reflecting strong support among the buy-side to leverage a centrally cleared platform for their repo trading activity. In order to create a robust cleared repo market, however, you need to be able to provide access to as many market participants as possible on both the long and short sides of the equation. Buy-side participation, therefore, is crucial because they are the true cash lenders and cash borrowers the market needs, but many have struggled over the years to get capacity due to constraints on dealers' balance sheets, particularly at month-end and quarter-end. The expansion of the Sponsored DVP Repo Service creates needed capacity for the market and, importantly, it also reduces systemic risk posed by fire sales.

This same commitment to serving the industry is evident in the proposal we unveiled last year to modernize the U.S. equity post-trade infrastructure. Following the successful effort we helped lead and that culminated in 2017 when the U.S. markets transitioned from a T+3 to a T+2 settlement cycle, we knew a large-scale, multiyear initiative to move to T+1 or T+0 would be difficult for most firms on the heels of moving to T+2. So we reframed the challenge by asking ourselves how we could achieve the benefits of a shorter settlement cycle without actually moving to T+1 or T+0. The result is what we call Settlement Optimization — a creative solution that, if implemented in full, would strengthen settlement finality by leveraging untapped resources at DTC, improving liquidity and capital efficiency without actually eliminating a calendar day. We've formed an industry group to vet and iterate our approach and are using their feedback to guide our work.

FROM DISCRETE TO COHESIVE SOLUTIONS

Our clients have told us that one of their top needs are cohesive products and services that reduce or eliminate friction and fragmentation in the post-trade process and support greater straight-through processing. This feedback helped shape our strategy to support our clients more holistically across the post-trade lifecycle, including creating common APIs and establishing stronger linkages among our solutions.

In the institutional post-trade space, for example, our vision is to transform the infrastructure by creating a no-touch process from trade execution to settlement finality. This has been a holy grail of sorts for buy-side, sell-side and custodians for decades, and we believe the capabilities we've built and acquired in recent years will allow us to reduce the costs, risks and inefficiencies that have bedeviled the industry for so long. In 2018, we took aim at solving one of the more frustrating challenges facing the institutional community — breaks in the post-trade and settlement process — with the launch of DTCC Exception Manager (DXM). This was a significant development because not only does the service help clients solve an immediate problem of correcting trade fails faster and sooner, but it will also promote compliance with the Central Securities Depositories Regulation (CSDR) when it goes live in 2020.

CSDR is just one of many regulatory mandates that will be implemented in multiple jurisdictions globally in the coming years. We know mitigating compliance risk is atop the agenda of most of our clients, so we've been working hand-in-hand with them to develop solutions to meet these new requirements — from leveraging our existing infrastructure to create a one-stop-shop for data transformation and trade reporting to satisfy the Securities Financing Transactions Regulation (SFTR) in Europe to leveraging the data we process to support compliance with the Fundamental Review of the Trading Book (FRTB) regulation and helping firms meet uncleared margin rules through our GlobalCollateral joint venture with Euroclear.

MANAGING THROUGH THE UNCERTAINTY OF BREXIT AND GEOPOLITICS

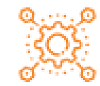
The geopolitical landscape remains volatile, and the issues that could impact our business are more diverse than ever before. There's no better example of this than Brexit. Because the UK's withdrawal from the European Union remains an ongoing source of uncertainty for our clients, we've trained our focus on what we can control. Last year, we established an EU-based entity in Dublin, which along with our London-based repository, will allow us to continue providing trade repository services in both the EU and UK through a single access point.

A significant part of the work we do in the political and regulatory arenas involves advocating for policies that enhance financial stability and promote greater market transparency. In 2018, we built upon the collaborative relationships we've developed with policymakers globally to raise awareness of the need for greater harmonization of swaps data reporting rules — a topic of great importance to our clients in all parts of the world. In addition, we actively participated in legislative and regulatory discussions on EMIR's Regulatory Fitness and Performance (REFIT) program and EMIR 2.2, as well as international CCP equivalence. With the political environment shifting so rapidly, we intend to remain active participants in policy discussions globally.

FINTECH

Technology has always been an essential part of the DTCC foundation. From our earliest days, we've been leading the digital transformation of the post-trade landscape, and today we're actively deploying or experimenting with distributed ledgers (DLT), cloud computing, robotics process automation (RPA) and applied machine learning to deliver even greater efficiencies and cost savings to our clients. I'm proud to say that this pioneering work, along with the expertise and knowledge we've shared through our leadership roles with the HyperLedger Foundation and Enterprise

Ethereum Alliance, among others, is helping to drive the agenda globally and shaping the development, maturation and future use of fintech.



DLT remains the most fascinating of these new technologies even though our own research has led us to conclude that cloud computing, RPA and machine learning will likely deliver a bigger impact on the industry's post-trade architecture sooner. However, we remain strong believers in the technology, and the work we're doing with it has been recognized globally as among the most innovative and far-reaching in financial services today. The measure of success in our opinion isn't simply moving a process from one tech platform to a distributed ledger. The real opportunity — and where true innovation lies — is in using the technology to completely reimagine the process itself to improve the client experience and deliver greater client value.

As we push the boundaries of what's possible with cutting-edge technologies, we're opening new doors of opportunity for transformation.

We've learned a lot from the seminal work we're doing to re-platform our Trade Information Warehouse (TIW) onto DLT — one of the largest initiatives of its kind to date — and we've been applying these learnings as we experiment with technology. A study we completed with Accenture last year, for instance, demonstrated that DLT can process the average daily trading volumes of the U.S. equity market without hitting the ceiling in terms of performance and scalability. This was an important milestone because it pushed the boundaries of what's possible and eliminated a barrier to progress. The journey continues.

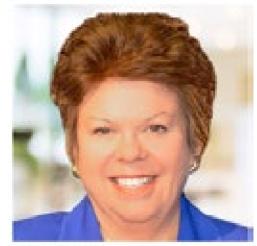
DTCC: A BEST PLACE TO WORK

The architects of the foundation we're building for the future are our employees. They engage with our clients, generate the ideas, brainstorm the solutions, write the code, perform the testing and deliver the high-quality products and services that the industry expects from us. Our job is to empower them to have maximum impact and to thrive. I'm proud to report that our efforts to create a world-class work environment were recognized last year when Forbes ranked DTCC as one of "America's Best Mid-Size Employers." We know that when you establish an atmosphere where employees feel challenged, supported and valued, great things will happen. It's gratifying that our employees are responding to the changes we've made in recent years, and we're excited, for instance, by how quickly they've embraced organizational agility and new ways of working, which will enable us to respond to evolving client needs faster and deliver increased value throughout the development life cycle.

One of the most important elements of building a great company is prioritizing Diversity & Inclusion (D&I). In recent years, we've placed increased emphasis on improving the diversity of our ranks, especially at leadership levels, to reflect our workplace population. This is a top challenge facing virtually all industry sectors, but it's particularly pronounced in financial services. While we've made progress in certain areas, it's not enough as far as I'm concerned, and we will do better. Through my involvement with the CEO Action for Diversity & Inclusion™, I'm working in partnership with more than 600 CEOs from over 85 industries to advance policies and practices that foster a workplace where different perspectives are welcomed and unconscious bias is addressed. In addition, I created a new executive-level position last year reporting directly to me with responsibility for shaping our policies and practices to increase the representation of diverse talent in the organization. This is a business imperative for DTCC, and while I recognize that change won't happen overnight, we will hold ourselves accountable for improving in this area.

THANK YOU FOR AN OUTSTANDING YEAR

Larry Thompson



Paula Arthus

This past year, two members of our senior management team retired — Larry Thompson, who served as General Counsel of DTCC since 2005, and, more recently, Vice Chairman of the firm; and Paula Arthus, who previously was CEO of Omgeo and, for the past two years, my Chief of Staff and Head of Strategy. Both Larry and Paula represented the very best of DTCC. They had deep knowledge of financial services, thoughtful perspectives on how to address industry challenges and wisdom that comes from experience. But most of all, they were true partners and friends who understood the firm's special role in the industry and brought a healthy dose of common sense that helped us manage the complex issues we face. We wish them much happiness in retirement and good fortune in the years ahead.

Our Board of Directors, which is composed of representatives of our clients and independent directors and is led ably by Bob Druskin, our Non-Executive Chairman, brings unparalleled insight to guide our strategy and shape our agenda. We're fortunate to work alongside such a distinguished group of leaders, and I'm thankful for their partnership and counsel. All our stakeholders reap the benefits of having them represent the industry's collective interests.

For all our successes in 2018, however, we have bigger plans, grander ideas and bolder actions to take in the future. If the past year has reinforced anything, it's that DTCC is in a stronger position than we've been in for many years to reimagine and redefine how we can serve our clients and deliver greater client value. In a world of constant change, there's nothing we can't accomplish together. Once again, thank you for your support.

Sincerely,

Michael Bodson

5 Types of Cyber Attacks and Their Impact on the Financial System

Scroll over each headline to view impact

1. Deletion of Critical Data

Compromise of the **availability of data** critical for the accurate and effective functioning of payments, clearing and settlement processes through data deletion.

2. Manipulation of Critical Data

Compromise of **integrity** of data critical for the accurate and effective functioning of payments, clearing and settlement processes through data deletion.

3. Disruption of Critical Industry-Wide Services

Disrupted **availability** of critical payments, clearing and settlement services of multiple institutions for an extended period of time.

4. Fraudulent Transactions Leveraging Central Infrastructure

Initiation of fraudulent transactions leveraging critical payments infrastructure.

5. Theft of Critical Non-Public Information

Compromised **confidentiality** of industry-critical non-public information in insider trading, market manipulating action or intelligence gathering.

To read about response and recovery strategies to combat these cyber-attacks, please read **DTCC's white paper on large scale cyber-attacks on the financial system.**

DTCC

Securing Today. Shaping Tomorrow.®

NEW WAYS OF WORKING TO DELIVER FOR CLIENTS

Learn How DTCC is Embracing Organizational Agility

In the fast-moving digital economy, organizational agility is a must-have core capability for success. Companies in the future will prosper largely on their ability to adapt their business and operating models to the fundamental changes being brought on by global market dynamics, technological advancements, and the evolving needs and expectations of clients and other stakeholders.

AT DTCC, our employees have embraced transformation, and today, they're leading change by embedding agile practices across the firm. Valden Paes, DTCC Managing Director and Head of Business Transformation, shares with us how DTCC, a highly regulated organization approaching its fifth decade of service, is at the forefront of defining a new way of working to better serve our clients and engage our employees. In the process, we're also proving that the organization can move fast, manage risk and bring to market high-quality solutions quicker than they've done in the past.

Q: Organizational agility has become a hot topic in the corporate world, but what exactly does it mean, and what makes it so effective?
VP: Agile principles have been used in software development for decades, and because they've proven to be so successful in creating a more collaborative, efficient and productive way of working, companies have begun adopting these methods more broadly. What we've found at DTCC is that by replacing traditional functional silos with cross-functional teams and aligning them by the same goals and priorities, we're better able to provide value to our clients at a much faster pace. It goes without saying that these changes have been supported by a robust training program, appropriate re-tooling of our systems and a very thoughtful employee-centered organizational change management, which is the secret sauce for building support and momentum.

Q: Can you give an example of how this new way of working benefits your clients?
VP: Sure. Last year, we re-architected our Global Trade Repository (GTR) service to support trade reporting in Singapore and Australia. If we had used our traditional approach, one team would have drafted the business requirements, another would have written the code, yet another would

have performed testing and so on – and often with little or no input from our clients or other stakeholders before delivery. Instead, we leveraged many of the elements I've described, including incorporating industry feedback early and often, to support a seamless go-live. And the results speak for themselves – 90% of clients reported satisfaction with the product release. There are many other success stories like this, including more quickly shutting down or pivoting projects that were not heading in the right direction. That's the value of organizational agility.

Q: These are impressive results, but for an organization that plays such a critical role in the marketplace and has the legacy and heritage of DTCC, is it necessary to make such a transformational change in your operating model?
VP: I can easily list a dozen companies off the top of my head that stayed the course when the times demanded that they evolve – and every one of them is no longer in business. The pace of change in financial services is so fast today that the only thing we can be certain of is that the post-trade landscape will look radically different five or 10 years from now. We need to change to stay competitive, or we run the risk of becoming irrelevant to our clients.

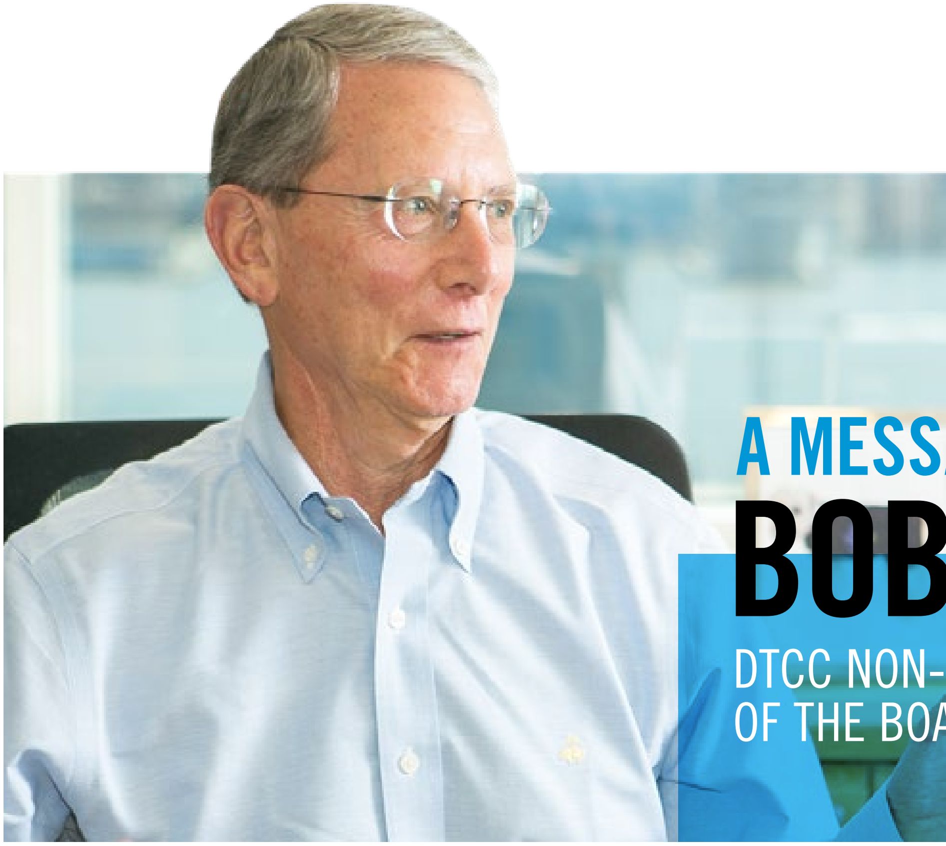
> *"If given the choice between defining our future and having it defined for us, that's an easy decision."*

Q: How did you select Enterprise Agile as a new operating model? What other options did you consider before deciding?
VP: We conducted a lot of research to gather ideas. We were already familiar with agile principles because our Institutional Trade Processing (ITP) business has been using them for some time, and we've also been leveraging it for many of our IT projects for about three years. We also visited companies like ING, Fannie Mae, ADP and even the Houston Astros, who were kind enough to share their agile journeys with us. It was eye-opening to understand how much more value we could create by making an enterprise-wide change to our operating model.

Q: Did you also seek input from employees?
VP: Absolutely. We sought feedback from our employees at different levels and across functions through a series of focus groups. We then brought in outside experts to help guide us. Over the course of several months, we held numerous design sessions to develop the blueprint that we're now implementing at DTCC. Since last year, we've piloted this new way of working in ITP, as well as GTR and our Equities business, and we're now in a continuous improvement mode in which we're learning from previous implementations and enhancing our approach as we further expand it across our other business lines.

Q: How long will it take for DTCC to become a fully agile organization?
VP: We're very pleased with the initial progress, and the businesses that are working this way are benefitting from the immediate impacts of change. These are great initial results, but the most important thing to remember is that agile is an ongoing journey that will allow us to continue to evolve in synch with the market and our clients. We will never be done, and that's a good thing!

Q: Let's fast-forward three years from now. What does DTCC look like?
VP: I expect that we'll operate in a completely different manner than we do today. We'll be a company where frequent stakeholder feedback is embedded into our processes, and we'll be able to consistently deliver high-quality solutions that solve our clients' most challenging issues. We'll make quicker decisions, experiment while still managing risk and foster a more client-centric mindset in all parts of the firm. Our employees will be fully empowered, and managers will be focused on removing roadblocks for their teams. And most importantly, we'll balance our responsibilities to protect the safety and integrity of the global financial system while remaining a leader in pioneering new ideas and continuing to serve the best interests of our stakeholders and the industry.



A MESSAGE FROM BOB DRUSKIN

DTCC NON-EXECUTIVE CHAIRMAN OF THE BOARD

Dear Stakeholder:

One of the many benefits of serving as non-Executive Chairman is the opportunity to work closely with my colleagues on the Board as well as Mike and his senior management team to help DTCC achieve its key objectives. There are many examples where this is evident, but none more so than in our strategic planning process, which the Board and management fine-tuned last year in response to industry feedback and evolving market forces. This level of partnership has become even more critical because the industry is facing greater uncertainty across a broader range of issues than at almost any other time that I can remember. As they've done in the past, our clients are looking to us to help them take significant costs and risks out of their operations.

In 2018, we partnered with senior management to proactively direct resources to the firm's most important and impactful initiatives — one of the Board's key responsibilities.

- Meeting or exceeding regulatory expectations remains a top matter for the Board, and we applaud management's efforts to work collaboratively with our supervisors to demonstrate compliance with the rules and mandates that govern the firm in all parts of the world, as well as to share details on our most important undertakings.
- Across all business lines, management continued to identify areas of opportunity to develop new solutions in cash securities processing and over-the-counter (OTC) derivatives. The Board has helped shape this agenda, providing guidance on ways to support our clients in achieving their goals and objectives.
- Strengthening DTCC's financial position has been a multiyear effort, and the firm has made great progress due to

its successful focus on increasing capital, reducing leverage and diversifying funding sources. As a result, DTCC has never been in a stronger financial position than it is today.

- Management's emphasis on creating an agile organization that can quickly pivot as market or client circumstances change is of great interest to the Board. We're supportive of the company's decision to embrace Agile management techniques, and we're pleased with how the firm is balancing this transformation while maintaining strong risk controls. We expect this transition will translate into an improved client experience, greater productivity and enhanced quality.

Another area of focus is the annual Board and Committee self-assessment survey, which we conduct to evaluate how effectively we operate and interact with each other and with senior management. In addition, we've continued to strengthen the Board by identifying and attracting new members who bring varied experiences and expertise to help drive the organization forward. I am personally grateful to the Board members for their support and commitment. They bring invaluable insight to our discussions and important perspectives to help us think creatively about the future.

In 2018, the Board bid goodbye to Lester Owens, Doug Shulman, Umesh Subramanian, Lee Waite and Lara Warner. Each of them served the industry and DTCC well during their time with us. We're thankful for their contributions and will miss their wise counsel. However, we're fortunate that an equally distinguished group of leaders has joined the Board — Shawn Feeney, Claudine Gallagher, Raj Mahajan, Joseph Molluso and Emily Portney. I have no doubt they will be strong partners in the years ahead.

Looking back on 2018, with its many successes, makes me excited for the year ahead. We have an engaged Board, a seasoned and talented management team, a crisp and defined strategy and an experienced and dedicated workforce that's always ready to take on new challenges. The goal for 2019 is, as always, to make sure DTCC delivers for our clients and the industry.

Sincerely,

Bob Druskin

10 YEARS OF ACHIEVEMENT

2008

DTCC successfully manages the largest liquidation in U.S. financial history, resolving $500 billion in exposure from the bankruptcy of Lehman Brothers with no financial loss to DTCC or its members.

DTCC manages 11 credit events in the thick of the financial crisis, including Lehman Brothers, Fannie Mae and Freddie Mac, totaling roughly $285 billion of credit default swap contracts. The firm's Trade Information Warehouse nets the actual payments down to $12 billion.

2009

As clients expand their trading activities globally, DTCC obtains regulatory approval for FICC's Government Securities Division to include direct participation by non-U.S. broker/dealers and banks, extending the safety and reliability of our services to our clients' counterparties.

2010

DTCC begins implementing upgraded intraday risk monitoring systems for NSCC and FICC, preparing to launch intraday margining for the two clearing agencies, taking new steps to mitigate risk.

2011

DTCC launches the first automated "Regulators' Portal," providing direct online access to OTC derivatives swaps data. The Portal contains data on market exposures on 98% of all CDS contracts registered in DTCC's trade repositories.

2012

DTCC averts a full-blown crisis when a technology problem at Knight Capital sends the markets into free-fall. Over four days, DTCC manages the settlement of erroneous trades and protects itself and clients from potential losses, helping to keep Knight solvent in the immediate aftermath of the event.

Despite Superstorm Sandy devastating DTCC's New York headquarters and vault, the firm seamlessly processes $19 trillion in transactions and meets all critical deadlines for clearing and settlement. The following year, DTCC completes the largest certificate recovery effort in history.

DTCC launches the Mortgage-Backed Securities (MBS) Central Counterparty, reducing risk and costs in the $100-trillion-a-year U.S. market by guaranteeing settlement of all matched MBS trades.

Three DTCC subsidiaries (NSCC, FICC and DTC) are designated Systemically Important Financial Market Utilities (SIFMUs) under the U.S. Dodd-Frank Act, reflecting the critical role the firm plays in the global markets.

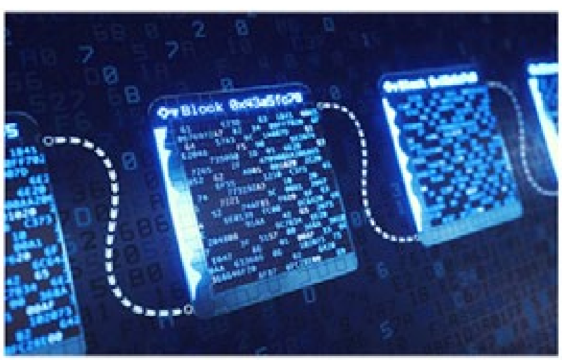
2013

DTCC's Global Trade Repository (GTR) service expands its global footprint by supporting trade reporting in Japan, Singapore, Australia and Hong Kong. At the time, DTCC's trade repositories held more than 8 million open swap positions and published 150,000+ weekly real-time messages.

DTCC acquires 100% of Omgeo, growing the firm's global footprint to 15 countries and expanding its subject matter expertise to cover all market segments across multiple asset classes.

2014

With new financial rules expected to transform the collateral market, DTCC partners with Euroclear to launch **DTCC-Euroclear Global Collateral Ltd.** to streamline collateral processing, while reducing risks and costs.



2015

As excitement over the potential of distributed ledger technology (DLT) sweeps across the industry, DTCC establishes an Office of Blockchain Strategy and Research (now the Office of Fintech Strategy) to coordinate the firm's research activities and prioritize use cases.

DTCC completes an $800 million capital raise to strengthen the firm's balance sheet and create opportunities for investments in key priorities, such as risk management, cyber defense and new product innovation.

2016

DTCC gains global recognition for its leadership on distributed ledger technology (DLT) with the publication of a widely-read **white paper**, hosting our first-ever Blockchain Symposium and making financial investments in **Digital Asset Holdings** and **Hyperledger Foundation**.

2017

DTCC helps lead the U.S. markets to shorten the settlement cycle for equities, corporate and municipal bonds and unit investment trusts to **T+2**.

DTCC fully integrates Omgeo into DTCC under a new business line, **Institutional Trade Processing (ITP)**, and launches **DTCC Exception Manager** to help solve the long-standing industry challenge of resolving trade fails.

DTCC launches one of the industry's largest and most complex digital transformation initiatives with the **re-platforming of the Trade Information Warehouse (TIW)** using distributed ledger technology (DLT) and the cloud.

10 YEARS OF EXPANSION

2008

6 Global Locations

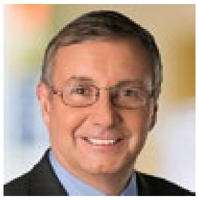
2,584 Global Employees

2018

22 Global Locations

4,509 Global Employees

BOARD OF DIRECTORS



MICHAEL C. BODSON

President and Chief Executive Officer, DTCC; President and Chief Executive Officer of DTC, FICC and NSCC

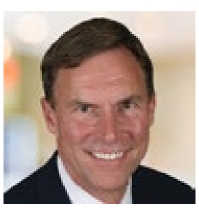
Michael C. Bodson is President and Chief Executive Officer of DTCC. He is also President and Chief Executive Officer of DTCC's principal operating subsidiaries, DTC, FICC and NSCC, and a member of DTCC's board of directors.

In his prior position as DTCC's Chief Operating Officer, Bodson had enterprise-wide responsibility for all Information Technology and Operations and oversaw DTCC Deriv/SERV LLC and EuroCCP. He previously served as Chairman of various DTCC subsidiaries, including Deriv/SERV and Omgeo.

Bodson joined DTCC in 2007 as Executive Managing Director for Business Management and Strategy. Prior to this, he held a number of senior management positions with Morgan Stanley over a 20-year period. In his last position at Morgan Stanley, he was Global Head of the Institutional, Retail and Asset Management Operations department. He previously served as Divisional Operations Officer for the Institutional Securities Group and Head of the Enterprise Information Group. He served as Head of Finance, Administration and Operations for Morgan Stanley Japan in Tokyo, and prior to that, he held similar responsibilities for Morgan Stanley Asia in Hong Kong. Prior to joining Morgan Stanley, Bodson worked at Bear Stearns and Price Waterhouse.

He is a CPA and graduated magna cum laude from Boston College. He currently is a member of the Board of Digital Asset Holdings and is a trustee of the World Economic Forum's Financial Services Initiative.

ROBERT L.D. COLBY

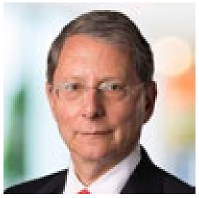


Chief Legal Officer of the Financial Industry Regulatory Authority (FINRA)

Robert L.D. Colby is the Chief Legal Officer of the Financial Industry Regulatory Authority (FINRA), which he joined in June 2012. In this capacity, he oversees FINRA's corporate and regulatory General Counsel functions, as well as FINRA's Advertising and Corporate Financing Departments, the Office of Hearing Officers and Dispute Resolution.

Previously, Colby was a partner in the Washington, DC, office of Davis Polk & Wardwell LLP, where he advised on regulatory and compliance matters involving securities and derivatives for financial institutions, markets and clearing organizations.

Before joining Davis Polk in 2009, Colby served for 17 years as Deputy Director of the Securities and Exchange Commission's Division of Trading and Markets. In that role, he was responsible for the regulation of broker-dealers, securities markets and clearing organizations. Previously, for 11 years he was Chief Counsel of the Division and Chief of the Division's Branch of Market Structure.



ROBERT DRUSKIN

Non-Executive Chairman of DTCC's Board and Chairman of the Board Executive Committee

Robert Druskin is Non-Executive Chairman of DTCC's Board and Chairman of the Board Executive Committee. Druskin served as Executive Chairman from April 2011 to December 31, 2015.

Previously, Druskin was Lead Director of E*Trade from May through December 2009, interim Chief Executive Officer from December 2009 to March 2010, and Chairman of the Board from December 2009 to March 2011.

Prior to that, Druskin spent nearly 16 years at Citigroup and its predecessor companies in a number of senior executive positions across the organization, including Chief Operating Officer and Member of the Office of the Chairman, Chief Operations and Technology Officer, and Chief Executive Officer of the Global Corporate and Investment Banking Division.

Druskin was with Salomon Smith Barney (and previously Smith Barney) for nine years and held a number of senior positions, including Chief Administrative Officer. Prior to joining Smith Barney, he was Chief Financial Officer of Shearson Lehman Brothers.

SHAWN K. FEENEY

Managing Director at Citigroup and Chief Administrative Officer for North America Markets and Securities Services

Shawn K. Feeney is a Managing Director at Citigroup and Chief Administrative Officer for Markets and Securities Services, which consists of institutional sales and trading, distribution and research activities spanning a broad range of asset classes and products. Previously, Feeney spent eight years as the Lead Finance Officer for Global Markets. He has also served as Global Fixed Income's Chief Financial Officer and its Chief Administrative Officer.

Feeney joined Citi in 1984 as a senior accountant in the Management Reporting Group at Salomon Brothers. He has also worked in Planning and Analysis, Controllers, Office of the Chairman, High Yield and Global Loans. From 1981 to 1984, Feeney worked as a staff accountant at Price Waterhouse.

At Citi, he is a member of the Policy Committee, Information Security Committee and 401(k) Investment Committee.

Feeney is a CPA and a graduate of Georgetown University's McDonough School of Business. He currently is Chairman and President of the American Bankers Association Securities Association (ABASA) Board of Directors.

CLAUDINE GALLAGHER

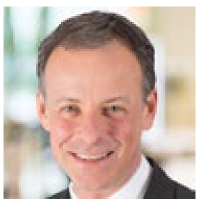
Managing Director and Americas Head of Securities Services, BNP Paribas

Claudine Gallagher is Managing Director and Head of Securities Services, Americas, for BNP Paribas. She is responsible for the strategic development of the region, spearheading its client and product development, and marketing initiatives. She joined the firm in 2012 as Head of North America for Securities Services.

Prior to joining BNP Paribas, Gallagher was an executive at J.P. Morgan for 10 years in a variety of senior management roles. In her most recent role there, she was global head of Depositary Receipts (DRs), a position she had held since 2006.

At BNP Paribas, she serves on various senior committees throughout the Bank, including the Executive Committees of the BNP Paribas Americas Territory and of BNP Paribas Securities Services.

She was named one of the '25 Most Powerful Women in Finance' by American Banker Magazine in 2016, 2017 and 2018. She is also on the Board of the French-American Chamber of Commerce in New York. Gallagher is a graduate of the University of Massachusetts with a Bachelor of Arts in French Literature and Bachelor of Business Administration in Finance.



DAVID S. GOONE

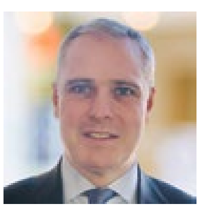
Chief Strategic Officer, Intercontinental Exchange (ICE)

David S. Goone is Chief Strategy Officer of Intercontinental Exchange, Inc. (NYSE: ICE). He is responsible for all aspects of ICE's product line, including futures products and capabilities for ICE's electronic platform.

Goone also represents ICE on industry boards including the Options Clearing Corporation and National Futures Association. Additionally, he is a Director of ICE Mortgage Services, the governing board of MERSCORP Holdings, Inc.

Prior to joining ICE in 2001, Goone was Managing Director and Head of Product Development and Sales at the Chicago Mercantile Exchange. Before joining the CME in 1992, Goone served as a Vice President at Indosuez Carr Futures, where he was instrumental in developing institutional and corporate business. Prior to joining Indosuez, Goone worked at Chase Manhattan Bank, where he developed and managed the company's exchange-traded foreign currency options operation at CME.

Goone earned a Bachelor of Science degree in Accountancy from the University of Illinois at Urbana-Champaign.



KIERAN HANRAHAN

Managing Director in J.P. Morgan Chase's Corporate and Investment Bank

Kieran Hanrahan is a Managing Director in J.P. Morgan Chase's Corporate and Investment Bank based in New York. Hanrahan is responsible for managing all aspects of the Corporate and Investment Bank's Global Markets Operations and also has regional responsibility for Latin American and EMEA Branch Operations.

Hanrahan manages a team of approximately 3,300 people located in 34 trading locations and service centers around the globe. His team manages the daily operational processes for a diverse range of businesses and products such as Bonds, Equities, FX, Listed and OTC derivatives, and Commodities. Prior to his current role, over the last 20 years, he has managed a number of Markets Operations and Product Control teams across Rates, SPG, FX, Credit Trading and Emerging Markets.

Hanrahan places an emphasis on building high performing teams and aligning his Operations team's goals with those of the businesses he supports. Key projects that he has managed for JPM include Euro Exit contingency planning, implementation of the Swap Margin Rule, MifiD2 and operational preparations for Brexit.

Prior to joining J.P. Morgan Chase, Hanrahan worked as an auditor with PwC in Ireland and the UK from 1991 to 1995. Hanrahan is qualified as a Chartered Accountant in 1996.

Hanrahan lives in Westchester with his wife and two children.

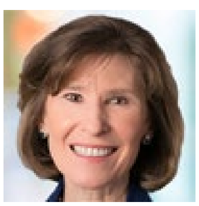
MICHAEL HERSKOVITZ

Director of Fixed Income Risk Operations and Technology and Co-head of Enterprise Operational Risk at AllianceBernstein

Michael Herskovitz is the co-head of Global Technology and Operations at AllianceBernstein. Herskovitz joined AB in 2006 from UBS, where he was the Managing Director of Risk and Finance Technology group. He has held senior technology management and quantitative research positions with Morgan Stanley, including the London-based role of International CIO, Merrill Lynch and Zurich Scudder Investments.

Over his 25+ year career in financial services, he has had extensive analytical and technical experience with fixed income, commodities, derivative products, regulatory compliance and risk management. Herskovitz has co-authored two books and many research papers on mortgage-backed securities pricing and analytics.

He holds a BS in operations research and an MS in industrial administration from Carnegie Mellon University. He has served as Chairperson of the Asset Managers Forum and is currently a member of SIFMA's Operations and Technology Steering Committee. In addition, he serves on the Boards of The Parris Foundation, Alliance of Resident Theatres/New York and National School Climate Center.



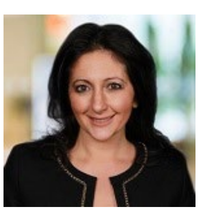
LORI HRICIK

Former Chief Executive Officer and Head of JPMorgan Treasury Services

Lori Hricik is the former Chief Executive Officer and Head of JPMorgan Treasury Services.

Hricik retired from JPMorgan in 2008, having become a globally recognized leader in delivering technology-driven treasury, cash management, liquidity, trade finance and information solutions to corporations, financial services companies and government entities worldwide. She worked extensively with the industry and regulators on global payments' initiatives.

Hricik joined Chase in 1976 from the Securities Industry Automation Corporation and had held a number of executive positions in technology, operations, administration and finance. She earned an MBA from Columbia University.



PINAR KIP

Executive Vice President, Global Strategic Operations, State Street

Pinar Kip is Executive Vice President at State Street and is the Global Head of the Client Delivery Management organization.

Previously, Kip held roles in leading Global Strategic Operations; Strategic Enterprise Business Solutions; Restructuring divisions and has served as the Design Lead for the State Street Beacon program. Within State Street, Kip serves as the executive sponsor of the company's Leadership Development Program and the New York Professional Women's Network.

Prior to State Street, Kip was strategy consultant with Booz & Company, with expertise in capital markets strategy and transformation. Additionally, she worked in Bank of America's Global Structured Finance division. Kip also serves on the board of directors for All In Together and Partnership with Children organizations.

Kip has attended Massachusetts Institute of Technology (MIT) and received two B.S. degrees in Electrical Engineering / Computer Science and Management Science with a minor in Economics. Kip has also received an MBA degree from Harvard Business School.

KATHLEEN B. LYNCH

Chief Operating Officer for UBS Americas and Wealth Management Americas (WMA)

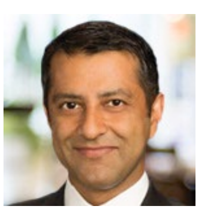
Kathleen B. Lynch has had a distinguished career in the financial services industry spanning more than three decades and including a range of senior executive roles.

Most recently, Lynch served as Chief Operating Officer for UBS Americas and Wealth Management Americas (WMA). She was a member of the firm's Combined U.S. Operations Management Committee and the WMA Executive Committee. She currently serves as a Non-Executive Director on the Board of Directors of UBS Americas Holding LLC.

As WMA COO, Lynch was responsible for the oversight of the front to back control environment and supported the execution of the business division's strategy, while also ensuring operational efficiency and effectiveness. Critical areas in her portfolio included technology and operations, risk management and UBS's regulatory framework. In her role as UBS Americas COO, Lynch focused on further integrating all of the firm's businesses and support functions across the region. She also supported the President of UBS Americas in all regulatory activities and oversaw the governance and control framework in the region.

Lynch joined UBS in June 2012 as an advisor to senior management on a number of key initiatives, including the strengthening of UBS's regulatory and operating framework in the Americas region.

Prior to UBS, Lynch was Chief Operating Officer of Bank of America Merrill Lynch Global Research, responsible for Publishing & Distribution, Supervisory Analysts, Business Management and various support functions.



RAJ MAHAJAN

Co-head of the Securities Division engineering organization within Goldman Sachs

Raj Mahajan is Co-head of the Securities Division engineering organization within Goldman Sachs. Previously, he was global head of Equities Electronic Execution Services. Mahajan first joined Goldman Sachs in 1996 as an analyst in the firm's commodities business and rejoined the firm as a partner in 2015.

Prior to rejoining the firm, he served as chief executive officer of Allston Trading, a Chicago-based market making firm. Earlier in his career, Mahajan was president of global trading at SunGard, which he joined in 2004 after the firm acquired Kiodex, the commodities trading technology company Mahajan co-founded in 2000.

A recipient of a Ford Foundation Fellowship, Mahajan earned an MPA with an emphasis on economics and Public Policy from Princeton University and a BA in Economics from the University of California.

GRAEME MCEVOY

Managing Director in the Global Operations division at Morgan Stanley

Graeme McEvoy is a Managing Director in the Global Operations division at Morgan Stanley, based in New York. He is the Global Head of Institutional Securities Group Operations, responsible for the operational support of the Trading and Sales functions of the firms ISG business lines. He joined Morgan Stanley in 2008 initially to run the Shared Services Operations team, and has been in his current role since 2013. Graeme previously spent 12 years at Goldman Sachs, in both London and New York, running the Operations team supporting the J Aron Commodities business and in other Operations roles in the Securities space.

Prior to joining the DTCC Board of Directors, Graeme served on the DTCC/Deriv Serv board and the DTCC/ITP Board of Managers. He is also a member of the SIFMA Operations and Technology Steering Committee.

Graeme graduated from Exeter University in the UK with a degree in History in 1991, and spent the early part of his career, prior to joining the financial services industry, serving as a Submarine Officer in the Royal Navy.

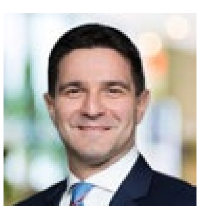
JOSEPH A. MOLLUSO

Executive Vice President and Chief Financial Officer of Virtu Financial

Joseph A. Molluso is the Executive Vice President and Chief Financial Officer of Virtu Financial where he is responsible for strategic planning, operational responsibilities and day-to-day management. Prior to joining Virtu, Molluso served as Managing Director, Investment Banking at J.P. Morgan from 2006 to 2013, where he provided strategic advice to financial institutions with a particular focus on market structure related companies including global exchanges, alternative trading venues, securities broker dealers, asset managers, futures commission merchants, market-making firms, retail and institutional electronic trading platforms, clearing firms, custodial and trust banks and other financial services firms.

Molluso began his career as an investment banker specializing in financial institutions including banks, insurance companies and broker dealers in 1997 at Donaldson, Lufkin & Jenrette and its successor, Credit Suisse Group.

Molluso received his M.B.A. from New York University in 1997, and his B.B.A. from Pace University in 1991.



JOSEPH NOTO

Managing Director and the Americas Treasurer for Barclays International

Joseph Noto is a Managing Director and the Americas Treasurer for Barclays International. As regional treasurer, Noto is a key officer to the Intermediate Holding Company (IHC), and is responsible for developing the capital and liquidity plan for the IHC and Consolidated US Operations (CUSO);

providing oversight for liquidity and capital adequacy for the IHC and CUSO including the annual CCAR process; and ensuring that all interest rate and FX risks associated with gathering of assets and liabilities for the IHC and CUSO are appropriately managed within allocated limits.

He joined Barclays in 2017 as the Global Head of Funding & Liquidity Management for Barclays International, where he is responsible for management of funding and liquidity for Barclays International businesses, including funding strategy to balance the appropriate funding mix and tenor, governance and controls associated with funding, and consolidated and legal entity planning and stress testing.

Prior to joining Barclays, he held a variety of treasury and business roles at Citadel, JP Morgan, Bear Stearns, and Prudential.

He is a CFA Charterholder, and holds an MBA from NYU Stern School of Business, an MA from Princeton University, and a BA from Drew University. He is a member of the Drew University Board of Trustees, where he is chairman of the Finance Committee.

EMILY PORTNEY

Head of Asset Servicing, Americas for Bank of New York Mellon Corporation

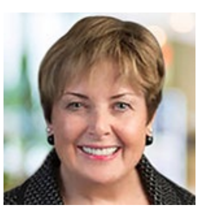
Emily Portney is Head of Asset Servicing, Americas for Bank of New York Mellon Corporation. In her role she leads the firm's Asset Servicing business in the U.S. and Latin America, and oversees BNYM's interest in CIBC Mellon, a joint venture in Canada.

She is a member of BNYM's Global Asset Servicing Executive Committee with direct ownership for BNYM's current and future product capabilities across custody, trust services, fund accounting and administration, as well as mid-office outsourcing.

Prior to joining BNYM, Portney was Chief Financial Officer for Barclays Bank PLC where she was responsible for Finance, Treasury, and Tax functions.

She is an active member of Executive Board of the Futures Industry Association, CME's Clearing House Risk Committee, CFTC's Market Risk Advisory Committee (MRAC), and CFTC's Global Markets Advisory Committee (GMAC).

Portney is a graduate of Duke University and holds an MBA from the Columbia Business School.



ANN N. REESE

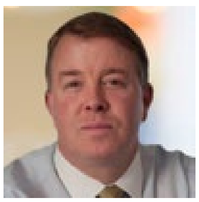
Founder and Co-Executive Director, The Center for Adoption Policy

Ann N. Reese founded the Center for Adoption Policy in New York in 2001 and serves as its Co-Executive Director. The organization provides research, analysis, advice and education to practitioners and the public about current legislation and practices governing ethical domestic and intercountry adoption. Prior to that, Reese served as a Principal with Clayton, Dubilier & Rice, a private equity investment firm, in 1999 and 2000. From 1995 to 1998, she was Executive Vice President and Chief Financial Officer of ITT Corporation, a hotel and gaming company.

Reese also serves as a Director on the Boards of Sears Holdings and Genesee & Wyoming Inc. She has extensive executive experience in corporate finance, financial reporting and strategic planning through her position as a public company chief financial officer as well as corporate governance expertise gained from her experience on other public company boards.

She is a Trustee of the University of Pennsylvania, where she is a member of the Executive Committee and chair of the Audit Committee. She is also a member of the Board of Overseers of the School of Social Policy and Practice (SP2) at Penn, and a member of the Trustees Council of Penn Women.

Reese has an MBA from the Stern School of Business at New York University and a BA from the University of Pennsylvania.



PAUL SIMPSON

Global Banking & Markets Operations Executive, Bank of America

Paul Simpson is the Global Banking & Markets Operations and Regions executive at Bank of America. He leads a team responsible for operations for institutional and commercial, corporate, investment banking and government clients, as well as small business and business banking clients. The team delivers end-to-end services, support and operations for sales, trading and underwriting businesses and comprehensive financial services solutions, including credit, depository, treasury and trade delivery and support. Simpson also leads the regional technology and operations teams in the Asia Pacific, Europe, Middle East & Africa and Latin America regions. Simpson is also responsible for robotics, and robotics process automation optimization across Global Technology and Operations.

Prior to this role, Simpson was managing director and global head of Equity Asset Management Services at Bank of America Merrill Lynch. He was responsible for multiple Global Markets businesses, including Prime Brokerage, Stock Loans, Swaps, Global Custody and Agency Services, Futures & Options, OTC Clearing and Foreign Exchange Prime Brokerage.

Simpson previously led the Global Transactions Services business, which included payments, liquidity and investments, receivables, trade and supply chain finance and custody and agency services. He has more than 28 years of experience working in the financial services industry, principally in treasury and trade services, public sector and commodities.

Prior to joining the bank in 2011, Simpson was with Citigroup as global head of Treasury & Trade Solutions in the Global Transaction Services group. He joined Citi in 2007 as head of Global Public Sector & Healthcare Markets. Previously, Simpson was with JP Morgan Chase in roles with increasing responsibility within Treasury Services, Public Sector and Healthcare. Earlier in his career, he spent time with Deutsche Bank as head of eCash Solutions and head of Trade Services; and with ANZ Banking Group in Trade and Commodity Finance.

He holds a B.S. in Russian from Georgetown University and an MBA in Finance, Economics and International Business from New York University Stern School of Business. He also studied in Moscow at the Pushkin Institute.

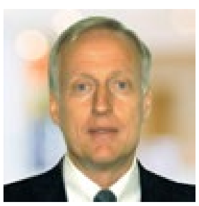
GARY H. STERN

Former President and Chief Executive Officer, Federal Reserve Bank of Minneapolis

Gary H. Stern was President and Chief Executive Officer of the Federal Reserve Bank of Minneapolis from March 1985 to September 2009. Stern joined the Federal Reserve Bank of Minneapolis in January 1982 as senior vice president and director of research. Before joining the Minneapolis Fed, Stern was a partner in a New York-based economic consulting firm. Stern's prior experience includes seven years at the Federal Reserve Bank of New York.

Stern serves on the board of directors of the Council for Economic Education (CEE) and Heller-Hurwicz Economics Institute of the University of Minnesota. Stern is co-author of Too Big to Fail: The Hazards of Bank Bailouts, published by the Brookings Institution (2004). Stern is a member of the FDIC's Systemic Resolution Advisory Committee.

Stern holds an A.B. in economics from Washington University, St. Louis, and a Ph.D. in economics from Rice University, Houston. He formerly served as chair of the board of the Northwest Area Foundation, The Minneapolis Club, and Blue Cross Blue Shield of Minnesota. He was also a board member of FINRA, the Dolan Company, Minneapolis College of Art and Design, and ETS. Stern is the recipient of the 2009 Visionary Award from CEE and the Distinguished Alumnus Award from Washington University's College of Liberal Arts in 2010.



JOSEPH WEINHOFFER

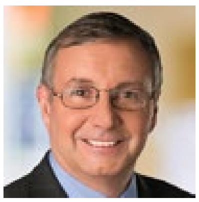
Treasurer and Chief Investment Officer of EDF Man Capital Markets Inc. (MCM)

Joseph Weinhoffer is Treasurer and Chief Investment Officer of EDF Man Capital Markets Inc. (MCM) with responsibility for firm financing, capital management, bank relationships, investing client segregated assets and supervising the Prime Services business.

Prior to joining MCM in 2014, Weinhoffer was a Managing Director at Mitsubishi UFJ Securities (MUS) responsible for U.S. Treasury, repo and stock loan. Before joining MUS in 2009, Weinhoffer was at Annaly Capital Management where he established RCap Securities. From 2001 until 2008, Weinhoffer was the Founder and CEO of Quadriserv, a stock loan marketplace. Prior to Quadriserv, Weinhoffer served at Morgan Stanley, Merrill Lynch and Bank of New York. Prior to his civilian career, Weinhoffer served in the U.S. Army for five years.

Weinhoffer is a graduate of the United States Military Academy and the Columbia Business School and is CFA and CAIA chartered.

MANAGEMENT COMMITTEE



MICHAEL C. BODSON

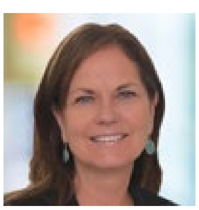
President and Chief Executive Officer, DTCC; President and Chief Executive Officer of DTC, FICC and NSCC

Michael C. Bodson is President and Chief Executive Officer of DTCC. He is also President and Chief Executive Officer of DTCC's principal operating subsidiaries, DTC, FICC and NSCC, and a member of DTCC's board of directors.

In his prior position as DTCC's Chief Operating Officer, Michael had enterprise-wide responsibility for all Information Technology and Operations and oversaw DTCC Deriv/SERV LLC and EuroCCP. He previously served as Chairman of various DTCC subsidiaries, including Deriv/SERV and Omgeo.

Michael joined DTCC in 2007 as Executive Managing Director for Business Management and Strategy. Prior to this, he held a number of senior management positions with Morgan Stanley over a 20-year period. In his last position at Morgan Stanley, Michael was Global Head of the Institutional, Retail and Asset Management Operations department. He previously served as Divisional Operations Officer for the Institutional Securities Group and Head of the Enterprise Information Group. He served as Head of Finance, Administration and Operations for Morgan Stanley Japan in Tokyo, and prior to that, he held similar responsibilities for Morgan Stanley Asia in Hong Kong. Prior to joining Morgan Stanley, Bodson worked at Bear Stearns and Price Waterhouse.

Michael is a CPA and graduated magna cum laude from Boston College. He currently is a member of the Board of Digital Asset Holdings, American Red Cross Metropolitan New York North Region and is a trustee of the World Economic Forum's Financial Services Initiative.



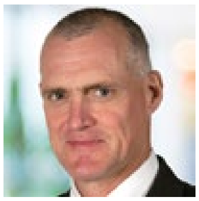
SUSAN COSGROVE

Managing Director and Chief Financial Officer

Susan Cosgrove is Managing Director and Chief Financial Officer, leading DTCC's global finance and treasury teams and overseeing the company's financial processes and liquidity and capital position. She is also responsible for strategic sourcing, real estate, corporate services and location strategy.

Susan was previously Managing Director and General Manager of Settlement and Asset Services, overseeing all depository businesses. Prior to this role, she was the General Manager for DTCC's Equity and Fixed Income Clearing Services. Susan is a member of DTCC's Management Committee and Management Risk Committee, and she co-chairs the firm's Investment and Operating Committee. She is also a member of the DTCC ITP Board of Managers and the Board of Directors for Deriv/SERV and PENCIL, a not for profit organization leading collaboration between business and public education communities.

Prior to joining DTCC in 1999, she served as a Senior Vice President at Lehman Brothers in charge of Audit and Compliance for the company's Americas division. Before Lehman, she worked at Maxcor Financial Group for 10 years as Chief Financial Officer and Head of Compliance. Susan began her career as a Senior Auditor for PricewaterhouseCoopers in their Financial Services Group.

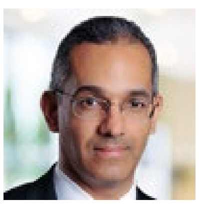


ROBERT GARRISON

Managing Director and Chief Information Officer

Robert Garrison is DTCC's Managing Director and Chief Information Officer, with enterprise-wide responsibility for the ongoing development and testing of all the technology that supports DTCC's post-trade infrastructure, communications networks, processing and messaging systems, and the IT applications underlying DTCC's broad range of products and services.

Bob became CIO in July 2011. Prior to joining DTCC in October 2010 as a Managing Director and Chief Development Officer of the Information Technology division, Bob spent 25 years at Morgan Stanley working in various senior technology-leadership positions.

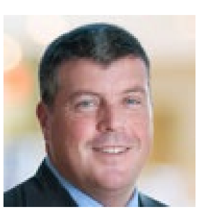


ANDREW GRAY

Managing Director and Group Chief Risk Officer

Andrew Gray is Managing Director, Group Chief Risk Officer, with global responsibility for all aspects of DTCC's Risk Management, including Credit, Market & Liquidity Risk, Operational Risk Management and Systemic Risk, Information Security and Technology Risk Management, Business Continuity Management and Global Security Management. Andrew also has responsibility for DTCC's Enterprise Data Management program. Prior to this role, Andrew served as Managing Director, Core Business Management, with overarching responsibility for DTCC's businesses, including Clearance and Settlement of Equities and Fixed Income products, Asset Services, Wealth Management Services, Insurance & Retirement Services, Omgeo and Data Services as well as the firm's Marketing & Communications function. Andrew serves on the Board of the International Securities Services Association (ISSA) and is a member of the Board of Trustees of Global Association of Risk Professionals (GARP).

Before joining DTCC in September 2009, Andrew spent more than a decade with Merrill Lynch. Most recently, he served as Managing Director and Chief Operating Officer for Merrill's Latin American and Canadian businesses. Prior to that, he was a Managing Director in Strategy and Business Development for Merrill's Global Markets and Investment Banking businesses and for Global Securities Research & Economics. Previously, Andrew was a principal at Booz-Allen & Hamilton, the global management consulting firm.



TIMOTHY KEADY

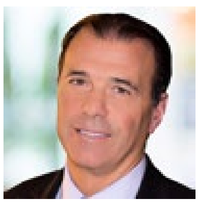
Managing Director and Head of DTCC Solutions

Timothy Keady is Chief Client Officer (CCO) and Head of DTCC Solutions. In his role as CCO, Tim leads

DTCC's sales, relationship management, global solution delivery and marketing & communications functions, which support the company's global client base and drive increased enterprise-wide client value across all services. As Head of DTCC Solutions, Tim is responsible for overseeing DTCC's Derivatives and Collateral, Institutional Trade Processing and Data Services businesses as well as DTCC's joint venture, DTCC-Euroclear Global Collateral Ltd.

Previously, Tim served as Managing Director, Sales & Solution Delivery, for Omgeo prior to DTCC's acquisition of the firm. In this role, he oversaw the sales, relationship management, global partners, global marketing, sales planning & execution and integration teams. Before joining Omgeo, Tim was an account executive at Thomson Financial ESG. He has also held sales positions at Fidelity Investments Institutional Services Co. and Keystone Mutual Funds.

During his more than two-decade career in financial services, Tim has created multiple programs, products and initiatives that have successfully secured strategic partnerships, streamlined processes for maximum efficiency and penetrated new, international markets. He has consistently played a key role in recognizing clients' needs and aligning them with revenue-enhancing solutions worldwide.

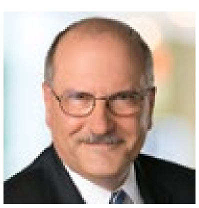


ANTHONY PORTANNESE

Managing Director and Chief Human Resources Officer

Anthony Portannese is Managing Director and Chief Human Resources Officer. He's also a member of DTCC's Executive Committee and Operating Committee. He is responsible for leading all global human resources activities, including the planning, design and delivery of corporate compensation and benefit programs, executive compensation programs, employee relations, talent strategies and diversity.

Portannese joined The Depository Trust Company (DTC) in 1981. During his career at the company, he has held numerous leadership roles within Human Resources, Operations, Real Estate and Corporate Services. He was promoted to Managing Director in 2005 and serves as Chair on the Foundation Board of the Borough of Manhattan Community College.



MURRAY C. POZMANTER

Managing Director and Head of Clearing Agency Services and Global Ops

Murray Pozmanter is Head of Clearing Agency Services and Global Operations and Client Services. He has responsibility for the development and marketing of products and services related to DTCC's post-trade processing of transactions across DTC, NSCC, and FICC. In addition, Murray oversees DTCC's Global Operations and Client Services teams.

Prior to joining DTCC in 2007 as Managing Director, Murray was at Nomura Securities for 18 years, where the last position he held was Managing Director and Head of U.S. Operations. At Nomura, Murray was responsible for all fixed-income, equity and derivatives operations for all U.S. subsidiaries of Nomura Holding America. Before joining Nomura, Murray spent six years at Salomon Brothers Inc.

He is a member of the Treasury Market Practices Group, as well as SIFMA's Funding Division Executive Committee and Operations and Technology Steering Committee. He has also been a member of DTCC's Operations Advisory Committee.

ANN SHUMAN

Managing Director and General Counsel

Ann Shuman is General Counsel of DTCC, responsible for overseeing the company's legal, compliance, corporate governance and regulatory relations functions. She was appointed General Counsel in February 2017 and serves as a member of DTCC's Management Committee. She has extensive experience with financial services regulation, particularly the regulation of central counterparties.

Ann joined DTCC in January 2014 as Managing Director & Deputy General Counsel. Prior to joining DTCC, Ann was Managing Director & Deputy General Counsel of CME Group Inc. Ann served as a senior executive at CME Group for thirteen years, holding positions of increasing responsibility in the legal and corporate development functions, in which she worked on many of the company's significant strategic transactions.

Prior to joining CME Group, Ann practiced law at Sidley & Austin in Chicago. Ann received her B.A. from Trinity University in 1990 and her J.D. from the University of Chicago Law School in 1996, and served as a law clerk to the Hon. E. Grady Jolly of the U.S. Court of Appeals for the Fifth Circuit.

CHAPTER 2

DELIVERING CLIENT VALUE

OUR ACCOMPLISHMENTS

DTCC remains committed to providing solutions that reduce risk and increase transparency across the industry, as we have for more than 45 years. In this section, our team members from around the world share with you how we're delivering upon key initiatives to strengthen the security and resiliency of the capital markets, pioneer new industry-wide post-trade solutions and increase the value of our existing services.

CYBERSECURITY

JASON HARRELL

Executive Director, Head of Business and Government Cybersecurity Partnerships

Cybersecurity incidents are the single greatest threat to the global financial markets today. In recent years, we've seen the scale, scope and complexity of attacks increase, which means that we must always be on the offensive. Our primary focus is on preventing an incident before it occurs, but if a cybercriminal does penetrate our defenses, we need to be able to recover quickly. While we have many tools and resources at our disposal, we're continually improving our capabilities as well as advancing industry-wide discussions on ways that the industry can work together to share knowledge and information.

2018 Highlights & Achievements

- Delivered new white paper with Oliver Wyman to further industry dialogue around cybersecurity resumption and resiliency, a paper with the International Securities Servicers Association (ISSA) outlining current cybersecurity offerings and their risk management capabilities, and a paper with the Institute of International Finance (IIF) to further educate supervisors on the need for regulatory coordination.
- Joined and actively participated in a new consortium led by the World Economic Forum to strengthen cybersecurity for fintech providers and data aggregators.
- Partnered with the IIF and Financial Stability Board (FSB) to further supervisors' understanding of operational and cyber resiliency challenges.
- Actively supported the development of the FSSCC Cybersecurity Profile on behalf of the financial market utilities to further the sector's regulatory coordination efforts.

EQUITIES INFRASTRUCTURE

JOHN ABEL

Executive Director, Settlement Product Management

Each day, we process a massive volume of financial transactions to keep the global markets operating safely and efficiently. We're building on this legacy with a plan to further modernize DTCC's U.S. equity post-trade infrastructure. One initiative, known as settlement optimization, will reimagine how transactions are processed to further enhance and accelerate settlement. We've been partnering with a working group of clients to develop a number of proposals that will deliver significant benefits to the industry with minimal industry investment.

2018 Highlights & Achievements

- Began industry testing of "night cycle reengineering," the first component of settlement optimization, which will improve night settlement rates to lower risk and exposure. Implementation is scheduled for 2019.
- Continued collaborating with an industry working group to further improve early settlement rates to drive settlement finality.
- Advanced efforts to offer an alternative DTC settlement process for Continuous Net Settlement Transactions (CNS) to reduce intraday funding needs and NSCC margin requirements, with the final proposal expected by the end of 2019.
- Launched paper detailing DTCC's vision for the evolution of the U.S. equities market structure, unveiling a series of proposals to provide seamless access to new shortened settlement processing options, both pre-and post-trade.

REPOSITORY AND DERIVATIVES SERVICES

KATE DELP

Executive Director and General Manager, GTR Americas

One of the legacies of the '08 financial crisis was the introduction of trade repositories, including the DTCC trade repositories that provide our Global Trade Repository (GTR) service. These sophisticated databases of critical trade information have brought an unprecedented degree of transparency to the OTC derivatives marketplace and given regulators new insights into systemic risks. Since then, we've been using our expertise to expand the GTR service to include more asset classes and jurisdictions and identify new ways to deliver more value from reported data. I have a lot of pride knowing that we're helping our clients meet their reporting obligations in the most efficient way possible while also reducing risk in this multi-trillion-dollar global market. In the years to come, we're going to build on this legacy.

2018 Highlights & Achievements

- Re-architected the GTR platform for reporting to the Monetary Authority of Singapore (MAS) and the Australian Securities and Investments Commission (ASIC), increasing usability and value for clients.
- Expanded the GTR service in Singapore to support equities and commodities trade reporting in support of new MAS rules.
- Received approval to expand the GTR service to support Swiss Reporting (FinFraG).
- Began to support EU Securities Financing Transaction Reporting (SFTR) requirements by issuing a new white paper, establishing partnerships with a wide range of firms and delivering a one-stop SFTR solution.
- Opened a Dublin office to continue providing regulatory reporting services for clients in the EU27 and the UK post-Brexit.
- Recognized as the Trade Repository of the Year by FOW and Regulation Asia.

FIXED INCOME INFRASTRUCTURE

JIM HRASKA

Managing Director and General Manager, FICC Services

Central clearing has been a staple of the U.S. fixed income markets for a long time, with eligible firms taking advantage of the risk management capabilities and capital efficiencies offered by our clearinghouse. However, its true potential remains untapped, with opportunities to reduce risk even further by extending membership to additional participants and by adding new capabilities and asset classes. Bringing this activity into clearing addresses many of the risk and resiliency issues highlighted in the TMPG White Paper on Clearing and Settlement and a recent U.S. Department of the Treasury Report.

2018 Highlights & Achievements

- FICC's Government Securities Division (GSD): Continued efforts around the Sponsored Service, which allows FICC netting members to sponsor Qualified Institutional Buyers' (QIBs) deliverable activity into clearing, bringing increased capacity, safety and transparency to the market. On April 1, 2019 DTCC announced that it had received SEC approval to expand the service to enable a broader category of market participants to participate as sponsors, including Dealers, non-US Banks and Prime Brokers (referred to as Category 2 Sponsoring Members).
- FICC's Mortgage Backed Securities Division (MBSD): Continued to expand operational novation, which made FICC the central counterparty for all transactions and created a TBA netting feature resulting in 65% of trades now being settled for net cash movements rather than securities. These enhancements have provided capital benefits as well as operational efficiencies in fail management, fail tracking and confirmation, principal and interest tracking, and conditional prepayment rate claims.
- Contributed extensive content in the support of the TMPG white paper focused on the clearing and settlement capabilities in the U.S. Treasury market.

RISK MANAGEMENT

BASIL GEORGE

Associate Director, Risk Management, Business Analysis

Despite the many enhancements to financial stability over the past decade, we know that the next crisis will likely be different because the nature of risk has evolved dramatically in recent years. As a critical market infrastructure, we need to stay ahead of this curve so we're prepared to prevent or mitigate the impact of a future systemic shock. To accomplish this, we've expanded the remit of the risk organization, reoriented our view of risk to look at the landscape more holistically, and invested in people, tools and technology to transform our approach to managing risk and our risk management systems. Today, we're building on these achievements to create state-of-the-art capabilities and extending our platform to our clients to protect the safety and integrity of the global financial system.

2018 Highlights & Achievements

- Introduced new margining models for the Government Securities Division (GSD) of FICC and NSCC to further address risks related to pro-cyclicality and member portfolios to promote robust risk management, safety and soundness across the industry.
- Continued efforts around the Capped Contingent Liquidity Facility (CCLF) to further support the repo market should a netting member default. The CCLF would enable DTCC's FICC subsidiary to access additional liquidity in the event that its other liquidity resources were deemed insufficient, providing adequate resources to meet settlement obligations to non-defaulting netting members.
- Launched an NSCC client calculator and portal and GSD client calculator, enabling clients to achieve new insights and transparency into their risk management calculations, requirements and potential liquidity needs.
- Progressed use cases leveraging emerging Big Data technology and artificial intelligence/machine learning techniques in areas of cybersecurity anomaly detection, technology incident management, counterparty credit risk surveillance and market risk exposure modeling.

GLOBAL PUBLIC POLICY

LAURA ASTRADA & ALI WOLPERT

Executive Directors, Global Public Policy

Building strong relationships with policymakers and sharing our knowledge with them is an important part of protecting the safety and soundness of the global markets. This has become even more critical in a fast-moving environment where regulations are sparking changes in market structure and issues like cyberattack and the emergence of fintech are raising new questions. We see our role as helping our clients navigate the policy landscape and working with regulators and lawmakers to better understand the financial services industry's legal and operational framework and the challenges facing firms.

2018 Highlights & Achievements

- Secured language in EMIR 2.2 for EU equivalency with the U.S. central counterparty (CCP) regulatory regime to streamline compliance implications for our clients and provide continued access to DTCC's CCPs under existing policies.
- Shared our expertise on fintech and data with policymakers globally, including participating in the European Commission's EU Cloud Computing Stakeholders Group & DLT Harmonization Group and the Commodity Futures Trading Commission's (CFTC) Technical Advisory Committee, as well as briefing key members of the U.S. Congress.
- Advocated for trade reporting rule harmonization globally, including common data fields, to increase the value of reported data and improve systemic risk monitoring.
- Worked with the Monetary Authority of Singapore to permit eligible Singapore institutions to directly clear certain U.S. securities for the first time, allowing greater counterparty risk mitigation, balance sheet and capital relief, and growth of on-loan balances and income.

SYSTEMIC RISK

ADRIEN VANDERLINDEN

Executive Director, Systemic Risk Office

The safety and soundness of the capital markets is critical to the global economy, so we actively identify and monitor potential systemic risks that could jeopardize the security of the industry. We focus on raising awareness across a wide range of risks, from the threat of a cyberattack to how fintech could impact market safety. We also continually monitor and enhance our own risk management capabilities to make sure we're resilient and able to recover from shocks with minimal disruption. We've gained deep expertise in risk management over the course of more than 45 years of managing risk for the industry, and we share that knowledge through white papers and at conferences, as well as by engaging with regulators and our clients on the most effective strategies to protect the safety and security of the financial system.

2018 Highlights & Achievements

- Issued "The Next Crisis Will Be Different," a white paper that outlined new risks that have emerged since the 2008 financial crisis.
- Published the annual Systemic Risk Barometer Survey, highlighting the top threats in financial services.
- Hosted quarterly Financial Market Infrastructure Forums with chief risk officers and risk leaders to identify collaborative strategies to address emerging risks impacting infrastructure providers and the industry.
- Led discussions with regulators, clients and industry bodies globally to raise awareness of risk trends and drive best practices in risk management.

WEALTH MANAGEMENT SERVICES

JOSEPHINE TORELLI & YANA GRANOVSKIY

Executive Director & Director, Wealth Management Services

Mutual funds are still using manual processes like faxing, phone calls and emails to provide details of upcoming corporate actions to their intermediary partners. This is inefficient, resource intensive and not scalable; it increases operational risk and ultimately impacts shareholders of the fund. We have a long history of automating critical processes across the mutual funds industry over the course of nearly three decades, and we continue to solve problems like this with innovative solutions that leverage our expertise in risk mitigation, technology and thought leadership.

2018 Highlights & Achievements

- Collaborated with our clients to develop and launch MF Info Xchange, a new centralized communications service for the mutual fund industry.
- Actively participated in and hosted the MF Info Xchange working group with our clients to identify future requirements for the service.

COLLATERAL MANAGEMENT

DAVE PERRY

Director, GlobalCollateral Product Manager

Collateral management processes have become more complex and costly since the introduction of uncleared initial margin requirements several years ago. With additional initial margin rules expected to go live in 2019 and 2020, even more firms will need to meet heightened regulatory requirements and the resulting expected increase in margin calls. To address these demands and ensure improved scalability, we're developing solutions to optimize collateral management processes and make them more efficient while lowering operational, counterparty and liquidity risks. At the same time, we're also helping firms to take a longer-term view, focused on liquidity and capital management, with straight-through processing (STP) efficiencies helping to meet these objectives.

2018 Highlights & Achievements

- Enhanced DTCC-Euroclear GlobalCollateral Ltd. Margin Transit Utility (MTU) with segregated account workflows, standardized reporting and improved triparty reporting.
- Grew MTU community, moving past the pilot stage and integrating almost 50 buy-side and sell-side firms, custodians, triparty providers and collateral management vendors committed to leveraging the service.
- Worked with members of ISITC, ICI, SIFMA AMG, FIA, and ISDA to continue the discussion around the evolving collateral management landscape and how best practices can reduce risk and increase transparency.

STRATEGIC PRICING

LYNN REEN

Executive Director, Financial Planning & Analysis and Pricing

As a member of the finance team, we're always looking for ways to better serve our clients — starting with making sure our pricing and billing align to client value. Over the last year, we've been working on a strategic pricing initiative that simplifies fee structures and increases transparency into how bills are calculated. We also worked hard to ensure our pricing changes incent industry best practices and behaviors to enhance market efficiency. We completed the strategic pricing review of our core services and are excited to extend this work to other businesses in the months and years ahead.

2018 Highlights & Achievements

- Developed comprehensive framework to evaluate all future pricing decisions to ensure consistency and alignment across the firm.
- Completed a restructuring of pricing across our Systemically Important Financial Market Utilities (SIFMU) businesses, NSCC, FICC, DTC, as well as Wealth Management Services, to simplify structure, reduce complexity and provide transparency (launched in Q1 2019).

- Continued efforts to review the pricing structure across our Institutional Trade Processing (ITP) suite of services, with a new ALERT® pricing structure to be launched later in 2019 to better align value and cost.

INSTITUTIONAL TRADE PROCESSING

JOSEPH CAPABLANCA

Executive Director, Head of Relationship Management, Asia

Clients tell us that with settlement cycles continuing to compress, they're facing increased pressure on operations, and costs and complexity continue to rise. In many cases, firms are managing time-sensitive business processes across multiple teams, technologies and time zones. We're responding by integrating our Institutional Trade Processing (ITP) solutions and further streamlining the trade life cycle, from trade agreement to settlement finality. We've recently launched DTCC Exception Manager (DXM), our solution to capture and assist clients in the resolution of trade exceptions in order to promote timely settlement. In the longer term, we'll deliver our ITP post-trade services via a single platform so users can benefit from a completely no-touch workflow across the full post-trade lifecycle.

2018 Highlights & Achievements

- Launched DXM service, with 30 signed investment managers and 20 data submitters.
- Partnered with Symphony to enhance DXM capabilities around issue resolution by enabling the use of secure chat providers.
- Advanced the strategy that will unify ITP post-trade services on a single platform, including the exception management capabilities of DXM, the central matching features of CTM™ and the standing settlement instruction capabilities of ALERT®.

DATA SERVICES

DAN MAGARINO

Executive Director, Head of Product Management, Data Services

In today's global markets, having access to the right data can make all the difference when faced with important business decisions. At DTCC, we're focused on identifying new ways to provide data to help our clients become more efficient and informed. It's been a collaborative effort. Our clients have shared their challenges around risk management, regulatory reporting, capital adequacy, liquidity and market transparency, and we have responded with new solutions that leverage our data, technology and analytical tools. Over the past year, we launched two new services – Equity Kinetics and a real-price observation data service prototype for capital management –designed to address some of these challenges.

2018 Highlights & Achievements

- Launched Equity Kinetics to enable users to view, track and analyze aggregated U.S. equity trade volumes over time and in the context of broader market activity.

- Established a 30+ member FRTB pilot group representing all major jurisdictions and financial centers to define and design a new real-price observation pooling solution.
- Launched the initial DTCC FRTB Real-Price Observation Data Service prototype for industry review.

CHAPTER 3

REIMAGINING THE FUTURE

EVOLVING THE RISK MANAGEMENT DISCIPLINE

With Andrew Gray
Managing Director, Group Chief Risk Officer

BUILDING INTELLIGENT RESILIENCE

Intelligent resilience is a phrase we coined to describe how risk managers can use strategic data analysis and informed decision-making to more effectively predict future shocks and understand ways to recover efficiently should a market event occur. The concept requires investing in people, processes and technology. Our people would set the strategy and leverage technology for data collection and consolidation. Using artificial intelligence (AI) or machine learning, they could conduct analyses across the extended enterprise by extracting insights from massive data sets, detecting patterns and supporting faster adaptation of risk models through automated learning. Technology opens the door to developing a more sophisticated and predictive risk management program in the future.

HARNESSING THE CRITICAL HUMAN FACTOR

Technology is playing a more prominent role in most firms' risk management programs, but it has certain limitations, particularly when it comes to decision-making. The human element of risk management is essential for setting overall strategy, establishing a strong risk management culture and developing an approach for qualitative decision-making, the delegation of responsibility within an organization, and, of course, ensuring technological complacency is avoided. People are also essential for interpreting the output and applying the right level of judgment to how that information is used. Fintech's true value is as an enabler of more advanced risk management, but it's not a substitute for a comprehensive risk management strategy.

IDENTIFYING THE PATTERN OF ATTACK

One of the most promising areas of artificial intelligence (AI) is its ability to identify what we call the "Pattern of Attack" – that is, the indicators, behaviors and sequence of actions of cyber-criminals that could help to identify them or the attacks they launch. Much like a detective uses this approach to solve crimes in the physical world, our team is beginning to use AI to do the same in the digital arena. AI can help us understand cyber-criminals and their actions in a completely different way than previous technologies allowed.

POWERING FINTECH WITH HIGH-QUALITY DATA

Robotics and artificial intelligence (AI) can transform how firms manage data, but the power of these technologies is dependent on creating a foundation of high-quality data governed by proper frameworks and disciplines. That's because there's an inherent synergy between data and AI. Data is the fuel that powers AI, so the richer the data, the smarter the technology is in identifying trends. The key to this is for firms to adopt a data-driven philosophy – and a rigorous data management program is the first step in building that culture. This will enable the necessary practices, standards and controls to ensure high quality of data, which is not only foundational for the business, but is essential for using advanced technologies to manage risk.

STRENGTHENING THE INFRASTRUCTURE

With Murray C. Pozmanter
Managing Director and Head of Clearing Agency Services and Global Ops

GAINING TRADING INSIGHTS WITH AI

Businesses are investing heavily in more precise algorithms and faster computing power as artificial intelligence (AI) promises to turn mountains of data into competitive insights that can fuel business growth. At DTCC, we're exploring the possibilities of using cognitive technology and data mining to dramatically enhance our clients' understanding of their trading activity or, as with our Mutual Fund Profile Service II, give them unparalleled speed, accuracy and capacity to make sense of the overwhelming volume of data in mutual fund prospectuses. AI is allowing us to significantly improve data management capabilities in a flexible, innovative system that's continuously learning, growing and adapting.

PUSHING THE LIMITS OF DLT

A question I often get asked is whether DLT will be a transformative technology. It all depends on if it can meet the performance levels and scalability for adoption in high-volume, regulated markets. A benchmark study we conducted last year with Accenture demonstrated that the technology can support U.S. equity market trading volumes. These were groundbreaking results, and they served as a critical starting point for understanding how DLT could potentially be used for trade settlement. While this study generated a lot of excitement, we still need to determine if DLT will be able to meet the resiliency, security, operational needs and regulatory requirements of the existing clearance and settlement system.

USING ADVANCED ALGOS TO ACCELERATE SETTLEMENT

One of the most important lessons we've learned over the years is that innovation in fintech is usually built on a foundation of things we already know. The key to thinking about a challenge differently is to look at it from a new perspective or toss out all assumptions. For example, what if we could reimagine, from scratch, the system for processing securities transactions? What would be possible today that wasn't previously imaginable? That's how we brainstormed ways to accelerate settlement in the U.S. after the transition to T+2. The system hadn't changed fundamentally in over two decades, but when we reframed the issues, the creativity began to flow. This enabled us to take a huge step forward with our proposal for Settlement Optimization – an innovative, automated algorithmic-driven enhancement to the settlement cycle.

STRIKING A BALANCE BETWEEN OLD AND NEW

Firms are experimenting with fintech and investing in R&D at record levels, but innovation is beneficial only if it creates a stronger value proposition – and with it, increased safety, stability and resiliency across the global marketplace. The key is to understand how to use the infrastructure that's been proven over many decades, while still taking advantage of new systems and processes optimized for the future. As we've learned with several use cases involving distributed ledgers, the best solution doesn't always require the newest technologies. Sometimes, enhancing existing systems and processes yield better results than building something from scratch.

ENHANCING THE CLIENT EXPERIENCE

With Timothy Keady
Managing Director and Head of DTCC Solutions

DELIVERING A FULLY-INTEGRATED DIGITAL ECOSYSTEM

When you look at financial firms today, they're often using a patchwork of siloed platforms for their post-trade processing. This maze of legacy technology is costly to maintain, increases risk and limits organizational agility. When speaking with clients, they want a synchronized and integrated ecosystem that can be accessed through a single entry point, linking matching, settlement and asset servicing, with simple navigation to ancillary services and accessible from multiple digital channels. This vision seemed outside the realm of possibility just a few years ago, but with advances in technologies like cloud computing, APIs and distributed ledgers, creating a fully-integrated digital ecosystem could be a reality in the not-too-distant future.

TRANSFORMING CLIENT ONBOARDING

One of the top challenges across the industry is onboarding products and services to new and existing clients. It can be a complex and lengthy process. At DTCC, we're trying to solve this by creating a simple and convenient one-click onboarding process for our Global Trade Repository (GTR) service. It's been successful in eliminating manual data errors and expediting contract signing as our clients prepare for Brexit. We're bringing this same thinking to other parts of the process, including exploring how bots can help us reduce the time it takes to onboard a service. And as we build out new self-service capabilities using technology, we're freeing up our people to focus their time on more strategic client matters.

LEVERAGING CLOUD IN SERVICE DELIVERY

Cloud computing has been around for years, but most financial firms were hesitant to leverage the technology because it lacked the strict security, privacy and compliance controls required in a highly-regulated industry. Many of these challenges have been addressed, although more progress is needed before we can move the most critical applications off premises. Despite that, we've had success overhauling our legacy IT infrastructure using the cloud, including employing the technology for our real-time swaps data reporting. That initiative reinforced the value proposition of cloud computing – you can spin up an environment quickly, test out assumptions at minimal cost and succeed quickly or fail fast.

GAINING NEW CLIENT INSIGHTS

Our primary job as a service provider is to meet and exceed the expectations of our clients. We take advantage of many different feedback loops to gain insight into their unique requirements, but cognitive technology and advanced data analytics have the potential to elevate our understanding of our clients' pain points and even help us to identify trends so we can develop solutions before a problem arises. It's like the concept of Apple inventing the iPod before any of us knew we needed a pocket-sized device to carry our favorite music. Fintech is allowing our people to gain deeper insights into our clients' likes, dislikes, behaviors and patterns, which is essential to delivering the world-class service they deserve.

NAVIGATING THE REGULATORY LANDSCAPE

With Mark Wetjen
Managing Director, Head of Global Public Policy

REGULATORY OVERSIGHT OF FINTECH INNOVATIONS

Integrating fintech into the fabric of financial services requires more than proving the technology can enhance market efficiencies or reduce costs. We need to be certain that innovations like distributed ledgers and artificial intelligence won't negatively impact the safety and soundness of the system. This is a top priority of regulators and policymakers, who are consulting at a global level through international standards bodies like the Financial Stability Board (FSB) and the International Organization of Securities Commissions (IOSCO). Finding a balance between promoting innovation, safeguarding stability and maintaining investor confidence will require ongoing engagement and a collaborative partnership among policymakers, regulators and the industry.

A POST-TRADE FRAMEWORK FOR TOKENIZED SECURITIES

Large institutional market participants have made limited investment in crypto-assets due, in part, to a lack of regulatory certainty and infrastructure to support this asset class. For the market to grow in the institutional space, we believe certain fundamental issues must be addressed. First, if the implementation of a crypto-asset or token meets the definition of a security, it should be traded on a regulated platform. Second, international standards, such as the Principles for Financial Market Infrastructures (PFMI), in addition to specific regulatory requirements currently in place, may prove helpful when determining which post-trade responsibilities should apply to security token platforms. Until issues like these are resolved, platforms may fail to attract institutional participation, limiting growth and integration into the markets.

COLLABORATION KEY ON CYBER POLICY

As the frequency of cyberattacks on the financial sector continues to increase, regulators have been proactively emphasizing a focus on resilience and encouraging best practices to protect the safety of the system. Unfortunately, because these mandates are often introduced at the local level and by multiple, different agencies, firms are forced to comply with different requirements, terminology and approaches, creating unnecessary complexity and dueling priorities. Greater policymaker collaboration across jurisdictions is needed to harmonize approaches and build consensus on developing principle-based rules to establish a consistent and efficient regulatory regime. The industry is taking steps to support this approach by working to harmonize a cyber-security lexicon and create a standardized list of terms that can be used by regulators, providers and market participants globally when establishing policy.

CHAPTER 4

BUILDING COMMUNITY

THE YEAR IN REVIEW

Support of the communities where we operate, a diverse workforce and an inclusive work environment are cornerstones of our culture and drive employee engagement. In this section, we share how embracing the unique perspectives of our employees enhances our capacity to innovate, adapt to change and create effective solutions that meet the evolving needs of our clients.

MESSAGE FROM KEISHA BELL

HEAD OF DIVERSE TALENT MANAGEMENT AND ADVANCEMENT

After nearly 15 years with DTCC, I'm excited to step into a new role that's a top priority for the company and a subject that's very close to my heart – increasing diversity across our ranks. Over the years, I've had the opportunity to apply my skills in Risk Governance and Product Management at the firm. Each of these experiences showed me that diversity is one of the most important success factors in solving the increasingly complex and global challenges we face as an industry. We're proud that we've scored well against other industries with regard to race and ethnicity, but like many of our colleagues in financial services, the results of our actions have not always matched the passion of our words when it comes to the representation of women.

In looking at DTCC's D&I journey, we've accomplished so much since we established a Diversity Council and our first Business Professional Networks (BPNs) nine years ago.

DTCC is a very special place to work, and we confront challenges like this head-on. That's why I'm confident that we will solve the diversity issue and succeed in recruiting, retaining and promoting diverse talent and further strengthening our culture of inclusivity. Our Business Professional Networks (BPNs) transcend business lines and geographies and, as I can tell you from my own involvement in several of them, they've given my colleagues and me new avenues for personal and professional development.

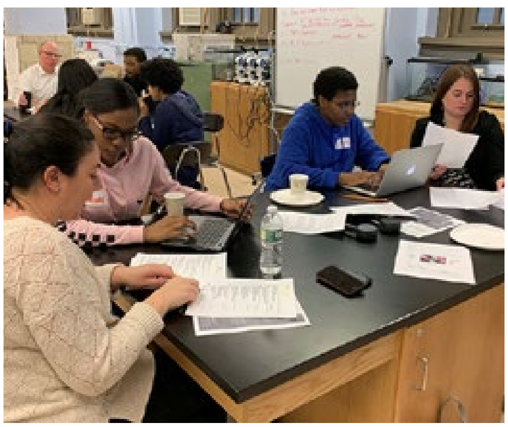
In recent years, we've also made great progress in developing future diverse leaders with new emerging talent programs targeting IT and Operations for black and Hispanic employees, expanding leadership training across demographic groups and creating our "Voices of Inclusion" initiative to promote conversations about race in the workplace. Next on our agenda is introducing programs and processes to help us achieve greater diversity so that individuals from all groups are appropriately represented at all levels.

I'm very excited about our journey ahead, but I'm also realistic that change takes time, patience and commitment. In the near term, our focus will be on advancing women of all diversities and backgrounds in leadership positions. DTCC's employee population overall is about 63-percent men, 37-percent women – and only 30-percent of women are officers – so we have plenty of room to expand women's leadership opportunities.

I'm also going to work in partnership with my colleagues to elevate our conversations and practices to further strengthen our culture of D&I. To me, diversity means everyone has a seat at the table – where the table looks like society at large. Inclusion means that everyone you've invited to sit there feels welcome and recognized. What's more, everyone has a vital role to play as agents of change. DTCC's D&I journey is not just for gay people, or black women, or Latinos, or any other group: it's for all of us, together.

I consider my new role the job of a lifetime. But my success will be determined by whether I'm able to create similar opportunities for my current and future colleagues of diverse backgrounds. I'm excited to get started and look forward to working with my partners at DTCC and across the industry to make a positive difference on such an important issue.

TRAINING TOMORROW'S TALENT



DTCC works with several organizations to help build a strong pipeline of talent that's ready to take on the complexities of the modern workplace, including mastering emerging technologies. Our 5-year partnership with PENCIL, a leader in aligning schools, eager students and career professionals for mentoring and internships, is one example of how we're investing our time and resources to train tomorrow's professionals. More than 20 Jersey City employees, including Jeanine D., volunteer with PENCIL to work with students at the Hudson High School of Learning Technologies to explore career paths, build financial literacy, support college readiness and prepare them for internships with the firm. Here is what Jeanine has to say:

"It's been rewarding to volunteer for PENCIL. I'm able to share my professional experiences with high school students and explain the numerous twists and turns of my own career. We talk about the various factors that may influence their career choice and that some of those factors may change during the course of their professional life, so they shouldn't worry too much that a particular college or course will box them into a certain field or industry for their entire career.

"At our monthly sessions with students, we cover topics like personal branding, resume building and interviewing so they can begin preparing for life after school. It's been an incredibly rewarding experience to show students how what they are learning through the PENCIL program relates to their future by providing real-world exposure.

pencil
TRANSFORMING SCHOOLS. TOGETHER.

HUDSON HIGH SCHOOL
OF LEARNING TECHNOLOGIES
THE SCHOOL OF AWESOME - NEW YORK CITY

"I remember a conversation with a student who wants to be an accountant. She was excited to get an internship at a major accounting firm, but disappointed that she wouldn't be doing accounting work. I explained to her that this was a wonderful opportunity to get her foot in the door and to work hands-on in a professional environment, and gain connections with professionals in her field of interest.

"These young men and women have so much potential. It's so fulfilling when you break through and help them recognize that they have a lot to offer in the workplace."

GROWING STRONGER COMMUNITIES

Christine L. of DTCC Wrexham shares her perspective on volunteering at Nightingale House and how meaningful she and her colleagues find their time spent there.

Strong, healthy communities are essential for people to build stable and productive futures. That's why we partner with organizations across the globe that focus on alleviating poverty and increasing economic stability by connecting individuals to local services and job training.

In our Wrexham office, for instance, employees annually choose three charities they would like to support. Our ability to select a cause that is near and dear to our hearts is important because we're passionate about neighbors helping neighbors.

We consistently selected Nightingale House Hospice because the work is so meaningful and relatable to our own personal lives and families. Some of our employees have had close relatives who have spent time at Nightingale and they often talk about the high-quality support they and their families have received from the caring hospice staff.

We do many things at the hospice to make a difference, and this provides our employees with the opportunity to give back and allow other families the opportunity to see their loved ones pass away peacefully. During 2018, for instance, we sponsored the annual Nightingale House Color Run, and we also supported two UK-based employees in fundraising activities such as bake sales, pub quizzes, pool tournaments and raffles so they could take part in a once-in-a-lifetime trip to trek The Great Wall of China in support of Nightingale House.

I love that I get to join with my colleagues to support such a wonderful organization like Nightingale House Hospice as part of my job at DTCC. There's nothing better than giving back to the community where we live and work.

Nightingale House Hospice provides free palliative care services to local patients and their families, along with bereavement support for children and young people.

OUR CORPORATE SOCIAL RESPONSIBILITY PILLARS

Expanding Access to STEM Education

We work to improve access to education in STEM subjects (science, technology, engineering and math) to build a pipeline of future talent in the diverse communities where we work.

Increasing Economic Stability and Inclusion

We partner with organizations that work to alleviate poverty and increase economic stability by connecting individuals to community services and job training.

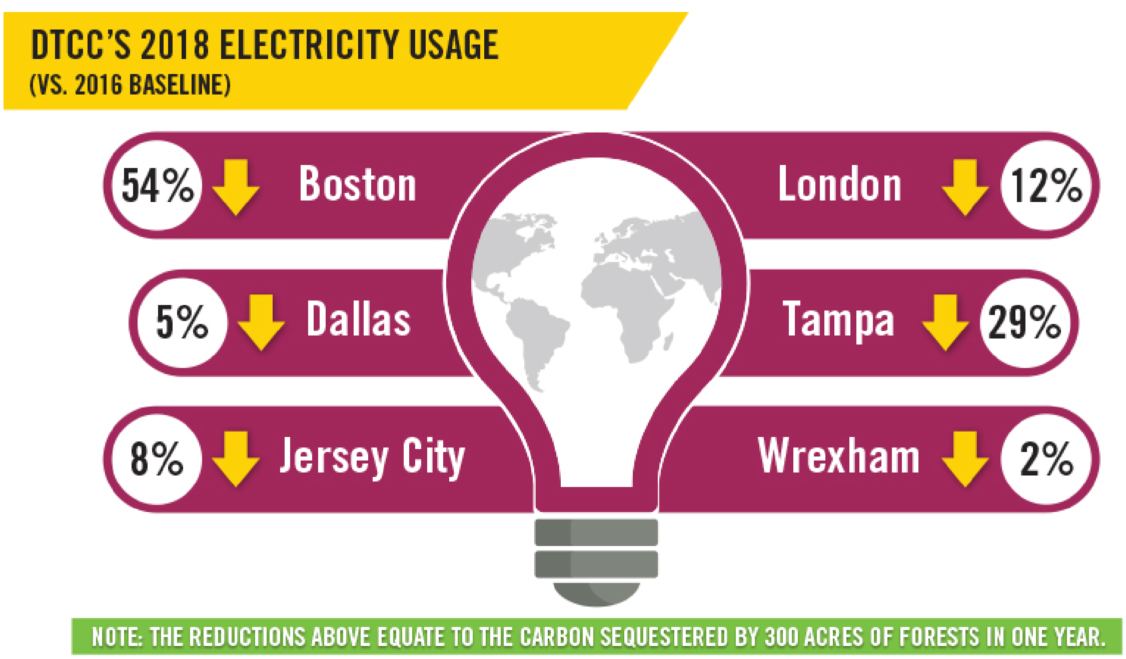
Promoting Environmental Conservation and Sustainability

We promote environmental sustainability by actively recycling and conserving resources, optimizing efficiencies in our workplaces, and encouraging environmentally responsible behavior from our employees.

MINIMIZING OUR FOOTPRINT

As a financial technology company, it's only natural for us to embrace innovation — and that includes ways we can become more energy efficient and reduce our environmental impact. We accomplish this by supporting environmental sustainability and conservation through various initiatives globally. Our Workplace Design and Services team has created programs focused on making our operations more efficient, and is committed to identifying ways to use fewer resources like energy, water or paper to minimize our environmental impact and reduce our operating costs.

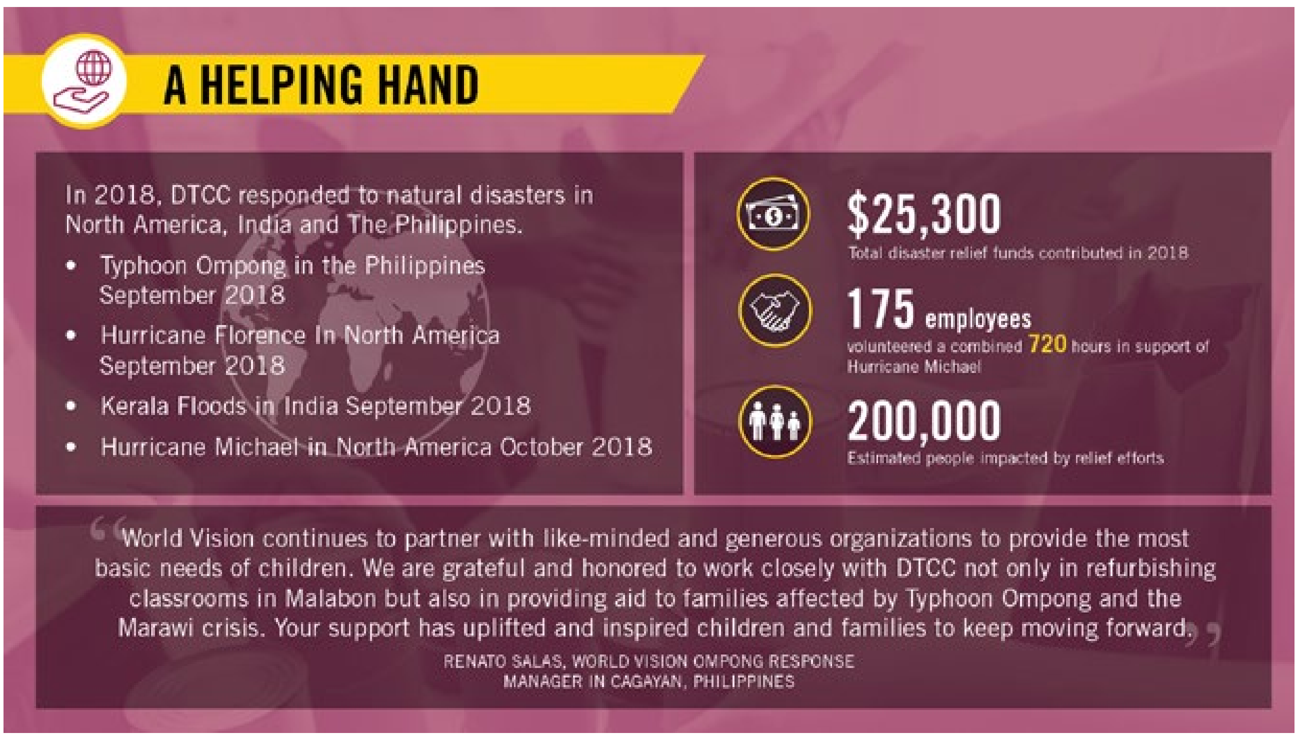
In 2018, we continued to research and implement leading technologies and practices, including transitioning to LED lighting, replacing and upgrading end-of-life equipment and conducting a monthly analysis on our power usage to identify and address better ways for conserving energy. We also pursue LEED (Leadership in Energy and Environmental Design) certification – a widely used green building rating system – or the local equivalent at all our global offices, ensuring we use only the most efficient products and processes in our global facilities.



A HELPING HAND

We believe in the power of practical compassion to provide rapid relief to local communities following natural disasters. When a crisis strikes, our people want to make a difference, so we've have partnered with the Red Cross, World Vision Philippines, UNICEF and UNHCR to provide critical emergency relief following all kinds of natural disasters, including floods, hurricanes and earthquakes.

Each disaster is unique, and we know from experience that it's impossible to accurately predict the real scale of needs people will have. That's why we develop disaster relief funding based on where the disaster is occurring and the impact to our employees and the communities in which we operate. This includes providing corporate funding and matching gifts on a case-by-case basis.



CONNECTING OUR PEOPLE WITH OUR COMMUNITIES

We know that our people gain the greatest fulfillment when pursuing volunteer and fundraising activities that have personal meaning to them. That's why we encourage employees to find causes they want to support across our CSR pillars and even beyond. For some, that means lending their time and skills to rebuild neighborhoods, clean up beaches and waterways and feeding the homeless, while others offer job readiness training with military veterans. And to support volunteering outside the office, every employee receives paid time off to work with a charity of their choice.

In 2018, DTCC and its employees donated $750,000 in total contributions to more than 300 organizations worldwide.

To maximize our impact, we also provide matching gift programs for both individual donations and group fundraising events. In fact, several employees set up their own fundraising drives to benefit different causes and initiatives they care about.

AMERICA'S BEST MID-SIZE EMPLOYER

We know DTCC is a great place to work, but we were still delighted to be recognized in 2018 on the Forbes list of America's Best Mid-Size Employers, which ranks companies that excel in creating a work environment where employees feel happy, inspired, and well-compensated. More than 30,000 Americans rated their own employer and nominated organizations in other industries. The final list ranked the 500 large and 500 mid-size employers that received the most recommendations.

Although specific to the U.S., we believe this award reflects the work environment of our entire company. Silvia S. from DTCC Tampa knows this. She sees the company's success is the result of each employee's individual achievements and their ability to partner across teams. In her seven years with DTCC, Silvia was encouraged to pursue her own personal development – and she's taken advantage of these opportunities by obtaining a Master of Science in Information Systems degree.

In this video, Silvia S. shares how DTCC is invested in its employees' career development and growth and how this translates into creating a dynamic and engaged workforce.

EXPANDING ACCESS TO STEM EDUCATION

Creating a vibrant workforce means thinking differently about how we educate and support today's students so they have the skills they need to thrive. We believe that inclusive access to STEM education will do more than create the next generation of talent for our industry. It will bring an even greater innovative mindset to future employees of financial services and other industries around the world.

With that goal, we focus on providing funding to organizations that expand access to science-based education for students in underserved communities, and in volunteering with partner organizations to share our knowledge and expertise. Working with our community partners allows us to see first-hand the impact of our support on our future leaders.

As we aim to bridge the gap between what industries need and what schools teach our children, our goals are to build a diverse and powerful STEM workforce – adding new voices, different perspectives and creative ideas that will enhance the global economy.

Watch highlights of our webcast on "Building STEM Talent for the Workforce of Tomorrow" featuring a roundtable discussion with experts from DTCC, BNY Mellon, the Center for K12 STEM Education at NYU's Tandon School of Engineering and the Center for Talent Innovation.

WHAT WE VALUE

While our commitment to diversity is based on our belief that every person has unique and valuable experiences to share, we also want to create a community where our employees feel welcome and their ideas are respected – a home away from home. Being a considerate employee and coworker should be a given in the workplace, and at DTCC, it's an expectation that fosters a positive work environment, which results in boosted morale and better business results too. We're proud that we continue to achieve impressive scores in Diversity & Inclusion and Considerate Treatment on our employee engagement surveys, with both ratings above the global benchmark.

In this video, Rholda T. from the DTCC Jersey City office recounts why she considers DTCC to be her second home – a place where she is valued not only for her skills and contributions but also for her uniqueness.

DAY OF UNDERSTANDING

Like all things in life, today's workplace has evolved considerably, and so, too, has our understanding about the positive impact an open and inclusive environment has on employee engagement. By embracing diversity, embedding it in an inclusive environment and taking the actions necessary to recognize the full scope of people's identities, we are creating a positive atmosphere that enables employees to deliver outstanding results to our clients.

On December 7, 2018, we took an important step to advance inclusivity by hosting A Day of Understanding at our U.S. offices, joining many other firms across sectors to create greater trust, openness and compassion among our workforce. The Day of Understanding is the brainchild of Tim Ryan, senior partner and chairman of PwC US, and promoted by CEO Action for Diversity and Inclusion, the largest CEO-driven business commitment to advance diversity and inclusion in the workplace.

As part of the event, DTCC hosted Mary Frances Winters, author of We Can't Talk About That at Work, to lead a discussion on how to broach sensitive topics like politics, religion, race, gender and sexual orientation in a positive way and how to create a supportive environment that encourages greater understanding.

More than 600 people in Jersey City attended the Friday afternoon event. Here are the reflections of two employees:

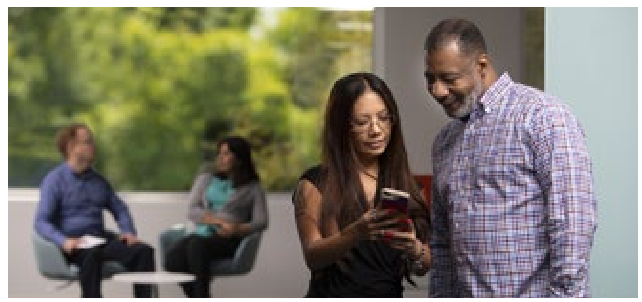
"The Day of Understanding showed that DTCC's position on diversity and inclusion is more than the current hot topic. DTCC is actively working on improving diversity in all aspects and that is visible from the tone at the top. Mike [Bodson, DTCC's CEO] genuinely wants everyone to feel like they're part of a great team, to feel safe being different and bringing their authentic selves to work. Focusing on

diversity is not exclusive but a way to value all employees – and that's why this is a unique place to work. I don't have to minimize my life experiences or downplay my hardships. We may look different on the surface, but once we take the time to understand and get to know each other, we then see our similarities."
– Deanna B., Internal Audit

"I was pleased to hear our guest speaker, Mary Frances [Winters], acknowledge that it can be really uncomfortable to talk about sensitive topics at work. We're taught to minimize conflict. But sometimes it's just about hearing another person out and knowing where they're coming from. You shouldn't expect two people to approach things the same way. It's that higher level of understanding – acknowledging differences and understanding that neither you or I need to change – that's what inclusion really means."
– Tracy D., Human Resources

BRINGING YOUR REAL SELF TO WORK

Claude G. from DTCC Tampa shares how DTCC makes him feel valued in a way he's never experienced before in his professional career.



For the sixth consecutive year, DTCC was recognized as a "Best Place to Work for LGBTQ Employees" after again scoring a perfect 100% on the Human Rights Campaign Corporate Equality Index.

"When I leave my house each morning, I don't need to hide who I am before I walk into work. I get to be exactly who I am, and I know I have the support of my company and my colleagues. The policies are very clear here, which is important, but it's the actions we take as a company as well as the partnership of my colleagues that make everyone feel accepted.

"Creating the LGBTQ Business Professional Network (BPN) was a big step. Like many firms, we have a lot of support for our Pride Month activities, but what makes DTCC unique is the feeling of inclusion. And the BPN plays a big role in fostering and promoting that culture. As a former co-lead for the BPN for many years and a current member of the BPN's Steering committee, I've taken on the responsibility to give back to my co-workers by increasing knowledge of LGBTQ issues, sharing our experiences and creating a safe place for people who aren't out at work or who just want to be part of a positive and vibrant community.

"One of the most impactful partnerships we've developed is with PFLAG, who has helped us foster an inclusive environment by reaching out to the straight community and holding onsite workshops to talk about matters that are often avoided in the workplace, such as transgender issues. There was a lot of uncertainty when we began this outreach, but our colleagues were true to their DTCC values and we were able to break down barriers and build deeper relationships among employees. I'm truly appreciative that I have the opportunity to work here and can act as a force for positive change."

SALUTING OUR VETERANS

Cristina P. from DTCC Tampa and co-lead of DTCC's Veterans' Business Professional Network (BPN) explains how DTCC supports active and retired military personnel.

“One of the difficult things for veterans entering the workforce is transitioning from the military to a corporate environment. It may also be one of the overlooked aspects when hiring veterans. I became a U.S. Air Force Reservist straight out of high school and was also a college student and held a full-time job at that time. Following 9/11, I was called into active duty. When my service time had ended, the transition back to a work environment was challenging and it took some time to adjust, so I can relate to others in the same situation.

“About five years ago, we formed the Veterans’ BPN to help ease the transition of our new veteran employees as well as employees who have spouses and family members that have served or who are actively serving, by having a support network in place with colleagues who’ve shared the same experience. But what happened during those early days amazed me – dozens of people who never served in the military volunteered to join the BPN. They wanted to show their appreciation to our veteran community and help them succeed professionally. Over time, the percentage of our membership made up of civilians has continued to grow.

“One of our most satisfying accomplishments was when a BPN member questioned DTCC’s military leave policy, which at that time was three days per year. We knew we could do better, so we raised the issue to our executive sponsors, who took it on as their own and, working together with us, we were able to update the policy to four weeks. This is a huge benefit to our active military reservists because it gives them time to fulfill their military duties without having to use their vacation days. It says a lot about DTCC that one person’s voice could lead to such an important change.”

CHAPTER 5

FINANCIAL PERFORMANCE

A MESSAGE FROM SUSAN COSGROVE

DTCC CHIEF FINANCIAL OFFICER

Dear Stakeholder:

I am delighted to report that DTCC delivered another strong financial performance in 2018, exceeding targets and further strengthening the firm's financial position. Net income attributable to DTCC was $296 million before payment of our preferred dividend, up $131 million from 2017. Bottom line growth was primarily driven by high trade processing and reporting volumes, alongside continued expense discipline, as well as the impact of our improved effective tax rate of 14 percent, the result of U.S. corporate income tax reform and the favorable settlement of a multi-year state income tax audit. Excluding the net impacts of non-recurring items primarily related to impairment of certain assets, gains on sales of businesses, a state tax audit settlement and the adoption of legislation in the U.S., The Tax Cuts and Jobs Act, adjusted net income was $255 million in 2018, or $45 million higher than in 2017.

As we've seen in recent years, heightened financial market volatility again drove significant increases in volumes. In 2018, this resulted in a 10-percent year-over-year revenue increase across our core clearing and settlement businesses. Revenues from our three Systemically Important Financial Market Utilities (SIFMUs) — The Depository Trust Company (DTC), Fixed Income Clearing Corporation (FICC) and National Securities Clearing Corporation (NSCC) — were $1.16 billion, up $105 million from 2017. This, coupled with continued strong performance of our Global Trade Repository (GTR), Trade Information Warehouse (TIW), and Institutional Trade Processing (ITP) businesses, brought total DTCC revenues to $1.78 billion.

To deliver the highest value to our clients, we launched a strategic review of our fee structure and pricing across all DTCC products and services in 2018. As a result, the Government Securities Division (GSD) of FICC implemented a new streamlined pricing model last July, and in January 2019, we implemented fee consolidation and simplification for clients of DTC, FICC's Mortgage-Backed Securities Division (MBSD) and NSCC. Furthermore, we are advancing similar improvements for clients of Institutional Trade Processing (ITP), Derivatives and Data Services, which we expect to implement later in 2019. DTCC also launched an online portal to give clients greater visibility across their total relationship with us, as well as access to transaction detail to support deeper and more insightful business analytics. The feedback has been positive, and we plan to continue exploring opportunities to enable clients to source additional insights from their transaction data.

A key area of investment last year was in defining and shaping the digital transformation of the post-trade infrastructure. DTCC's leadership in advancing the use of fintech, such as cloud capabilities, distributed ledgers, artificial intelligence and robotics, is intended to improve the efficiency and stability of the capital markets, as well as to enhance our internal business processes and operations. We expect this to remain a primary area of focus for the foreseeable future.

DTCC, along with our SIFMU businesses, continue to maintain high credit ratings from S&P and Moody's due to our robust risk management framework, our unique market position as the centralized infrastructure for the U.S. capital markets and our financial strength. As a key imperative, we have reduced long-term debt to $36 million, and our frozen defined benefits plan's year-end funded ratio was a healthy 97-percent.

In 2018, we increased our free available cash and further strengthened DTCC's resiliency by growing tangible equity by approximately $300 million to $2 billion, up 20-percent. This enabled us to increase investments in our strategic recovery and wind-down plans that are focused on providing continuity of critical services and sustaining capital market resiliency in the event of extreme or catastrophic market conditions.

Overall, 2018 was another positive year for DTCC as we improved our financial position, funded strategic investments in financial and market transformation, and sustained a well-controlled and reliable post-trade market infrastructure for our clients. We look forward to continuing on this positive trajectory in 2019.

Sincerely,

Susan Cosgrove

PERFORMANCE DASHBOARD

TOTAL VALUE OF SECURITIES PROCESSED

2018

$1.854
QUADRILLION

2017
$0
QUADRILLION

2016
$0
QUADRILLION

TOTAL VOLUME OF SECURITIES TRANSACTIONS SETTLED

2018

389 MILLION

2017

369 MILLION

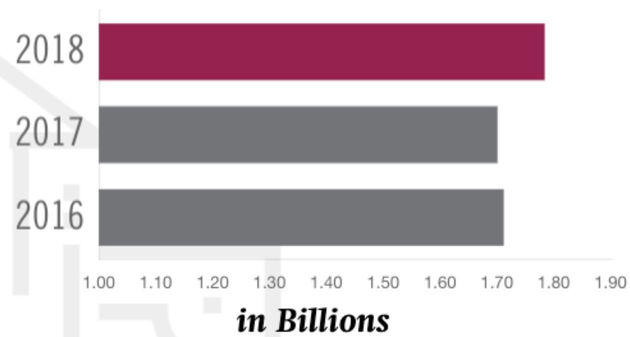
2016

356 MILLION

TOTAL REVENUE

2018

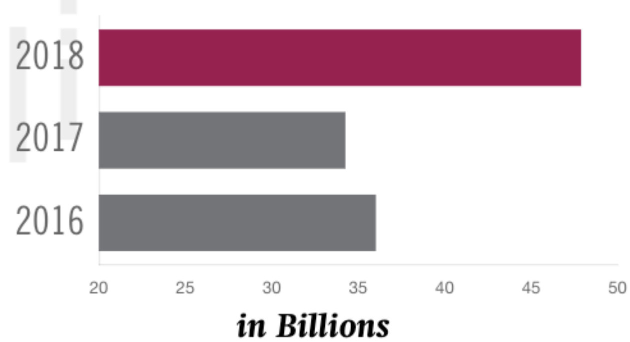
$1.784 BILLION



TOTAL ASSETS

2018

$47.891 BILLION



EQUITIES CLEARING

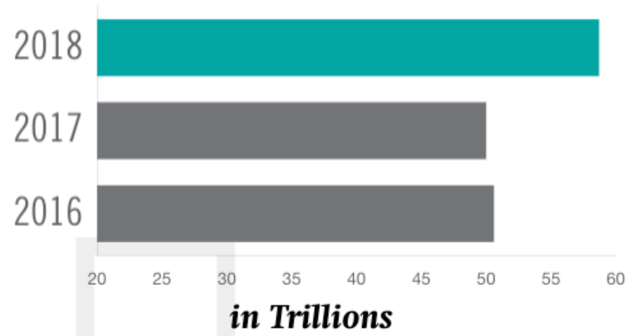
Average Daily Value of Equities Trades Cleared (in Billions)	
2018	$1,269.7
2017	$961.8
2016	$965.5

Average Daily Volume of Equities Trades Cleared (in Millions)	
2018	106.2
2017	90.0
2016	102.1

FIXED INCOME CLEARING

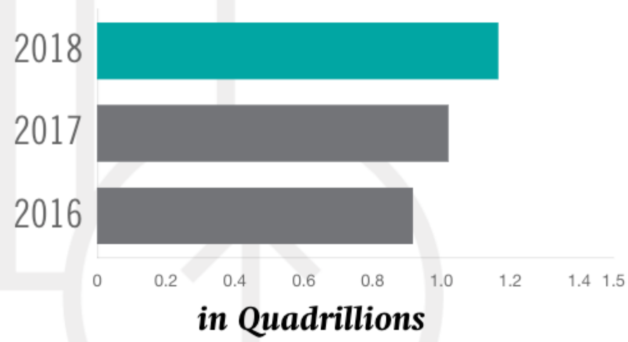
Mortgage-Backed Securities: Par Value Netting Destined

58.7 TRILLION



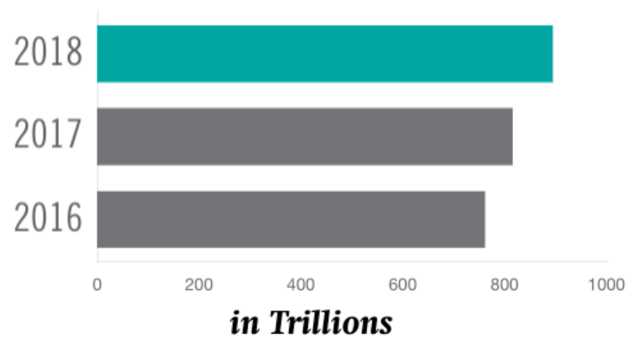
Goverment Securities Division: Value of Transactions Processed

$1.165 QUADRILLION



Total Value of GCF Repos (Compared Trades)

$894.4 TRILLION



SETTLEMENT & ASSET SERVICES

Volume of Securities Transactions Settled (in Millions)

2018	**389**
2017	369
2016	356

Value of Securities Transactions Settled (in Trillions)

2018	**$122.60**
2017	$114.30
2016	$111.10

Number of Active Security Issues Held at DTCC (in Millions)

2018	**1.34**
2017	1.35
2016	1.35

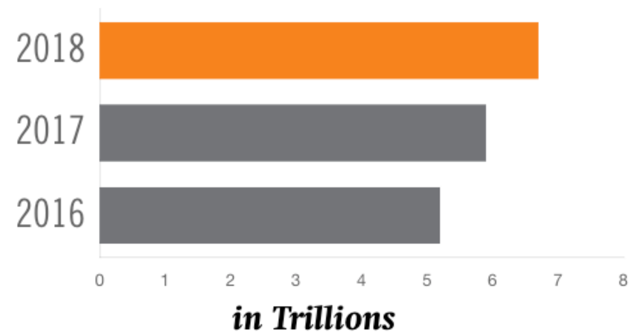
Total Value of Active Issues Held at DTCC (in Trillions)

2018	**$52.20**
2017	$57.40
2016	$48.30

WEALTH MANAGEMENT SERVICES

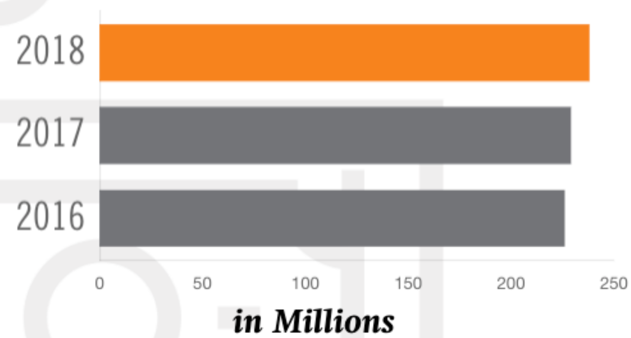
Mutual Funds: Value of Fund/SERV Transactions (in Trillions)

$6.7 TRILLION



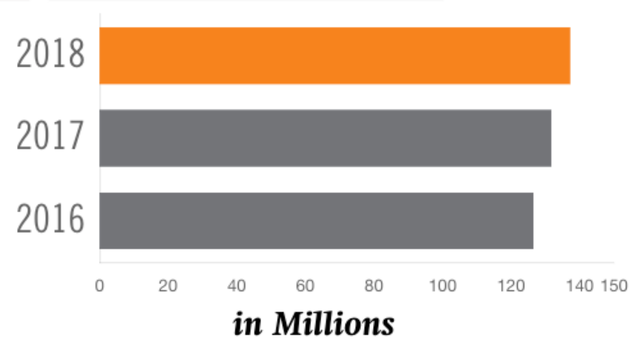
Mutual Funds: Volume of Fund/SERV Transactions (in Millions)

238 MILLION



Mutual Funds: Defined Contribution Clearance and Settlement (Yearly Volume) (in Millions)

137.2 MILLION



Alternative Investment Products: Annual Transactions and Orders (in Millions)

2018 **58**

2017 63

2016 61

Alternative Investment Products: Total Security Identifiers (CUSIPS)

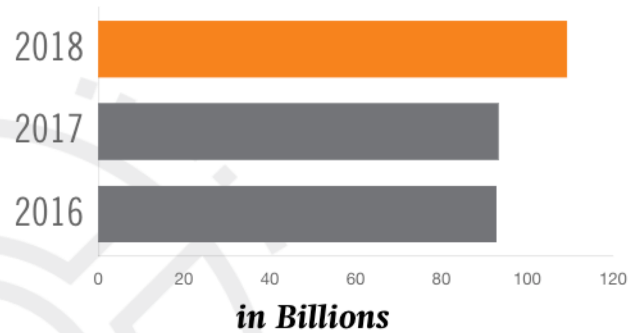
2018 **5,000**

2017 3,900

2016 3,200

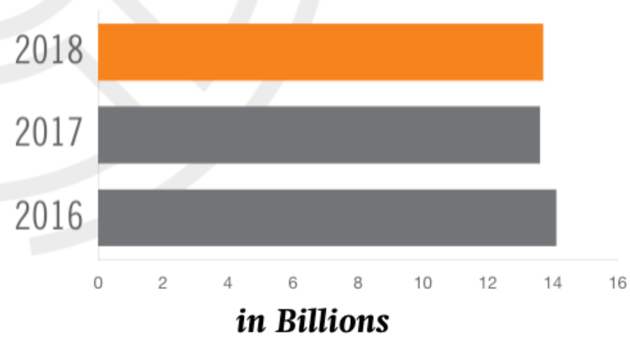
Insurance & Retirement Services: Total Processed Settlement Value

$109.30 BILLION



Insurance & Retirement Services: Total Transaction Volume

13.7 BILLION



INSTITUTIONAL TRADE PROCESSING TRANSACTIONS PROCESSED

2018

892.5 MILLION

2017

868.4 MILLION

GLOBAL MARKET ENTITY IDENTIFIER

GMEI PORTAL BY COUNTRY

United States	119,109
Sweden	38,640
Canada	17,394
Cayman Islands	13,182
Luxembourg	16,088
United Kingdom	11,864
Other	70,268
Denmark	26,468
Norway	15,473
Australia	7,022

The Depository Trust & Clearing Corporation

Consolidated Financial Statements as of and for the Years Ended December 31, 2018 and 2017, and Independent Auditors' Report

THE DEPOSITORY TRUST & CLEARING CORPORATION

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Deloitte.

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INDEPENDENT AUDITORS' REPORT

To the Board of Directors and Shareholders of
The Depository Trust & Clearing Corporation

We have audited the accompanying consolidated financial statements of The Depository Trust & Clearing Corporation and its subsidiaries (the "Company"), which comprise the consolidated statements of financial condition as of December 31, 2018 and 2017, and the related consolidated statements of income, comprehensive income, changes in shareholders' equity, and cash flows for the years then ended, and the related notes to the consolidated financial statements.

Management's Responsibility for the Consolidated Financial Statements

Management is responsible for the preparation and fair presentation of these consolidated financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of consolidated financial statements free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the consolidated financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the consolidated financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Company's preparation and fair presentation of the consolidated financial statements in order to design audit procedures appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of The Depository Trust & Clearing Corporation and its subsidiaries as of December 31, 2018 and 2017, and the results of their operations and their cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America.

Deloitte & Touche LLP

March 27, 2019

THE DEPOSITORY TRUST & CLEARING CORPORATION
CONSOLIDATED STATEMENTS OF FINANCIAL CONDITION

(In thousands, except share data)	As of December 31, 2018	As of December 31, 2017
ASSETS		
CURRENT ASSETS:		
Cash and cash equivalents	$ 8,641,036	$ 5,075,318
Participants' segregated cash	77,988	20,120
Short-term investments	800,000	—
Accounts receivable - net of allowance for doubtful accounts of $1,650 and $205 as of December 31, 2018 and 2017, respectively	177,880	174,456
Participants' and Clearing Funds	36,622,122	27,015,465
Other Participants' assets	518,115	868,036
Other current assets	133,960	101,654
Total current assets	46,971,101	33,255,049
NON-CURRENT ASSETS:		
Premises and equipment - net of accumulated depreciation of $399,846 and $394,039 as of December 31, 2018 and 2017, respectively	213,111	233,835
Goodwill	57,699	57,699
Intangible assets - net of accumulated amortization of $839,236 and $740,942 as of December 31, 2018 and 2017, respectively	319,119	338,359
Equity method investments	10,491	10,394
Other non-current assets	319,579	353,836
Total non-current assets	919,999	994,123
TOTAL ASSETS	$ 47,891,100	$ 34,249,172
LIABILITIES AND SHAREHOLDERS' EQUITY		
CURRENT LIABILITIES:		
Commercial paper - net of unamortized discount of $43,856 and $3,371 as of December 31, 2018 and 2017, respectively	$ 7,436,141	$ 3,222,571
Current portion of long-term debt	2,650	7,877
Current portion of pension and postretirement benefits	16,608	21,337
Accounts payable and accrued expenses	104,013	118,345
Participants' and Clearing Funds	36,622,122	27,015,465
Payable to Participants	596,103	888,156
Other current liabilities	260,677	249,929
Total current liabilities	45,038,314	31,523,680
NON-CURRENT LIABILITIES:		
Non-current portion of long-term debt	33,725	36,375
Non-current portion of pension and postretirement benefits	198,492	291,208
Other non-current liabilities	288,334	370,242
Total non-current liabilities	520,551	697,825
Total liabilities	45,558,865	32,221,505
COMMITMENTS AND CONTINGENCIES (Note 21)		
SHAREHOLDERS' EQUITY		
Preferred stock:		
Series A, $0.50 par value - 10,000 shares authorized, issued (above par), and outstanding	300	300
Series B, $0.50 par value - 10,000 shares authorized, issued (above par), and outstanding	300	300
Series C, $0.50 par value - 1,600 shares authorized, issued (above par), and outstanding	390,516	390,516
Common stock, $100 par value - 80,000 shares authorized, 50,908 shares issued and outstanding	5,091	5,091
Paid-in capital	411,065	411,065
Retained earnings	1,571,298	1,261,309
Accumulated other comprehensive loss, net of tax	(196,335)	(189,354)
Non-controlling interests	150,000	148,440
Total shareholders' equity	2,332,235	2,027,667
TOTAL LIABILITIES AND SHAREHOLDERS' EQUITY	$ 47,891,100	$ 34,249,172

The Notes to Consolidated Financial Statements are an integral part of these statements.

THE DEPOSITORY TRUST & CLEARING CORPORATION
CONSOLIDATED STATEMENTS OF INCOME

(In thousands)	For the years ended December 31, 2018	2017
REVENUES		
Settlement and asset services	$ 458,973	$ 449,039
Clearing services	604,628	523,539
Matching and data services	275,979	269,168
Repository services	292,980	285,521
Wealth management services	112,133	108,925
Other services	44,481	50,747
Investment (loss) income	(4,806)	14,804
Total revenues	1,784,368	1,701,743
EXPENSES		
Employee compensation and related benefits	664,068	647,770
Information technology	161,863	158,731
Professional and other services	369,477	335,865
Occupancy	48,180	45,578
Depreciation and amortization	159,528	179,208
General and administrative	43,723	38,654
Impairment of Intangible assets	8,588	19,797
Total expenses	1,455,427	1,425,603
Total operating income	328,941	276,140
NON-OPERATING INCOME (EXPENSE)		
Interest income	460,017	213,677
Refunds to Participants	(326,017)	(163,594)
Interest expense	(148,390)	(76,839)
Net loss from Equity method investments	(10,423)	(13,240)
Impairment of Equity method investments	—	(9,881)
Other non-operating income	42,709	79,701
Total non-operating income	17,896	29,824
Income before taxes	346,837	305,964
Provision for income taxes	47,124	127,730
Net income	299,713	178,234
Net income attributable to non-controlling interests	3,900	13,342
Net income attributable to DTCC	$ 295,813	$ 164,892

The Notes to Consolidated Financial Statements are an integral part of these statements.

THE DEPOSITORY TRUST & CLEARING CORPORATION
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

(In thousands)	For the years ended December 31, 2018	2017
Net income	$ 299,713	$ 178,234
OTHER COMPREHENSIVE INCOME (LOSS) - Net of tax:		
Defined benefit pension and other plans (1)	33,129	(29,279)
Foreign currency translation	(6,434)	1,254
Other comprehensive loss	26,695	(28,025)
Comprehensive income	326,408	150,209
Comprehensive income attributable to non-controlling interests	3,900	13,342
Comprehensive income attributable to DTCC	$ 322,508	$ 136,867

(1) Amounts are net of provision for income taxes of $12,797 and benefit for income taxes of $11,330 for 2018 and 2017, respectively.

The Notes to Consolidated Financial Statements are an integral part of these statements.

THE DEPOSITORY TRUST & CLEARING CORPORATION

CONSOLIDATED STATEMENTS OF CHANGES IN SHAREHOLDERS' EQUITY

(In thousands)	Preferred Stock Series A	Preferred Stock Series B	Preferred Stock Series C	Common Stock	Paid-In Capital	Retained Earnings	Accumulated Other Comprehensive Income (Loss), Net of Tax: Defined Benefit Pension and Other Plans	Accumulated Other Comprehensive Income (Loss), Net of Tax: Foreign Currency Translation	Non-controlling Interests	Total Shareholders' Equity
BALANCE - January 1, 2017	$ 300	$ 300	$ 390,516	$ 5,091	$ 411,065	$ 1,115,917	$ (159,646)	$ (1,683)	$ 144,748	$ 1,906,608
Net income	—	—	—	—	—	164,892	—	—	13,342	178,234
Other comprehensive (loss) income	—	—	—	—	—	—	(29,279)	1,254	—	(28,025)
Business disposition	—	—	—	—	—	—	—	—	(8,570)	(8,570)
Dividend to non-controlling interest	—	—	—	—	—	—	—	—	(1,080)	(1,080)
Dividends on preferred stock	—	—	—	—	—	(19,500)	—	—	—	(19,500)
BALANCE - December 31, 2017	300	300	390,516	5,091	411,065	1,261,309	(188,925)	(429)	148,440	2,027,667
Cumulative adjustment for accounting changes[(1)]	—	—	—	—	—	33,676	(33,676)	—	—	—
Net income	—	—	—	—	—	295,813	—	—	3,900	299,713
Other comprehensive income (loss)	—	—	—	—	—	—	33,129	(6,434)	—	26,695
Dividend to non-controlling interest	—	—	—	—	—	—	—	—	(2,340)	(2,340)
Dividends on preferred stock	—	—	—	—	—	(19,500)	—	—	—	(19,500)
BALANCE - December 31, 2018	$ 300	$ 300	$ 390,516	$ 5,091	$ 411,065	$ 1,571,298	$ (189,472)	$ (6,863)	$ 150,000	$ 2,332,235

(1) The cumulative adjustments relate to the adoption of certain accounting updates during the current and prior year periods. See Note 2 and Note 3 for additional information.

The Notes to Consolidated Financial Statements are an integral part of these statements.

THE DEPOSITORY TRUST & CLEARING CORPORATION
CONSOLIDATED STATEMENTS OF CASH FLOWS

(In thousands)	For the years ended December 31, 2018	2017
CASH FLOWS FROM OPERATING ACTIVITIES:		
Net income	$ 299,713	$ 178,234
Adjustments to reconcile net income to net cash provided by/(used in) operating activities:		
Depreciation and amortization	159,528	179,208
Loss on impairment of Intangible assets	8,588	19,797
Net (gain)/loss on disposal of Premises and equipment and Intangible assets	(1,769)	1,494
Loss on impairment of Equity method investments	—	9,881
Net loss from Equity method investments	10,423	13,240
Deferred income taxes	42,260	22,598
Discount on Commercial paper outstanding	24,854	—
Gain on business dispositions	—	(47,001)
Other	(6,432)	(161)
Net change (excluding the effects of business dispositions) in:		
Accounts receivable	(7,490)	27,801
Other Participants' assets	5,529	(792)
Other assets	(31,367)	(40,900)
Accounts payable and accrued expenses	(13,590)	17,836
Pension and postretirement benefits	(64,316)	(21,611)
Other liabilities	(74,658)	32,095
Participants' and Clearing Funds liabilities, net	1,995,148	(1,258,042)
Payable to Participants	(292,053)	(88,483)
Net cash provided by/(used in) operating activities	2,054,368	(954,806)
CASH FLOWS FROM INVESTING ACTIVITIES:		
Sale of securities under Reverse repurchase agreements	—	100,000
Purchases of Short-term investments	(800,000)	—
Maturities of Investments in marketable securities	83,600	75,000
Purchases of Investments in marketable securities	(58,600)	(75,000)
Purchases of Premises and equipment	(36,706)	(47,718)
Purchases of Intangible assets	(93,215)	(86,310)
Investment in Equity method investments	(11,000)	(15,000)
Purchase of equity investments	(1,104)	—
Proceeds from disposition of businesses, net of Cash and cash equivalents sold	—	22,768
Net cash provided by/(used in) investing activities	(917,025)	(26,260)
CASH FLOWS FROM FINANCING ACTIVITIES:		
Change in Commercial paper, net (see Note 13)	4,188,716	668,551
Repayments on long-term debt and other borrowings	(4,237)	(20,468)
Preferred stock dividend payments	(19,500)	(19,500)
Payment to Non-controlling interests	(1,080)	(480)
Net cash provided by/(used in) financing activities	4,163,899	628,103
Effect of foreign exchange rate changes on Cash and cash equivalents	(1,900)	5,416
Net increase/(decrease) in Cash and cash equivalents, Participants' segregated cash, Participants' and Clearing Funds cash deposits, Cash in Other Participants' assets	5,299,342	(347,547)
Cash and cash equivalents, Participants' segregated cash, Participants' and Clearing Funds cash deposits, Cash in Other Participants' assets - Beginning of year	20,270,015	20,617,562
Cash and cash equivalents, Participants' segregated cash, Participants' and Clearing Funds cash deposits, Cash in Other Participants' assets - End of year	$ 25,569,357	$ 20,270,015
SUPPLEMENTAL DISCLOSURES:		
Cash interest paid	$ 80,992	$ 32,551
Cash income taxes paid - net of refunds	$ 83,009	$ 69,068
Non-cash financing activity - capital lease obligation	$ 3,640	$ —

The Notes to Consolidated Financial Statements are an integral part of these statements.

1. BUSINESS AND OWNERSHIP

The Depository Trust & Clearing Corporation (DTCC) is the parent company of various operating subsidiaries, including, but not limited to, The Depository Trust Company (DTC), National Securities Clearing Corporation (NSCC), Fixed Income Clearing Corporation (FICC), DTCC ITP LLC (ITP), DTCC Deriv/SERV LLC (Deriv/SERV), DTCC Solutions LLC (Solutions), Business Entity Data, B.V. (GMEI); collectively, the "Company" or "Companies."

Subsidiaries
DTC is a limited purpose trust company formed under the Banking Law of New York State and supervised by the New York State Department of Financial Services (NYSDFS); a State member bank of the Federal Reserve System (FRS), subject to examination by the Federal Reserve Bank of New York (FRBNY) under delegated authority from the Board of Governors (the FRB) of the FRS; and a clearing agency registered with and under the supervision of the U.S. Securities and Exchange Commission (SEC). DTC provides central securities depository, settlement and related services to members of the securities, banking and financial services industries.

NSCC is organized as a business corporation under New York law, and is a clearing agency registered with the SEC. NSCC provides clearing, settlement, risk management, and central counterparty (CCP) services to its members for broker-to broker trades involving equities, corporate and municipal debt, exchange-traded funds, and unit investment trusts.

FICC is a clearing agency registered with the SEC that provides CCP services to members that participate in the U.S. government and mortgage-backed securities markets, consisting principally of automated real-time trade comparison, netting, clearance, settlement, trade confirmation, risk management and electronic pool notification. FICC has two divisions: the Government Securities Division (GSD) and the Mortgage-Backed Securities Division (MBSD).

DTC, NSCC and FICC are designated as Systemically Important Financial Market Utilities (SIFMUs) by the U.S. Financial Stability Oversight Council pursuant to Title VIII of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010. This designation subjects the clearing agencies to enhanced standards for operation and governance, as established by the SEC's Standards for Covered Clearing Agencies (CCAS).

The members of DTCC's clearing agencies are collectively referred to as Participants.

ITP, formerly known as Omgeo LLC, provides post-trade matching, processing and other related services, primarily to members of the financial community.

Deriv/SERV, through its subsidiaries and affiliates, enhances transparency and provides operational efficiency for the derivatives market. Its trade repository system supports a multitude of data submissions, including real-time price reporting, transaction details, confirmation records and valuation data.

Solutions provides information-based and business processing solutions to financial intermediaries globally.

GMEI utility is DTCC's Legal Entity Identifier (LEI) solution offered in collaboration with Society for Worldwide Interbank Financial Telecommunication (SWIFT) and a consortium of 14 global financial services organizations, led by the Global Financial Markets Association (GFMA), to meet the requirements across all asset classes. GMEI is designed to create and apply a single, universal standard identifier to any organization or firm involved in a financial transaction globally.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of presentation. The accompanying Consolidated Financial Statements are prepared in accordance with generally accepted accounting principles in the United States of America (U.S. GAAP). The accompanying Consolidated Financial Statements include the accounts of the Company, its wholly owned subsidiaries and consolidated Variable Interest Entities (VIEs). Intercompany accounts and transactions have been eliminated in consolidation. The Company reclassified prior period amounts related to Refunds to Participants, restricted cash, and certain components of net periodic pension cost to conform to the current year presentation. See below in the footnote herein, Note 3 and Note 16 for additional information.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

In December 2018, the Company determined that revenues related to Trade Information Warehouse were recorded as Clearing services instead of Repository services. As a result, the Company reclassified $9,414,000 from Clearing services to Repository services for the year ended December 31, 2017.

The Company consolidates entities in which it retained a controlling financial interest. The Company applies accounting guidance to determine if a controlling financial interest exists by evaluating whether the entity is a VIE. The Company also determines whether or not assets, liabilities, non-controlling interests and results of operations of a VIE need to be included in the accompanying Consolidated Financial Statements. Where the Company holds current or potential rights that provide DTCC with sufficient control to direct the activities of a VIE that most significantly impacts the VIE's economic performance, combined with a variable interest that gives DTCC the right to receive potentially significant benefits or the obligation to absorb potentially significant losses, the Company is deemed to have a controlling financial interest in that VIE. Rights held by others to remove the party with control over the VIE are not considered unless one party can exercise those rights unilaterally. When changes occur to the design of the entity, the Company reconsiders whether it is subject to the VIE model.

Use of estimates. The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the amounts reported in the Consolidated Financial Statements. Management makes estimates regarding, among other things, the collectability of receivables, the outcome of litigation, the realization of deferred taxes, unrecognized tax benefits, impairment of intangible assets, fair value measurements and other matters that affect the reported amounts. Estimates are based on judgment and available information; therefore, actual results could differ materially from those estimates.

Equity method investments. All investments that represent less than a majority, but at least a 20% ownership interest, and where the Company can exert significant influence over the operations of the investment, are accounted for using the equity method. Investments are initially recognized at cost. Subsequently, investments are measured at fair value when a transaction price is observed for the identical or similar security. The Company's share of investees' earnings are recorded in the accompanying Consolidated Statements of Income in the period earned. Dividends are recorded as a reduction to the investment account.

Non-controlling interests. Shareholders' equity is adjusted for the income attributable to the non-controlling interest shareholders and any distributions to those shareholders.

Cash and cash equivalents. All highly liquid investments purchased with an original maturity of three months or less at the date of acquisition are classified as Cash and cash equivalents. Cash equivalents consist primarily of highly liquid investments in deposits held in banks.

Participants' segregated cash. DTCC receives cash from Participants for the exclusive benefit of the Participants' customers in compliance with SEC rule 15c3-3 (customer protection), which requires broker-dealers to segregate a certain amount of cash and securities in specially protected accounts on behalf of their clients.

Short-term investments. Consists of cash invested in bank deposits with original maturities greater than three months and less than one year with various yields carried at amortized cost and approximate fair value due to their short-term maturities.

Fair value measurements. The Company may be required or permitted to measure and disclose certain assets and liabilities using fair value measurements. Fair value is defined as the price that would be received to sell an asset, or paid to transfer a liability, in an orderly transaction between market participants at the measurement date. The Company uses a three-level classification hierarchy of fair value measurements that establishes the quality of inputs used to measure fair value. The fair value of financial instruments is determined using various techniques that involve some level of estimation and judgment, the degree of which is dependent on the price transparency and the complexity of the instruments.

Accounts receivable. Accounts receivable are stated at cost, net of an allowance for doubtful accounts. The Company establishes an allowance for estimated losses resulting from uncollectibility. The Company determines the need for an allowance based on a variety of factors, including the length of time receivables are past due, macroeconomic conditions, historical experience and the financial condition of customers and other debtors.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

Participants' and Clearing Funds. The rules of DTC, NSCC and FICC require Participants to maintain deposits related to their respective activities based on calculated requirements. The deposits are available to collateralize Participants' obligations and certain liabilities of the Companies. Margin deposits and Participant contributions are maintained within the Participants' and Clearing Funds on the accompanying Consolidated Statements of Financial Condition due to the benefits and risks of ownership incurred by the Company. Deposits and contributions may be in the form of cash and cash equivalents and securities. These deposits and contributions may be applied to satisfy obligations of the depositing Participant, other Participants, or the Company as provided in the rules of the relevant subsidiaries of the Company.

Cash deposits and Investments in marketable securities. Deposits and contributions received in the form of cash may be invested in bank deposits, reverse repurchase agreements, money market funds and direct obligations of the U.S. Government. Reverse repurchase agreements provide for FICC's delivery of cash in exchange for securities having a fair value that is at least 102% of the amount of the agreements. Securities purchased under reverse repurchase agreements are typically U.S. Treasury and agency securities. Reverse repurchase agreements are recorded at the contract amounts. All interest earned on investments is accrued and included within Interest income in the accompanying Consolidated Statements of Income. This interest is refunded to Participants, which is included in Refunds to Participants in the accompanying Consolidated Statements of Income.

Securities on deposit - at fair value. Securities may include U.S. Treasury securities, U.S. agency debt securities and U.S. agency residential mortgage-backed securities. All interest earned on these investments is accrued and included within Interest income in the accompanying Consolidated Statements of Income. This interest is refunded to Participants, which is included in Refunds to Participants in the accompanying Consolidated Statements of Income.

Securities held in custody. Securities held in custody by DTC for Participants, which are predominantly in electronic book form, but also include physical certificates, are not reported in the accompanying Consolidated Financial Statements. Cash dividends and interest received by DTC or due on such securities and in the process of distribution or awaiting claim, are included in Other Participants' assets with a corresponding liability recorded in Payable to Participants on the accompanying Consolidated Statements of Financial Condition. Short positions occasionally exist in securities balances and are credited to the account of the Participants; such short positions are valued and collateralized daily by 130% of the short position reflected in Other Participants' assets on the accompanying Consolidated Statements of Financial Condition. DTC's obligation to return such cash collateral to Participants is also reflected in Payable to Participants.

Federal Reserve Stock. DTC is a member of the FRBNY and, as a member, is required to maintain a minimum level of investment in FRB stock based on the Company's capital. The FRB stock is carried at cost, classified as a restricted security and periodically evaluated for impairment based on ultimate recovery of par value. Based on this evaluation, the Company determined there is not an other-than-temporary impairment as of December 31, 2018 and 2017. The FRB stock, amounting $6,402,000 at December 31, 2018 and 2017, is included in Other non-current assets on the accompanying Consolidated Statements of Financial Condition.

Other Participants' assets and Payable to Participants. The Company receives cash and stock dividends, interest, reorganization and redemption proceeds on securities registered in the name of its nominee, Cede and Co., and interest and redemption proceeds on bearer securities, which it distributes to Participants. These balances are included in Other Participants' assets with a corresponding liability recorded in Payable to Participants on the accompanying Consolidated Statements of Financial Condition.

Restricted cash. As a result of the adoption of Accounting Standards Update (ASU) 2016-18, *Statement of Cash Flows: Restricted Cash* under the full retrospective method of adoption, (see Note 3), the Company has reported the cash and cash equivalents related to Participants' segregated cash, Participants' and Clearing Funds cash deposits, Cash in Other Participants' assets within the beginning and ending balances of Cash and cash equivalents, Participants' segregated cash, Participants' and Clearing Funds cash deposits, Cash in Other Participants' assets on the accompanying Consolidated Statements of Cash Flows.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

A reconciliation of Cash and cash equivalents, Participants' segregated cash, Clearing Fund cash deposits, Cash in Other Participants' assets, reported within the accompanying Consolidated Statements of Financial Condition that sum to the total of the same such amounts shown on the accompanying Consolidated Statements of Cash Flows as of December 31, 2018 and 2017 follows (in thousands):

	2018	2017
Cash and cash equivalents	$ 8,641,036	$ 5,075,318
Participants' segregated cash	77,988	20,120
Participants' and Clearing Funds cash deposits (see Note 7)	16,332,668	14,312,520
Cash in Other Participants' assets (see Note 5)	517,665	862,057
Total Cash and cash equivalents, Participants' segregated cash, Participants' and Clearing Funds cash deposits, Cash in Other Participants' assets shown on the Consolidated Statements of Cash Flows	$ 25,569,357	$ 20,270,015

As a result of this accounting change, net cash provided by operating activities of approximately $2 billion is primarily driven by the change in Participants’ and Clearing Funds liabilities and Payable to Participants.

Impacts to previously reported results

The impact of the new cash flows standard on the Company's previously reported results for the year ended December 31, 2017 follows (in thousands):

	As Previously Reported	New Restricted Cash Standard Adjustment	As Restated
CASH FLOWS FROM OPERATING ACTIVITIES			
Other Participants' assets	$ 92,717	$ (93,509)	$ (792)
Participants' and Clearing Funds liabilities, net	—	(1,258,042)	(1,258,042)
Net cash provided by/(used in) operating activities	396,745	(1,351,551)	(954,806)
CASH FLOWS FROM INVESTING ACTIVITIES			
Change in Participants' segregated cash	$ (4,234)	$ 4,234	$ —
Net cash provided by/(used in) investing activities	(30,494)	4,234	(26,260)

Premises and equipment. Premises and equipment are stated at cost, net of accumulated depreciation. Routine maintenance, repairs and replacement costs are expensed as incurred, while improvements that extend the useful life of the assets are capitalized. When equipment is sold or otherwise disposed of, the cost and related accumulated depreciation are removed from the accounts and any resulting gain or loss is recognized in the accompanying Consolidated Statements of Income. Premises and equipment are reviewed for impairment whenever events or changes in circumstances indicate the related carrying amount may not be recoverable. The following table summarizes how the Company depreciates Premises and equipment:

Premises and equipment	Amortization Period	Amortization Method
Leasehold improvements	Shorter of useful life or remaining term of the lease	Straight-line
Furniture and equipment	5 to 7 years	Straight-line
Building and improvements	39 years	Straight-line

Depreciation expense for leasehold improvements, furniture and equipment, and buildings and improvements is included in Depreciation and amortization in the accompanying Consolidated Statements of Income.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

Goodwill and Intangible assets

Goodwill. The Company records Goodwill upon the completion of a business combination as the difference between the purchase price and the fair value of the net assets acquired. Subsequent to initial recognition, Goodwill is not amortized but is tested for impairment annually or more frequently if events occur or circumstances change that indicate an impairment may exist. The Company has the option to first assess qualitative factors to determine whether the existence of events or circumstances leads to a determination that it is more likely than not that the fair value of a reporting unit is less than its carrying amount. If after assessing the totality of events or circumstances, the Company determines it is more likely than not that the fair value of a reporting unit is greater than its carrying amount, then performing the two-step test is not required. However, if the Company concludes otherwise, then it is required to perform the first step of the two-step impairment test that compares the estimated fair value of the reporting unit with its carrying value, including goodwill. If the estimated fair value of the reporting unit exceeds its carrying value, it is not considered to be impaired; however, if the carrying value of the reporting unit were to exceed its estimated fair value, a second step would be performed that compares the implied fair value of the reporting unit's goodwill with the carrying value of its goodwill. An impairment loss would be recognized to the extent the carrying value of goodwill exceeds the implied fair value.

Intangible assets. The Company's intangible assets include customer relationships and capitalized software.

Capitalized software. The Company capitalizes eligible costs associated with the acquisition or development of internal-use software projects that provide new or significantly improved functionality. The Company capitalizes software costs expected to result in long-term operational benefits, such as replacement systems or new applications that result in significantly increased operational efficiencies or functionality. All other costs incurred in connection with internal-use software are expensed as incurred.

The following table summarizes how the Company amortizes and when it tests Intangible assets for impairment:

Intangible Asset	Life/ Amortization Period	Amortization Method	Impairment Testing Frequency
Customer relationships	Finite/ 12 Years	Straight-line	If a triggering event occurs
Capitalized software	Finite/ 3 to 5 Years	Straight-line	If a triggering event occurs

Commercial paper. NSCC issues unsecured short-term promissory notes (Commercial paper) with maturities generally less than one year. In February 2018, the SEC approved NSCC's proposal to increase the program limit from $5 billion to $10 billion. The proceeds from the issuance of the Commercial paper constitute liquid resources of NSCC that, together with other liquid resources of NSCC, will enable it to effect the settlement of its payment obligations in the event of the default of any of its Participants in accordance with NSCC's rules and procedures. Pending use by NSCC of the proceeds of the Commercial paper issuance for this purpose, the funds raised are invested in highly liquid short-term instruments in accordance with NSCC's investment policy.

Revenue recognition. On January 1, 2018, the Company adopted ASU 2014-09, *Revenue from Contracts with Customers* under the full retrospective method of adoption. See Note 3 for additional information.

The Company recognizes revenue to depict the transfer of promised services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those services. To achieve that principle, the Company applies the following steps: identify the contract(s) with the customer, identify the performance obligations in the contract(s), determine the transaction price, allocate the transaction price to the performance obligations in the contract and recognize revenue when (or as) the entity satisfies a performance obligation.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

The Company recognizes revenue from contracts with customers as performance obligations are satisfied when promised services are transferred to the customer. The majority of the promised services and related performance obligations are recognized at the point in time when the control of the promised service is transferred to the customer.

The amount of revenue recognized reflects the consideration the Company expects to be entitled to for transferring the promised services to the customer. For certain contracts with customers, the consideration in which the Company expects to be entitled to in exchange for transferring promised service to a customer consists of variable consideration. The variable consideration primarily relates to volume based discounts or rebates for certain services, however, the volume targets or thresholds typically reset on a monthly basis therefore, the variable consideration does not have an impact on the revenue recognition.

The Company derives its revenue from transaction fees, subscription revenue and support services, professional services, and other services. Revenue from transaction fees is recognized at a point in time on the transaction date, as the customer obtains the control and benefit of the service at that point. Subscription and support revenues are recognized ratably over the performance period of the relevant contract using a time elapsed measure of progress as the customer receives the benefits of the services throughout the term of the contract. Professional services and other revenues, when sold with subscription and support offerings, are accounted for separately when these services have value to the customer on a standalone basis and are recognized as the performance obligation is satisfied and control of the service is transferred to the customer, otherwise they are recognized ratably over the contract term. Other services, which represent fees generated from offering referential based data and business processing solutions to financial institutions globally, is recognized when services are provided based on contractual terms.

Revenue streams

Details for each revenue stream presented in the Company's Consolidated Statements of Income follow:

S*ettlement and asset services.* DTC provides settlement services for equity, corporate and municipal debt trades and money market instruments in the U.S. The payment and transfer of securities ownership occurs at DTC, which provides custody and asset servicing for securities. Asset services include underwriting, corporate actions processing, securities processing, global tax services and issuer services.

Clearing services. The Company's subsidiaries, NSCC and FICC, deliver clearing services across the U.S. equities and fixed income markets. Clearing services include continuous net settlement, mortgage backed securities clearing, and government securities clearing.

Matching and data services. DTCC's Institutional Trade Processing (ITP) service provides trade processing solutions combined with DTCC's global solution for LEIs and its settlement capabilities with pre-trade and matching services. ITP offers buy-side, sell-side, and custodian firms an end-to-end straight-through-processing solution for their trading activity. Matching and data services include trade enrichment, trade agreement, and data analytics.

Repository services. The Global Trade Repository service supports data submissions including real-time price reporting, transaction details, confirmation records and valuation data. The Trade Information Warehouse's Trade Reporting Repository enables regulators and market participants to view the market's overall risk exposure to over-the-counter (OTC) credit derivatives instruments by operating and maintaining the centralized, electronic database for credit default swap contracts outstanding in the global marketplace. Repository services include OTC derivatives reporting and trade reporting.

Wealth management services. NSCC provides wealth management services that include centralized, automated processing and information services for mutual fund, alternative investment, and insurance and retirement products. These businesses drive centralized, automated processing and information services. Wealth management services enable seamless, end-to-end communications with broker/dealers and other distribution partners for funds, asset managers and insurance companies and their service providers.

Other services. The Company offers referential and activity-based, announcement, security reference, and liquidity data through the DTCC Data Services product. These offerings are delivered in fixed or configurable formats, sourced from the Company's transaction, reference, position and asset servicing data.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

Accounts receivable and deferred revenue

The period in which the Company recognizes revenue may differ from the timing of payments received from customers. The Company typically bills its customers 30 days in arrears. The Company records a receivable when revenue is recognized prior to payment and there is an unconditional right to payment. See Note 6, Due from Participants and customers for services, net, for the Company's receivables related to revenues from contracts with customers. Alternatively, when payment precedes the provision of the related services, the Company records deferred revenue until the performance obligations are satisfied. Deferred revenue represents the Company's contract liabilities related to billings or payments received in advance for subscription and support services, as well as professional service fees, where the performance obligation has not yet been satisfied. Deferred revenue was $12,311,000 and $16,612,000 at December 31, 2018 and December 31, 2017, respectively, and is included in Other current liabilities on the accompanying Consolidated Statements of Financial Condition.

Impacts to previously reported results

The impact of the new revenue recognition standard on the Company's previously reported results for the year ended December 31, 2017 follows (in thousands):

	For the year ended December 31, 2017		
	As Previously Reported	New Revenue Standard Adjustment	As Restated
Interest income	$ 139,303	$ 74,374	$ 213,677
Refunds to Participants	(89,220)	(74,374)	(163,594)

Investment (loss) income. Investment (loss) income represents changes in the fair values of investment assets related to the Company's deferred compensation plan (structured as a Rabbi Trust). All of the marketable securities of the Rabbi Trust are classified as trading securities and are recorded at fair value.

Non-qualified deferred compensation plan. DTCC maintains a self-directed, non-qualified deferred compensation plan structured as a “Rabbi Trust” for certain executives and other highly compensated employees. Under the plan, Participants may elect or be required to defer receipt of a portion of their annual compensation and invest it in various mutual funds. All such investments are held in the Rabbi Trust and the plan requires settlement in cash. The investment assets of the Rabbi Trust are recorded at fair value and included on the accompanying Consolidated Statements of Financial Condition in Other non-current assets as long-term incentive plan assets. The amount of compensation deferred under the plan is credited to each Participant’s deferral account and a deferred compensation liability is recorded in Other non-current liabilities on the accompanying Consolidated Statements of Financial Condition. In 2018 and 2017, the investment assets of the Rabbi Trust were classified as trading securities, and accordingly, changes in their fair values are recorded in Investment (loss) income in the accompanying Consolidated Statements of Income. In addition, changes in the fair value of the plan’s investments were recorded in Employee compensation and related benefits in the accompanying Consolidated Statements of Income. The Investment (loss) income on the change in fair value of these investments was $4,806,000 and $14,804,000 for the years ended December 31, 2018 and 2017, respectively.

Long-term incentive plan. DTCC’s Long-term incentive plan is provided to certain designated employees of DTCC to establish retention incentives for certain key employees. The performance period is a three-year period commencing January 1 of each calendar year, unless modified, extended or terminated by the Board of Directors and the Compensation and Human Resources Committee. Only those employees specifically designated by the Compensation Committee are eligible to participate in the plan. The associated liabilities for the plan are classified in Other current liabilities and Other non-current liabilities on the accompanying Consolidated Statements of Financial Condition.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

Defined contribution retirement plans. The Company sponsors two defined contribution plans for U.S. employees, The Depository Trust & Clearing Corporation Employee Savings Plan (Employee Savings Plan) and The Depository Trust & Clearing Corporation Operations Level Employee Savings Plan (Operations Level Savings Plan). The Plans are administered by the Company's Employee Benefit Plans Committee, which is appointed by the Board of Directors of the Company and is composed of designated Company officers. The Employee Savings Plan is a single employer plan covering non-bargaining unit employees. The Operations Level Savings Plan is a single employer plan covering bargaining unit employees. All investments, except loans receivable, are included in The Depository Trust & Clearing Corporation Master Savings Plan Trust and are administered by the Plans' trustee, State Street Bank & Trust Company. Conduent Inc. serves as the recordkeeper for the Plans. Both Plans are subject to the provisions of the Employee Retirement Income Security Act of 1974 (ERISA).

Pension and postretirement plans. DTCC has a qualified non-contributory defined benefit pension plan (the Pension Plan), under which employees hired or rehired before May 1, 2009 are eligible to participate upon attainment of age 21 and completion of six months of service. The Pension Plan is closed to new participants, but existing participants continue to accrue benefits. The Pension Plan is qualified under Section 401(a) of the Internal Revenue Code of 1986, as amended. It is subject to the provisions of ERISA. The Pension Plan provides benefits to retired or vested terminated employees or their beneficiaries. The Pension Benefit Guarantee Corporation, a United States governmental agency, guarantees most vested normal age retirement benefits subject to certain limitations. Pension benefits under the Pension Plan are determined based on an employee’s length of service and earnings. DTCC’s funding policy requires the Company to make contributions to the Pension Plan that meet or exceed the minimum funding standards under the ERISA and the Internal Revenue Code.

DTCC provides health care and life insurance benefits to DTCC eligible retired employees in Retiree Medical and Life Insurance Plans. The Retiree Medical Plan is available to certain eligible retired employees and their dependents. DTCC maintains a 401(h) account to fund the retiree medical plans. Life insurance coverage is available to certain retired employees who have completed twenty years of full time service and their dependents.

DTCC also sponsors a Supplemental Executive Retirement Plan (SERP) and a Restoration Plan that are non-qualified non-funded defined benefit plans, which provide additional retirement benefits to certain employees. Benefits paid to retirees are based on age at retirement, years of credited service and average compensation. The cost of non-qualified defined benefits is determined using substantially the same actuarial methods and economic assumptions as those used for the qualified pension plan. The Company maintains certain assets in trust for non-qualified retirement benefit obligations.

The annual measurement date for DTCC’s defined benefit plans is December 31. Plan assets are determined based on fair value generally representing observable market prices. The projected benefit obligations are determined based on the present value of projected benefit distributions at an assumed discount rate. The discount rate utilized is based on the yield curves of high-quality corporate bonds available in the marketplace. The net periodic pension expense or income includes service costs, interest costs based on an assumed discount rate, an expected return on plan assets based on an actuarially derived market-related value and amortization of prior years’ actuarial gains and losses. On January 1, 2018, the Company adopted ASU 2017-07, *Compensation: Retirement Benefits* under the retrospective method of adoption, which required service costs, interest costs, and all other costs to be classified as Employee compensation and related benefits, Interest expense, and Other non-operating income, respectively. Previously the entire net periodic pension expense or income was reported in Employee compensation and related benefits. See Note 3 and Note 16 for additional information.

Actuarial gains and losses include the impact of plan amendments, gains or losses related to changes in the amount of the projected benefit obligations or plan assets resulting from experience different from the assumed rate of return, changes in the discount rate or other assumptions. To the extent an actuarial gain or loss exceeds 10% of the greater of the projected benefit obligation or the market-related value of plan assets, the excess is recognized over the future lifetime of the defined benefit plans.

The expected long-term rate of return on plan assets is based on anticipated returns for each applicable asset class. Anticipated returns are weighted for the expected allocation for each asset class and are based on forecasts for prospective returns in the equity and fixed income markets, which should track the long-term historical returns for these markets. The Company also considers the growth outlook for the U.S. and global economies, as well as current and prospective interest rates.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

The market-related value utilized to determine the expected return on plan assets is based on the fair value of plan assets adjusted for the difference between expected returns and actual performance of plan assets. The difference between actual experience and expected returns on plan assets is included as an adjustment in the market-related value over a 4-year period.

Income taxes. The Provision for income taxes is computed using the asset and liability method. The tax currently payable is based on taxable income for the year. Taxable income differs from Income before taxes as reported in the accompanying Statement of Income because it excludes items of income or expense that are taxable or deductible in other years and it further excludes items that are never taxable or deductible. The Company records a deferred income tax (benefit) provision when there are differences between assets and liabilities measured for financial reporting and for income tax return purposes. These temporary differences result in taxable (deferred tax liability) or deductible (deferred tax asset) amounts in future years and are measured using the tax rates and laws that will be in effect when such differences are expected to reverse. Valuation allowances are recognized if, based on the weight of available evidence, it is more likely than not that some portion of the deferred tax asset will not be realized. Deferred tax assets and liabilities are reported net in non-current assets or liabilities on the accompanying Statements of Financial Condition. It is the Company's policy to provide for uncertain tax positions and the related interest and penalties based upon management's assessment of whether a tax benefit is more likely than not to be sustained upon examination by the tax authorities.

On December 22, 2017, the Tax Cuts and Jobs Act of 2017 (Tax Reform Act) was signed into law making significant changes to the Internal Revenue Code. Changes include a Federal corporate tax rate decrease from 35% to 21% for tax years beginning after December 31, 2017, imposing a mandatory one-time transition tax on accumulated earnings of foreign subsidiaries and enactment of a tax on global intangible low-taxed income (GILTI). The Company accounted for the tax effects of the Tax Reform Act on a provisional basis in its 2017 Financial Statements and completed the related accounting in the fourth quarter of 2018. The Company has made an accounting policy election to recognize income tax expense associated with GILTI as incurred.

In February 2018, new guidance was issued that allows companies the option to reclassify tax effects stranded in accumulated other comprehensive income as a result of the Tax Reform Act to retained earnings. The guidance is effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2018 and early adoption is permitted. The Company adopted the guidance in the fourth quarter of 2018 and reclassified stranded tax effects of $33,676,000.

Foreign currency. Assets and liabilities denominated in foreign currencies are translated at rates of exchange prevailing on the dates of the accompanying Consolidated Statements of Financial Condition. Revenues and expenses are translated at average rates of exchange during the year. Gains or losses on foreign currency transactions are included in the accompanying Consolidated Statements of Income. Gains or losses on translation of the financial statements of foreign subsidiaries, when the functional currency is other than the U.S. dollar, are included in the accompanying Consolidated Statements of Comprehensive Income.

Derivatives and hedging. The Company uses forward contracts to hedge net investments in certain foreign subsidiaries whose functional currencies are not the U.S. dollar. The Company formally documents all relationships between the hedging instruments and hedged items, as well as the Company's risk-management objectives and strategy for undertaking various hedging transactions. Hedge accounting is applied when a derivative is highly effective at reducing the risk associated with the hedged exposure and the risk management objective and strategy are documented. Hedge documentation identifies the derivative hedging instrument, the asset or liability and type of risk hedged, and how the effectiveness of the derivative is assessed prospectively and retrospectively. For hedging instruments that qualify for hedge accounting, changes in the fair value of the derivatives are recorded in Other comprehensive (loss) income. If it is determined that a derivative is not highly effective at hedging the designated exposure, the Company discontinues hedge accounting and changes in fair value of the hedging instrument are recorded in earnings.

3. ACCOUNTING AND REPORTING DEVELOPMENTS

Standard	Description	Impact on the financial statements or other significant matters
Financial Accounting Standards Board Standard Issued, but not yet Adopted		
ASU 2018-14 Changes to the Disclosure Requirements for Defined Benefit Plans *Issued August 2018*	• Eliminates requirements for certain disclosures that are no longer considered cost beneficial and requires new ones that the Financial Accounting Standard Board (FASB) considers pertinent.	• Effective January 1, 2021. • The Company is evaluating the impact on related disclosures in its Consolidated Financial Statements.
ASU 2018-18 Clarifying Interactions of the Revenue Recognition and Collaborative Arrangements Standards *Issued November 2018*	• Amends Collaborative Arrangement standard to clarify that certain transactions between participants in a collaborative arrangement should be accounted for under new Revenue Recognition standard when the collaborative partner is considered the customer. Requires revenues from such collaborative contracts to be recognized upon transfer of control of a good or service in the amount of consideration expected to be received from the collaborative partner. • Precludes an entity from presenting collaborative arrangement consideration as revenue from contracts with customers if the collaborative partner is not considered the customer.	• Effective January 1, 2020. • The Company is evaluating the impact on its Consolidated Financial Statements and related disclosures.
ASU 2018-15 Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement (CCA) That Is a Service Contract Issued August 2018	• Implementation costs incurred by customers in a CCA that is a service contract are deferred if they would be capitalized by customers in software licensing arrangements under the internal-use software guidance.	• Effective January 1, 2020. • The Company is evaluating the impact on its Consolidated Financial Statements and related disclosures.
ASU 2018-13 Changes to the Disclosure Requirements for Fair Value Measurement Issued August 2018	• Entities will no longer be required to disclose the amount of and reasons for transfers between Level 1 and Level 2 of the fair value hierarchy (see Note 15). • Public companies will be required to disclose the range and weighted average used to develop significant unobservable inputs for Level 3 fair value measurements. • Modifies certain disclosure requirements for nonpublic entities to make them less burdensome.	• Effective January 1, 2020. • The Company is evaluating the impact on its Consolidated Financial Statements and related disclosures.

3. ACCOUNTING AND REPORTING DEVELOPMENTS (CONTINUED)

Standard	Description	Impact on the financial statements or other significant matters
Financial Accounting Standards Board Standard Issued, but not yet Adopted (Continued)		
ASU 2017-04 Intangibles —Goodwill and Other *Issued January, 2017*	• Eliminates the second step from the goodwill impairment test. If a reporting unit's carrying amount exceeds its fair value, an entity will record an impairment charge based on that difference. The impairment charge will be limited to the amount of goodwill allocated to that reporting unit.	• Effective January 1, 2020. • The Company is evaluating the impact on related disclosures in its Consolidated Financial Statements.
ASU 2016-13 Customer's Financial Instruments - Credit Losses *Issued June,2016*	• Replaces the current incurred loss approach for credit losses with an "expected loss" model for instruments measured at amortized cost. • Requires all lifetime credit losses for financial assets held at the reporting date to be estimated based on factors such as historical experience, current conditions and forecasts. • Requires entities to record allowances for available-for-sale debt securities.	• Effective January 1, 2020. • The Company is evaluating the impact on related disclosures in its Consolidated Financial Statements.
ASU 2016-02 Leases *Issued February 2016*	• Requires a lessee to recognize leases with terms of longer than 12 months within balance sheet assets and liabilities. • Changes the recognition measurement and presentation of expenses and cash flows arising from a lease depending on its classification as a financing or operating leases as determined by the lessee. • Lessor accounting will remain largely unchanged from current GAAP. Leases of fewer than 12 months are exempt from the updated standard.	• The Company will adopt the new lease accounting standard as of January 1, 2019 through a cumulative-effect adjustment without revising prior comparative period and elected the practical expedients permitted under the transition guidance within the new lease accounting standard, which permits the Company not to reassess the following for any expired or existing contracts: i) whether any contracts contain leases; ii) lease classification (i.e. operating lease or finance/capital lease); and iii) initial direct cost. • The Company estimates that the adoption of the New Lease Accounting Standard will result in the recognition of right-of-use assets of approximately $260 million and lease liabilities of approximately $300 million on the Consolidated Statements of Financial Condition at January 1, 2019, consisting primarily of operating leases relating to real estate. The new lease accounting standard did not have a material impact in the Consolidated Statements of Income.

3. ACCOUNTING AND REPORTING DEVELOPMENTS (CONTINUED)

Standard	Description	Impact on the financial statements or other significant matters
Recently Adopted Accounting Standards		
ASU 2018-02 Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income *Issued February 2018*	• Allows companies to reclassify the stranded tax effects associated with the enactment of the Tax Reform Act from Accumulated Other Comprehensive Income to Retained Earnings. • In the period of adoption, companies must disclose whether or not such an election was made and a description of the tax effects that are reclassified, if any. • May be applied either in the period of adoption or retrospectively to the period in which the tax effects associated with the Tax Act are recognized.	• Adopted October 1, 2018. • The Company recorded a net increase to Retained earnings as a result of the reclassification of $34 million of stranded tax effects previously recorded in Accumulated Other Comprehensive Income. See Note 2 for additional information.
ASU 2017-07 Compensation - Retirement Benefits *Issued March 2017*	• Requires the components of net periodic pension and postretirement benefit costs (service cost, interest cost and actuarial gain/losses) to be reported separately from one another in the Company's Statements of Income. • Requires retrospective application and presentation in the Consolidated Statements of Income.	• Adopted January 1, 2018. • The adoption of the standard did not change the Company's Consolidated Net Income, but required the Company to reclassify other components of net periodic pension cost from Total operating income to Total non-operating income. The service cost component is presented in Employee compensation and related benefits, the interest cost component is presented in Interest expense, and all other components of net periodic pension cost are presented in Other non-operating income in the accompanying Consolidated Statements of Income. See Note 16 for additional information.
ASU 2016-18 Statement of Cash Flows - Restricted Cash *Issued November 2016*	• Requires inclusion of restricted cash in the cash and cash equivalents balances in the Consolidated Statements of Cash Flows. • Requires additional disclosures to supplement the Consolidated Statements of Cash Flows. • Requires retrospective application to all periods presented.	• Adopted April 1, 2018. • The Company adopted the standard under the retrospective method of adoption. • The adoption of the standard did not change the Company's Consolidated Statements of Financial Condition or Consolidated Statements of Income; however, it resulted in a presentation change related to the Consolidated Statements of Cash Flows by broadening the definition of cash and cash equivalents to include items that are not on the balance sheet's cash line, e.g., Participants' segregated cash, Participants' and Clearing Funds cash deposits and Cash in Other Participants' assets. See Note 2 for additional information.

3. ACCOUNTING AND REPORTING DEVELOPMENTS (CONTINUED)

Standard	Description	Impact on the financial statements or other significant matters
Recently Adopted Accounting Standards (Continued)		
ASU 2016-01 Recognition and Measurement of Financial Assets and Financial Liabilities *Issued January 2016*	• Requires the fair value measurement of unconsolidated equity investments, except those accounted for under the equity method. • Requires measurement of these investments at the end of each reporting period and recognition of the changes in fair value in net income. • Will no longer be able to recognize unrealized gains and losses on equity securities classified as available-for-sale in other comprehensive income. • Requires a modified retrospective approach but specifies prospective transition for equity investments without a readily determinable fair value.	• Adopted January 1, 2018. • The Company adopted the standard under the prospective transition method of adoption. • The Company elected to measure equity method investments at fair value when a transaction price is observed for the identical or similar security. • The adoption of the standard did not have a material impact on the accompanying Consolidated Financial Statements.
ASU 2014-09 Revenue from Contracts with Customers *Issued May 2014*	• Requires revenue from contracts with customers to be recognized upon transfer of control of a good or service in the amount of consideration expected to be received. • Changes the accounting for certain contract costs, including whether they may be offset against revenue in the accompanying Consolidated Statements of Income, and requires additional disclosures about revenue and contract costs. • May be adopted using a full retrospective approach or a modified, cumulative effect approach wherein the guidance is applied only to existing contracts as of the day of initial application, and to new contracts transacted after that date.	• Adopted January 1, 2018. • The Company adopted the standard under the full retrospective transition method of adoption. • The Company's implementation efforts included the identification of revenue within the scope of the standard and the evaluation of revenue contracts using the practical expedient portfolio approach. • The adoption of the standard did not have a material impact to the recognition and timing of its revenues, but required the Company to change the presentation of Interest Income and Refunds to Participants from a net basis to a gross basis in the accompanying Consolidated Statements of Income. See Note 2 for additional information.

4. BUSINESS DISPOSITIONS

On February 6, 2017, the Company, along with Clarient Global LLC's (Clarient) minority interest owners, signed a definitive agreement to sell their interests in Clarient to the Thomson Reuters Corporation (Thomson Reuters). On the same day, the Company also signed a definitive agreement to sell Avox Ltd (Avox) to Thomson Reuters. Both sales closed on March 14, 2017. As a result of these transactions, the Company disposed of Clarient and Avox, effective March 14, 2017. The Company's gain on the sales, net of the gain attributable to non-controlling interests related to Clarient, totaled $31,136,000 and was included in Other non-operating income in the Company's accompanying Consolidated Statements of Income. The agreements were subject to indemnity clauses for which there were indemnification escrows that were released in September 2018.

Details of the gain on sales follow (in thousands):

	Clarient	Avox	Total
Gain on sale included in Other non-operating income	$ 39,082	$ 7,919	$ 47,001
Less: Gain on sale attributable to non-controlling interest	(15,865)	—	(15,865)
Net gain on business dispositions	$ 23,217	$ 7,919	$ 31,136

Details of the balances related to the business dispositions follow (in thousands):

	Clarient	Avox	Total
Consolidated assets:			
Cash and cash equivalents	$ 708	$ 3,122	$ 3,830
Accounts receivable - net	531	3,488	4,019
Other current assets	848	51	899
Premises and equipment	—	1,215	1,215
Goodwill	—	7,836	7,836
Intangible assets	6,932	2,674	9,606
Other non-current assets	476	—	476
Total assets	$ 9,495	$ 18,386	$ 27,881
Consolidated liabilities:			
Accounts payable	$ 257	$ 252	$ 509
Other current liabilities	28,239	6,043	34,282
Total liabilities	$ 28,496	$ 6,295	$ 34,791

5. PARTICIPANTS' SEGREGATED CASH, OTHER PARTICIPANTS' ASSETS AND PAYABLE TO PARTICIPANTS

Details for Participants' segregated cash, Other Participants' assets and Payable to Participants as of December 31, 2018 and 2017 follow (in thousands):

	2018	2017
Assets:		
Participants' segregated cash	$ 77,988	$ 20,120
Other Participants' assets:		
Cash in Other Participants' assets	517,665	862,057
Other	450	5,979
Total	$ 596,103	$ 888,156
Liabilities:		
Payable to Participants	$ 596,103	$ 888,156

Participants' segregated cash represents cash received from Participants to facilitate their compliance with SEC 15c3-3 customer protection rules. Unclaimed balances are remitted to the appropriate authority when required by abandoned property laws.

Payable to Participants included $127,000 and $435,000 of cash collateral received from Participants, representing 130% of short positions as of December 31, 2018 and 2017, respectively. Unclaimed balances are remitted to the appropriate authority when required, pursuant to abandoned property laws.

6. ACCOUNTS RECEIVABLE

Details for Accounts receivable as of December 31, 2018 and 2017 follow (in thousands):

	2018	2017
Due from Participants and customers for services	$ 165,554	$ 161,935
Allowance for doubtful accounts	(1,650)	(205)
Due from Participants and customers for services, net	163,904	161,730
Other receivables	13,976	12,726
Total	$ 177,880	$ 174,456

Total write-offs in the allowance for doubtful accounts were $382,000 and $520,000 for the years ended December 31, 2018 and 2017, respectively.

7. PARTICIPANTS' AND CLEARING FUNDS

Details for the Participants' and Clearing Funds as of December 31, 2018 and 2017 follow (in thousands):

	2018			
	DTC	NSCC	FICC	Total
Required deposits	$ 1,150,000	$ 6,830,444	$ 18,053,674	$ 26,034,118
Excess deposits	684,363	1,435,091	8,468,550	10,588,004
Total	$ 1,834,363	$ 8,265,535	$ 26,522,224	$ 36,622,122

	2017			
	DTC	NSCC	FICC	Total
Required deposits	$ 1,150,000	$ 3,360,160	$ 14,970,573	$ 19,480,733
Excess deposits	621,078	631,610	6,282,044	7,534,732
Total	$ 1,771,078	$ 3,991,770	$ 21,252,617	$ 27,015,465

Cash deposits, Investments in marketable securities and Securities on deposit. Details for cash deposits, investments in marketable securities and securities on deposit of the Participants' and Clearing Funds, which may be applied to satisfy obligations of the depositing Participant, other Participants, or the Company as provided in the rules of the relevant subsidiaries of the Company, as of December 31, 2018 and 2017 follow (in thousands):

	2018			
	DTC	NSCC	FICC	Total
Cash deposits	$ 1,834,363	$ 7,651,033	$ 6,847,272	$ 16,332,668
Securities on deposit - at fair value	—	614,502	19,674,952	20,289,454
Total	$ 1,834,363	$ 8,265,535	$ 26,522,224	$ 36,622,122

	2017			
	DTC	NSCC	FICC	Total
Cash deposits	$ 1,771,078	$ 3,725,574	$ 8,815,868	$ 14,312,520
Investments in marketable securities	—	—	25,000	25,000
Securities on deposit - at fair value	—	266,196	12,411,749	12,677,945
Total	$ 1,771,078	$ 3,991,770	$ 21,252,617	$ 27,015,465

Details for the Participants' and Clearing Funds cash deposits and investments in marketable securities as of December 31, 2018 and 2017 follow (in thousands):

	2018			
	DTC	NSCC	FICC	Total
Bank deposits	$ 1,834,363	$ 5,720,033	$ 5,466,272	$ 13,020,668
Money market fund investments	—	1,556,000	931,000	2,487,000
Reverse repurchase agreements	—	375,000	450,000	825,000
Total	$ 1,834,363	$ 7,651,033	$ 6,847,272	$ 16,332,668

	2017			
	DTC	NSCC	FICC	Total
Bank deposits	$ 1,771,078	$ 2,820,574	$ 6,116,868	$ 10,708,520
Money market fund investments	—	595,000	2,139,000	2,734,000
Reverse repurchase agreements	—	310,000	560,000	870,000
U.S. Treasury bills	—	—	25,000	25,000
Total	$ 1,771,078	$ 3,725,574	$ 8,840,868	$ 14,337,520

8. PREMISES AND EQUIPMENT

The cost, accumulated depreciation and net book value of Premises and equipment for the years ended December 31, 2018 and 2017 follow (in thousands):

	Furniture and Equipment	Leasehold Improvements	Capital Leases	Buildings and Improvements	Land	Total
Cost:						
January 1, 2017	$ 391,824	$ 187,619	$ 44,755	$ 33,160	$ 4,221	$ 661,579
Additions	37,220	8,998	160	1,340	—	47,718
Disposals	(73,549)	(3,284)	(877)	(3,713)	—	(81,423)
As of December 31, 2017	355,495	193,333	44,038	30,787	4,221	627,874
Additions	28,484	7,865	129	228	—	36,706
Disposals	(21,603)	(15)	(20,995)	(9,010)	—	(51,623)
As of December 31, 2018	$ 362,376	$ 201,183	$ 23,172	$ 22,005	$ 4,221	$ 612,957
Accumulated Depreciation:						
January 1, 2017	$ 281,442	$ 87,306	$ 31,449	$ 10,591	$ —	$ 410,788
Depreciation expense	43,833	9,839	7,975	914	—	62,561
Disposals	(72,170)	(2,710)	(717)	(3,713)	—	(79,310)
As of December 31, 2017	253,105	94,435	38,707	7,792	—	394,039
Depreciation expense	40,910	9,009	5,033	709	—	55,661
Disposals	(19,844)	(5)	(20,995)	(9,010)	—	(49,854)
As of December 31, 2018	$ 274,171	$ 103,439	$ 22,745	$ (509)	$ —	$ 399,846
Net Book Value:						
January 1, 2017	$ 110,382	$ 100,313	$ 13,306	$ 22,569	$ 4,221	$ 250,791
As of December 31, 2017	$ 102,390	$ 98,898	$ 5,331	$ 22,995	$ 4,221	$ 233,835
As of December 31, 2018	$ 88,205	$ 97,744	$ 427	$ 22,514	$ 4,221	$ 213,111

During 2018 and 2017, disposals of premises and equipment resulted in losses of $1,769,000 and $898,000, respectively, and are included in General and administrative in the accompanying Consolidated Statements of Income.

9. GOODWILL AND INTANGIBLE ASSETS

The gross carrying value, accumulated amortization and net carrying values of Goodwill and Intangible assets for the years ended December 31, 2018 and 2017 follow (in thousands):

	Goodwill	Customer Relationships	Capitalized Software	Total
Gross carrying value:				
January 1, 2017	$ 65,535	$ 239,774	$ 1,078,229	$ 1,383,538
Additions	—	—	86,310	86,310
Disposals	(7,836)	(8,074)	(297,141)	(313,051)
Impairment	—	—	(19,797)	(19,797)
As of December 31, 2017	57,699	231,700	847,601	1,137,000
Additions	—	—	93,215	93,215
Impairment	—	—	(14,161)	(14,161)
As of December 31, 2018	$ 57,699	$ 231,700	$ 926,655	$ 1,216,054
Accumulated amortization:				
January 1, 2017	$ —	$ 68,076	$ 851,232	$ 919,308
Amortization expense	—	19,385	97,262	116,647
Disposals	—	(5,400)	(289,613)	(295,013)
As of December 31, 2017	—	82,061	658,881	740,942
Amortization expense	—	19,310	84,557	103,867
Impairment	—	—	(5,573)	(5,573)
As of December 31, 2018	$ —	$ 101,371	$ 737,865	$ 839,236
Net carrying value:				
January 1, 2017	$ 65,535	$ 171,698	$ 226,997	$ 464,230
As of December 31, 2017	$ 57,699	$ 149,639	$ 188,720	$ 396,058
As of December 31, 2018	$ 57,699	$ 130,329	$ 188,790	$ 376,818

During 2017, disposals of software resulted in losses of $596,000 and are included in General and administrative in the accompanying Consolidated Statements of Income. In addition, during 2017, disposals of customer relationships and software related to the dispositions of Clarient and Avox (see Note 4) resulted in charges of $6,932,000 and $2,674,000, respectively, and are included in Other non-operating income in the accompanying Consolidated Statements of Income, as part of the Company's net gain on the sales.

Goodwill impairment testing. DTCC completed its annual goodwill impairment test in the fourth quarter of 2018 and concluded that goodwill was not impaired. DTCC performed a qualitative assessment to test the goodwill for impairment and determined it was more likely than not that the fair value of each reporting unit exceeded their carrying value and therefore goodwill was deemed not impaired.

Intangible assets. The Company recognized impairment charges of $8,588,000 and $19,797,000 related to capitalized software for the years ended December 31, 2018 and 2017, respectively, that were determined to have no realizable value. The impairment charges were included in Impairment of Intangible assets in the accompanying Consolidated Statements of Income.

During 2018, the Company's evaluation of internally developed software projects resulted in the recognition of an impairment of internally developed software, as previously noted above.

9. GOODWILL AND INTANGIBLE ASSETS (CONTINUED)

During 2017, the re-platforming of the Company's Global Trade Repository (GTR) system triggered the evaluation of its internally developed software for impairment. The evaluation concluded that the $5,009,000 carrying value of certain GTR business internally developed software was not recoverable and exceeded its fair value. As a result, the Company recognized an impairment charge of $5,009,000 for the year ended December 31, 2017.

In addition, during 2017, the delayed revenue generation and losses sustained for DTCC-Euroclear GlobalCollateral LTD (DEGCL), triggered the evaluation of the Company's internally developed software for DEGCL for impairment. The evaluation concluded that the $14,788,000 carrying value of the Company's internally developed software for DEGCL was not recoverable and exceeded its fair value. As a result, the Company recognized an impairment charge of $14,788,000, for the year ended December 31, 2017, which reduced the carrying value of the Company's internally developed software for DEGCL to zero.

Details for estimated amortization expense for each of the next five years and thereafter follow (in thousands):

2019	$ 93,911
2020	83,070
2021	56,156
2022	32,884
2023	19,308
Thereafter	33,790
Total future estimated amortization	$ 319,119

10. EQUITY METHOD INVESTMENTS

Details for DTCC's Equity method investments as of December 31, 2018 and December 31, 2017 follow (in thousands, except ownership percentage):

	2018	2017
European Central Counterparty N.V.		
Percentage ownership	20%	20%
Carrying value	$ 10,491	$ 10,394
DTCC-Euroclear GlobalCollateral, LTD		
Percentage ownership	50%	50%
Carrying value	$ —	$ —

European Central Counterparty N.V. (ECCP N.V.), a joint venture with ABN AMRO Clearing Investments B.V., NASDAQ AB, BATS Trading Limited and Euronext N.V., provides a pan-European clearing solution offering economies of scale and risk management expertise to European market participants. ECCP N.V. uses the risk management framework and customer service organization of European Multilateral Clearing Facility N.V. (EMCF), and conducts its operations using the technology platform and infrastructure of EMCF.

10. EQUITY METHOD INVESTMENTS (CONTINUED)

DTCC-Euroclear GlobalCollateral LTD (DEGCL), a joint venture with Euroclear plc, provides support to financial institutions in addressing significant regulatory, operational and industry challenges related to the management of margin calls and collateral impacting the over-the-counter (OTC) derivatives market.

The Company's contributions to DEGCL for the years ended December 31, 2018 and 2017 follow (in thousands):

	Amount
April 6, 2017	$ 10,000
November 10, 2017	5,000
June 19, 2018	5,000
December 5, 2018	6,000
Total (1)	$ 26,000

(1) DTCC maintained the same ownership percentage as the joint venture partner, Euroclear plc, who also contributed a total of $26,000,000

Based on the delayed revenue generation and losses sustained by DEGCL services, a triggering event resulted during 2017 that required DTCC to assess its investment in DEGCL for other-than-temporary impairment. DTCC utilized a discounted cash flow methodology based on the forecasted cash flows for DEGCL to determine fair value for both its investment and internally developed software related to DEGCL. DTCC applied a discount rate of 25%, which reflected the weighted-average cost of capital adjusted for the risks inherent in the future cash flows. As a result, DTCC determined the fair value of its investment in DEGCL was less than its carrying value and concluded that this loss was other-than temporary. DTCC recognized an impairment charge of $9,881,000, which is included in Impairment of Equity method investments in the accompanying Consolidated Statement of Income for the year ended December 31, 2017. Cash contributions made to DEGCL subsequent to impairment were for the funding of prior losses of DEGCL and will be included in Net loss from Equity method investments in the accompanying Consolidated Statements of Income until financial conditions improve. DTCC continues to maintain its relationship with the DEGCL joint venture.

11. OTHER ASSETS

Details for Other assets as of December 31, 2018 and 2017 follow (in thousands):

	2018	2017
Prepaids	$ 81,774	$ 63,203
Prepaid taxes	24,645	22,130
Other current assets	27,541	16,321
Total other current assets	133,960	101,654
Long-term incentive plan assets	148,549	171,995
Cash surrender value on insurance policies	61,035	59,618
Prepaids	44,978	24,036
Deferred tax assets	44,952	86,242
Equity investments	11,750	5,411
Investment in Federal Reserve Stock	6,402	6,402
Other non-current assets	1,913	132
Total other non-current assets	319,579	353,836
Total	$ 453,539	$ 455,490

Prepaids primarily represent the interest and up-front fees paid for lines of credit maintained to support potential default liquidity resources for DTC and NSCC and maintenance contracts for various hardware and software services.

11. OTHER ASSETS (CONTINUED)

The Company purchased life insurance policies for employees who participated in DTCC's long-term incentive plans. Cash surrender value on insurance policies represents the amounts receivable from various insurance companies upon cancellation of the life insurance policies purchased for employees and is classified in Other non-current assets on the accompanying Consolidated Statements of Financial Condition. The associated liability for these deferred compensation plans and the loans drawn against these policies are classified in Other current liabilities and Other non-current liabilities on the accompanying Consolidated Statements of Financial Condition.

12. OTHER LIABILITIES

Details for Other liabilities as of December 31, 2018 and 2017 follow (in thousands):

	2018	2017
Compensation payable	$ 143,837	$ 137,446
Long-term incentive plan liabilities	51,979	44,072
Deferred rent	829	5,053
Other current liabilities	64,032	63,358
Total other current liabilities	260,677	249,929
Long-term incentive plan liabilities	206,758	224,791
Unrecognized tax benefits (1)	40,153	81,601
Deferred rent	35,136	36,117
Deferred tax liabilities	970	—
Other payables	5,317	27,733
Total other non-current liabilities	288,334	370,242
Total	$ 549,011	$ 620,171

(1) See Note 17 for additional information.

13. COMMERCIAL PAPER

Details for Commercial paper as of December 31, 2018 and December 31, 2017 follow (in thousands):

	2018	2017
Commercial paper - net of unamortized discount of $43,856 and $3,371 as of December 31, 2018 and 2017, respectively	$ 7,436,141	$ 3,222,571
Weighted-average interest rate	2.59%	1.43%

Interest expense on Commercial paper included in the accompanying Consolidated Statements of Income was $104,714,000 and $32,171,000 for the years ended December 31, 2018 and 2017, respectively.

Details for the cash flows associated with the issuance and maturities of Commercial paper for the years ended December 31, 2018 and 2017 follow (in thousands):

	2018	2017
Maturities less than 90 days:		
Proceeds from/(Repayments of) Commercial paper less than 90 days, net	$ 1,051,025	$ 880,352
Maturities greater than 90 days:		
Proceeds from Commercial paper	7,176,146	2,217,232
Repayments of Commercial paper	(4,038,455)	(2,429,033)
Proceeds from/(Repayments of) Commercial paper greater than 90 days, net	3,137,691	(211,801)
Change in Commercial paper, net	$ 4,188,716	$ 668,551

14. LONG-TERM DEBT

Details for Long-term debt as of December 31, 2018 and 2017 follow (in thousands):

	2018	2017
Notes payable	$ 36,375	$ 39,025
Capital lease obligations	—	5,227
Total long-term debt	36,375	44,252
Less: Current portion of long-term debt	(2,650)	(7,877)
Non-current portion of long-term debt	$ 33,725	$ 36,375

Details for principal payments due on Long-term debt for each of the next five years and thereafter follow (in thousands):

	Notes Payable
2019	$ 2,650
2020	2,650
2021	2,650
2022	2,650
2023	2,650
Thereafter	23,125
Total	$ 36,375

Notes payable. Details for notes payable as of December 31, 2018 and 2017 follow (in thousands):

			Outstanding Balance	
Issue Date	Maturity	Rate	2018	2017
April 26, 2012	April 26, 2032	3.83%	$ 19,575	$ 21,025
September 28, 2012	September 28, 2032	3.93%	16,800	18,000
Total			$ 36,375	$ 39,025

The weighted-average interest rate was 3.88% as of December 31, 2018 and 2017, respectively. Total Interest expense on notes payable included in the accompanying Consolidated Statements of Income was $1,465,000 and $1,663,000 for the years ended December 31, 2018 and 2017, respectively.

Capital lease obligations. Leased property meeting certain criteria is capitalized and the present value of the related lease payments is recorded as a liability. During the first quarter of 2018, the Company extinguished its remaining capital lease obligations.

14. LONG-TERM DEBT (CONTINUED)

The weighted-average interest rate was 0.00% and 1.80% as of December 31, 2018 and December 31, 2017, respectively. Total Interest expense on capital lease obligations included in the accompanying Consolidated Statements of Income was $68,000 and $339,000 for the years ended December 31, 2018 and 2017, respectively.

Lines of credit. DTCC maintains a committed line of credit for general funding purposes while certain of its subsidiaries, DTC and NSCC, also maintain committed lines of credit to support settlement.

Details for the terms of the outstanding lines of credit as of December 31, 2018 and December 31, 2017 follow:

	2018	2017
DTCC		
Committed Amount	$500 million	$500 million
Denomination	USD	USD
No. of Participants/Lenders	10/10	10/10
DTC		
Committed Amount	$1.9 billion	$1.9 billion
Denomination	USD	USD
No. of Participants/Lenders	33/41	32/41
Uncommitted Amount	C$150 million (1)	C$150 million (1)
Denomination	CAD	CAD
No. of Participants/Lenders	1/1	1/1
NSCC		
Committed Amount	$12.1 billion	$12.2 billion
Denomination	USD	USD
No. of Participants/Lenders	33/41	32/41

(1) Used to support Canadian settlement.

There were no borrowings under the line of credit during 2018 and 2017.

14. LONG-TERM DEBT (CONTINUED)

Details for debt covenants related to the notes payable and lines of credit as of December 31, 2018 and December 31, 2017 follow:

	2018	2017
Notes Payable		
DTCC		
Minimum Net Worth	$400 million	$400 million
Maximum Priority Debt	20% of Net Worth	20% of Net Worth
Lines of Credit		
DTCC		
Minimum Net Worth	$1.1 billion	$1.1 billion
Maximum Priority Debt	$200 million	$200 million
DTC		
Minimum Net Worth	$150 million	$150 million
Minimum Participants' Fund deposits	$750 million	$750 million
NSCC		
Minimum Net Worth	$125 million	$125 million
Minimum Clearing Fund deposits	$1 billion	$1 billion

As of December 31, 2018 and 2017, the Company was in compliance with its debt covenants.

Credit Ratings. DTCC, DTC, FICC and NSCC are rated by Moody's Investors Service, Inc. (Moody's) and S&P Global Inc. (S&P). Details for senior debt ratings and ratings outlooks for DTCC and its three clearing agency subsidiaries as of December 31, 2018 follow:

	Moody's (1)			S&P		
	Long-term	**Short-term**	**Outlook**	**Long-term**	**Short-term**	**Outlook**
DTCC	Aa3	N/A	Stable	AA-	A-1+	Stable
DTC	Aaa	P-1	Stable	AA+	A-1+	Stable
FICC	Aaa	P-1	Stable	AA	A-1+	Stable
NSCC	Aaa	P-1	Stable	AA+	A-1+	Stable

(1) Moody’s categorizes the long-term issuer ratings of DTC, FICC and NSCC as clearing counterparty ratings (CCR) under the agency's Clearing Houses Rating Methodology.

15. FAIR VALUE MEASUREMENTS

Valuation hierarchy
U.S. GAAP provides for a three-level valuation hierarchy based on the transparency of inputs to the valuation of an asset or liability as of the measurement date. Details for the description of the three levels follow:

- Level 1 — Inputs to the valuation methodology are unadjusted quoted market prices for identical assets or liabilities in active markets as of the valuation date.

- Level 2 — Inputs to the valuation methodology are quoted market prices for similar assets and liabilities in active markets; quoted market prices for identical or similar assets or liabilities in markets that are not active; inputs other than quoted prices that are observable for the asset or liability; and inputs that are derived principally from or corroborated by observable market data by correlation or other means.

- Level 3 — Inputs to the valuation methodology are unobservable and reflect the Company's own assumptions about the estimates market participants would use pricing the asset or liability based on the best information available in the circumstances (e.g., internally derived assumptions surrounding timing and amount of expected cash flows).

A financial asset or liability's categorization within the valuation hierarchy is based on the lowest level of input that is significant to the fair value measurement.

15. FAIR VALUE MEASUREMENTS (CONTINUED)

Financial Assets and Liabilities measured at fair value on a recurring basis. For financial assets and liabilities measured at fair value on a recurring basis, the Company applies the following valuation techniques to measure fair value:

Product/ Instrument	Valuation Methodology	Classification in the valuation hierarchy
<u>Assets - Participants' and Clearing Funds - Securities on deposit</u>		
U.S. Treasury Securities U. S. Agency Issued Debt Securities (Non-Callable)	Obtained from pricing services engaged by the Company, and the Company receives one price for each security. The fair values provided by the pricing services are estimated using pricing models, where the inputs to those models are based on observable market inputs.	Level 1
U. S. Agency Issued Debt Securities (Callable) U.S. Agency Residential Mortgage-Backed Securities	Quoted market price of recent trades of similar securities obtained from pricing services engaged by the Company.	Level 2
<u>Non-Current Assets - Other non-current assets</u>		
Rabbi Trust	Obtained from pricing services engaged by the Company, and the Company receives one price for each security.	Level 1
	Quoted market price of recent trades of similar securities obtained from pricing services engaged by the Company.	Level 2
<u>Liabilities - Participants' and Clearing Funds - Securities on deposit</u>		
Participants' and Clearing Funds liabilities	Derived from the corresponding Participants' and Clearing Funds assets (see above).	Level 1 and Level 2

15. FAIR VALUE MEASUREMENTS (CONTINUED)

Fair value measurements of those items measured on a recurring basis as of December 31, 2018 and 2017 follow (in thousands):

	2018			
	Level 1	Level 2	Level 3	Total
Assets - Participants' and Clearing Funds				
Securities on deposit	$ 16,659,680	$ 3,629,774	$ —	$ 20,289,454
Non-current assets				
Long-term incentive plan assets	113,151	35,398	—	148,549
Total	$ 16,772,831	$ 3,665,172	$ —	$ 20,438,003
Participants' and Clearing Funds - Securities liabilities	$ 16,659,680	$ 3,629,774	$ —	$ 20,289,454
Total	$ 16,659,680	$ 3,629,774	$ —	$ 20,289,454

	2017			
	Level 1	Level 2	Level 3	Total
Assets - Participants' and Clearing Funds				
Securities on deposit	$ 10,900,451	$ 1,777,494	$ —	$ 12,677,945
Non-current assets				
Long-term incentive plan assets	135,087	36,908	—	171,995
Total	$ 11,035,538	$ 1,814,402	$ —	$ 12,849,940
Participants' and Clearing Funds - Securities liabilities	$ 10,900,451	$ 1,777,494	$ —	$ 12,677,945
Total	$ 10,900,451	$ 1,777,494	$ —	$ 12,677,945

There were no transfers between levels in the fair value hierarchy, nor were any financial assets and liabilities measured at fair value on a recurring basis classified as Level 3 as of December 31, 2018 and 2017.

15. FAIR VALUE MEASUREMENTS (CONTINUED)

Financial Assets and Liabilities measured at other than fair value. For financial assets and liabilities that are not required to be carried at fair value on a recurring basis the Company applies the following valuation techniques to measure fair value:

Product/ Instrument	Valuation Methodology	Classification in the valuation hierarchy
Assets - Current Assets - Clearing Fund Investments in marketable securities		
U.S. Treasury bills	Obtained from pricing services engaged by the Company, and the Company receives one price for each security. The fair values provided by the pricing services are estimated using pricing models, where the inputs to those models are based on observable market inputs.	Level 1
Liabilities - Current Liabilities		
Long-term debt	Discounted cash flows using current market rates for similar instruments of the same remaining maturity or quoted prices for the same of similar issues.	Level 2

Financial assets and liabilities whose carrying value approximates fair value. The carrying values of certain assets and liabilities approximate their fair values because they are short-term in duration, have no defined maturity or have market-based interest rates. These instruments include Cash and cash equivalents, Participants' segregated cash, Short-term investments, Participants' and Clearing Funds - Cash deposits, Other Participants' assets, Commercial paper, Accounts payable and accrued expenses, Participants' and Clearing Funds - Cash deposit liabilities, Payable to Participants and Long-term debt.

15. FAIR VALUE MEASUREMENTS (CONTINUED)

The carrying values, fair values and fair value hierarchy levels of all financial instruments measured at other than fair value on the accompanying Consolidated Statements of Financial Condition as of December 31, 2018 and 2017 follow (in thousands):

2018	Carrying Amount	Total Fair Value	Level 1	Level 2	Level 3
Assets:					
Cash and cash equivalents	$ 8,641,036	$ 8,641,036	$ 8,641,036	$ —	$ —
Participants' segregated cash	77,988	77,988	77,988	—	—
Short-term investments	800,000	800,000	—	800,000	—
Participants' and Clearing Funds:					
Cash deposits	16,332,668	16,332,668	15,507,668	825,000	—
Other Participants' assets	518,115	518,115	517,665	450	—
Total	$ 26,369,807	$ 26,369,807	$ 24,744,357	$ 1,625,450	$ —
Liabilities:					
Commercial paper	$ 7,436,141	$ 7,436,141	$ —	$ 7,436,141	$ —
Accounts payable and accrued expenses	104,013	104,013	—	104,013	—
Participants' and Clearing Funds Cash deposit liabilities	16,332,668	16,332,668	16,332,668	—	—
Payable to Participants	596,103	596,103	596,103	—	—
Long-term debt	36,375	36,035	—	36,035	—
Total	$ 24,505,300	$ 24,504,960	$ 16,928,771	$ 7,576,189	$ —

2017	Carrying Amount	Total Fair Value	Level 1	Level 2	Level 3
Assets:					
Cash and cash equivalents	$ 5,075,318	$ 5,075,318	$ 5,075,318	$ —	$ —
Participants' segregated cash	20,120	20,120	20,120	—	—
Participants' and Clearing Funds:					
Cash deposits	14,312,520	14,312,520	13,442,520	870,000	—
Investments in marketable securities	25,000	24,920	24,920	—	—
Other Participants' assets	868,036	868,036	862,057	5,979	—
Total	$ 20,300,994	$ 20,300,914	$ 19,424,935	$ 875,979	$ —
Liabilities:					
Commercial paper	$ 3,222,571	$ 3,222,571	$ —	$ 3,222,571	$ —
Accounts payable and accrued expenses	118,345	118,345	—	118,345	—
Participants' and Clearing Funds Cash deposit liabilities	14,337,520	14,337,520	14,337,520	—	—
Payable to Participants	888,156	888,156	888,156	—	—
Long-term debt	44,252	45,822	—	45,822	—
Total	$ 18,610,844	$ 18,612,414	$ 15,225,676	$ 3,386,738	$ —

15. FAIR VALUE MEASUREMENTS (CONTINUED)

Financial assets measured at fair value on a non-recurring basis. Certain assets are subject to measurement at fair value on a non-recurring basis. For these assets, measurement at fair value in periods subsequent to their initial recognition is applicable if they are determined to be impaired or when an observable event occurs.

The Company recognized impairment charges on certain Intangible assets and Equity method investments as disclosed in Note 9 and Note 10, respectively. The fair values of the Intangible assets and Equity method investments were determined based on a discounted cash flow method which reflected estimated future cash flows associated with the identified assets at the measurement date, and is within Level 3 under the fair value hierarchy on a non-recurring basis. The Intangible assets and Equity method investments were determined to be fully impaired and were written down to a fair value of zero on the impairment date.

The rollforward of Equity investments categorized within Level 3 in the fair value hierarchy for the year ended December 31, 2018 follow (in thousands):

	Investment at December 31, 2017	Transfers Into Level 3 (1)	Purchases(2)	Unrealized Gain	Fair Value at December 31, 2018
Equity investments	$ —	$ 5,411	$ 1,104	$ 5,235	$ 11,750

(1) On January 1, 2018, the Company adopted the new standard related to fair value measurement of unconsolidated equity investments under the prospective transition method of adoption. See Note 3 for additional information.

(2) On June 25, 2018, the Company made an additional cash investment of $1,104,000 in Equity investments, which increased the Company's total investment in Equity investments, to $11,750,000, including a $5,235,000 mark-to-market investment gain included in Other non-operating income in the accompanying Consolidated Statements of Income.

The Company's primary level 3 financial asset, the valuation techniques used to measure the fair value of the financial asset and the significant unobservable inputs as of December 31, 2018 follow (in thousands):

Financial Instruments Owned	Fair Value (in thousands)	Valuation Technique	Unobservable Inputs	Input Range	Weighted Average
Equity Investments	$11,750	Last Round of Financing	Price Per Share(1)	$15 - $107(2)	$71(2)

(1) Price is determined using the latest valuation from the most recent round of financing of equity investments.

(2) The unobservable input range and weighted-average are driven by the individual equity investments.

16. PENSION AND POSTRETIREMENT BENEFITS

Defined contribution retirement plans. The Company matches 50% of the first 6% of the employee's contributions up to the Internal Revenue Service compensation limits. Company matching contributions and employee contributions vest immediately. In addition, the Company also makes a service contribution of a percentage of base and incentive pay based on years of service (3% for less than five years, 4% for five years but less than ten years, and 5% for 10 or more years). Company service contributions vest at the rate of 20% for each year of service or at age 55. Total expense for the defined contribution retirement plans included in Employee compensation and related benefits in the accompanying Consolidated Statements of Income was $37,510,000 and $38,953,000 for the years ended December 31, 2018 and 2017, respectively.

Defined benefit pension and other postretirement benefit plans.
Benefit obligations. The reconciliation of the beginning and ending balances of the projected benefit obligations for defined benefit plans follow (in thousands):

	Pension Benefits		Other Benefits	
	2018	2017	2018	2017
Benefit obligations, beginning of year:	$ 1,135,910	$ 1,056,165	$ 72,062	$ 63,064
Service cost	5,868	7,089	744	668
Interest cost	37,289	38,278	2,188	2,122
Plan amendments	—	—	—	2,357
Gross benefits paid	(66,178)	(55,690)	(3,498)	(3,800)
Expenses paid	(1,900)	(3,222)	—	—
Actuarial loss	(96,943)	93,290	(7,294)	7,651
Total benefit obligations at end of year	$ 1,014,046	$ 1,135,910	$ 64,202	$ 72,062
Total accumulated benefit obligations at end of year	$ 1,009,611	$ 1,128,916	N/A	N/A

The Accumulated Benefit Obligations are defined as the actuarial present value of postretirement benefits attributed to employee services rendered before December 31, 2018 and 2017, respectively, and based on employee service and compensation prior to the applicable date.

Funded status. The funded status of the plans, as of December 31, 2018 and 2017, follow (in thousands):

	Pension Benefits		Other Benefits	
	2018	2017	2018	2017
Benefit obligations at end of year:				
Qualified plan	$ 894,461	$ 1,010,203	$ —	$ —
Other plans	119,585	125,707	64,202	72,062
Total benefit obligations at end of year	1,014,046	1,135,910	64,202	72,062
Fair value of qualified plan assets at end of year	863,953	896,442	—	—
Fair value of unqualified plan assets at end of year	—	—	—	—
Total fair value of plan assets at end of year	863,953	896,442	—	—
Unfunded status	$ (150,093)	$ (239,468)	$ (64,202)	$ (72,062)
Amounts recognized in the balance sheet consist of:				
Current liability	$ (11,996)	$ (16,723)	$ (4,613)	$ (4,614)
Non-current liability	(138,097)	(222,745)	(59,589)	(67,448)
Amount recognized, end of year	$ (150,093)	$ (239,468)	$ (64,202)	$ (72,062)

16. PENSION AND POSTRETIREMENT BENEFITS (CONTINUED)

Plan assets. The summary and reconciliation of the beginning and ending balances of the fair value of the plans' assets follow (in thousands):

	Pension Benefits		Other Benefits	
	2018	2017	2018	2017
Change in plan assets:				
Fair value of plan assets, beginning of year	$ 896,442	$ 814,352	$ —	$ —
Actual return on plan assets	(25,275)	97,025	—	—
Employer contribution	60,864	43,977	3,498	3,800
Gross benefits paid	(66,178)	(55,690)	(3,498)	(3,800)
Expenses paid	(1,900)	(3,222)	—	—
Fair value of plan assets, end of year	$ 863,953	$ 896,442	$ —	$ —

Investments are classified based on the lowest level of input that is significant to the fair value measurement. Details of the classification of plan assets in accordance with the three-tier fair valuation hierarchy and current asset allocations as of December 31, 2018 and 2017, follow (in thousands, except percentages):

	Target Allocation 2018	Percentage of Plan Assets, December 31, 2018	Total	Quoted Prices in Active Markets for Identical Assets (Level 1)
Pension assets as of December 31, 2018:				
Short-term investment fund(1)	0.50%	0.60%	$ 5,154	$ —
Equity Portfolio:				
Domestic large cap growth(1)			26,979	—
Domestic large cap value(1)			26,418	—
Domestic large cap core(1)			53,836	—
Domestic small core			10,065	10,065
International core			16,756	16,756
International emerging markets			5,733	5,733
Total equity securities	17.50%	16.18%	139,787	32,554
Fixed income portfolio:				
Domestic liability driven investment(1)	80.00%	82.43%	712,191	—
Guaranteed insurance contracts:				
Annuity fund(1)	2.00%	0.79%	6,821	—
Total pension assets as of December 31, 2018			$ 863,953	$ 32,554

16. PENSION AND POSTRETIREMENT BENEFITS (CONTINUED)

	Target Allocation 2017	Percentage of Plan Assets, December 31, 2017	Total	Quoted Prices in Active Markets for Identical Assets (Level 1)
Pension assets as of December 31, 2017:				
Short-term investment fund[(1)]	—%	1.76%	$ 15,776	$ —
Equity Portfolio:				
Domestic large cap growth[(1)]			44,455	—
Domestic large cap value[(1)]			43,675	—
Domestic large cap core[(1)]			88,898	—
Domestic small core			16,684	16,684
International core			26,210	26,210
International emerging markets			9,058	9,058
Total equity securities	25.00%	25.55%	228,980	51,952
Fixed income portfolio:				
Domestic liability driven investment[(1)]	73.00%	71.91%	644,670	—
Guaranteed insurance contracts:				
Annuity fund[(1)]	2.00%	0.78%	7,016	—
Total pension assets as of December 31, 2017			$ 896,442	$ 51,952

(1) Certain investments that were measured at net asset value per share (or its equivalent) have not been classified in the fair value hierarchy. The fair value amounts presented in the table are intended to permit the reconciliation of the fair value hierarchy to the amounts presented on the accompanying Consolidated Statement of Financial Condition. See Note 15 for further information. The Company did not hold defined benefit plan assets designated as Level 2 or Level 3 as of December 31, 2018 and 2017.

Net periodic benefit expense (income). Details of the components of net periodic benefit expense (income) and amortization recognized in OCI, excluding taxes, follow (in thousands):

	Pension Benefits		Other Benefits	
	2018	2017	2018	2017
Components of net periodic benefit expense (income):				
Expected return on plan assets	$ (39,564)	$ (37,449)	$ —	$ —
Interest cost	37,289	38,278	2,188	2,123
Service cost	5,868	7,089	744	668
Amortizations:				
Prior service cost (credit)	933	933	(5,926)	(5,926)
Actuarial loss	8,731	6,692	2,188	1,112
Settlement loss	444	198	—	—
Net periodic benefit expense (income)	$ 13,701	$ 15,741	$ (806)	$ (2,023)

16. PENSION AND POSTRETIREMENT BENEFITS (CONTINUED)

Impacts to previously reported results. On January 1, 2018, the Company adopted ASU 2017-07, *Compensation: Retirement Benefits* under the retrospective method of adoption. See Note 3 for additional information. The impact of the new retirement benefits standard on the Company's previously reported results for the year ended December 31, 2017 follows (in thousands):

	For the year ended December 31, 2017		
	As Previously Reported	New Retirement Benefits Standard Adjustment	As Restated
Employee compensation and related benefits	$ 653,731	$ (5,961)	$ 647,770
Interest expense	(36,438)	(40,401)	(76,839)
Other non-operating income	45,261	34,440	79,701

Changes in OCI. Details of the changes in plan assets and benefit obligations recognized in OCI (excluding taxes) follow (in thousands):

	Pension Benefits		Other Benefits	
	2018	2017	2018	2017
Other changes recognized in OCI:				
Prior service cost arising during the period	$ —	$ —	$ —	$ 2,356
Net loss arising during the period	(32,104)	33,713	(7,294)	7,651
Amortizations:				
Prior service (cost) credit	(933)	(933)	5,926	5,926
Actuarial and settlement loss	(9,175)	(6,890)	(2,188)	(1,112)
Net other changes in OCI	$ (42,212)	$ 25,890	$ (3,556)	$ 14,821

Details of the net amount recognized in Accumulated other comprehensive income on the accompanying Consolidated Statements of Financial Condition (excluding taxes) follow (in thousands):

	Pension Benefits		Other Benefits	
	2018	2017	2018	2017
Amount not yet reflected in net periodic benefit (cost) and included in Accumulated other comprehensive loss:				
Prior service (cost) credit	$ (3,502)	$ (4,434)	$ 17,680	$ 23,606
Accumulated loss	(242,541)	(283,821)	(14,944)	(24,426)
Accumulated other comprehensive (loss) income	(246,043)	(288,255)	2,736	(820)
Cumulative net periodic benefit (cost) in excess of employer contributions	95,950	48,787	(66,938)	(71,242)
Net amount recognized at year-end	$ (150,093)	$ (239,468)	$ (64,202)	$ (72,062)

16. PENSION AND POSTRETIREMENT BENEFITS (CONTINUED)

The estimated actuarial loss (gain) and prior service (cost) credit that will be amortized from accumulated other comprehensive loss into the accompanying Consolidated Statement of Income through net periodic benefit (cost) or expense over the next fiscal year follow (in thousands):

	Pension Benefits		Other Benefits	
	2018	2017	2018	2017
Prior service credit (cost)	$ (933)	$ (933)	$ 5,926	$ 5,926
Net loss	(5,270)	(9,131)	(1,270)	(2,528)
Total	$ (6,203)	$ (10,064)	$ 4,656	$ 3,398

Assumptions for net periodic benefit expense (income). Details for the defined benefit plans assumptions used by actuaries to determine net periodic benefit expense (income) as of December 31, 2018 and 2017 follow:

	Pension Benefits		Other Benefits	
	2018	2017	2018	2017
Weighted-average assumptions used to determine net periodic benefit expense (income) for the years ended December 31:				
Discount rate	3.73%	4.39%	3.62%	4.19%
Expected long-term rate of return on plan assets	4.75%	4.75%	n/a	n/a
Rate of compensation increase	n/a	n/a	n/a	n/a
Assumed health care cost trend rates as of December 31:				
Health care cost trend rate assumed for next year			6.89%	7.31%
Rate to which the cost trend rate is assumed to decline				
(the ultimate trend rate)			4.46%	4.46%
Year that the rate reaches the ultimate trend rate			2038	2040

To develop the expected long-term rate of return on assets assumptions, DTCC considered the historical returns and the future expectations for returns for each asset class, as well as the target asset allocation of the pension portfolio. This resulted in the selection of the 4.75% long-term rate of return assumptions as of December 31, 2018 and 2017.

The discount rate reflects the rate at which defined benefit plan obligations could be effectively settled. The Company projects the benefits to be paid by each plan for each year in the future, the sum of which is the projected benefit obligations. The benefits are then discounted using the Above Mean Mercer Yield Curve spot rates for the corresponding maturity years.

The total of the present values for the benefit payment years is used to calculate the single rate that discounts the benefit cash flows to the same total present value. The single rate is the basis for the final effective discount rate.

16. PENSION AND POSTRETIREMENT BENEFITS (CONTINUED)

Details for the defined benefit plans assumptions used by actuaries to determine benefit obligations as of December 31, 2018 and 2017 follow:

	Pension Benefits		Other Benefits	
	2018	2017	2018	2017
Weighted-average assumptions used to determine benefit obligations as of December 31:				
Discount rate	4.41%	3.73%	4.30%	3.62%
Rate of compensation increase	n/a	n/a	n/a	n/a
Assumed health care cost trend rates as of December 31:				
Health care cost trend rate assumed for next year			6.46%	6.89%
Rate to which the cost trend rate is assumed to decline (the ultimate trend rate)			4.46%	4.46%
Year that the rate reaches the ultimate trend rate			2038	2040

Assumptions for defined benefit obligations. Mortality is a key assumption used to determine the benefit obligations for the Company's defined benefit plans. The mortality assumption for all plans uses MRP-2006 generational tables projected with scale MMP-2018. The mortality projection scale was changed from scale MMP-2016 to scale MMP-2018. The mortality tables use a white collar adjustment for the SERP, Restoration Plan and non-union Retiree Medical and Life Insurance Plans and a blue collar adjustment for the union Retire Medical and Life Insurance Plans. The Pension Plan continues to use no collar adjustment. On a lump sum basis, mortality is based on IRS prescribed tables projected using scale MP-2018, with segmented interest rate adjustments. This projection scale was changed from MP-2016 to MP-2018.

Expected cash flows. The Company contributed $55,000,000 to the Pension Plan in 2018 and expects to contribute approximately $10,000,000 during 2019. Settlement losses relate to early retirement of executives who elected lump-sum and periodic payments. There were no settlement losses in 2018 and 2017. There were no participant contributions to the plans in 2018 and 2017.

Details for the benefit payments for the pension plans and other plans for 2018 and 2017 follow (in thousands):

	2018	2017
Pension plans	$ 66,177	$ 55,690
Other plans	3,498	3,800
Total	$ 69,675	$ 59,490

Details for estimated amounts to be paid in each of the next five years and the five year period thereafter follow (in thousands):

	Pension	Employer Benefits Payments	Medicare Subsidy Receipts
2019	$ 67,555	$ 4,613	$ 12
2020	82,753	4,790	11
2021	67,863	4,890	11
2022	67,118	4,930	10
2023	60,162	4,912	9
Thereafter	327,169	22,806	37
Total	$ 672,620	$ 46,941	$ 90

17. INCOME TAXES

DTCC and its subsidiaries file a consolidated Federal income tax return and various state tax returns. DTCC and its subsidiaries also file other state and non-U.S. jurisdiction income tax returns on a separate company basis.

Details for the components of the Company's Provision for income taxes for the years ended December 31, 2018 and 2017 follow (in thousands):

	2018	2017
Current income tax:		
Federal	$ 10,397	$ 53,857
State and local	24,785	5,174
Foreign	23,539	17,480
Total current income tax	58,721	76,511
Deferred income tax/(benefit):		
Federal	22,993	21,919
State and local	(35,641)	21,074
Foreign	1,051	8,226
Total deferred income tax/(benefit)	(11,597)	51,219
Provision for income taxes	$ 47,124	$ 127,730

The Company recognized a provisional income tax charge of $52,736,000 in 2017 as a result of the Tax Reform Act, which was included as a component of the Company's Provision for income taxes. The Company completed its analysis within the one-year measurement period from the enactment date and recorded a tax benefit of $11,216,000 for the year ended December 31, 2018.

The 2018 and 2017 effective tax rates differ from the 21% and 35% Federal statutory tax rate, respectively, mainly due to state and local taxes, change in unrecognized tax benefits, the enactment of the Tax Reform Act, and settlements of tax audits. Details for the reconciliation of the U.S. Federal statutory tax rate to the Company's effective tax rate on Income before taxes for the years ended December 31, 2018 and 2017 follow:

	2018	2017
U.S. statutory tax rate	21.0%	35.0%
State and local income taxes, net of Federal income tax benefit	4.9	2.4
Income from foreign operations	(0.6)	(6.9)
Change in unrecognized tax benefits	(9.4)	1.9
Non-controlling interest	—	(1.5)
Disposition of Clarient and Avox	—	(6.2)
Enactment of the Tax Reform Act	(3.2)	17.3
Settlements of tax audits	2.3	0.1
Other	(1.4)	(0.3)
Effective tax rate	13.6%	41.8%

17. INCOME TAXES (CONTINUED)

Details for the components of deferred tax assets and liabilities as of December 31, 2018 and 2017 follow (in thousands):

	2018	2017
Deferred tax assets:		
Accrued compensation and benefits	$ 117,299	$ 138,768
Deferred rent	9,011	10,488
Other	29,443	44,300
Total deferred tax assets	155,753	193,556
Deferred tax liabilities:		
Capitalized software	(44,826)	(46,699)
Investment tax basis difference	(39,685)	(38,875)
Depreciation	(27,260)	(21,740)
Total deferred tax liabilities	(111,771)	(107,314)
Net deferred tax assets	$ 43,982	$ 86,242

The deferred tax assets are expected to be fully realized and, accordingly, no valuation allowance was established.

For certain of its non-U.S. subsidiaries, the Company has not provided additional U.S. income taxes and foreign withholding taxes on the undistributed earnings of certain foreign subsidiaries as of December 31, 2018. As a result of the Tax Reform Act's one-time mandatory transition tax on the accumulated earnings of foreign subsidiaries, the Company expects the unrecognized deferred tax liability attributable to indefinitely reinvested earnings to be immaterial.

Details for unrecognized tax benefits, included in Non-current liabilities, for the years ended December 31, 2018 and 2017 follow (in thousands):

	2018	2017
Beginning balance	$ 53,008	$ 45,410
Increases based on prior period tax positions	2,586	17,592
Decreases based on prior period tax positions	(22,192)	(2,201)
Increases based on current period tax positions	1,444	400
Decreases related to lapses in statute	(734)	(8,076)
Decreases related to settlements with taxing authorities	(5,420)	(117)
Unrecognized tax benefit	28,692	53,008
Accrued interest	11,461	28,593
Ending balance	$ 40,153	$ 81,601

The Company classifies interest and penalties related to unrecognized tax benefits, if incurred, in Provision for income taxes in its accompanying Consolidated Statements of Income. The Company recognized a decrease in accrued interest and penalties of $17,132,000 for the year ended December 31, 2018 primarily related to the settlement of state tax audits.

17. INCOME TAXES (CONTINUED)

Details for the periods currently under examination and remaining subject to examination by jurisdiction as of December 31, 2018 follow:

	Tax Years	
Jurisdiction	**Under Examination**	**Subject to Examination**
U.S. Federal - Internal Revenue Service	-	2015 - 2017
New York State	-	2015 - 2017
New York City	2010 - 2014	2015 - 2017
State of Illinois	2012 - 2013	2014 - 2017
State of Florida	2013 - 2016	2017

Unrecognized tax benefits are estimated based on judgment, assessment of relevant risks, facts and circumstances. Actual results could differ materially from those estimates. The Company believes that the liability for unrecognized tax benefits is the best estimate in relation to the potential for additional assessments. Unexpected results from one or more such tax audits could significantly adversely affect the Company's income tax provision and results of operations.

18. SHAREHOLDERS' EQUITY

DTCC Series A Preferred stock. All 10,000 shares of DTCC Series A Preferred stock are issued and outstanding and held of record by Stock Clearing Corporation, a wholly owned subsidiary of the New York Stock Exchange LLC, the successor-in-interest to the New York Stock Exchange Inc. In the event of DTCC's voluntary or involuntary liquidation, dissolution or winding-up, the holders of Series A Non-Cumulative Perpetual Preferred stock are entitled to a liquidation preference of $30.00 per share.

DTCC Series B Preferred stock. All 10,000 shares of DTCC Series B Preferred stock are issued and outstanding and held of record by National Clearing Corporation, a wholly owned subsidiary of the Financial Industry Regulatory Authority Inc. ("FINRA"). In the event of DTCC's voluntary or involuntary liquidation, dissolution or winding-up, the holders of Series B Preferred stock are entitled to a liquidation preference of $30.00 per share.

DTCC Series C Fixed-to-Floating Rate Non-Cumulative Perpetual Preferred stock. DTCC issued 1,600 shares of Fixed-to-Floating Rate Non-Cumulative Perpetual Preferred stock, Series C, $0.50 par value per share, with a liquidation preference of $250,000 per share. When declared by DTCC's Board of Directors, dividends on the Series C Preferred stock are payable in arrears on June 15 and December 15 of each year through June 15, 2020 at a fixed rate of 4.875% per annum. From June 15, 2020 onward, dividends will accrue at a floating rate equal to three-month LIBOR plus 3.167% per annum. DTCC may redeem the Series C Preferred Stock at its option, for cash, i) in whole or in part, from time to time, on any dividend payment date on or after June 15, 2020 at a redemption price equal to $250,000 per share, plus any declared and unpaid dividends to, but excluding the redemption date, or ii) in whole but not in part, at any time within 90 days following a Regulatory Capital Treatment Event, as defined in the Series C Preferred Stock Offering Memorandum, at a redemption price equal to $250,000 per share, plus any declared and unpaid dividends to, but excluding, the redemption date.

On April 17, 2018 and October 17, 2018, in accordance with the Amended Certificate of Incorporation of DTCC, the Board of Directors approved and declared dividends in the amount of $6,093.75 per share on 1,600 shares outstanding of its Series C Preferred Stock. The semi-annual aggregate dividend of $9,750,000 was paid on June 15, 2018 and December 15, 2018, to the holders of the Series C Preferred Stock as of record date May 31, 2018 and November 30, 2018, respectively.

DTC Series A Non-Cumulative Perpetual Preferred stock. Under a plan adopted by the Board of Directors, each Participant of DTC is required to own shares of DTC Series A preferred stock. There was $150,000,000 of DTC Series A preferred stock (1,500,000 shares at par value of $100 per share) outstanding as of December 31, 2018 and 2017. Annual dividends are accrued based on the weighted-average rate of interest paid by the Company on required Participants' Fund deposits during the dividend period as disclosed in the DTC's rules. The 2018 annual dividend amount of $2,340,000 was approved and declared by the Board of Directors in February 2019, and will be paid in April 2019, to the holders of DTC Series A Preferred stock during 2018.

19. CAPITAL REQUIREMENTS

The capital requirement for each of the clearing agencies is equal to the sum of the general business risk capital requirement and corporate contribution, as described below. The clearing agencies must meet the capital requirements by holding liquid net assets funded by equity, as described in rule 17Ad-22(e)(15) of the CCAS and the Clearing Agency Policy on Capital Requirements.

General Business Risk Capital Requirement. The general business risk capital requirement is determined according to Rule 17Ad-22(e)(15) of the CCAS and the Clearing Agency Policy on Capital Requirements. The capital requirement is held to cover potential general business losses so that the clearing agencies can continue operations and provide services as a going concern if those losses materialize. It is determined based on the general business risk profile and estimated time to execute a recovery or orderly wind-down of critical operations for each of the clearing agencies and, at a minimum, is equal to six months of operating expenses.

Corporate Contribution. The clearing agencies maintain an amount referred to as the corporate contribution, to be applied to losses as provided in each of the respective clearing agencies rules. The amount of the corporate contribution is generally equal to 50% of each clearing agency's general business risk capital requirement.

Details of the general business risk capital requirement, corporate contribution and liquid net assets funded by equity for the clearing agencies as of December 31, 2018 and 2017 follow (in thousands):

	2018		
	DTC	NSCC	FICC
General business risk capital requirement	$ 169,119	$ 153,054	$ 107,845
Corporate contribution	84,559	76,527	53,922
Total requirement	253,678	229,581	161,767
Liquid net assets funded by equity	529,478	445,732	265,724
Excess	$ 275,800	$ 216,151	$ 103,957

	2017		
	DTC	NSCC	FICC (a)
General business risk capital requirement	$ 159,181	$ 142,035	$ 93,203
Corporate contribution	79,590	71,017	46,602
Total requirement	238,771	213,052	139,805
Liquid net assets funded by equity	444,265	397,540	236,922
Excess	$ 205,494	$ 184,488	$ 97,117

(a) Restated due to the retrospective adoption of ASU 2017-07 *Compensation: Retirement Benefits*, which resulted in a reclassification of certain components of net periodic pension cost allocated from Total operating income to Total non-operating income (expense). See Note 3 for additional information.

Regulatory capital. DTCC's regulated subsidiaries maintain and report regulatory capital in accordance with all relevant laws, rules and guidelines. As a multinational enterprise, various DTCC subsidiaries are subject to regulatory capital regimes, as applicable. Certain DTCC subsidiaries submit regulatory capital reports to various regulators, including, but not limited to, FRBNY, the NYSDFS and the Commodity Futures Trading Commission in the United States; Ontario Securities Commission in Canada; and the Monetary Authority of Singapore in Singapore.

Capital adequacy. Certain DTCC subsidiaries are subject to capital guidelines issued by United States federal and state banking regulators. During the year DTCC engaged in banking activities under DTC.

19. CAPITAL REQUIREMENTS (CONTINUED)

DTC capital ratios filed with the FRBNY and the NYSDFS, and included in DTC's Financial Statements submitted to the SEC as of December 31, 2018 follow:

	DTC	Minimum Capital Ratio[a]	Well Capitalized Ratio[a]
Tier 1 capital ratio [1]	97.57%	6.00%	8.00%
Total capital ratio [1]	97.57%	8.00%	10.00%
Tier 1 leverage ratio [2]	19.69%	4.00%	4.00%

(a) As defined by the regulations issued by the Federal Reserve, Office of the Comptroller of the Currency and the Federal Deposit Insurance Corporation.

(1) Tier 1 capital ratio primarily includes preferred stock, common stock and retained earnings. DTC’s tier 1 capital and total capital ratios are based on tier 1 capital and total risk-weighted assets.

(2) Tier 1 leverage ratio is based on tier 1 capital and quarterly average total assets.

20. TRANSACTIONS WITH RELATED PARTIES

DTCC has agreements with DEGCL to provide various support services and office facilities. Expense reimbursements under these agreements follow (in thousands):

	Other Services[1]		Other Receivables[2]	
Related parties	2018	2017	2018	2017
DEGCL	$ 14,313	$ 21,792	$ 982	$ 3,065

(1) Included in Other services revenue in the accompanying Consolidated Statements of Income.

(2) Included in Accounts receivable on the accompanying Consolidated Statements of Financial Condition.

21. COMMITMENTS AND CONTINGENCIES

Litigation. The Company is involved in legal proceedings and litigation arising in the ordinary course of business. In the opinion of management, the outcome of such proceedings and litigation is not expected to have a material effect on the accompanying Consolidated Statements of Financial Condition, Income or Cash Flows.

Lease commitments. The Company leases office space and equipment. Total rental expense under the leases were $29,764,000 and $25,870,000 for the years ended December 31, 2018 and 2017, respectively.These amounts are included in Occupancy and Information technology in the accompanying Consolidated Statements of Income.

The Company sublets office space in some of its leased offices. Rental income under these subleases was $1,843,000 and $659,000 for the years ended December 31, 2018 and 2017, respectively. These amounts are included in Other non-operating income in the accompanying Consolidated Statements of Income.

Details for estimated future minimum rental payments under all noncancelable leases follow (in thousands):

2019	$	33,981
2020		33,804
2021		33,879
2022		29,779
2023		29,716
Thereafter		232,344
Total minimum rental payments (1)	$	393,503

(1) Future minimum rental payments were not reduced by minimum sublease rentals of $52,639,000 due in the future under noncancelable subleases.

22. GUARANTEES

Certain DTCC subsidiaries (NSCC and FICC) provide CCP services, including clearing, settlement and risk management services. Acting as a CCP, NSCC and FICC (through GSD and MBSD) guarantee the settlement of trades in the event one or more of their Participants' defaults. A Participant default is defined in the respective rules of NSCC, GSD and MBSD. In their guarantor role, each clearing subsidiary has equal claims to and from Participants, as applicable, on opposite sides of the netted transactions. To cover their guarantee risk, NSCC and FICC (through GSD and MBSD) use risk-based margining to collect cash and securities collateral through their Clearing Funds.

NSCC is the leading provider of clearance, netting, risk management and settlement for virtually all U.S. broker-to-broker trades involving equities, corporate and municipal debt, exchange traded funds and unit investment trusts. Through its Continuous Net Settlement (CNS) system, NSCC is interposed between Participants in securities clearance and settlement. CNS transactions are generally guaranteed at the point of trade comparison and validation for bilateral submissions or the point of trade validation for locked-in submissions. Since NSCC stands between the Participants delivering and receiving CNS trades, the failure of Participants to deliver securities to NSCC on settlement date, and the corresponding failure of NSCC to redeliver the securities, results in open positions. Open CNS positions are marked-to-market daily. Such marks are debited from or credited to the involved Participants through the settlement process.

FICC, through GSD, provides real-time trade matching, clearing, netting, risk management and settlement for trades in U.S. government debt including buy-sell transactions and repurchase agreement transactions. Securities processed by GSD include Treasury bills, bonds, notes, zero-coupon securities, government agency securities and inflation-indexed securities. The U.S. Government securities market is predominantly an over-the-counter market and most transactions are settled on trade date plus one day (T+1). Trades are guaranteed and novated upon comparison. The guarantee of GSD net settlement positions may result in a potential liability to FICC. Guaranteed positions that have not yet settled are margined and collateralized twice-daily through the Clearing Fund and marked-to-market twice-daily through the funds-only settlement process. In addition, a Participant may be subject to an additional amount referred to as the intra-day supplemental required fund deposit, which, if applicable, may be collected on an intra-day basis through the Clearing Fund.

MBSD provides real-time trade matching, clearing, netting , risk management and settlement for trades in the U.S. mortgage-backed securities market. Specifically, MBSD processes to-be-announced transactions, specified pool trades and stipulated trades. FICC's guarantee of MBSD transactions may result in potential liability to FICC. Guaranteed positions that have not yet settled are margined and collateralized daily through the Clearing Fund. The daily Clearing Fund includes a mark-to-market component that is calculated using guaranteed positions and prices as of prior end-of-day. In addition, a Participant may become subject to an intra-day mark-to-market charge which, if applicable, may be collected on an intra-day basis through the Clearing Fund.

If a Participant defaults in either NSCC or FICC, such Participant's deposits to the applicable Clearing Fund are the first source of funds and collateral that the NSCC and FICC would use to cover any losses that may result from the close-out and liquidation of the defaulting Participant's positions. To address potential tail losses, NSCC and FICC each separately maintain additional prefunded resources. These consist of (i) the CCP's Clearing Fund that, in the aggregate, currently serves as the CCP's default fund, and (ii) the CCP's corporate contribution, (see Note 19).

22. GUARANTEES (CONTINUED)

If, after closing out and liquidating a defaulting Participant's positions, the CCP were to suffer a loss, such loss would be satisfied as follows: (i) first, applying the defaulter's Clearing Fund deposit, including any amounts available under cross-guaranty agreements to which the CCPs are a party, described below; (ii) next, the CCPs may apply their corporate contribution (or such higher amount as approved by their Board of Directors), and (iii) by allocating any remaining loss to Participants.

Amounts that may be available under cross-guaranty agreements include, for NSCC, amounts available under the netting contract and limited cross-guaranty between DTC and NSCC relating to collateralization across the DTC-NSCC interface, or for FICC, amounts available under the cross-margining agreements between GSD and the Chicago Mercantile Exchange Inc., which may provide for additional funds if the defaulting member was a cross-margining Participant.

DTC, NSCC, FICC and The Options Clearing Corporation (OCC) have also entered into a multilateral netting contract and limited cross-guaranty agreement. In accordance with these agreements, these clearing agencies have agreed to make payments to each other for any remaining unsatisfied obligations of a common defaulting Participant to the extent that these clearing agencies have excess resources belonging to the defaulting Participant. Under this agreement, no party ever needs to pay out of pocket and no party can receive more than its loss.

Details for open CCP positions for which a trade guarantee applied as of December 31, 2018 and 2017 follow (in billions):

	2018	2017
FICC		
GSD	$ 1,160	$ 1,039
MBSD	333	312
NSCC	176	135

There were no defaults by Participants to these obligations.

23. OFF BALANCE SHEET AND CONCENTRATION OF CREDIT RISKS

DTCC is exposed to significant credit risk to third-parties including its Participants, which extends to companies in the global financial services industry. Customers are based in the United States of America and overseas and include participating brokers, dealers, institutional investors, banks, trust issuers, mutual fund companies, insurance carriers, hedge funds and other financial intermediaries - either directly or through correspondent relationships. Credit risk represents the potential for loss due to the default or deterioration in credit quality of a Participant. The Company's exposure to credit risk is primarily derived from clearing and settlement service operations. Credit risk also comes from financial assets, which consist principally of cash and cash equivalents, investments, accounts receivable and Participants' and Clearing Funds.

Given that NSCC and FICC are CCPs, they are exposed to significant credit risk of third parties, including their customer base, which extends to companies within the global financial services industry.

Concentrations of credit risk may arise due to large connected individual exposures and significant exposures to groups of Participants whose likelihood of default is driven by common underlying factors, including economic conditions affecting financial markets, the securities industry and debt-issuing countries.

Cash and cash equivalents. The Company maintains cash and cash equivalents with various financial institutions including the FRBNY. These financial institutions are located in various geographical regions, and the Company's policy is designed to limit exposure with any one financial institution. As part of its credit and risk management processes, the Company performs periodic evaluations of the relative credit standing of the financial institutions with whom it places funds. The Company generally makes deposits with financial institutions with a credit rating of at least BBB+/Baa1 or better from recognized rating agencies and that are approved via its internal credit review process. The Company also monitors the condition of the financial institutions with whom it places funds on an ongoing basis to identify any significant change in a financial institution's condition. If such a change takes place, the amounts deposited with such financial institutions may be adjusted.

23. OFF BALANCE SHEET AND CONCENTRATION OF CREDIT RISKS (CONTINUED)

Marketable securities. In addition to investing in reverse repurchase agreements, money market funds and bank deposits, the Company also directly invests in U.S. Treasury securities and debt obligations of the U.S. government or those U.S. government agencies guaranteed by the U.S. government. Credit risk related to marketable securities involves the risk of nonperformance by the counterparty, which could result in a material loss.

Accounts receivable. Credit risk related to accounts receivable involves the risk of non-payment by the counterparty. Credit risk is diversified due to the large number of Participants comprising the Company's customer base. The Company also performs ongoing credit evaluations of the financial conditions of its customers and evaluates the delinquency status of the receivables.

Participants' Fund and Clearing Funds. In addition to risk management policies described above for cash and cash equivalents, when Participants provide cash deposits to the Participants' and Clearing Funds, the Company may invest the cash in bank deposits at the FRBNY or reverse repurchase agreements (reverse repos). Reverse repos are collateralized and the collateral must have a market value greater than or equal to 102% of the cash invested. The Company bears credit risk related to reverse repos only to the extent cash advanced to the counterparty exceeds the value of collateral received. Securities purchased under reverse repos are generally U.S. Treasury and Agency securities having minimal credit risk due to low probability of U.S. government default, coupled with the highly liquid nature of these securities. Reverse repos are typically placed with financial institutions with a credit rating of BBB+/Baa1 or better from recognized rating agencies and that are approved via the Company's credit review process. To avoid concentration of credit risk exposures, the Company sets credit limits for each counterparty.

Participants' and Clearing Funds cash deposits may also be invested in money market mutual funds under Rule 2a-7 of the Investment Company Act of 1940 with a credit rating of AAA/Aaa from recognized rating agencies. Credit risk is mitigated by investing in highly rated money market mutual funds and having cash returned daily.

Credit risk arises at DTCC should a Participant fail to fulfill its settlement obligation. The Company manages and mitigates this risk by identifying, measuring and responding to these risks in order to protect the safety and soundness of the DTCC clearing and settlement system. Various tools are utilized to mitigate these risks including, but not limited to: setting capital adequacy standards; assessing new applicants; performing continuous monitoring of Participants financial condition; reviewing Participants daily trading activity and determining appropriate collateral requirements; maintaining the Participants' Fund and Clearing Fund; netting trades continuously; marking unsettled trades to market; and utilizing a variety of advanced quantitative analytical methodologies, such as back and stress testing.

To become a participating member at any of DTCC's clearing agency or registered clearing house subsidiaries, an applicant must meet minimum eligibility criteria that are specified in the subsidiaries' respective rules. All applicants must provide the Company with certain financial and operational information. This information is reviewed to ensure the applicant has sufficient financial resources to make anticipated contributions to the relevant subsidiary's Participants' Fund or Clearing Fund and to meet its obligations to the subsidiary. The credit quality of the Participant is evaluated at the time of application and monitored on an ongoing basis to determine if the Participant continues to be financially stable and able to meet the financial requirements of membership. As part of its review, the Company utilizes an internal credit risk rating matrix to risk-rate its Participants. The resulting rating determines the level of financial review to be performed on each Participant and may impact their Participants' Fund and Clearing Fund requirements.

Collateralization controls and net debit caps are employed by DTC to protect Participants against the risk that one or more Participants may fail to pay for their settlement obligations. DTC's collateralization controls prevent the completion of transactions that would cause a Participant's net debit balance to exceed the value of collateral in its account. The controls are designed to provide DTC with sufficient collateral to obtain funding for settlement in the event a Participant fails to pay its settlement obligation. DTC's net debit cap controls limit the net settlement debit that each Participant can incur to an amount, based upon activity level, which would be covered by DTC's liquidity resources. The net debit cap requires DTC to maintain sufficient liquidity to complete settlement should any single Participant or Participant family fail to settle.

23. OFF BALANCE SHEET AND CONCENTRATION OF CREDIT RISKS (CONTINUED)

NSCC and FICC collect Clearing Fund deposits from their Participants using a risk-based margining methodology. The risk-based methodology enables them to identify the risks posed by a Participant’s unsettled portfolio and to quickly adjust and collect additional deposits as needed to cover those risks. At multiple times during the day, Clearing Fund requirements are calculated for each Participant based on their then-current unsettled and pending transactions. Security pricing is updated on an intraday basis and additional charges may be collected to cover significant price movements from those Participants with a significant exposure in the identified security. The Company monitors Participants overall trading activities throughout the trading day to determine whether exposures exist that would require special actions to increase their Clearing Fund deposits.

The Company regularly performs back and stress testing of the quality and accuracy of its risk management systems to ensure the adequacy of Clearing Fund requirements and to respond to other risk factors the tests may reveal.

DTC and NSCC maintain committed, secured lines of credit to support potential liquidity needs in the event of a Participant default.

The Company also limits its exposure to potential losses from default by Participants through multilateral netting contracts and limited cross-guaranty agreements with other clearing agencies. These arrangements are designed to provide a mechanism for the sharing of excess net resources of a common defaulting Participant held at one clearing agency to cover losses incurred at another clearing agency. NSCC, FICC and DTC have a multilateral netting contract and limited cross-guaranty agreement with each other and with OCC under which these clearing agencies have agreed to make payment to each other for any remaining unsatisfied obligations of a common defaulting Participant to the extent they have excess resources of the defaulting Participant. NSCC and OCC also have an agreement providing for payments to each other relating to the settlement of certain option exercises and assignments in the event of a mutual Participant’s failure. Further, DTC and NSCC have a netting contract and limited cross-guaranty agreement, which includes certain arrangements. Securities delivered by DTC to NSCC to cover CNS system allocations are fully collateralized.

If a DTC Participant defaults, such Participant’s deposits to the Participants Fund would be liquidated to satisfy an outstanding obligation and/or loss incurred by DTC. If those funds are insufficient to cover the defaulting Participant's outstanding obligations, DTC may use other Participant deposits in the Participants' Fund or apply a portion of its retained earnings to cover the loss.

24. PARENT COMPANY CONDENSED FINANCIAL STATEMENTS

Condensed financial statements for DTCC (the Parent Company Condensed Financial Statements) that follow should be read in conjunction with the accompanying Consolidated Financial Statements of the Company and its subsidiaries and the notes thereto. The Parent Company Condensed Financial Statements as of December 31, 2018 and 2017 require management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues and expenses. Management believes that the estimates utilized in the preparation of the condensed financial statements are reasonable. Actual results could differ materially from these estimates.

The DTCC Parent Company Condensed Statements of Financial Condition follow (in thousands):

	As of December 31,	
	2018	2017
ASSETS:		
Cash and cash equivalents	$ 519,894	$ 454,341
Investments in subsidiaries	1,730,200	1,434,850
Due from subsidiaries	190,060	381,160
Premises, equipment and intangible assets	174,353	197,037
Other assets	379,305	384,327
TOTAL ASSETS	$ 2,993,812	$ 2,851,715
LIABILITIES AND SHAREHOLDERS' EQUITY:		
LIABILITIES:		
Long-term debt and other borrowings	$ 36,375	$ 44,252
Pension and postretirement benefits	214,445	311,698
Other liabilities	560,757	616,538
Total liabilities	811,577	972,488
SHAREHOLDERS' EQUITY:		
Preferred stock	391,116	391,116
Common stock	5,091	5,091
Paid-in capital	411,065	411,065
Retained earnings	1,571,298	1,261,309
Accumulated other comprehensive loss, net of tax	(196,335)	(189,354)
Total shareholders' equity	2,182,235	1,879,227
TOTAL LIABILITIES AND SHAREHOLDERS' EQUITY	$ 2,993,812	$ 2,851,715

24. PARENT COMPANY CONDENSED FINANCIAL STATEMENTS (CONTINUED)

DTCC Parent Company has an agreement with its subsidiaries whereby the DTCC Parent Company pays for substantially all of the expenses for the operations of its subsidiaries. The related expenses are allocated to subsidiaries based upon their estimated use of such goods or services as determined by applicable allocation factors. Further, the agreement provides that the DTCC Parent Company performs credit and quantitative risk services, and certain other services for its subsidiaries, including among other things, administrative, internal audit, finance and legal services. The billing for these services as a percentage of total allocated expenses ranged from 104% to 108% in 2018 and 2017, excluding pass-through charges and the impact of capitalized software. The fee, representing the amount over actual cost, is included in Interest and other income in the Condensed Statements of Income below.

The DTCC Parent Company Condensed Statements of Income follow (in thousands):

	For the years ended, December 31,	
	2018	**2017**
REVENUES:		
Equity in earnings of subsidiaries	$ 223,596	$ 177,588
Interest and other income	114,596	133,275
Total revenues	338,192	310,863
OPERATING EXPENSES:		
Professional services	19,874	20,941
Other	23,969	88,257
Impairment of Intangible assets	—	14,729
Total operating expenses	43,843	123,927
Income before taxes	294,349	186,936
Provision (benefit) for income taxes	(1,464)	22,044
Net income attributable to DTCC	$ 295,813	$ 164,892

24. PARENT COMPANY CONDENSED FINANCIAL STATEMENTS (CONTINUED)

The DTCC Parent Company Condensed Statements of Cash Flows follow (in thousands):

	For the years ended, December 31, 2018	2017
CASH FLOWS FROM OPERATING ACTIVITIES:		
Net income	$ 295,813	$ 164,892
Adjustments to reconcile net income to net cash provided by operating activities:		
Equity in earnings of subsidiaries	(223,596)	(177,588)
Depreciation and amortization	55,302	59,931
Impairment of Intangible assets	—	14,729
Deferred income taxes	20,856	(14,665)
Business dispositions	—	10,509
Net change in:		
Due from subsidiaries	191,100	(177,551)
Other operating assets and liabilities	(140,684)	113,507
Net cash provided by / (used in) operating activities	198,791	(6,236)
CASH FLOWS FROM INVESTING ACTIVITIES:		
Investments in subsidiaries	(165,000)	—
Distributions from subsidiaries	93,246	105,063
Purchases of Intangible assets and Premises and equipment	(34,174)	(54,339)
Net cash (used in) / provided by investing activities	(105,928)	50,724
CASH FLOWS FROM FINANCING ACTIVITIES:		
Preferred stock dividend payments	(19,500)	(19,500)
Repayments on debt and capital lease obligations	(7,877)	(20,468)
Net cash (used in) provided by financing activities	(27,377)	(39,968)
Effect of foreign exchange rate changes on Cash and cash equivalents	67	820
Net increase in Cash and cash equivalents	65,553	5,340
Cash and cash equivalents - Beginning of year	454,341	449,001
Cash and cash equivalents - End of year	$ 519,894	$ 454,341
SUPPLEMENTAL DISCLOSURES:		
Cash income taxes paid (refunds) - net	$ 20,588	$ (17,306)
Cash interest paid	$ 1,133	$ 1,735
Non-cash financing activity - capitalized lease	$ 3,640	$ —

25. SUBSEQUENT EVENTS

The Company evaluated events and transactions occurring after December 31, 2018 through March 27, 2019, for potential recognition or disclosure in these accompanying Consolidated Financial Statements. Other than previously disclosed in Note 18, Shareholders' Equity, no events or transactions occurred during such period that would require recognition or disclosure in these accompanying Consolidated Financial Statements.

DTCC

Securing Today. Shaping Tomorrow.®

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DTCC CAPITAL MANAGEMENT STATEMENT

April 2019

Capital management is integral to DTCC's mission to serve its clients and safeguard the stability of the financial services industry. DTCC considers a strong capital position a strategic priority and actively monitors and manages its capital adequacy to support its critical role in the financial markets. To ensure that DTCC has sufficient capital at all times, DTCC implemented a capital management strategy focusing on the following key objectives:

- Comply with regulatory capital requirements in markets and jurisdictions in which DTCC's regulated subsidiaries operate;
- Support high credit ratings and access to capital markets;
- Maintain adequate capital, at DTCC and its operating subsidiaries, to be resilient and protect against risks that may arise under adverse scenarios.

To meet its key capital management objectives, DTCC maintains a framework designed to comprehensively assess capital adequacy. The framework views capital adequacy from regulatory, financial, and economic perspectives, which correspond to the capital measurements used by regulators, credit rating agencies and banks, and management, respectively. Management monitors capital adequacy and reports to the DTCC Board of Directors regularly.

Regulatory Capital

The regulatory component of the framework assesses the capital of DTCC's regulated operating subsidiaries against their respective requirements, with an enhanced focus on the three core clearing agencies that are designated Systemically Important Financial Market Utilities (SIFMUs) – The Depository Trust Company (DTC), Fixed Income Clearing Corporation (FICC) and National Securities Clearing Corporation (NSCC) (referred to hereafter as the "Clearing Agencies", individually a "Clearing Agency").

The Clearing Agencies are subject to the regulatory capital requirements in Rule 17Ad-22(e)(15) (General Business Risk) of the Security and Exchange Commission's (SEC) Standards for Covered Clearing Agencies (CCAS), which prescribe that each Clearing Agency must hold liquid net assets funded by equity equal to at least six months of operating expenses or an amount sufficient to facilitate a recovery or orderly wind-down of operations. The "Clearing Agency Policy on Capital Requirements" documents how the Clearing Agencies meet the requirements of Rule 17Ad-22(e)(15). It was approved by the SEC and is reviewed by the Board no less than annually.

Also in accordance with the CCAS, the Clearing Agencies maintain a viable plan for raising additional equity should the equity of an affected Clearing Agency fall close to or below the minimum amount required by Rule 17Ad-22(e)(15). DTCC has identified a diversified set of strategies and tools to replenish financial resources for the enterprise and specifically for the Clearing Agencies, documented in the "Clearing Agency Capital Replenishment Plan" that was approved by the SEC and is reviewed by the Board no less than annually.

The regulatory component of the framework also takes into consideration guidance from the CPMI-IOSCO Principles for Financial Market Infrastructures (PFMIs), which establish international standards on governance and risk management for financial market infrastructures.

Financial Capital

The financial component of the framework focuses on the ability of each DTCC business to generate the financial resources needed to support their business operations, and, for regulated subsidiaries, to meet their regulatory capital requirements. DTCC uses a disciplined approach to financial planning and management to ensure the adequacy of financial resources. This approach provides a forward-looking view of expected cash flow and net income, which increases financial resources in the form of available liquidity and shareholder's equity, respectively. Key aspects of this approach include the annual budget process; business line performance reviews with management; and development of a three-year long-range financial plan for the overall enterprise and each operating business.

These elements are brought together to create a comprehensive financial plan that projects DTCC's ability to generate the required level of financial resources to protect against financial risks, support overall business strategies and further strengthen its resources and balance sheet.

The financial component of the framework also focuses on the qualitative and quantitative assessment criteria used by credit rating agencies and banks to assess the financial and credit risk of DTCC and its subsidiaries. To maintain adequate capital according to these criteria, DTCC has strengthened its capital structure by increasing equity through earnings, reducing financial leverage by prepaying third-party debt obligations and contributing aggressively to its frozen defined benefits plan. This has improved key ratios used to assess DTCC's credit quality and secure access to capital markets.

Economic Capital

The economic component of the capital framework focuses on DTCC's own view of the capital it should maintain relative to the risks it faces. This component provides a risk-based view of the firm's total business portfolio and is an important assessment tool to complement regulatory capital requirements, which are focused on specific subsidiaries.

Under this framework, DTCC is able to evaluate potential stress scenarios to more fully assess capital requirements and financial resources during periods of market stress. DTCC's economic capital requirements are measured on a consolidated basis across core risk categories; specifically, business risk, market risk, counterparty credit risk, investment risk and operational risk. The capital requirements are aggregated to arrive at a total economic capital requirement, quantifying the level of risk for DTCC on a firm-wide basis.

Regulatory Capital Requirements and Authorities

DTCC's regulated subsidiaries maintain and report regulatory capital in accordance with all relevant laws, rules and guidelines. As a multinational enterprise, various DTCC subsidiaries are subject to regulatory capital regimes, which are supervised and examined by the SEC, the Federal Reserve Bank of New York, the New York State Department of Financial Services (NYDFS), and the U.S. Commodity Futures Trading Commission in the United States; European Securities and Markets Authority in the European Union; the Japan Financial Services Agency in Japan; and the Monetary Authority of Singapore in Singapore.

DTC is a limited purpose trust company under the Banking Law of New York State, and is subject to capital requirements of New York State and Federal banking laws and regulations. DTC measures and reports capital adequacy to the NYDFS based on Common Equity Tier 1 Capital, Tier 1 Capital, Tier 1 Leverage and Total Capital ratios, and its Capital Conservation Buffer.

Susan Cosgrove

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