



January 2021

Research Note

Evolution of OTC Derivatives Markets Since the Financial Crisis

Over the past decade, significant regulatory reforms have been implemented in order to make derivatives markets safer and more robust. A major test of these reforms came in the first half of 2020, as the COVID-19 pandemic disrupted global financial markets and central banks intervened to provide much-needed liquidity.

While derivatives experienced volatility and liquidity pressures in line with cash markets, they continued to function without any major issues or dislocations reported by policy-makers or market participants.

The performance of derivatives markets during the pandemic reflects important changes and a significant reduction in counterparty credit risk over the past decade. As a result of the financial regulatory reforms, derivatives markets have become safer, more resilient and more transparent.

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Significant regulatory reforms have been implemented in order to make derivatives markets safer, more resilient and more transparent

INTRODUCTION

Over the past decade, significant regulatory reforms have been implemented in order to make derivatives markets safer, more resilient and more transparent.

At a Pittsburgh meeting in September 2009, Group-of-20 (G-20) leaders agreed to improve over-the-counter (OTC) derivatives markets and create more powerful tools to hold large global firms accountable for the risks they take¹. The main reform pillars included:

- Central clearing of standardized OTC derivatives;
- Higher capital and minimum margin requirements for non-cleared OTC derivatives;
- Exchange or electronic platform trading of standardized OTC derivatives, where appropriate; and
- Trade reporting of OTC derivatives to data repositories.

A major test of these reforms came in the first half of 2020, as the COVID-19 pandemic disrupted global financial markets and central banks intervened to provide much-needed liquidity.

Amidst this turmoil, the consensus is that derivatives markets performed well.

Heath Tarbert, chairman of the Commodity Futures Trading Commission (CFTC), stated: “The derivatives markets have so far acted as shock absorbers. Unlike during the 2008 financial crisis, derivatives have internalized the impact of market swings.”²

In the words of Sir Jon Cunliffe, deputy governor, financial stability, at the Bank of England: “Overall, my initial conclusion is that the derivatives reforms pretty much did the job they were intended to do.”³

While derivatives experienced volatility and liquidity pressures in line with cash markets, they continued to function without any major issues or dislocations reported by policy-makers or market participants.

The performance of derivatives markets during the pandemic reflects important changes and a significant reduction in counterparty credit risk over the past decade⁴.

Prior to the financial crisis, many derivatives transactions were executed bilaterally, and some were uncollateralized or under-collateralized. These bilateral transactions increased the financial system’s interconnectedness. At the same time, the lack of centralized information on OTC derivatives transactions contributed to uncertainty among market participants and policy-makers over counterparty exposures.

¹ G-20, Pittsburgh Summit Leaders’ statement, September 2009 https://www.fsb.org/wp-content/uploads/g20_leaders_declaration_pittsburgh_2009.pdf

² Chairman Tarbert in WSJ: Volatility Ain’t What It Used to Be <https://www.cftc.gov/PressRoom/PressReleases/8138-20>

³ Financial System Resilience: Lessons from a Real Stress, speech by Sir Jon Cunliffe <https://www.bankofengland.co.uk/speech/2020/jon-cunliffe-speech-at-investment-association>

⁴ Counterparty credit risk is the risk arising from the possibility that the counterparty to a transaction could default while a transaction remains open

The shift to central clearing and margin requirements for non-cleared derivatives both work to decrease counterparty credit risk. Central counterparties (CCPs) collect initial and variation margin (IM and VM) for cleared derivatives. At the same time, central clearing reduces aggregate exposures in the financial system by increasing the pool of transactions that counterparties can net to reduce offsetting claims.

Central clearing also decreases the interconnectedness of market participants and mitigates systemic risk by lowering the likelihood of contagious (knock-on) defaults that could spread from one counterparty to another. CCPs, however, have become new super-systemic entities in the derivatives markets⁵.

Meanwhile, margin requirements for non-cleared derivatives reduce counterparty risk by ensuring that collateral is available to offset losses caused by a counterparty default in bilateral transactions⁶.

As the result of financial regulatory reforms, derivatives markets have become safer, more resilient and more transparent, as demonstrated by the following metrics.

- **Central clearing:** 91.1% of interest rate derivatives (IRD) traded notional and 83.0% of credit derivatives traded notional in the US was cleared^{7,8}. Market participants have consistently cleared more than what is required under the CFTC's clearing mandate.

Market participants posted \$336.4 billion of IM to major CCPs for their cleared IRD and credit default swap (CDS) transactions⁹.

- **Margin requirements for non-cleared derivatives:** The amount of regulatory IM has been increasing as margin rules for non-cleared derivatives have been phased-in since September 2016 and more firms and new transactions have become subject to the requirements. The most recent ISDA Margin Survey found that the 20 largest global market participants (phase-one firms) collected approximately \$173.2 billion of IM and \$897.3 billion of VM for their non-cleared derivatives transactions¹⁰.
- **Capital:** Group-one banks doubled common equity tier-one (CET1) capital, increasing the level of CET1 from \$2.2 trillion in the first half of 2011 to \$4.4 trillion^{11,12}. The average CET1 capital ratio for group-one banks increased from 7.0% to 12.8%.
- **Trading:** 58.2% of IRD traded notional and 79.4% of total credit derivatives traded notional in the US was executed on swap execution facilities (SEFs)¹³.
- **Trade reporting:** In the US, all swap transactions are required to be reported to swap data repositories (SDRs), giving regulators more comprehensive data on derivatives trading and increasing market transparency.

⁵ Central clearing does not eliminate counterparty risk but reduces it by reallocating the risk to CCPs. Since the financial crisis, CCP risk management standards have been strengthened. Regulators continue to focus on improving CCP resilience and creating a framework for the recovery and resolution of CCPs. However, the rules for recovery and resolution of CCPs are still being finalized

⁶ Margin requirements for cleared and non-cleared derivatives have, however, significantly increased the requirement for funding and liquidity

⁷ SwapsInfo First Half of 2020 and Second Quarter of 2020 Review <https://www.isda.org/a/tImTE/SwapsInfo-1H-and-Q2-of-2020-Review-Full-Report.pdf>

⁸ These metrics are based on the data from the Depository Trust and Clearing Corporation (DTCC) swap data repository (SDR), which only covers trades that are required to be disclosed under US regulations

⁹ CCP disclosures at the end of the second quarter of 2020

¹⁰ ISDA Margin Survey Year-End 2019 <https://www.isda.org/a/1F7TE/ISDA-Margin-Survey-Year-end-2019.pdf>

¹¹ Basel III Monitoring Report April 2020 <https://www.bis.org/bcbs/publ/d500.pdf>

¹² Group one banks are defined as internationally active banks that have tier-one capital of more than €3 billion, and include all 29 institutions that have been designated as global systemically important banks

¹³ SwapsInfo First Half of 2020 and Second Quarter of 2020 Review <https://www.isda.org/a/tImTE/SwapsInfo-1H-and-Q2-of-2020-Review-Full-Report.pdf>

OVERVIEW OF THE GLOBAL DERIVATIVES MARKETS

Derivatives play an essential role in economic activity

A derivative is a financial instrument that derives its value from the performance of an underlying asset and is used to transfer risk from one party to another. There is a wide range of financial and non-financial instruments that can be used as underlying assets, including interest rates, fixed income instruments, foreign currencies, equities and commodities.

Derivatives Users

Derivatives play an essential role in economic activity by enabling issuers and investors to hedge against various risks (eg, interest rate, currency, credit and inflation risks), manage their assets and liabilities, protect investment portfolios against market volatility, reduce balance-sheet volatility and increase certainty in cashflows. All these activities have important economic and social benefits. Some examples of derivatives users are included in Table 1.

Table 1: Examples of Derivatives Users

Users	Underlying Risks	Derivative Types
Commodity manufacturers	Commodity price	Commodity derivatives
Multinational companies	Funding cost of foreign debt issuance and investments	Cross-currency swaps/FX forwards
Life insurers	Asset-liability management	Interest rate swaps or swaptions
Corporate treasurers	Funding cost before debt issuance	Forward rate agreements
Construction firms	The cost of raw materials	Commodity derivatives
Exporters	Foreign exchange (FX) fluctuations	Cross-currency swaps/FX forwards
Bank or loan portfolio managers	Credit risk of bond or loan exposures	Credit default swaps
Equity investors	Equity prices	Equity derivatives
Governments	Interest rate risk on new bond issuance	Interest rate swaps

Uses of Derivatives

The following examples from corporate financial statements illustrate how end users employ derivatives for risk management purposes:

Apple uses derivatives to partially offset its business exposure to foreign currency and interest rate risk on expected future cashflows, net investments in certain foreign subsidiaries, and certain existing assets and liabilities. The company enters into interest rate swaps (IRS) to manage interest rate risk on its outstanding term debt. IRS allow the company to effectively convert fixed-rate payments into floating-rate payments or floating-rate payments into fixed rate. The company also uses forwards, cross-currency swaps or other instruments to protect its foreign currency denominated term debt or marketable securities from fluctuations in foreign currency exchange rates¹⁴.

¹⁴ Apple Inc. 10-K [https://s2.q4cdn.com/470004039/files/doc_financials/2019/ar/_10-K-2019-\(As-Filed\).pdf](https://s2.q4cdn.com/470004039/files/doc_financials/2019/ar/_10-K-2019-(As-Filed).pdf)

AT&T is exposed to market risks primarily from changes in interest rates and foreign currency exchange rates. The company uses derivatives, including IRS, interest rate locks, foreign currency exchange contracts and cross-currency swaps, to manage its debt structure and foreign exchange exposure. This enables the firm to manage its capital costs, control financial risks and maintain financial flexibility over the long term¹⁵.

Chevron is exposed to market risks related to the price volatility of crude oil, refined products, natural gas, natural gas liquids, liquefied natural gas and refinery feedstocks. The company uses commodity derivatives to manage these exposures on a portion of its activity, including firm commitments and anticipated transactions for the purchase, sale and storage of crude oil, refined products, natural gas, natural gas liquids and feedstock for company refineries. The company also uses commodity derivatives for limited trading purposes¹⁶.

Over-the-counter Versus Exchange-traded Derivatives

OTC derivatives are customized contracts that are privately negotiated

Depending on the degree of customization and trading venues, derivatives can be classified as OTC or exchange-traded derivatives (ETD).

OTC derivatives are customized contracts that are privately negotiated and booked directly between two counterparties. These derivatives are executed either on trading platforms or bilaterally (by voice or electronically). Some examples are swaps, forwards, swaptions and exotic options.

ETDs are standardized contracts that are traded on organized exchanges. Most common products are futures and options.

Common Types of Derivatives Contracts

Swaps are customizable contracts between two parties to exchange cashflows based on certain rates over a specified period. An interest rate swap, for example, is a transaction where one party agrees to make periodic payments to the other party of amounts accrued at one reference rate (eg, a fixed rate) on the notional amount over a calculation period in exchange for payments by the other party accrued on the notional amount over the calculation period at another reference rate (eg, a floating rate).

Forwards are customizable agreements between two parties in which one party agrees to buy an underlying asset from the seller at a later date for a price established at the start of the contract.

Futures are legally binding agreements to buy or sell a standardized asset on a specific date or during a specific month. These contracts are standardized and traded on futures exchanges.

Options are contracts that give the buyer, in exchange for the payment of a premium, the right but not the obligation to buy or sell a specified amount of the underlying asset at a predetermined price at or until a stated time. Options may trade in the over-the-counter market, but they trade predominantly on exchanges.

¹⁵ AT&T Inc. 2019 Annual Report <https://investors.att.com/~media/Files/A/ATT-IR/financial-reports/annual-reports/2019/complete-2019-annual-report.pdf>

¹⁶ Chevron 2019 Annual Report <https://www.chevron.com/~media/chevron/annual-report/2019/documents/2019-Annual-Report.pdf>

OTC derivatives notional outstanding totaled \$606.8 trillion at the end of June 2020

Size of Global Derivatives Markets

Notional Outstanding

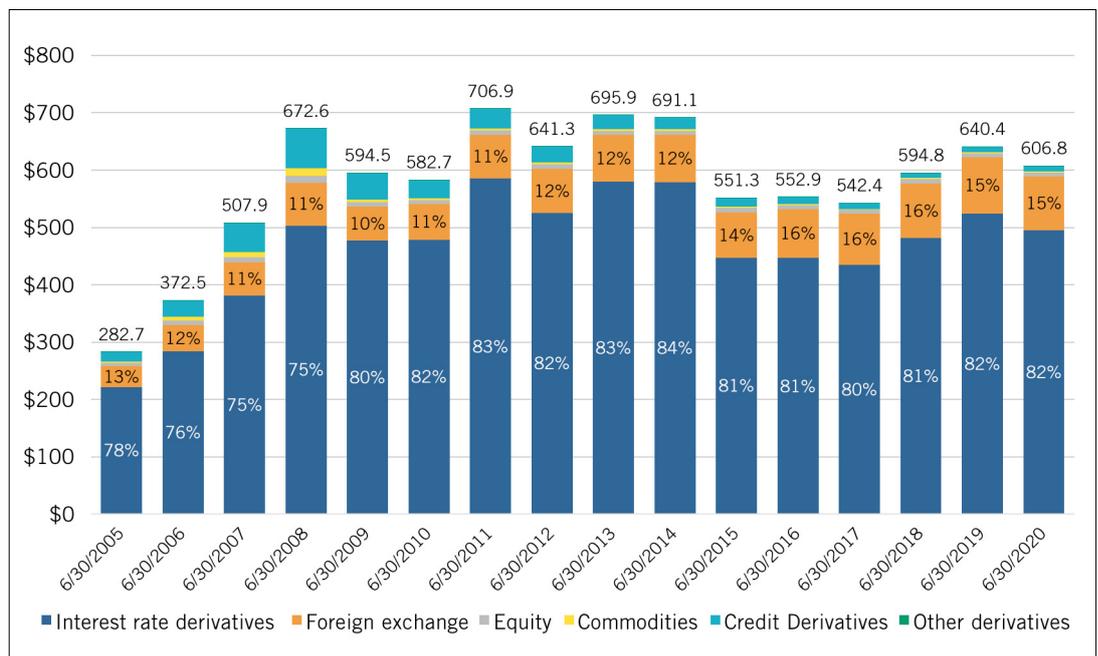
The Bank of International Settlements (BIS) OTC derivatives statistics capture the outstanding positions of banks and other major derivatives dealers at the end of June and December each year.

According to the BIS, OTC derivatives notional outstanding totaled \$606.8 trillion at the end of June 2020 compared with \$594.5 trillion at the end of June 2009^{17,18}. Notional outstanding reached its peak of \$706.9 trillion at the end of June 2011.

The decline in notional outstanding from the 2011 peak can be partially attributed to portfolio compression, which is widely used to reduce the number of transactions and gross notional while retaining the same economic exposure¹⁹.

IRD accounted for 81.6% of notional outstanding, while foreign exchange derivatives totaled 15.5% at the end of June 2020. Credit and equity derivatives represented 1.5% and 1.1%, respectively, of notional outstanding (see Chart 1).

Chart 1: Global OTC Derivatives Notional Outstanding (US\$ trillions)



Source: BIS OTC Derivatives Statistics

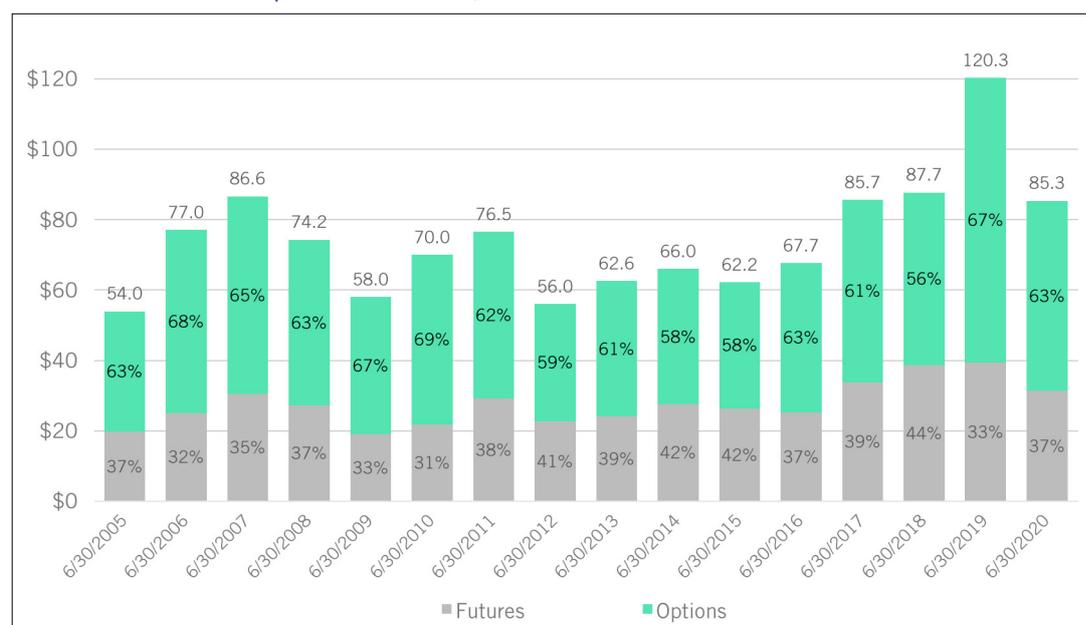
¹⁷ BIS OTC Derivatives Statistics <https://www.bis.org/statistics/derstats.htm>

¹⁸ Notional amount outstanding represents gross nominal or notional value of all derivatives contracts concluded and not yet settled on the reporting date

¹⁹ According to the BIS, portfolio compression "is a process that enables early termination of economically redundant derivatives transactions without changing the net position of each participant". It does so by terminating existing transactions and replacing them with a smaller number of new transactions with a substantially smaller notional, which carry the same risk profile and cashflows as the initial portfolio. In so doing, portfolio compression reduces the overall notional size and number of outstanding contracts in derivatives portfolios, thereby improving derivatives risk management

In comparison, the open interest of ETD was \$85.3 trillion at the end of June 2020 compared with \$58.0 trillion at the end of June 2009²⁰. Options accounted for 63.1% of ETD open interest, while futures represented the rest (see Chart 2).

Chart 2: Global ETD Open Interest (US\$ trillions)



Source: BIS ETD Statistics

Gross Market Value

Gross market value of OTC derivatives totaled \$15.5 trillion and accounted for 2.6% of notional outstanding

Gross notional outstanding is not an accurate measure of risk. Counterparties generally do not exchange notional amounts (except for cross-currency swaps) and notional is only used to calculate contractual payments for derivatives²¹.

Gross market value – the sum of the absolute values of all outstanding derivatives contracts with either positive or negative replacement values evaluated at market prices prevailing on the reporting date – provides information about the potential scale of market risk in derivatives transactions and of the associated financial risk transfer taking place²².

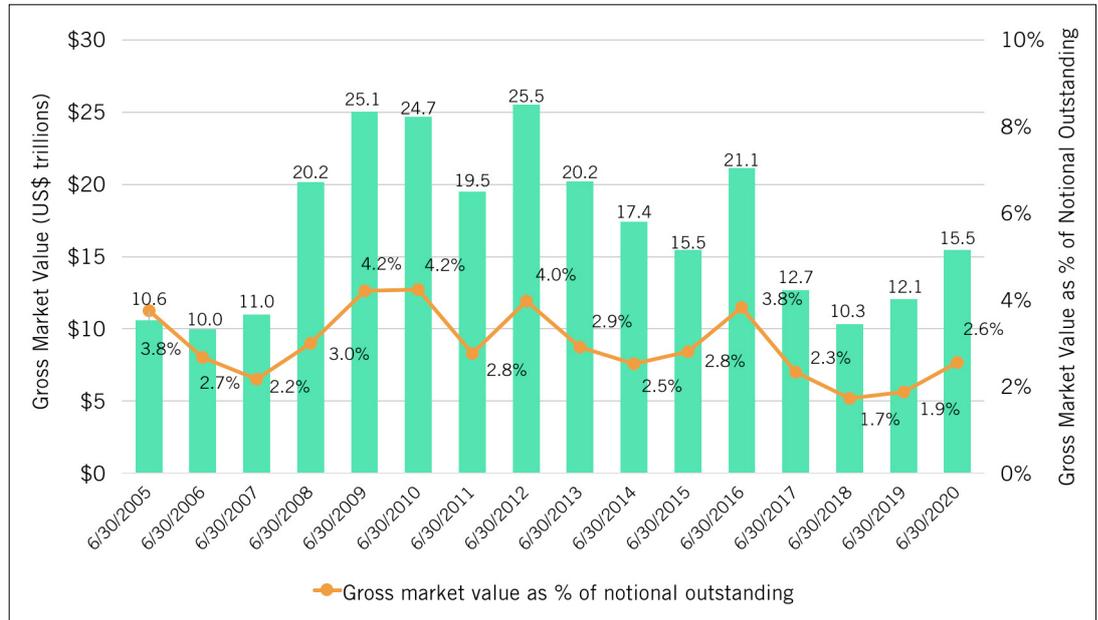
At the end of June 2020, the gross market value of OTC derivatives totaled \$15.5 trillion and accounted for 2.6% of notional outstanding. In comparison, gross market value of OTC derivatives was \$25.1 trillion in June 2009 (see Chart 3).

²⁰ Open interest is the total amount of exchange-traded contracts that have been entered into on a given day and not yet settled

²¹ In a cross-currency swap, interest payments and principal in one currency are exchanged for principal and interest payments in a different currency

²² The gross positive market value of a dealer's outstanding contracts is the sum of the replacement values of all contracts that are in a current gain position to the reporter at current market prices (and therefore, if they were settled immediately, would represent claims on counterparties). The gross negative market value is the sum of the values of all contracts that have a negative value on the reporting date (ie, those that are in a current loss position and, therefore, if they were settled immediately, would represent liabilities of the dealer to its counterparties). The term 'gross' indicates that contracts with positive and negative replacement values with the same counterparty are not netted. Nor are the sums of positive and negative contract values within a market risk category such as foreign exchange contracts, interest rate contracts, equities and commodities set off against one another. <https://www.bis.org/statistics/glossary.htm?selection=312&scope=Statistics&c=a&base=term>

Chart 3: Gross Market Value of Global OTC Derivatives



Source: BIS OTC Derivatives Statistics

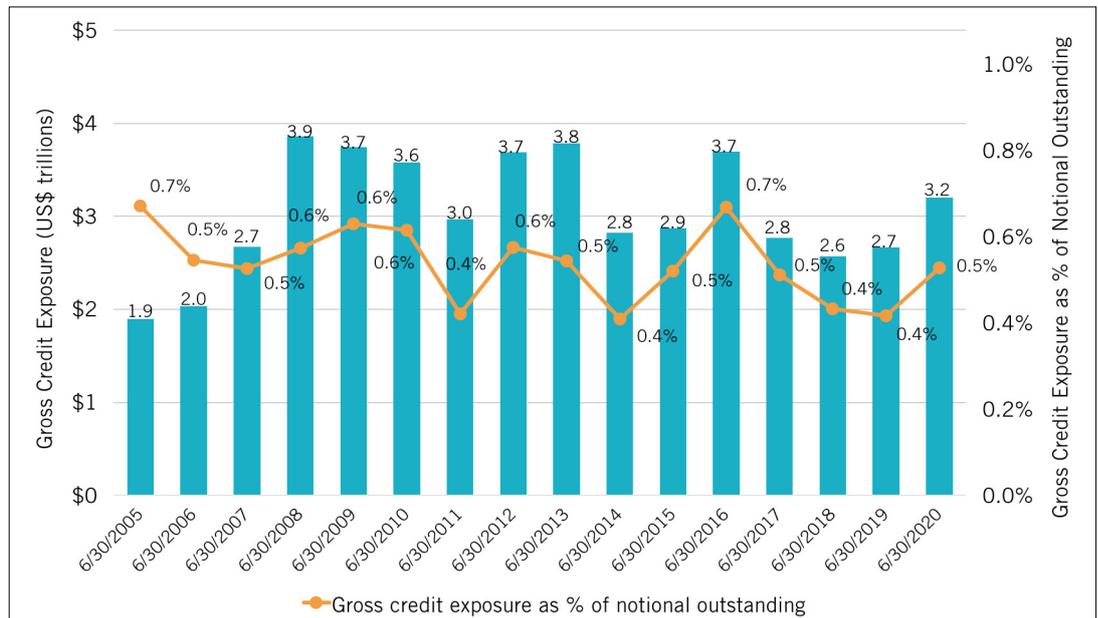
Gross Credit Exposure

As a result of close-out netting, market participants reduced their mark-to-market exposure by about 79.3%

Gross credit exposure of OTC derivatives, which is calculated as gross market value minus amounts netted with the same counterparty across all risk categories under legally enforceable bilateral netting agreements, represents a measure of counterparty risk before collateral.

The gross credit exposure of OTC derivatives totaled \$3.2 trillion and accounted for 0.5% of notional at mid-year 2020 (see Chart 4).

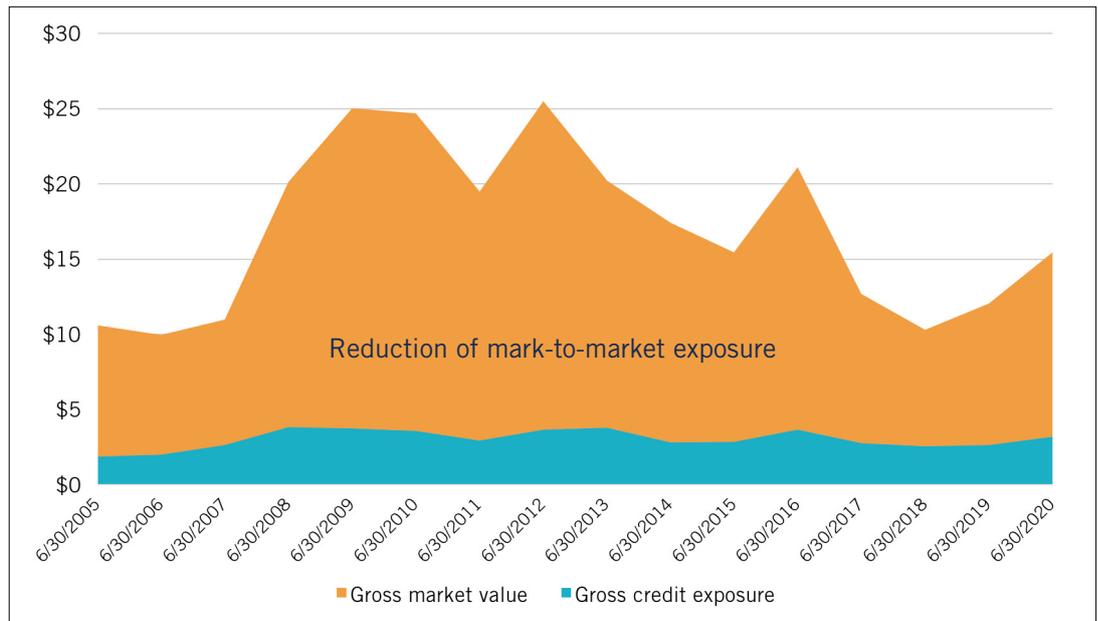
Chart 4: Gross Credit Exposure of OTC Derivatives



Source: BIS OTC Derivatives Statistics

As a result of close-out netting, market participants reduced their mark-to-market exposure by about 79.3% at mid-year 2020 (see Chart 5). This risk is further reduced by collateral that market participants post for cleared and non-cleared transactions.

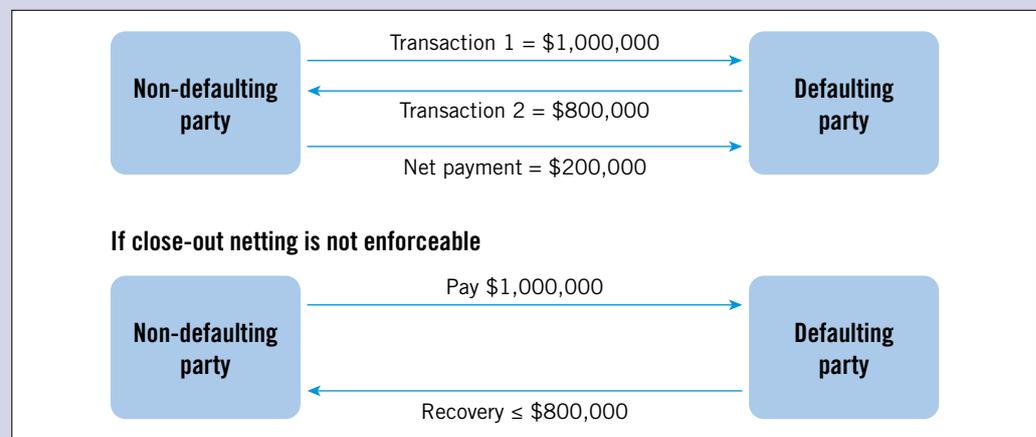
Chart 5: Reduction of Mark-to-market Exposure Due to Close-out Netting (US\$ trillions)



Source: BIS OTC Derivatives Statistics

Close-out Netting

Close-out netting is a process involving the termination of obligations under a contract with a defaulting party and subsequent combining of positive and negative replacement values into a single net payable or receivable. The diagram demonstrates payment obligations with and without close-out netting.



As close-out netting drastically reduces credit exposure between counterparties, it is the primary tool for mitigating credit risks associated with over-the-counter derivatives. Close-out netting is an essential component of the hedging activities of financial institutions and other users of derivatives.

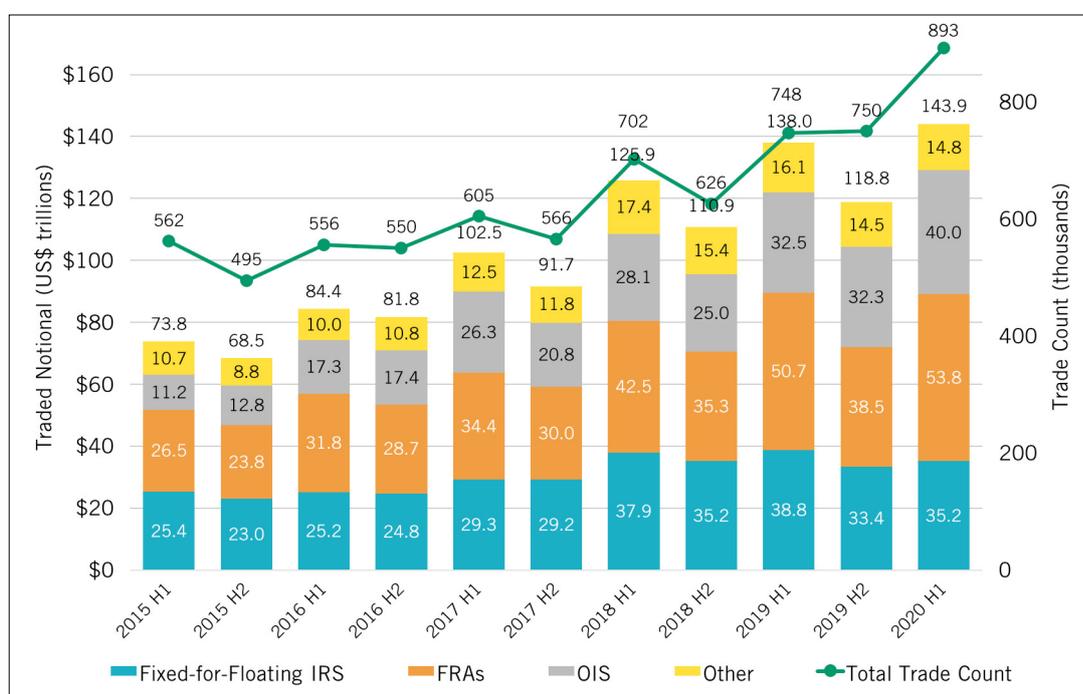
IRD traded notional in the US increased to \$143.9 trillion in the first half of 2020

IRD and Credit Derivatives Traded Notional in the US

IRD traded notional in the US increased significantly from \$73.8 trillion in the first half of 2015 to \$143.9 trillion in the first half of 2020. Trade count grew from 562.2 thousand to 893.0 thousand over the same period^{23,24} (see Chart 6).

Single currency fixed-for-floating interest rate swaps (IRS) represented 24.5% of total IRD traded notional in the first half of 2020. Forward rate agreements (FRAs) and overnight index swaps (OIS) accounted for 37.4% and 27.8%, respectively, of total IRD traded notional in the first half of 2020.

Chart 6: IRD Traded Notional and Trade Count



Source: DTCC and Bloomberg SDRs

Credit derivatives traded notional grew from \$3.6 trillion in the first half of 2015 to \$6.1 trillion in the first six months of 2020. Trade count increased from 106.5 thousand to 169.0 thousand over the same period (see Chart 7)²⁵.

In the first half of 2020, North American High Yield CDX Index (CDX HY) and North American Investment Grade CDX Index (CDX IG) represented 17.0% and 41.3%, respectively, of total credit derivatives traded notional, while iTraxx Europe accounted for 17.3%²⁶.

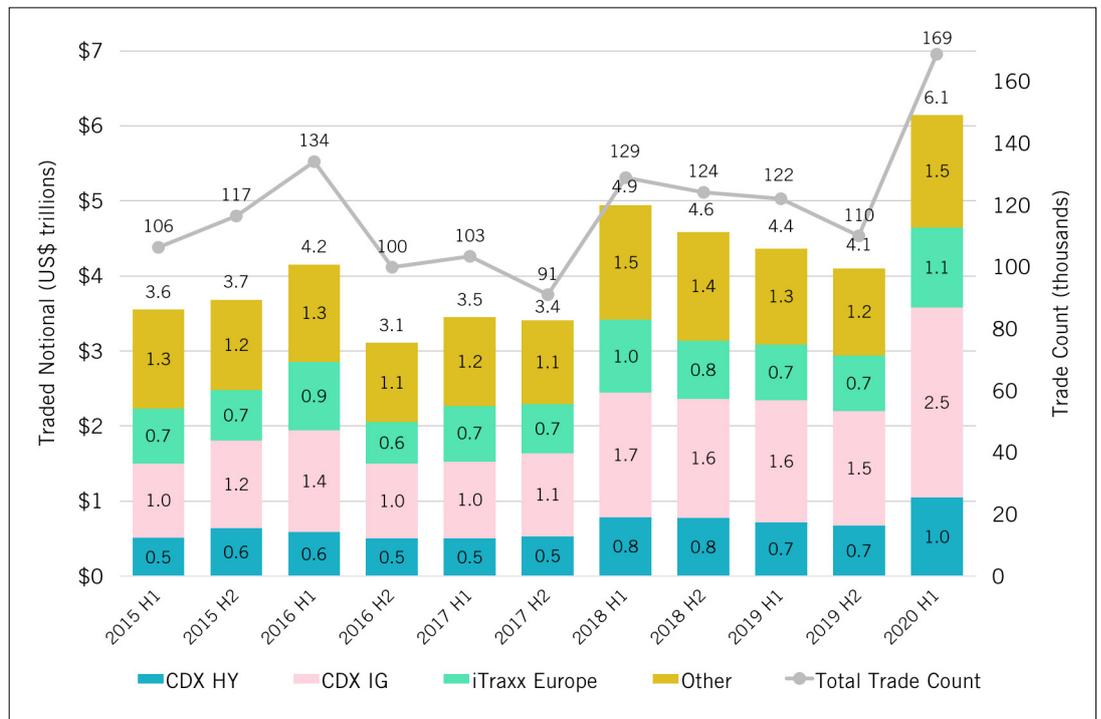
²³ Traded notional and trade count data is taken from the ISDA SwapsInfo website (swapsinfo.org), using information from the DTCC and Bloomberg SDRs. It only covers trades required to be disclosed under US regulations. No trading data is available for other global markets

²⁴ Derivatives traded notional generally depicts a more accurate picture of market activity than notional outstanding and can be seen as a rough proxy for market liquidity

²⁵ Credit derivatives mostly comprise credit default swap (CDS) indices, but also include CDS index tranches, credit swaptions, exotic products, total return swaps and insignificant amount of single-name CDS

²⁶ North American High Yield CDX Index is composed of 100 liquid North American entities with high yield credit ratings that trade in the CDS market. North American Investment Grade CDX Index is composed of 125 of the most liquid North American entities with investment grade credit ratings that trade in the CDS market. iTraxx Europe Index is composed of 125 liquid European entities with investment grade credit ratings that trade in the CDS market

Chart 7: Credit Derivatives Traded Notional and Trade Count



Source: DTCC and Bloomberg SDRs

EVOLUTION OF THE DERIVATIVES MARKETS SINCE THE FINANCIAL CRISIS

G-20 Market Reforms

As the result of regulatory reforms, derivatives markets have become safer, more resilient and more transparent than ever before

Following the 2008 financial crisis, the G-20 agreed to implement several key reforms to make derivatives markets safer and more transparent. The main pillars of the reforms are:

- Central clearing of standardized OTC derivatives;
- Higher capital and minimum margin requirements for non-cleared OTC derivatives;
- Exchange or electronic platform trading of standardized OTC derivatives, where appropriate; and
- Trade reporting of OTC derivatives to data repositories.

In the US, these reforms have been implemented through Title VII of the Dodd-Frank Wall Street Reform and Consumer Protection Act and rulemakings by US agencies, including the CFTC, the Securities and Exchange Commission (SEC) and US prudential regulators (the Federal Reserve Board, the Office of the Comptroller of the Currency and the Federal Deposit Insurance Corporation).

The rulemaking process for swaps under Title VII is now complete, resulting in rules on clearing, margin and capital, business conduct, trade execution requirements, and reporting and transparency obligations. The CFTC's regime has been in place for several years, while implementation of the SEC's regime for the smaller universe of security based swaps will go live in October 2021.

Together, these reforms have significantly reduced counterparty credit risk, which is the risk arising from the possibility that the counterparty to a transaction could default while a transaction remains open.

Prior to the financial crisis, many derivatives transactions were executed bilaterally, and some transactions were uncollateralized or under-collateralized. This allowed some market participants to take large speculative positions using a relatively small amount of capital, exposing their counterparties to considerable credit risk.

Bilateral transactions increased the financial system's interconnectedness. At the same time, the lack of centralized information on OTC derivatives transactions contributed to uncertainty among market participants about their counterparties' credit exposures and the extent of exposures during the financial crisis.

Central clearing reduces counterparty credit risk through a combination of collateralization and multilateral netting. CCPs collect IM and VM for cleared derivatives. At the same time, central clearing reduces aggregate exposures in the financial system by increased opportunity for netting offsetting claims. Central clearing also reduces interconnectedness of market participants and mitigates systemic risk by lowering the likelihood of contagious (knock-on) defaults that could spread from one counterparty to others²⁷.

Margin requirements for non-cleared derivatives have reduced counterparty risk by ensuring that collateral is available to offset losses caused by a counterparty default in bilateral transactions.

²⁷ Central clearing does not eliminate counterparty risk but reduces it by reallocating the risk to CCPs. Therefore, CCPs have become super-systemic entities in the market. Since the financial crisis, CCP risk management standards have been strengthened. Regulators continue to focus on improving CCP resilience and creating a framework for the recovery and resolution of CCPs. However, the rules for recovery and resolution of CCPs are still being finalized

In addition, large banks have become better capitalized and less leveraged. This has allowed the banking system to absorb macroeconomic shocks and enabled banks to play a central role in measures to support the flow of credit to the economy²⁸.

More data about OTC derivatives transactions and markets is currently available to the public and regulators to monitor systemic risk. As the result of the reforms, derivatives markets have become safer, more resilient and more transparent.

Central Clearing

91.1% of
IRD traded
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first half of
2020

Encouraging central clearing of standardized derivatives has been a major priority for policy-makers. This has resulted in a number of regulatory initiatives, including requirements for certain highly standardized/liquid products to be cleared, revised capital requirements, and margin rules for non-cleared derivatives.

In 2012, the CFTC issued a final rule implementing the clearing requirement determination under section 723 of the Dodd-Frank Act²⁹. The rule required four classes of IRD (fixed-for-floating swaps, basis swaps, FRAs and OIS) in four currencies (US dollar, euro, sterling and yen) to be cleared by derivatives clearing organizations registered with the CFTC³⁰.

The rule also required mandatory clearing of two classes of CDS, including North American untranching CDS indices and European untranching CDS indices. In 2016, the CFTC expanded the clearing requirement to apply to additional classes of IRD³¹.

What is Central Clearing?

Central clearing replaces bilateral trading exposures between market participants with a centralized network of exposures between clearing participants and central counterparties (CCPs).

A CCP is a clearing house that interposes itself between counterparties in a financial transaction. After the parties have agreed to a trade, the CCP becomes the buyer to every seller and the seller to every buyer. In doing so, the CCP reduces counterparty credit and liquidity risk exposures through netting³².

²⁸ Global in Life and Orderly in Death: Post-Crisis Reforms and the Too-Big-to-Fail Question, speech by Randal K. Quarles <https://www.federalreserve.gov/newsevents/speech/quarles20200707a.htm>

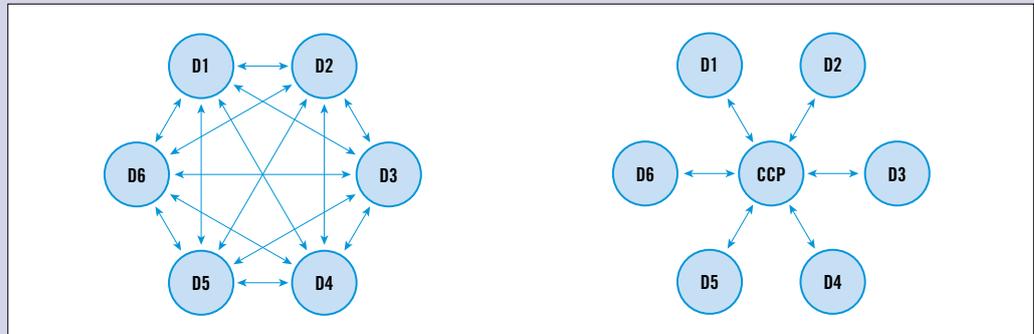
²⁹ CFTC 17 CFR Parts 39 and 50 Clearing Requirement Determination Under Section 2(h) of the CEA; Final Rule <https://www.cftc.gov/sites/default/files/idc/groups/public/@lrfederalregister/documents/file/2012-29211a.pdf>

³⁰ OIS denominated in yen were not included in the clearing mandate

³¹ CFTC 17 CFR Part 50 Clearing Requirement Determination Under Section 2(h) of the CEA for Interest Rate Swaps <https://www.cftc.gov/sites/default/files/idc/groups/public/@lrfederalregister/documents/file/2016-23983a.pdf>

³² Central Clearing: Trends and Current Issues https://www.bis.org/publ/qtrpdf/r_qt1512g.htm

Benefits of Central Clearing

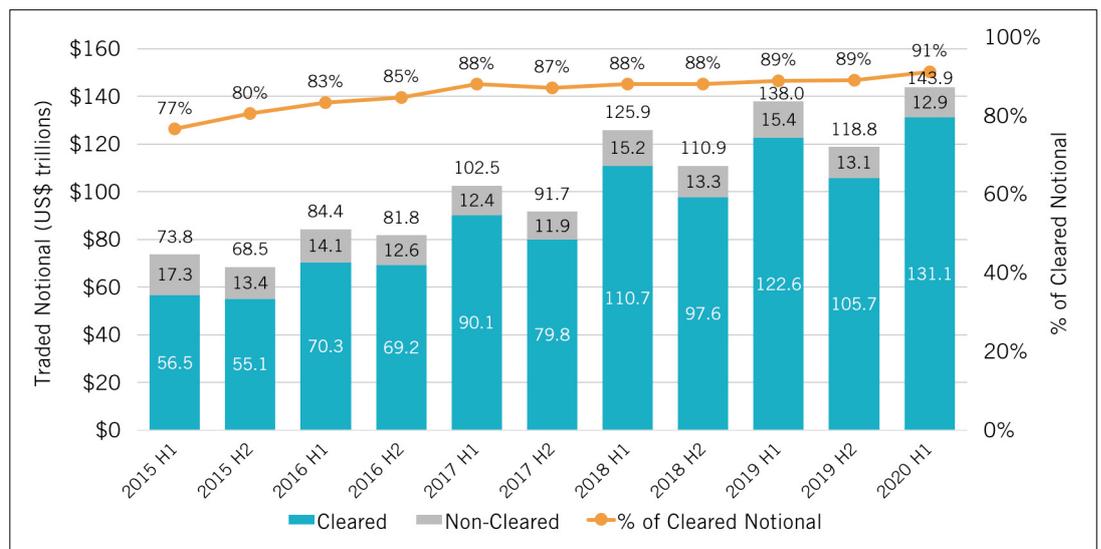


One of the key benefits of central clearing is that it allows for multilateral netting. Instead of having multiple exposures to a range of counterparties, each market participant has a single trading exposure to the CCP. Because of multilateral netting, the size of this exposure is equivalent to the net position versus all other clearing members.

As firms novate trades from multiple counterparties to a CCP, the economic and other benefits of multilateral netting create a powerful incentive to clear. As the result, market participants clear more than the clearing rules mandate. This includes both products not subject to the clearing mandate, as well as trades with counterparties that are exempt from clearing.

In the first half of 2020, IRD cleared notional in the US totaled \$131.1 trillion compared to \$56.5 trillion in the first half of 2015^{33,34}. Cleared IRD transactions represented 91.1% of total IRD traded notional in the first half of 2020 compared to 76.5% in the first half of 2015 (see Chart 8).

Chart 8: IRD Traded and Cleared Notional



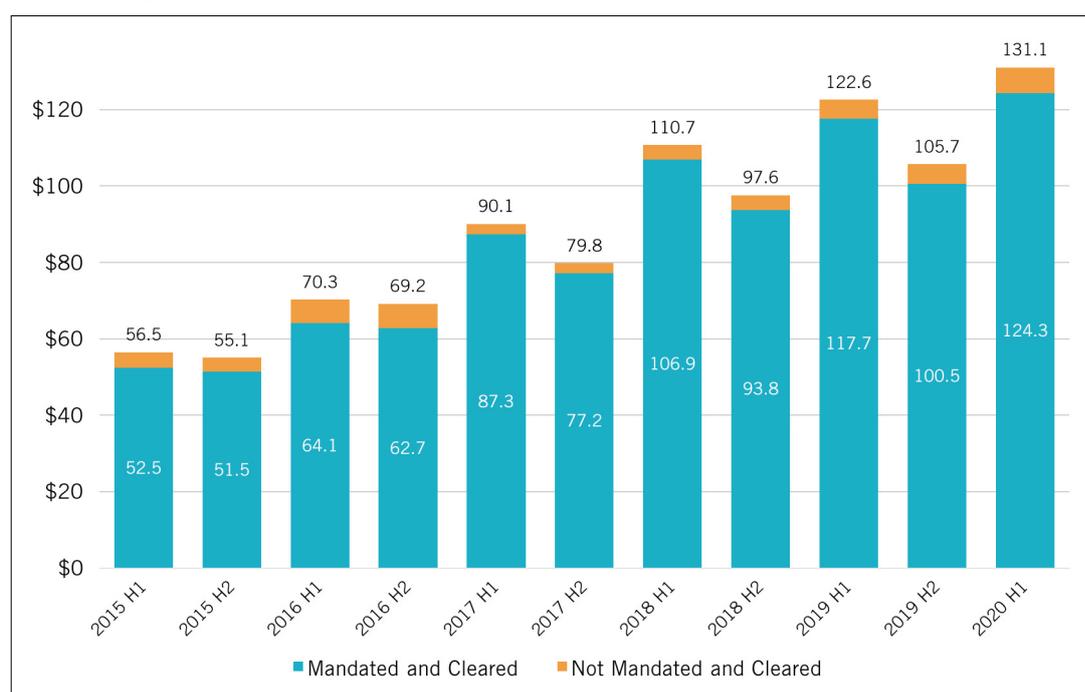
Source: DTCC and Bloomberg SDRs

³³ These metrics are based on the historical data from the Bloomberg and DTCC SDRs, which cover only trades that are required to be disclosed under US regulations. Bloomberg SDR closed in August 2018

³⁴ Cleared trades are reported pre-novation to CCPs so that a single trade is counted only once

Market participants have consistently cleared more than is required under the CFTC's clearing mandate. For example, \$52.5 trillion of IRD traded notional was subject to the clearing mandate compared to \$56.5 trillion that was cleared in the first half of 2015. In the first half of 2020, \$124.3 trillion of IRD traded notional was subject to the clearing mandate, while \$131.1 trillion was cleared (see Chart 9)^{35,36}.

Chart 9: IRD Mandated and Cleared Notional



Source: DTCC and Bloomberg SDRs

Credit derivatives cleared notional totaled \$5.1 trillion in the first half of 2020 compared to \$2.8 trillion in the first half of 2015³⁷. Cleared credit derivatives transactions represented 83.0% of total traded notional in the first half of 2020 compared to 77.8% in the first half of 2015³⁸ (see Chart 10).

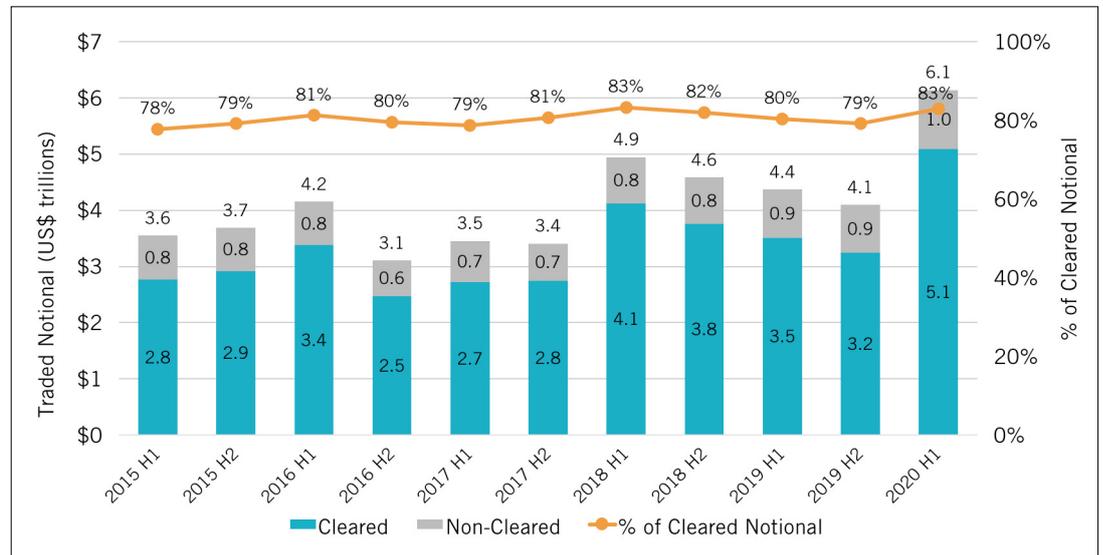
³⁵ Since ISDA does not have data to determine whether transactions were executed by counterparties that are exempt from the clearing requirement, it is assumed that all transactions in products subject to the CFTC's clearing mandate were executed by counterparties that are required to clear. As the result of this assumption, the percentage of the notional mandated to clear is likely to be overestimated

³⁶ The end-user exception exempts non-financial entities that use swaps to hedge or mitigate commercial risk from the clearing requirement. The rule also provides an exemption for cooperatives and swaps between affiliates that meet certain requirements. Additionally, the rule exempts small banks, savings associations, farm credit institutions and credit unions with total assets of \$10 billion or less from the definition of 'financial entity'. This means they are not subject to the mandatory clearing requirement with respect to swaps they use to hedge or mitigate commercial risk

³⁷ Credit derivatives mostly comprise CDS indices, but also include CDS index tranches, credit swaptions, exotic products, total return swaps and insignificant amount of single-name CDS

³⁸ The clearing mandate in the US covers only two classes of CDS, including North American untranching CDS indices and European untranching CDS. There is no clearing requirement for single-name CDS

Chart 10: Credit Derivatives Traded and Cleared Notional

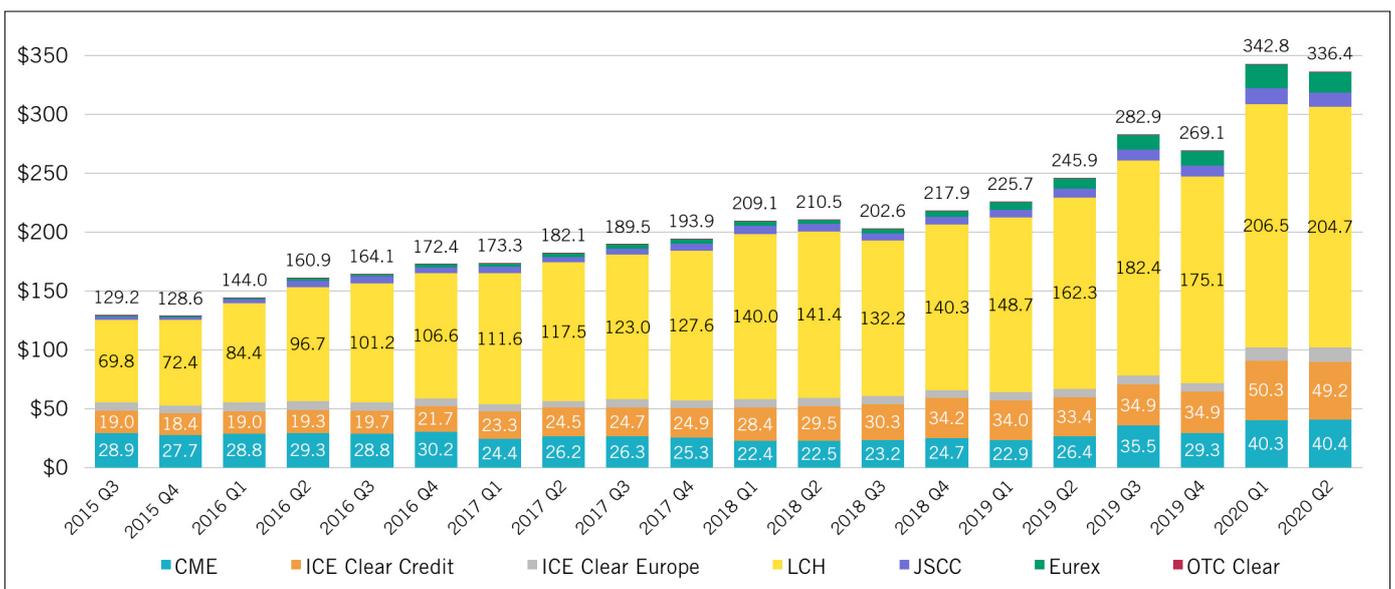


Source: DTCC and Bloomberg SDRs

Global IM for Cleared IRD and CDS

Based on the Committee on Payments and Market Infrastructures and the International Organization of Securities Commissions (CPMI-IOSCO) public quantitative disclosures for CCPs, the amount of IM for cleared OTC derivatives, including IRD and CDS, totaled \$336.4 billion at the end of the second quarter of 2020 compared with \$129.2 billion at the end of the third quarter of 2015 (see Chart 11)^{39,40}.

Chart 11: Global IM for Cleared IRD and CDS (US\$ billions)



Source: CCP disclosures

³⁹ CCPs have been providing quarterly CPMI-IOSCO public quantitative disclosures since the third quarter of 2015. All numbers are converted to US dollar based on the exchange rates at the end of each quarter: <https://www.x-rates.com/historical>

⁴⁰ LCH includes LCH Ltd and LCH SA

What is IM and VM?

Initial margin (IM) is the amount of collateral exchanged by counterparties at the beginning of a trade, reflecting the position's market risk during a close-out period. If IM is calculated on a portfolio basis, then it reflects the impact of the trade on the market risk of the portfolio during a close-out period.

For central counterparties (CCPs), IM is one of the critical layers of their financial resources to protect against potential future exposures if a clearing member defaults.

Variation margin (VM) is the amount of collateral exchanged during the life of the contract, reflecting daily changes in the market value of a trade.

CCPs typically collect VM at least daily from participants with mark-to-market losses on their positions and typically (although not always) pay it out to participants with mark-to-market gains.

Margin Requirements for Non-cleared Derivatives

The 20 largest global market participants collected approximately \$173.2 billion of IM for their non-cleared derivatives transactions

The margin rules for non-cleared derivatives require the mandatory posting of IM and VM for OTC derivatives that are not cleared through CCPs. These rules originate from a global policy framework and schedule established by the Basel Committee on Banking Supervision (BCBS) and IOSCO.

In the US, the IM and VM requirements for phase-one entities with average aggregate notional amount of non-cleared derivatives of over \$3.0 trillion took effect on September 1, 2016. VM requirements came into effect for a wider universe of entities from March 1, 2017.

Phase-two firms became subject to the IM rules on September 1, 2017. Phase-three and phase-four implementation of IM requirements went into effect on September 1, 2018 and September 1, 2019, respectively. The IM requirements for other entities subject to the rules will be phased-in through September 1, 2022, in line with the updated BCBS-IOSCO schedule.

The amount of regulatory IM has been increasing as margin rules for non-cleared derivatives have been phased-in since September 2016 and more firms and new transactions have become subject to the requirements.

The most recent ISDA Margin Survey found that the 20 largest market participants (phase-one firms) collected approximately \$173.2 billion of IM for their non-cleared derivatives transactions at year-end 2019⁴¹.

Of this amount, \$105.2 billion was collected from counterparties currently in scope of the margin regulatory requirements. In addition, \$68.0 billion was received from counterparties and/or for transactions that are not covered by the margin rules (independent amount (IA))⁴², including legacy transactions (see Table 2)⁴³.

⁴¹ ISDA Margin Survey Year-End 2019 <https://www.isda.org/a/1F7TE/ISDA-Margin-Survey-Year-end-2019.pdf>

⁴² Independent amount (IA) is IM delivered to or received from counterparties for legacy transactions executed prior to the implementation of the margin rules, or for transactions that are not subject to the margin requirements and/or for amounts posted in addition to regulatory IM

⁴³ Legacy transactions are trades entered into prior to the regulatory IM compliance date

Table 2: Phase-one Firms Regulatory IM and IA (US\$ billions)

	2019	2018	2017	2019 vs. 2018	2018 vs. 2017
Regulatory IM Received	105.2	83.8	73.7	25%	14%
IA Received	68.0	74.1	56.9	-8%	30%
Total IM Received	173.2	157.9	130.6	10%	21%
Regulatory IM Posted	105.6	83.2	75.2	27%	11%
IA Posted	9.5	10.1	6.4	-7%	57%
Total IM Posted	115.0	93.3	81.7	23%	14%

Source: ISDA Margin Survey

VM collected by phase-one firms for non-cleared derivatives totaled \$897.3 billion at year-end 2019. Of that amount, \$441.5 billion was required under global margin regulations, while \$455.8 billion of the VM collected by phase-one firms was discretionary VM and was collected from counterparties and/or for transactions that are not covered by the margin rules, including legacy transactions (see Table 3).

Table 3: Phase-one Firms Regulatory and Discretionary VM (US\$ billions)

	2019	2018	2017	2019 vs. 2018	2018 vs. 2017
Regulatory VM Received	441.5	N/A	N/A		
Discretionary VM Received	455.8	N/A	N/A		
Total VM Received	897.3	858.6	893.7	5%	-4%
Regulatory VM Posted	348.7	N/A	N/A		
Discretionary VM Posted	341.5	N/A	N/A		
Total VM Posted	690.2	583.9	631.7	18%	-8%

Source: ISDA Margin Survey

Capital Requirements

In response to the financial crisis, the BCBS developed new Basel III standards, which revised minimum capital requirements for internationally active banks. The Basel III reforms focused on improving the amount and quality of capital that banks hold, enhancing the market risk framework, specifying minimum leverage ratio requirements and mitigating excessive liquidity and funding risks⁴⁴.

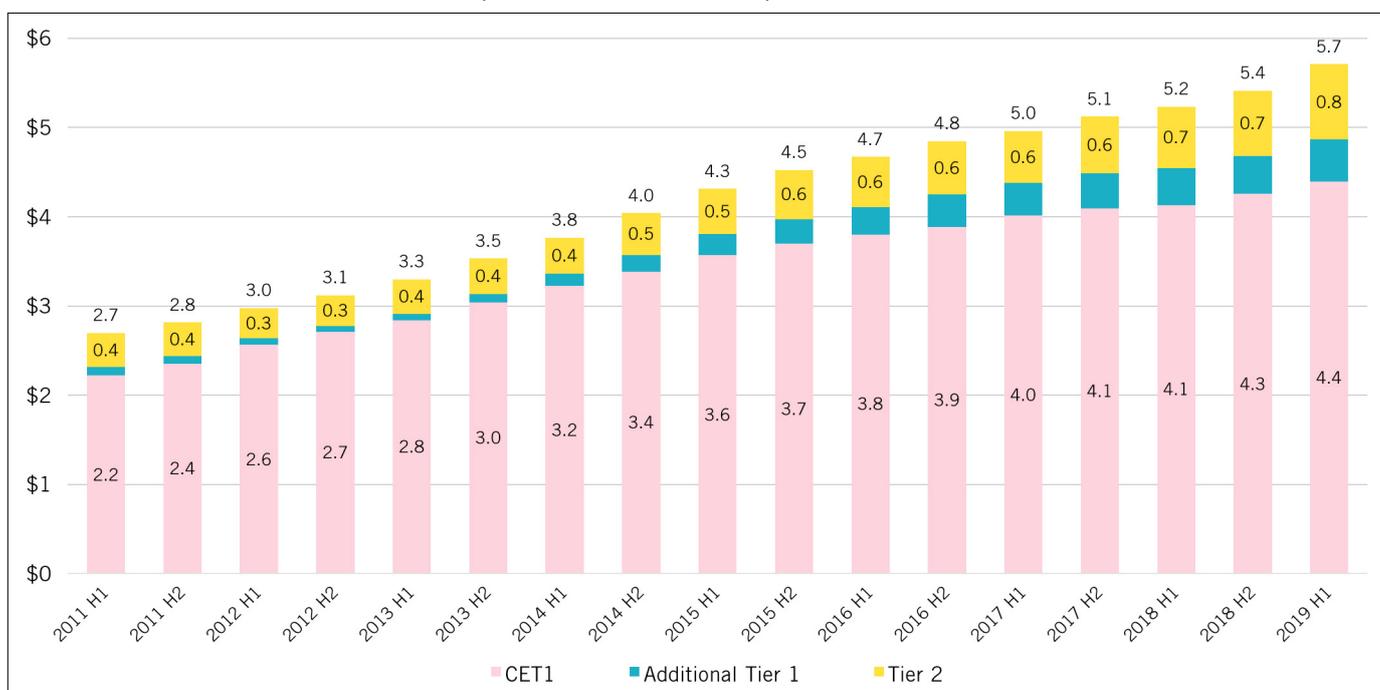
⁴⁴ Basel Committee on Banking Supervision, High Level Summary of Basel III Reforms https://www.bis.org/bcbs/publ/d424_hlsummary.pdf

Prior to the reforms, there was no global framework for leverage or liquidity. Now, new Basel standards for a leverage ratio, liquidity coverage ratio and net stable funding ratio (NSFR) contain specific provisions regarding derivatives⁴⁵. For example, the NSFR requires banks to apply a 100% required stable funding factor to 5% of the gross amount of derivatives liabilities.

Meanwhile, capital rules specific to derivatives counterparty risk, including the standardized approach for counterparty credit risk and credit valuation adjustment, have been completely revised, leading to higher capital amounts.

Bank capital levels have increased significantly as a result of the changes. For example, group-one banks doubled CET1 capital from \$2.2 trillion in the first half of 2011 to \$4.4 trillion in the first half of 2019^{46,47}. Total capital increased from \$2.7 trillion to \$5.7 trillion over the same period⁴⁸ (see Chart 12).

Chart 12: Group-one Banks Level of Capital (US\$ trillions)



Source: Basel Committee on Banking Supervision

The average CET1 capital ratio for group-one banks increased from 7.0% in the first half of 2011 to 12.8% in the first half of 2019, while total capital ratios grew from 8.6% to 16.8% over the same period (see Chart 13).

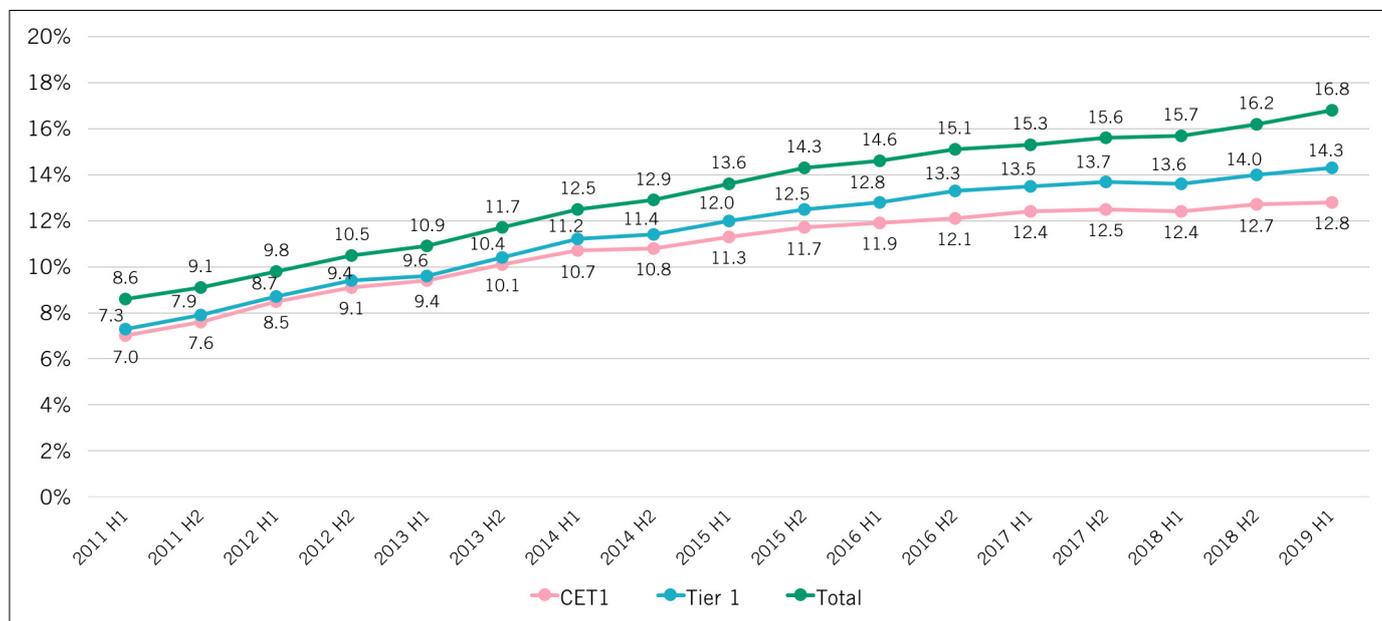
⁴⁵ The Basel Framework https://www.bis.org/basel_framework/index.htm?m=3%7C14%7C697

⁴⁶ Basel III Monitoring Report <https://www.bis.org/bcb/publ/d500.pdf>

⁴⁷ Group one banks are defined as internationally active banks that have tier-one capital of more than €3 billion, and include all 29 institutions that have been designated as global systemically important banks

⁴⁸ All values are converted to US dollar based on the exchange rates at the end of the first half of 2019: <https://www.x-rates.com/historical>

Chart 13: CET1, Tier-one and Total Capital Ratios for Group-one Banks



Source: Basel Committee on Banking Supervision

Components of Regulatory Capital

Total available regulatory capital is the sum of tier-one capital – which comprises common equity tier-one (CET1) capital and additional tier-one (AT1) capital – and tier-two capital. Each of the categories has a specific set of criteria that capital instruments are required to meet. Banks are required to maintain specified minimum levels of CET1, tier-one and total capital, with each level set as a percentage of risk-weighted assets⁴⁹.

CET1 is the sum of common shares (equivalent for non-joint stock companies) and stock surplus, retained earnings, other comprehensive income, qualifying minority interest and regulatory adjustments.

AT1 is the sum of capital instruments meeting the criteria for AT1 and related surplus, additional qualifying minority interest and regulatory adjustments.

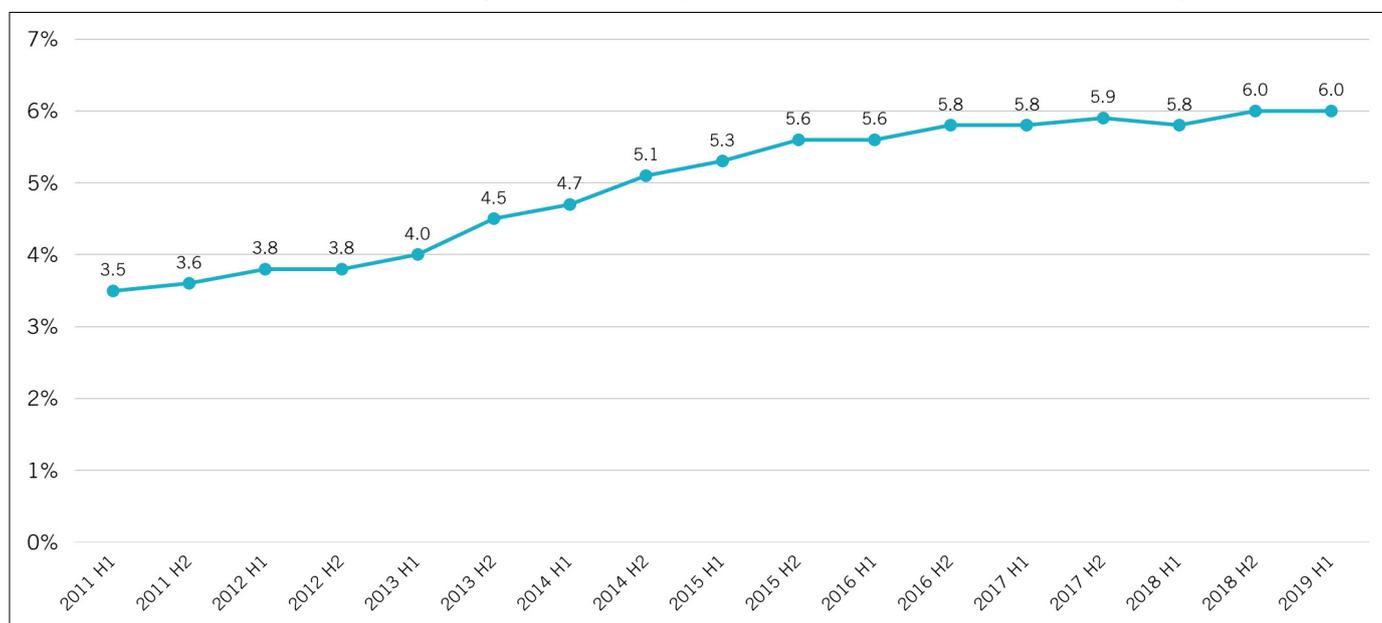
Tier 2 is the sum of capital instruments meeting the criteria for tier-two and related surplus, additional qualifying minority interest, qualifying loan-loss provisions and regulatory adjustments.

While the regulatory minimum capital ratios are set at 4.5% for CET1, 6% for tier-one and 8% for total capital (as well as a 3% requirement for the Basel III leverage ratio), the target levels also account for the capital conservation buffer of 2.5%, resulting in minimum total capital of 10.5%, as well as any applicable surcharge for global systemically important banks.

The average fully phased-in final Basel III tier-one leverage ratio for group-one banks increased from 3.5% in the first half of 2011 to 6.0% in the first half of 2019⁵⁰ (see Chart 14).

⁴⁹ Definition of capital in Basel III - Executive Summary https://www.bis.org/fsi/fsisummaries/defcap_b3.htm

⁵⁰ The average fully phased-in Basel III tier-one leverage ratio is the sum of all banks' fully phased-in tier-one capital for the total sample divided by the sum of all banks' Basel III leverage ratio exposures for the total sample

Chart 14: Group-one Banks Fully Phased-in Final Basel III Tier-one Leverage Ratio

Source: Basel Committee on Banking Supervision

Trade Execution

58.2% of IRD traded notional and 79.4% of total credit derivatives traded notional in the US was executed on SEFs in the first half of 2020

The trade execution requirement in the US means that swap transactions subject to the clearing mandate must be executed on a SEF or a designated contract market (DCM), if a DCM or SEF makes the swap available to trade or the transaction is subject to a clearing exception⁵¹.

The CFTC adopted its final rule relating to the registration and operation of SEFs in 2013, which outlined the types of entities required to register as SEFs and the core principles by which they must operate⁵².

The CFTC also issued the rule that established a process for SEFs and DCMs to determine whether a swap is made available to trade for the purpose of the trade execution requirements⁵³. In February 2014, certain IRS and CDS in US dollar, euro and sterling started trading on SEFs, representing a subset of the products subject to the clearing mandate⁵⁴.

In the first half of 2020, IRD traded notional executed on SEFs totaled \$83.8 trillion, while \$60.1 trillion was executed off-SEF. SEF-traded IRD represented 58.2% of total traded notional. In comparison, IRD traded notional executed on SEFs totaled \$41.6 trillion and represented 56.4% of total IRD traded notional in the first half of 2015 (see Chart 15).

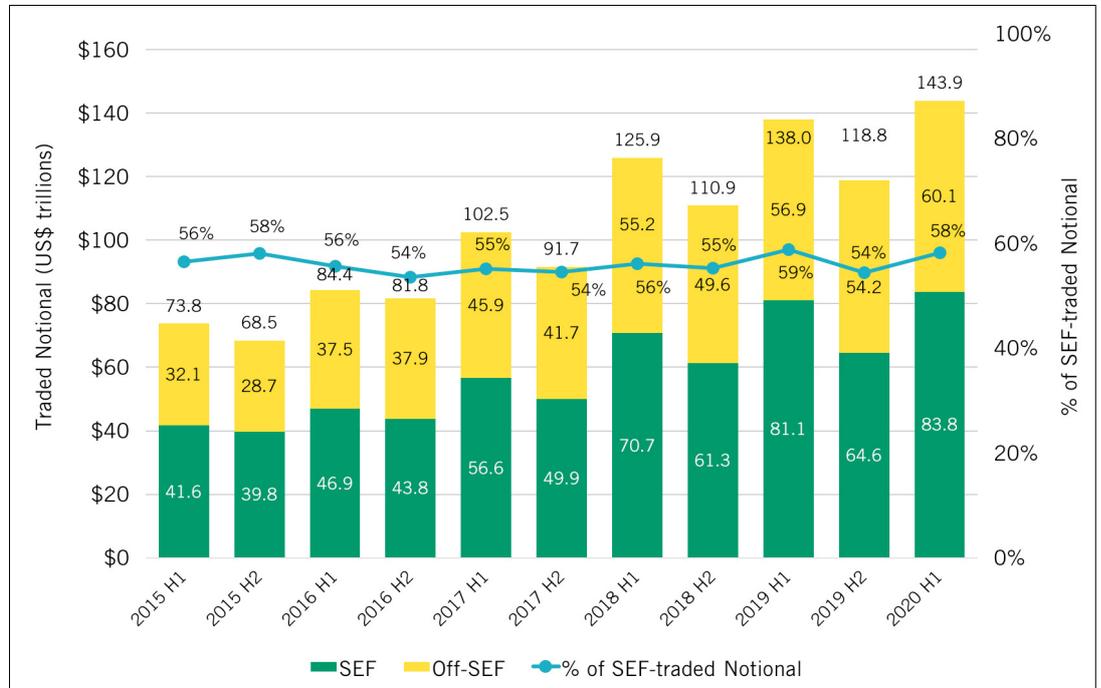
⁵¹ Dodd-Frank Wall Street Reform and Consumer Protection Act <https://www.gpo.gov/fdsys/pkg/PLAW-111publ203/pdf/PLAW-111publ203.pdf>

⁵² CFTC 17 CFR Part 37 Core Principles and Other Requirements for Swap Execution Facilities; Final Rule <https://www.gpo.gov/fdsys/pkg/FR-2013-06-04/pdf/2013-12242.pdf>

⁵³ CFTC 17 CFR Part 37 and 38 Process for a Designated Contract Market or Swap Execution Facility To Make a Swap Available to Trade, Swap Transaction Compliance and Implementation Schedule, and Trade Execution Requirement Under the Commodity Exchange Act; Final Rule <https://www.cftc.gov/sites/default/files/idc/groups/public/@lrfederalregister/documents/file/2013-12250a.pdf>

⁵⁴ Swaps Made Available To Trade <https://www.cftc.gov/sites/default/files/idc/groups/public/@otherif/documents/file/swapsmadeavailablechart.pdf>

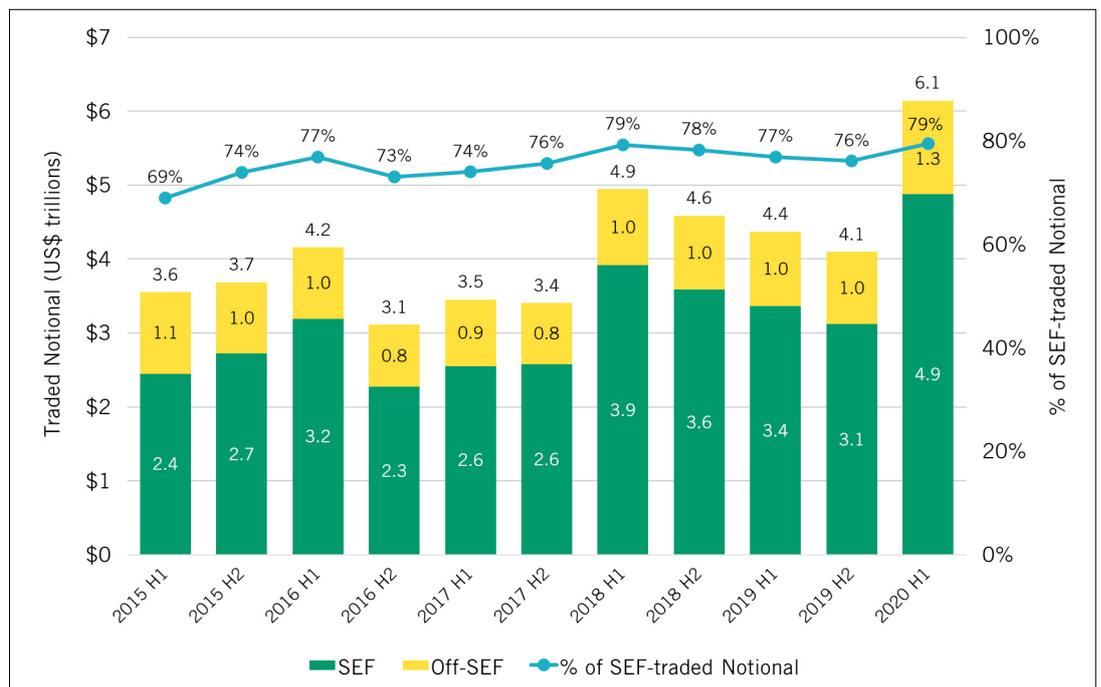
Chart 15: SEF and Off-SEF IRD Traded Notional



Source: DTCC and Bloomberg SDRs

In the first half of 2020, credit derivatives traded notional executed on SEFs equaled \$4.9 trillion and accounted for 79.4% of total credit derivatives traded notional. About \$1.3 trillion was executed off-SEF. In comparison, 68.9% of credit derivatives traded notional was executed on SEFs in the first half of 2015 (see Chart 16).

Chart 16: SEF and Off-SEF Credit Derivatives Traded Notional



Source: DTCC and Bloomberg SDRs

In the US, all swap transactions are now reported to SDRs, giving regulators more comprehensive data on derivatives trading and increasing market transparency

Trade Reporting

To enhance regulators' visibility into the swap markets, Dodd-Frank mandated that swap information be reported to SDRs. A subset of this reported information, including swap price and size, are required to be disseminated to the public in real time to promote public transparency.

The CFTC finalized its swap reporting rules in December 2011, and all traded swaps instruments were required to be reported by the end of 2013. The SEC has also recently finalized its security based swap reporting regime.

The CFTC rules, including 17 CFR parts 43 and 45, require every new swap to be reported to CFTC-regulated SDRs, where the data is stored for use by government officials. SDRs must publicly report the basic economic terms of most swaps in real time. In addition, parties to swaps are subject to extensive record-keeping requirements.

For swaps executed on SEFs or DCMs, the SEF or DCM is responsible for reporting swap transaction, pricing and swap creation data to the SDR. For off-facility swaps, a designated reporting counterparty, which differs depending on the status of the counterparties, is responsible for reporting the information.

Swap data reporting not only gives regulators more comprehensive data on derivatives trading, but it also increases market transparency and improves price discovery, both of which are recognized by US regulators as priorities and are important to healthy derivatives markets.

Three Types of Reporting Requirements

Real-time Reporting

Key information about swap transaction and pricing data is required to be reported to US-registered swap data repositories (SDRs) as soon as technologically practicable after execution. Real-time data is publicly disseminated on an anonymous basis for price discovery and market transparency purposes. Delays in reporting are allowed for block trades (transactions with a notional above the minimum block size for the relevant asset class).

Swap Data Record-keeping and Reporting

The reporting counterparty to a swap is responsible for reporting a host of information about transactions to an appropriate SDR, both upon creation and throughout the life of the swap. This data is only accessible to the CFTC, but not the public.

Historical Swap Record-keeping and Reporting

Counterparties to historical swaps – transactions entered into before the compliance dates for reporting requirements – are required to retain information about swap activity, and the reporting counterparty is required to report swap information to an SDR. The scope of the information reported depends on when the swap was entered into and terminated.

The reduction in counterparty credit risk has helped market participants manage risk and better absorb the macroeconomic shock during the COVID-19 pandemic

CONCLUSION

The significant turmoil in the financial markets in the first half of 2020 due to the COVID-19 pandemic was the first major test of the regulatory reforms enacted in the aftermath of the 2008 global financial crisis.

While the derivatives markets did experience liquidity and market pressures, they continued to function without any major issues or dislocations.

The performance of derivatives markets during this period reflects important changes and the significant reduction in counterparty credit risk over the past decade.

The shift to central clearing decreases counterparty credit risk through a combination of collateralization and multilateral netting. Central clearing also reduces the interconnectedness of market participants and mitigates systemic risk by lowering the likelihood of contagious (knock-on) defaults that could spread from one counterparty to others. In the US, 91.1% of IRD traded notional and 83.0% of credit derivatives traded notional was cleared in the first half of 2020.

Margin requirements for non-cleared derivatives reduce counterparty risk by ensuring that collateral is available to offset losses caused by a counterparty default in bilateral transactions. According to the most recent ISDA Margin Survey, the 20 largest global market participants collected approximately \$173.2 billion of IM and \$897.3 billion of VM for their non-cleared derivatives transactions at year-end 2019.

Large banks have become better capitalized and less leveraged. Global systemically important banks more than doubled CET1 capital, bringing it from \$1.5 trillion in the first half of 2011 to \$3.1 trillion in the first half of 2019.

As a result of financial regulatory reforms, derivatives markets have become safer, more resilient and more transparent. The reduction in counterparty credit risk has helped market participants manage risk, prevent financial contagion, and better absorb the macroeconomic shock during the COVID-19 pandemic.



ISDA has published other recent research papers:

- ***ISDA-Clarus RFR Adoption Indicator: November 2020, December 2020***

<https://www.isda.org/a/AgfTE/ISDA-Clarus-RFR-Adoption-Indicator-November-2020.pdf>

- ***Key Trends in the Size and Composition of OTC Derivatives Markets in the First Half of 2020, November 2020***

<https://www.isda.org/a/ZGNTE/Key-Trends-in-the-Size-and-Composition-of-OTC-Derivatives-Markets-in-the-First-Half-of-2020.pdf>

- ***SwapsInfo Third Quarter of 2020 and Year-to-September 30, 2020 Review, October 2020***

<https://www.isda.org/a/Kh4TE/SwapsInfo-Q3-of-2020-and-Year-to-September-30-2020-Review-Full-Report.pdf>

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ABOUT ISDA

Since 1985, ISDA has worked to make the global derivatives markets safer and more efficient. Today, ISDA has more than 925 member institutions from 75 countries. These members comprise a broad range of derivatives market participants, including corporations, investment

managers, government and supranational entities, insurance companies, energy and commodities firms, and international and regional banks. In addition to market participants, members also include key components of the derivatives market infrastructure, such as

exchanges, intermediaries, clearing houses and repositories, as well as law firms, accounting firms and other service providers. Information about ISDA and its activities is available on the Association's website:

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