2022 ANNUAL MARKETS REVIEW IN CENTRAL COUNTERPARTY CLEARING

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CCP12

A CCP12 REPORT

JULY 2023

MESSAGE FROM THE CHAIRMAN

2022 marked another year of extraordinary market volatility. In particular, the historic and tragic Russia-Ukraine war dramatically impacted energy prices, especially in Europe, and inflationary pressures drove interest rates significantly higher around the globe.

But once again, the disciplined, transparent, and regulated Central Counterparties ("CCPs") from around the world stood the test of these unique markets and operated as designed; thereby successfully mitigating systemic risk and allowing market participants to discover prices and manage their exposures.

CCP12 is pleased to publish this 2022 Annual Markets Review ("AMR"). As chair, I would like to thank the association's members and staff team who worked hard to draft this topical and comprehensive AMR. And I would like to thank the membership and the staff team for all their contributions throughout a busy year. As I often state, CCP12 is only as strong as the support we receive from our membership and our staff team (we are very fortunate in both respects).

The association has come a long way - "CCP12" was founded in 2001 by twelve major CCP organizations located in Europe, Asia, and the Americas. Since then, CCP12 has more than tripled its membership to include 42 members who operate over 60 individual CCPs globally across the EMEA, Asia-Pacific, and Americas. Given this significant expansion of its membership, CCP12 has decided to retire the reference to "12" and rebrand itself as "CCP Global" to reflect its much broader and inclusive membership.

In 2022 alone, CCP Global responded to 20 consultations and participated in dozens of industry meetings. In the past five years, CCP Global responded to 43 consultations and participated in countless industry meetings.

2022 also marks the year CCP Global opened its office in Amsterdam providing CCP Global with a greater international presence in both Asia and Europe.

At the time of the publication of this 2022 AMR, CCP Global is well into another busy year and consistent with our mission we continue to work closely with the industry to promote the safety and efficiency of the markets that our CCPs clear.

As CCPs, we hope that the extensive level of transparency that CCPs provide in reports, disclosures, engagement with clients, clearing members ("CMs") and authorities, promotes and fosters confidence and details the protection that results from centrally cleared markets.

Kevin R. McClear
CCP12 Chairman

MESSAGE FROM THE CEO

As always, it is a great pleasure to introduce our latest AMR, brought to you by our global association. The AMR brings to our readers a summary of key economic developments, describes how CCPs performed their critical risk management function for these markets and their participants, and our colourful case studies from members. This time around, the themes are of market reactions to exceptional events, and insights into how our members are developing their risk management systems, technology and settlement systems, legal framework, client protections, and transparency.

The often painful events across 2022 in the world were mirrored in many markets – whether energy and agricultural spikes following the Russia-Ukraine war, idiosyncratic shocks in particular commodities, the reactions to strained fiscal or monetary policies and inflation, or the fiascos in crypto currency markets. Despite these unfortunate events, CCPs, alongside their participants and stakeholders, have demonstrated exceptional resilience again and again. The robust standards and surety of the system is visible in its ability to continue upgrades, innovation, and supporting markets in special matters such as the transitions from Inter-bank Offered Reference Rates ("IBORs") to Risk-Free Rates ("RFRs") (or other rates), which have taken place across 2022.

The heightened interest in CCPs' risk management, be it in their supervision, the advice and probing of their participants in diligence, and of course the hard work of CCPs themselves yield their benefits in such times. Indeed, the developments in 2022 are a testament to this in two ways; the choice of participants to select and rely on centrally cleared markets for their trading, and the expansion and development of CCPs.

In the former sense, one can draw attention to the continuing elevated risk managed by CCPs for their participants. Variation Margin ("VM") – or the collection and payment of profits and losses across all open trades – reached new aggregate highs (in average terms). This is reflective of the record volumes of contracts cleared by CCPs, and the entire industry can be proud that their obligations have continued to be settled, every day, across the great variety of CCPs. For the latter, there is a trend of new CCPs being established or considered for new markets, especially in emerging markets that are keen to develop their local financial centres. In more august markets, market participants or authorities are considering the use of CCPs to reap their benefits.

I hope you enjoy this version of the AMR – and for further details and statistics, sign up to our newsletters!

Teo Floor
CCP12 CEO

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LIST OF ABBREVIATIONS

€STR	Euro Short Term Rate
ACL	Achieved Coverage Level
AE	Advanced Economies
AML	Anti-Money Laundering
AMR	Annual Markets Review
APAC	The Asia-Pacific Region
APC	Anti-procyclicality
BAC	Bid-Ask Charge
BCBS	Basel Committee on Banking Supervision
BIS	Bank for International Settlements
BoE	Bank of England
BoJ	Bank of Japan
BTC	Bitcoin
CBDC	Central Bank Digital Currency
CC	Concentration Charge
CCP	Central Counterparty
CDS	Credit Default Swap
CER	Certified Emission Reduction
CFTC	The (U.S.) Commodity Futures Trading Commission
C-GEO	CBL Core Global Emissions Offset
CM	Clearing Member
CME	Chicago Mercantile Exchange Group
ComDer	Comder Contraparte Central S.A.
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
CP	Consultation paper
CPI	Consumer Price Index
CPMI	Committee on Payments and Market Infrastructures
CPSS	Committee on Payment and Settlement Systems
CRS	Center for Resource Solutions
CSC	Correlation Stress Charge
CSD	Central Securities Depositories
CZK	Czech Koruna
DBC	Diversification Benefit Cap
DCO	Derivatives Clearing Organization
DeFi	Decentralised Finance
DF	Default Fund
DKK	Danish Krone
DMG	Default Management Group
DMP	Default Management Process
DvP	Delivery versus Payment
EACH	European Association of CCP Clearing Houses
ECAG/ Eurex	Eurex Clearing Group
ECB	European Central Bank

EMIR	European Market Infrastructure Regulation
ESMA	European Securities and Markets Authority
ETD	Exchange Traded Derivative
ETF	Exchange Traded Funds
ETH	Ethereum
EU	European Union
EUR	Euro
FAQ	Frequently Asked Questions
FCM	Futures Commission Merchant
FHS	Filtered Historical Simulation
FI	Fixed Income
FIA	Futures Industry Association
FIA PTG	FIA Principal Traders Group
FMI	Financial Market Infrastructure
FSB	Financial Stability Board
FTSE	Financial Times Stock Exchange
FX	Foreign Exchange
GBP	Great British Pound/ British Sterling
GBR/ UK	United Kingdom
GCE	Gross Credit Exposures
GDP	Gross Domestic Product
GER	Global Emission Reduction
GFC	Global Financial Crisis
GMV	Gross Market Value
GOSA	Gross Omnibus Segregated Account
GTR	Gross Total Return
HKEX	Hong Kong Exchanges and Clearing Limited
HUF	Hungarian Forint
IA	Independent Amount
IBOR	Inter-Bank Offered Rate
ICA	ICE Clearing Analytics
ICE	Intercontinental Exchange Inc
ICUS	ICE Clear U.S.
IM	Initial Margin
IMF	International Monetary Fund
INR	Indian Rupees
IOSCO	International Organization of Securities Commissions
IRD	Interest Rate Derivative
IRM1	ICE Risk Model 1
IRM2/ IRM2.0	ICE Risk Model 2
IRS	Interest Rate Swap
ISA	Individually Segregated Account
ISDA	the International Swaps and Derivatives Association
KYC	Know-your-customer
LHS	Left Hand Side
LIBOR	London Inter-Bank Offered Rate
LME	London Metal Exchange
LNG	Liquefied Natural Gas
LRC	Liquidity Risk Charge

MFA	Managed Funds Association
MPOR	Margin Period of Risk
MPPQD	Market Participant Public Quantitative Disclosures
MSCI	Morgan Stanley Capital International
NDF	Non-Deliverable Forward
NDL	Non-Default Loss
NEPOOL	New England Power Pool
NOK	Norwegian krone
NOSA	Net Omnibus Segregated Account
NSE	National Stock Exchange of India Ltd
NY	New York
NY Fed	The Federal Reserve Bank of New York
OBS	Observation Value
OECD	Organisation for Economic Co-operation and Development
OI	Open Interest
OIS	Overnight Index Swaps
OPEC	Organization of the Petroleum Exporting Countries
OTC	Over-The-Counter
P&L	Profit and Loss
PBoC	People's Bank of China
PFMI	Principles for financial market infrastructures
PLN	Polish Złoty
PQD	Public Quantitative Disclosures
QoQ	Quarter-on-Quarter
RBA	Reserve Bank of Australia
RBI	Reserve Bank of India
REC	Renewable Energy Certificate
Repo	Repurchase Agreement
RFRs	Risk-Free Rates
RHS	Right Hand Side
RMC	Risk Management Committee
ROSC	Review of Standards and Codes
RTGS	Real-Time Gross Settlement
RTS	Regulatory Technical Standards
RWG	Risk Advisory Working Group
S&P	Standard & Poor's
SEBI	Securities and Exchange Board of India
SEC	The (U.S.) Securities and Exchange Commission
SEK	Swedish krona
SHCH	Shanghai Clearing House
SHCOMP	Shanghai Composite
SIID	Integrated Derivatives Information System
SITG	Skin-in-the-Game
SOFR	Secured Overnight Financing Rate
SS	Supervisory Statement
SSBs	Standard-Setting Bodies
STIBOR	Stockholm Interbank Offered Rate
SWESTR	Swedish krona Short Term Rate

TM FRA	Tailor Made Forward Rate Agreement
TPRM	Third-Party Risk Management
TR	Trade Repository
TRF	Total Return Future
UKA	UK Allowance (Emissions Allowance)
UMR	Uncleared Margin Rules
UPI	United Payments Interface
USA	United States of America
USD	United States Dollar
USDA	United States Department of Agriculture
VaR	Value-at-Risk
VER	Verified Emission Reduction
VI	Volatility Index
VIX	Cboe Volatility Index®
VM	Variation Margin
VSTOXX	EURO STOXX 50® Volatility
WCA	Washington Carbon Allowance
WREGIS	Western Regional Energy Generation Information System

EXECUTIVE SUMMARY

Globally, 2022 was a very tumultuous year from the geopolitical and economic perspective. After several years of stresses caused by the COVID-19 pandemic and resultant real-economy pressures, rising inflation, price volatility, and obstructed access to many commodities, the prospects at the start of 2022 seemed to be improving together with the easing of lockdowns in many countries, reopening of economies, and people's regained freedom to move and travel again. These hopes were shattered with the beginning of a new, much more acute phase of the Russia-Ukraine war in February 2022 which marked the onset of yet another crisis – primarily humanitarian, but also for financial markets. A combination of unfavourable factors led to a galloping inflation addressed by major central banks with the tightening of monetary policies, bond markets' unprecedented volatility and a rapid growth in the yields of many government bonds. Commodities markets were also negatively affected by the geopolitical events and crypto winter exposed the crypto market's participants to significant losses, bankruptcies, and even fraud cases.

In spite of this, a significant part of financial markets fared well. CCPs and their participants fulfilled their roles and obligations even at the most challenging moments. CCPs, some of the most transparent and highly regulated entities in the markets, succeeded in managing risk and enhancing their models and offerings. CCPs remained very resilient, innovative, responsive to market participants' needs, and continued to be perceived as safe havens by market participants, as evidenced by stable or even increasing levels of overcollateralization observed at all major CCPs.

The above is well demonstrated by the data and accompanying commentary which can be found in the following chapters of the 2022 AMR, especially in the "Global economic landscape in 2022" and "CCP data and resilience in 2022" chapters. Our AMR also includes additional sections, that include a description of the CCP model and more details on the CCP regulatory context and developments in market practices that were observed last year. CCP12 was engaged in many discussions with global Standard Setting-Bodies ("SSBs") and policy makers on CCP-related topics, ranging from margining practices, auctions, climate risk, and third-party risk management, non-default losses ("NDLs"), client clearing and porting, recovery and resolution regimes, and governance arrangements. Many of these discussions also took the form of public consultations to which CCP12 submitted written responses.

The crème de la crème of AMR are case studies kindly provided by CCP12 members which in this edition are:

- CME Clearing and Eurex Clearing, which put together a joint case study on different porting mechanisms under their respective regulatory regimes;
- Comder Contraparte Central S.A. ("ComDer"), which describes the benefits of the new derivatives trade repository in Chile;
- Intercontinental Exchange Inc ("ICE"), which presents the process of the implementation of ICE Risk Model 2 ("IRM2.0"/"IRM2") system at ICE Clear U.S. ("ICUS");
- National Stock Exchange of India Ltd ("NSE"), which provides the story of successful migration to T+1 settlement cycle in India; and
- Shanghai Clearing House ("SHCH"), which shares the experience of the first stress test on legal risk in CCP default management in China.

1. GLOBAL ECONOMIC LANDSCAPE IN 2022

1.1 THE YEAR IN CHARTS: KEY ECONOMIC INDICATORS, TRENDS, AND SELECTED MARKET EVENTS DURING 2022

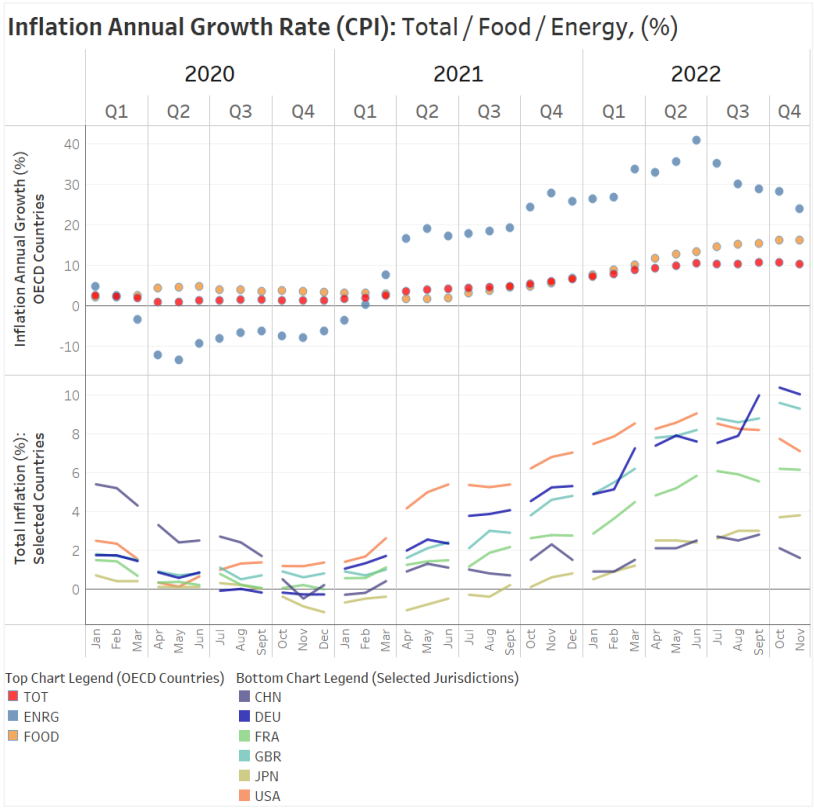
The global economy in 2022 started out in relatively good stead following two turbulent years of the global health crisis which affected every aspect of our lives, as well as our businesses. In very early 2022, the world began to show signs of strength and resilience – we were on the road to recovery.

However, in February 2022, we witnessed the most significant geopolitical event since the fall of the Iron Curtain, the ongoing Russia-Ukraine war. As a humanitarian tragedy, coupled with the significant effects on global economic activity, it was apparent that this was another shock to our global recovery.

Several themes are apparent for 2022 which involve the Russia-Ukraine war, inflation, rising interest rates, the "crypto-winter", energy market volatility, the liquidity crisis in the UK, and energy shortages. However, despite such adversity, the global financial markets functioned as designed. CCPs in particular remained resilient by playing a crucial role in guaranteeing contracts across a broad array of derivatives, as we will explore throughout this report. The success of the CCP model has yet again proved that CCPs are critical to supporting the stability of the financial markets they serve.

1.1.1 INFLATION AND INTEREST RATES[1]

INFLATION



The chart opposite (Inflation Annual Growth Rate (i.e. changes in consumer price index ("CPI")): Total / Food / Energy, (%)), provides an overview of how inflation changed between 2020 and 2022.

The top chart indicates how the Organization for Economic Cooperation and Development countries ("OECD") inflation grew across energy, food, and as a total. The bottom chart indicates total inflation for several selected jurisdictions.

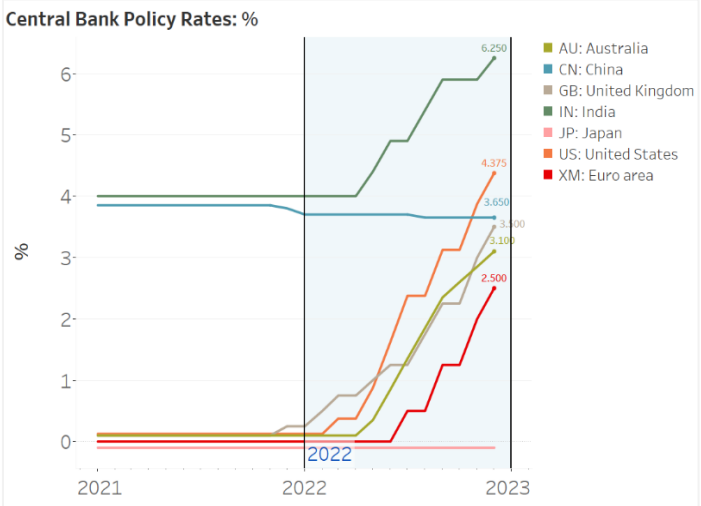
Reflecting back to 2019, inflation was at unprecedented lows. For 2022, however, the story reversed with inflation rising to unprecedented highs - beyond anticipated levels. The overall disruption of supply chains, coupled with the change in public spending habits during and post COVID-19, followed by the Russia-Ukraine war, all contributed to high inflation. With the supply of energy (most notably natural gas) constricted, the impact on Europe was significant. However, much of the world was seeing high inflation across the board.

In the United States of America ("USA"), the CPI peaked at 9.06% in 2022, the highest in four decades, while in Germany the rate peaked at 10.39% in October 2022, the first double-digit inflation since 1951.

From the start of 2022, inflation continued its trajectory and momentum. The price pressures did not ease and were eventually met by central bank policy rate increases as we will see in the next chart on page 13.

[1] OECD (2023), Inflation (CPI) (indicator). doi: 10.1787/eee82e6e-en (Accessed on 24 January 2023)

INTEREST RATES[2]



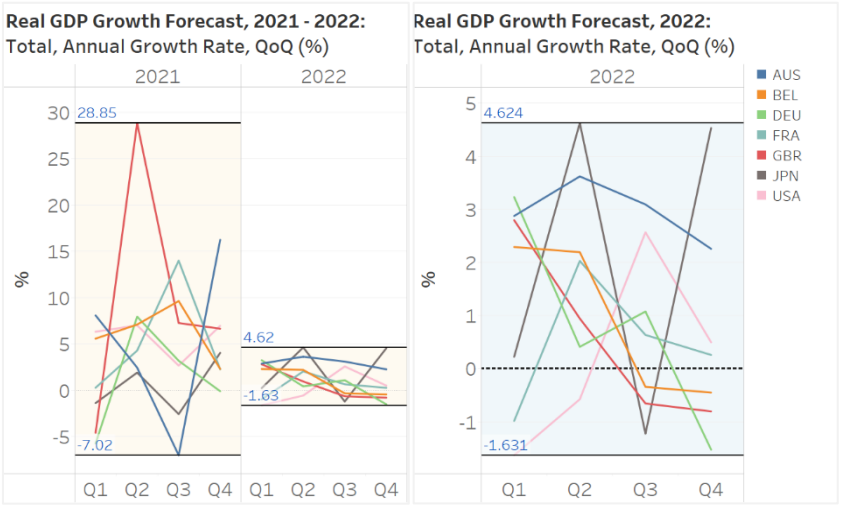
The chart opposite (Central Bank Policy Rates: %) provides a view of how central bank interest rates have dramatically increased in 2022 to stem inflation and stagnating economies.

The Reserve Bank of Australia ("RBA"), Bank of England ("BoE"), Reserve Bank of India ("RBI"), Federal Reserve ("the Fed"), and the European Central Bank ("ECB") all raised rates in 2022 through a plateaued approach. The People's Bank of China ("PBOC") decreased rates while the Bank of Japan ("BoJ") remained steady at their target of -0.1%. While many central banks adjusted rates towards the end of 2021 and the first months of 2022, the ECB began adjusting rates mid-way throughout the year in July 2022 starting with a 50-basis-point increase.

The efforts by central banks to bring inflation back to target has been an unprecedented challenge. And as can be seen, there has been a steep adjustment to rates in order to manage the economic impact of inflation globally.

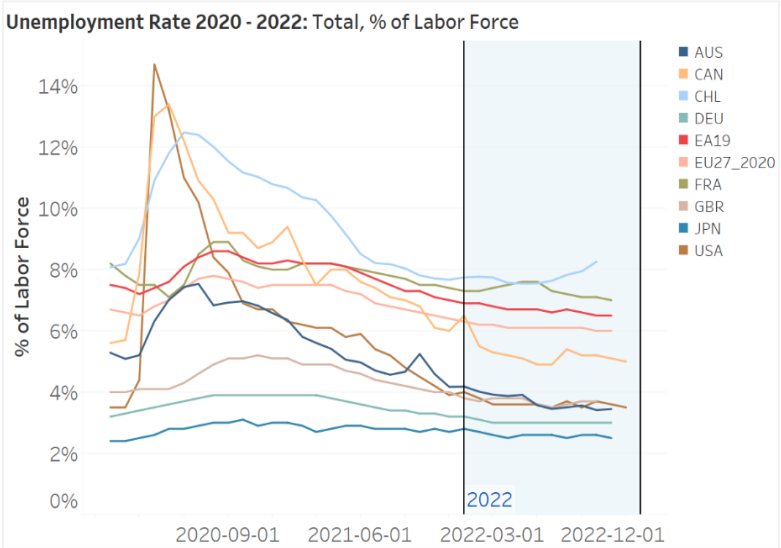
1.1.2 GROSS DOMESTIC PRODUCT ("GDP") AND UNEMPLOYMENT[3]

GDP[4]



The chart opposite (Real GDP Growth Forecast, Total, Annual Growth Rate, Quarter-over-Quarter ("QoQ") (%)) provides a view of how GDP changed from 2021 to 2022. For 2022 (chart on right-hand side), we observe a contraction across all major advanced economies. The USA contracted in the first half of 2022, before showing positive signs in Q3. The United Kingdom ("GBR" or "UK") saw a decline for each quarter since the start of 2022, ending at -0.81% in Q4. Amid the volatile conditions, the International Monetary Fund ("IMF"), World Economic Outlook Report for October 2022 indicates a slowdown in global growth is forecast, from 6.0% in 2021 to 3.2% in 2022 and subsequently, 2.7 percent in 2023.

UNEMPLOYMENT RATES



The chart opposite (Unemployment Rate 2020 – 2022: Total, % of Labor Force) indicates how the rates of unemployment have declined since the onset of the global pandemic in early 2020.

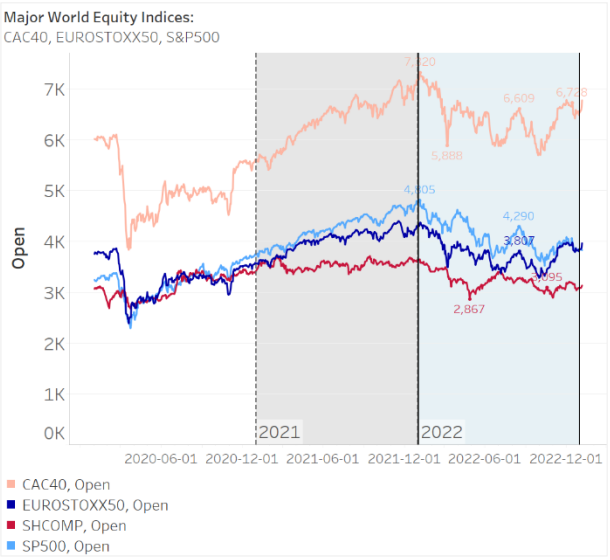
For 2022, unemployment rates generally remained relatively steady or in some cases with a shallow decline since the start of the year.

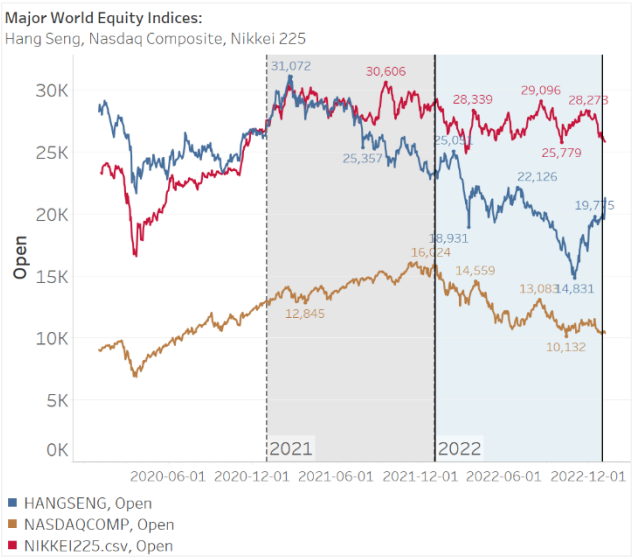
The European Union ("EU") countries (denoted by EU27_2020 in the chart) saw a decline in unemployment from 6.3% to 6.0% between the very start and end of 2022.

However, the challenges of taming inflation coupled with monetary policy have hindered investment and slowed productivity across the globe, which is likely to have a longer lasting effect on the unemployment rates.

[2] Bank for International Settlements: Central bank policy rates
[3] OECD (2023), Real GDP forecast (indicator). doi: 10.1787/1f84150b-en (Accessed on 24 January 2023), OECD (2023), Unemployment rate (indicator). doi: 10.1787/52570002-en (Accessed on 24 January 2023)
[4] World economic outlook (IMF), October 2022

EQUITY MARKETS[5]



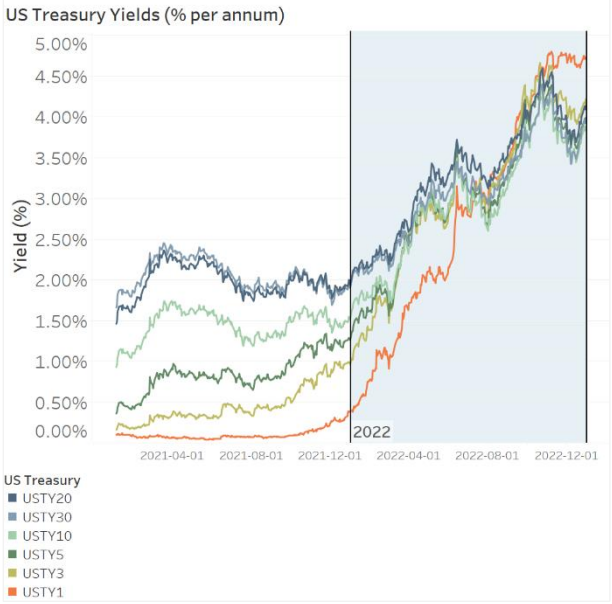


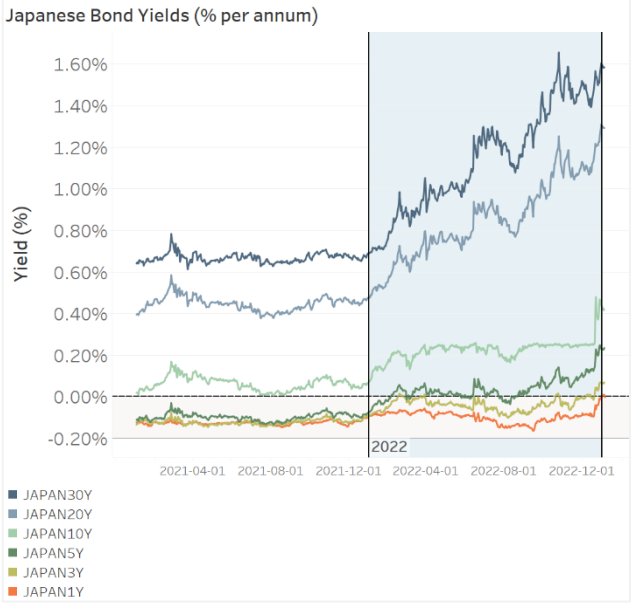
The charts above (Major World Equity Indices) provide an overview of selected indices between 2020 and 2022. Following the challenges of COVID-19 pandemic, there was a clear recovery taking place globally, with the equity markets slowly stabilising in 2021. Strong growth in 2021 for the S&P500, followed by the Eurostoxx50, Shanghai Composite ("SHCOMP") and CAC40 was a short-lived recovery as we witnessed the dramatic impact of the Russia-Ukraine war on the equity markets in the start of 2022. Across the Hang Seng, Nasdaq Composite, and Nikkei 225, the same story can be seen, however, the Hang Seng saw declines from mid-2021 which continued throughout 2022.

In the USA, equities fell in December 2022 on the backdrop of the Fed's statements that financial market conditions would remain restricted after interest rates increased again by a further 50 basis points. Across the EU, the equities market continued the negative decline in parallel with the ECB's stance of a 50-basis point increase. Emerging market economies also saw a decline in late 2022, however, performed better than those of their advanced economy counterparts. The Asia-Pacific Region ("APAC") equities remained relatively resilient despite market conditions. On the backdrop of the easing COVID-19 restrictions and further reopening, Chinese equity markets remained resilient. UK equities fell in 2022, especially in December. Market confidence remained low across the broad spectrum of equities as investors fought with increasing inflation, recessionary fears, and tighter financial conditions.

[5] Data provided by CCP12 Members

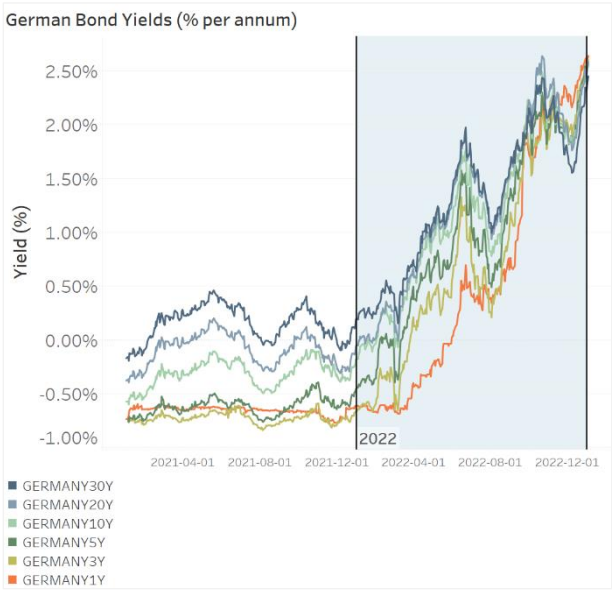
GOVERNMENT BONDS – US TREASURIES, JAPANESE BONDS[6]

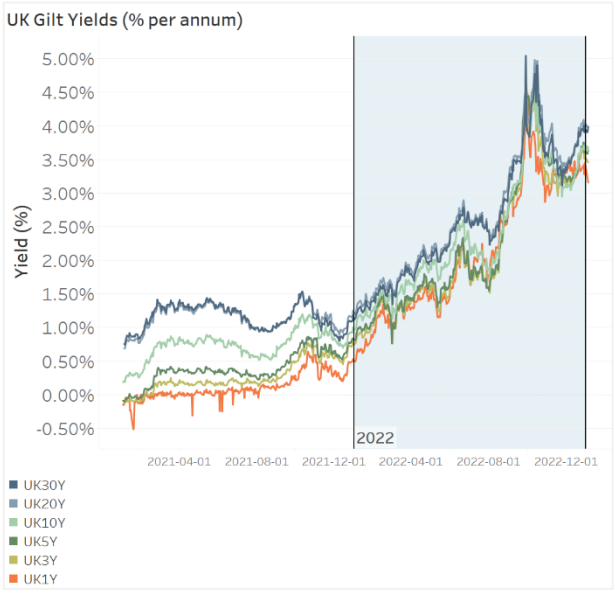




The charts above (US Treasury Yields, and Japanese Bond Yields (% per annum)) provide an overview of how bond yields faired from 2021 to 2022. 2022 marked a year where the bond markets saw unprecedented volatility amongst uncertainty about a looming recession, persistent inflation, and what these factors could mean for central bank policies and overall investor sentiment. Across the US Treasuries, we observed a rapid increase in the yields from the start of 2022 until their peak in October 2022, followed by a mild dip in November where they ended the year slightly lower than the peak (with the exception of USTY1 Treasuries which remained at a very high level till the end of 2022). Across the Japanese bond market, we observe a similar pattern, although the shorter dated bonds (1Y – 10Y) saw less of a pronounced increase in yield. However, that being said, the Japanese 3Y and 5Y bonds reached positive yield territory for the first time in the last 5 years.

GOVERNMENT BONDS – GERMAN BONDS, UK GILTS



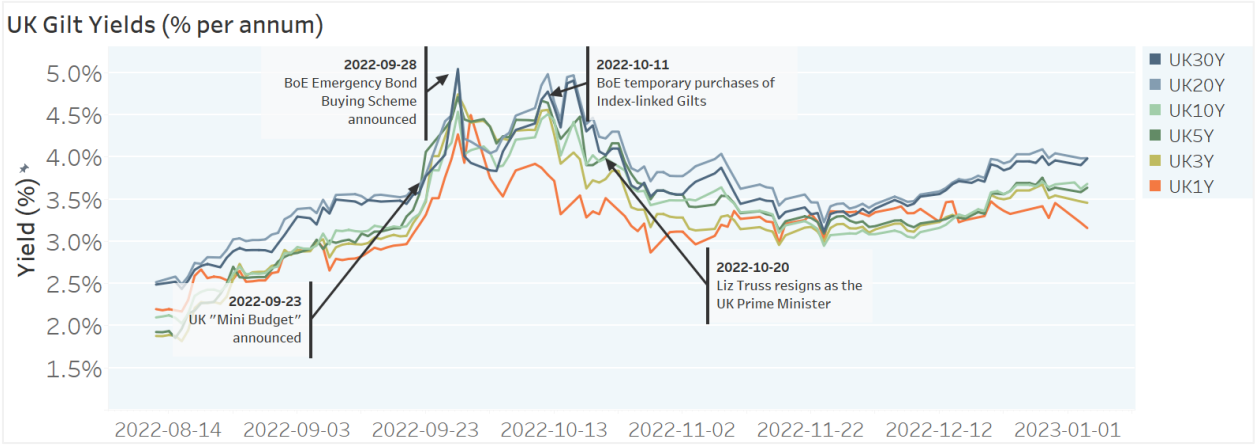


The charts above (German Bonds (Left Hand Side, "LHS") and UK Gilt Yields (Right Hand Side, "RHS") (% per annum)) indicate the shift in market expectations within the bond market given the changing monetary outlook for 2022. With unexpected central bank policy rate increases across all major advanced economies ("AEs") *(as explored within the interest rate section on page 13)*, the effect on the government bond markets was evidently pronounced. As we observe for the German Bonds above (LHS), we see that the longer dated bonds saw a more aggressive increase compared to the 1Y German Bond in the first months of 2022. German Bonds saw an increase until 22 June 2022, when the rates inverted on a downward trajectory until 2 August 2022.

For UK Gilts, a similar story can be observed, however, the change in the yield was much more dramatic where bonds started the year just under 1.0% for the 10Y Gilt, but then reached a high of 4.54% on 28 September 2022. As we will explore on the subsequent page, the unprecedented UK Gilt market volatility was exacerbated by UK government stimulus coupled with pension fund sector sales of long-dated bonds sending the Gilt market into a dire meltdown.

[6] Data provided by respective authorities, debt market agencies, CCP12 Members

GOVERNMENT BONDS - UK GILT MARKET AND PENSION FUND TURBULENCE[7,8]

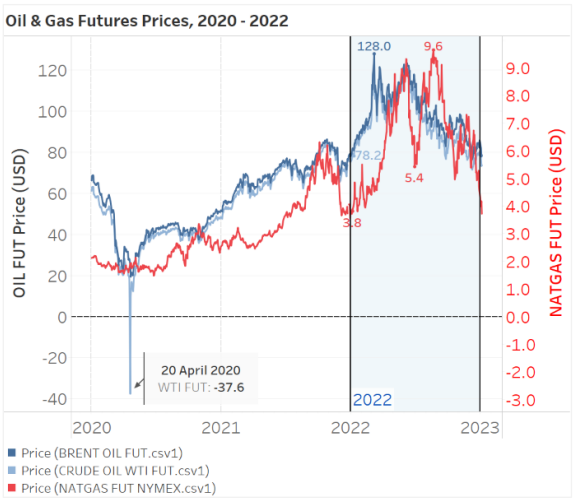


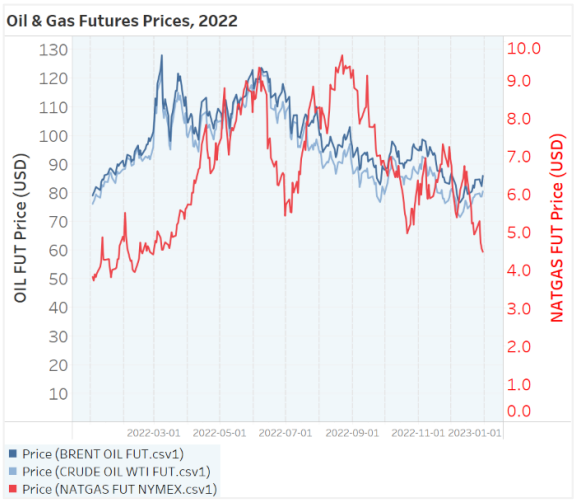
Within the UK Gilt and currency market, volatility was widespread, caused by both the fiscal and monetary policy stimulus. This was a liquidity-induced market issue which caused significant market stress. In August 2022, the BoE delivered its 50bps increase, which was much lower than the market expected at the time, from 1.25% to 1.75%.

Inflation was at its highest point within July and August 2022 between 8.60 and 8.80%. In terms of the fiscal landscape, the new government led by former Prime Minister Liz Truss took to office which led to the announcement of new economic package capping energy prices and providing a short-term subsidy to tackle the growing energy crisis, alongside "the mini-budget" from the Chancellor. Investor sentiment crumbled as the scale of the planned borrowing and energy subsidy caused a significant market panic, coupled at a time with a high interest rate environment.

The British pound plummeted against the US dollar reaching the lowest point since 1985. In the midst of the UK Gilt stress, the BoE stepped in between 28 September – 14 October 2022 in an emergency bond buying scheme, of long dated Gilts, in order to stabilize the disordered market. The fiscal turmoil led by former Prime Minister Liz Truss has since been reversed by her successor, Rishi Sunak.

COMMODITIES – OIL & GAS[9]





The charts above (Oil and Gas Futures Prices for 2020 – 2022 and 2022 alone) provide an overview of the oil and gas futures prices over recent years. Since 2020 until the end of 2022, we can observe a continued upwards trend of both Oil Futures and Natural Gas Futures prices. 2022 was another year met by various volatile events, primarily due to geopolitical events set out in early 2022.

Within the oil markets, from February to September 2022 (chart RHS), Brent crude oil fell almost 6%. However, due to global currency depreciations - in light of the strong United States Dollar ("USD") - close to 60% of the oil-importing emerging market and developing economies experienced an increase in their domestic currency oil prices as a result. The sharp decline in oil since July 2022 was further due to concerns over a global recession in 2023 and the tightening of financial conditions. The oil markets overall have seen a complete shift since early 2020 during the height of the COVID-19 pandemic.

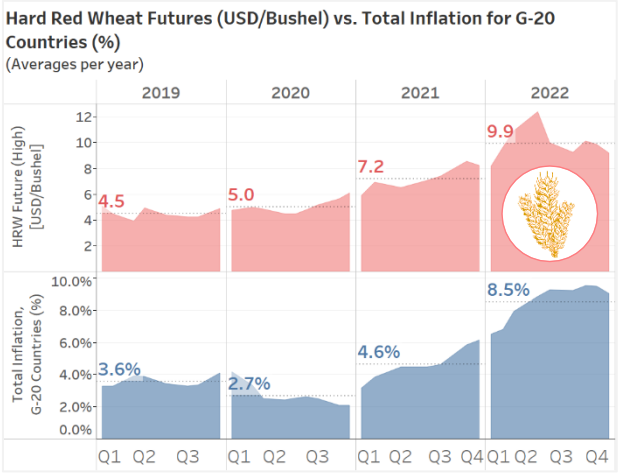
In October 2022, the Organization of the Petroleum Exporting Countries ("OPEC") members announced the reduction in their production target by 2 million barrels per day ("mb/d"), however, prices were still volatile. For natural gas prices, these reached all-time highs in August 2022 across Europe due to very prominent actions by countries to rebuild their inventories whilst reducing their reliance on Russian gas. Prices have since dropped as inventories reached their target levels and the demand has declined. Following the energy market volatilities, EU regulators established a market correction mechanism, which entered into force on 1 February 2023.

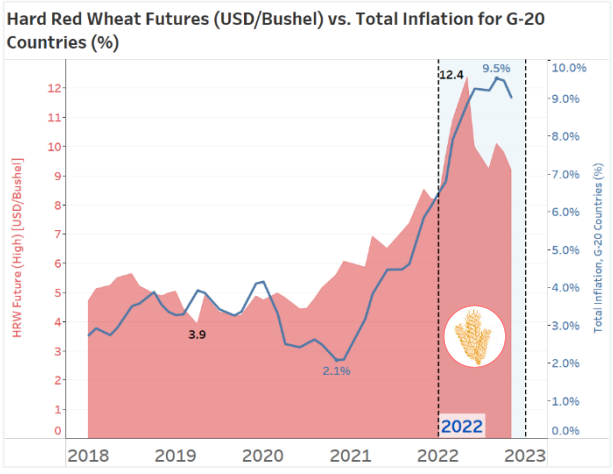
[7] BoE MPC Bank Rate Increased to 1.75% - August 2022

[8] Dutch Pension Funds Sell Record Amount in Assets, Dutch Central Bank Urges Pension Funds to Guard Against UK-Style Crisis

[9] Commodity Markets Outlook, World Bank, October 2022

COMMODITIES – HARD RED WHEAT FUTURES VS. OECD INFLATION STATISTICS[10]

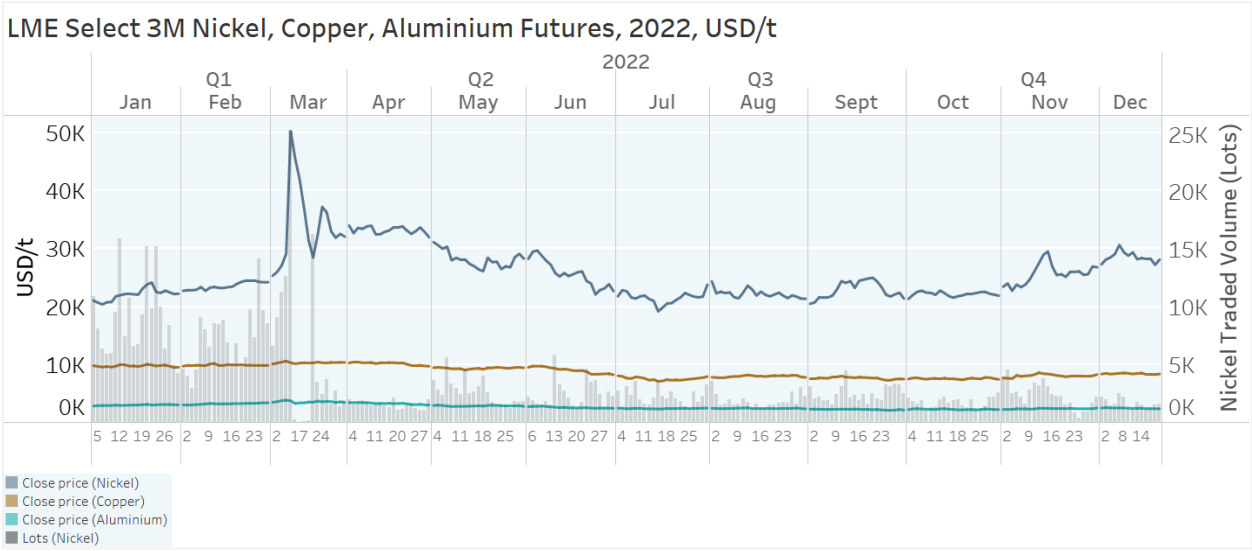




The charts above (Hard Red Wheat Futures USD/Bushel vs. Total Inflation for G-20 Countries (%)) provides an indication of how the price of wheat futures has increased since 2019. For 2019, the average price per bushel of wheat was USD 4.5 and by 2022, this more than doubled to almost USD 10.0 per bushel. The price of wheat increased considerably during Q1 and Q2 of 2022 during the height of the Russia-Ukraine war, which severely disrupted Ukrainian wheat exports, causing a global wheat stock shortfall for 2022 that was coupled with other fundamentals which also included poor Argentinian soil conditions for wheat harvests. The report of the US Foreign Agricultural Services (United States Department of Agriculture ("USDA")) of July 2022 stated that the global estimated wheats stock was at 267.5m tonnes, approximately 4.5% lower than the 280m tonnes ending stock in the year of 2021/2022.

Inflation as shown by both charts for the G-20 countries has also been rising since the onset of the COVID-19 pandemic. Inflation was around 3.6% on average for 2019, 2.7% for 2020, 4.6% for 2021, and a remarkable 8.5% for 2022.

COMMODITIES – NICKEL MARKET[11]



The chart above (LME Select 3M Nickel, Copper, Aluminium Futures, USD/t) provides an overview of the three contracts in addition to the Nickel trading volume. In early 2022 the prices in Nickel began to rise due to the rapidly changing geopolitical events which were unfolding in relation to Russian sanctions and the impact this would have on nickel producers and low nickel warehouse stocks. Nickel, being a key component in battery manufacture is an increasingly important commodity amongst the development of electric vehicle production and likely to see further increases.

Following the Russian invasion of Ukraine on 24 February, the market volatility was exacerbated and subsequently lead to the increased pressure on nickel manufacturing bases in Russia. Large short positions, including two significant concentrated OTC exposures, were built up prior to the March 2022 price increases. Investor outlook in the short and medium term was subdued and participants exposed to short positions came under increasing pressure, leading to a short squeeze. On 7 March 2022, nickel reached a close of USD 48k/t, compared to the previous day of USD 30k/t. Close to USD 16bn of margin calls were met by LME Clear members between 4 – 8 March and by 8 March, there was approximately USD 6bn of total OTC margin outstanding to LME Clear members by the CM clients themselves. Shortly after the nickel incident, LME introduced a daily price limit of 15% for nickel (and all other physically delivered metals) and introduced a new OTC position reporting regime (LME will implement further changes to strengthen and enhance its markets as announced in March 2023: Link).

Within the Oliver Wyman Independent Nickel Market Review, LME Group management stated: *"when risks around specific large positions were evaluated, the presence of a large on exchange component created an impression that it constituted the entirety of that beneficial owner's position when in fact there was a larger position held OTC."* CCP12 has long advocated that the data and information relating to non-centrally cleared markets be enhanced as it is necessary that the future policy work regarding transparency be focussed on the non-centrally cleared markets. A Market Participant Public Quantitative Disclosures ("MPPQD"), was proposed by CCP12 which would complement regulatory statistics (e.g., BIS statistics) and those available from CCPs (e.g., CCP PQDs).

[10] CME, KC HRW WHEAT FUTURES; OECD G-20, Inflation Statistics; USDA Report "War in Ukraine threatens to unleash "unprecedented wave" of global hunger and destitution, warns UN Chief"
[11] Oliver Wyman – Independent Nickel Market Review, Data provided by LME

CRYPTOCURRENCY [12, 13, 14, 15, 16, 17]

Crypto Winter – Weathering the Storm

The chart above provides an overview of how the selected cryptos faired throughout 2022. Global economies succumbed to market-wide stresses due to geopolitical events during the first half of 2022, and this also affected the crypto market sentiment as investor confidence fell across all asset classes. 2022 was an eventful year with several market events, sophisticated and unsophisticated cyber-attacks, bankruptcies, enforcement, and job-cuts which have continued well into 2023. The crypto ecosystem overall was overwhelmed with a variety of these aforementioned events, thereby adding to the impact of global economic volatility. Amongst one of the largest events was Terraform Labs (2018) which used blockchain technology that aimed to create a decentralized finance network. The blockchain used "TerraUSD" and its sister token, "Luna", to create a stablecoin system. However, in May 2022, the value of Luna collapsed from above USD 120 a coin to essentially zero, causing over USD 400 billion in losses for the overall cryptocurrency markets as a whole. The second major collapse in the crypto space was FTX's bankruptcy. In early November 2022, following a CoinDesk report highlighting leverage and solvency concerns involving FTX-affiliated trading firm Alameda Research, the collapse of this organisation ensued which impacted the overall crypto markets and added to the fall of the overall crypto market's capitalisation of all crypto assets combined to below USD 1 trillion valuation. Unable to find support via a bailout, on November 11, 2022, FTX's CEO Sam Bankman-Fried stepped down and the company filed for bankruptcy. Authorities arrested Bankman-Fried on 12 December 2022, for multiple fraud charges. Bankman-Fried was indicted by the U.S. District Court on eight criminal charges which included wire fraud, money laundering, and securities fraud.

With respect to BTC and ETH (top chart), it is clear that although in 2021 we saw both cryptos reach their all-time highs, 2022 marked a different story with these two cryptos falling to levels similar to that of the end of 2020. Although both BTC and ETH rallied in the first quarter of 2022, and reaching their highs in the early second quarter, this was short-lived, as both cryptos dropped against the USD to around USD16-17k and USD1.2k for BTC and ETH, respectively.

Central Bank Digital Currency ("CBDC")

Since the advent of digital assets, the idea of a CBDC has been viewed by some as having the potential to revolutionise payments and payment flows, however, there have been a variety of views. Seen as perhaps a way to enhance efficiency in the financial markets, market stakeholders have had mixed views over the years which included the challenges to financial stability, cyber security, and protection of privacy. While CBDC may seem similar to a crypto asset, it is fundamentally a digital copy of a country's fiat currency.

In 2022, during the Beijing Winter Olympic Games participants and media personnel made digital payments via mobile apps, payment cards, or wristbands with China's digital Yuan. China has long been at the forefront of the digital payments' ecosystem and thus, is home to the most advanced CBDC which has been developed so far. The G7 have taken a cautionary approach with CBDCs' market potential, particularly in the case of publicly used "retail" CBDCs. In October 2021, the G7 published a set of Public Policy Principles for Retail CBDCs alongside a G7 Finance Ministers and Central Bank Governors' Statement on CBDCs and digital payments. A 2021 BIS survey found that 86% of Central Banks were actively researching the potential for CBDCs, 60% were experimenting with the technology, and 14% were deploying pilot projects.

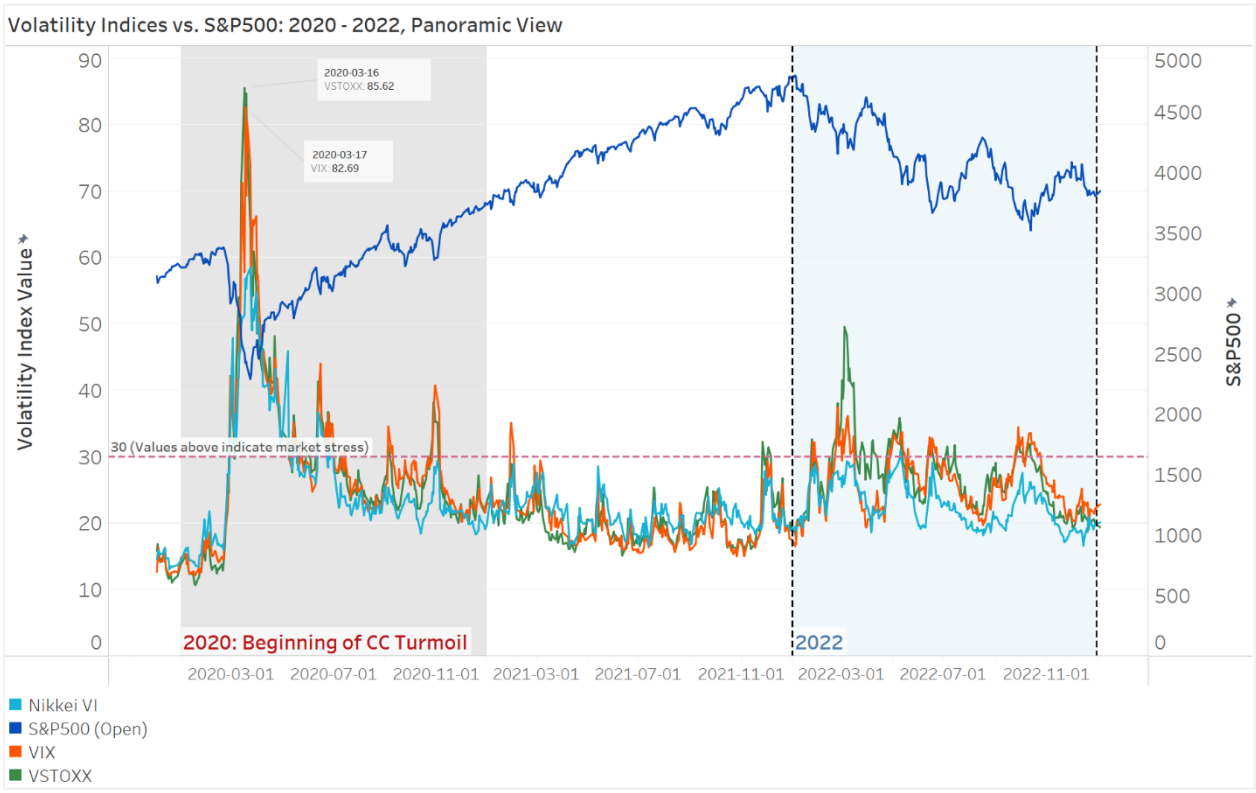
Crypto Policy Landscape

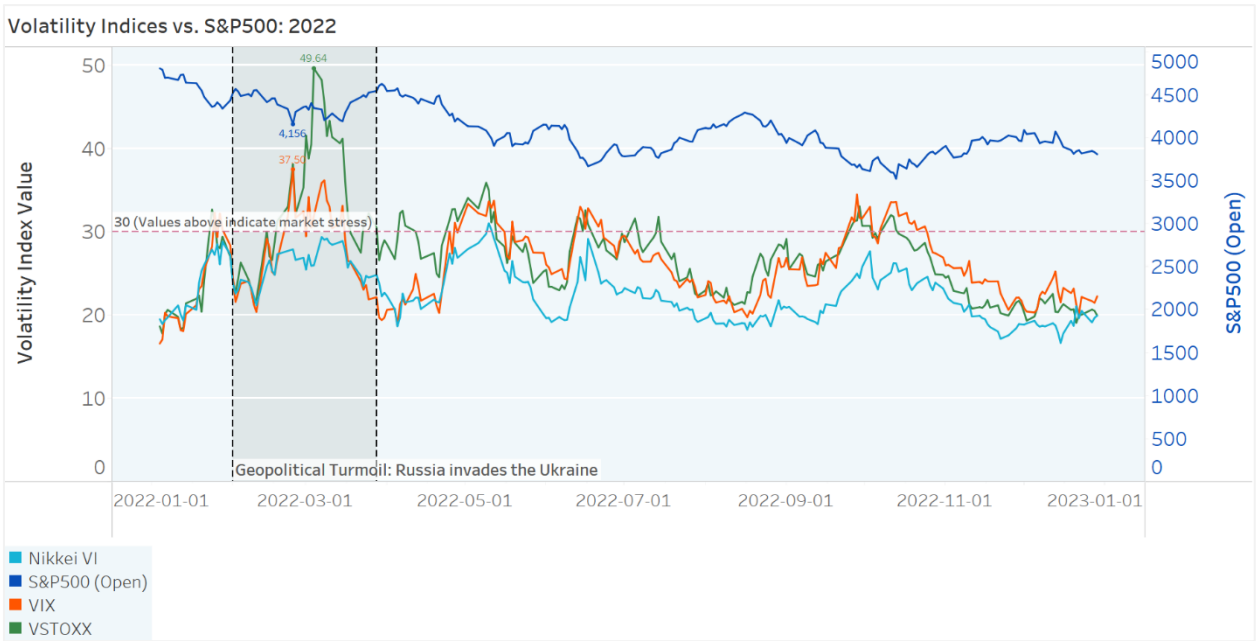
In a paper by the Financial Stability Board ("FSB") from February 2022 titled "Assessment of Risks to Financial Stability from Crypto-assets", the FSB raised potential risks concerning the international and diverse nature of the crypto markets. The paper examined the vulnerabilities across unbacked crypto-assets, stablecoins, Decentralised Finance ("DeFi") and Crypto-asset trading platforms. The FSB mentioned in the paper *"Efforts to enhance monitoring and to minimise regulatory arbitrage through further cooperation and information sharing are needed to keep pace with crypto-asset developments."*

[12] Cointelegraph: Rewind 2022: A crypto roundup of the year and stepping into 2023, Data from www.investing.com
[13] FCA: Research Note, Crypto Asset Consumer Research 2021
[14] ESMA: Keeping on Track in an Evolving Digital World
[15] FSB: Assessment of Risks to Financial Stability from Crypto-assets
[16] BIS Innovation Hub work on central bank digital currency (CBDC)
[17] G7 Public Policy Principles for Retail Central Bank Digital Currencies

1.1.4 GLOBAL VOLATILITY INDICES

NIKKEI VOLATILITY INDEX ("VI"), VIX AND VSTOXX [18]





The chart above (Volatility Indices vs. S&P500, 2020 – 2022 and 2022 alone) provides an overview of how the volatility indices (Nikkei VI, VIX, and VSTOXX) changed both in the last 2 years and for 2022.

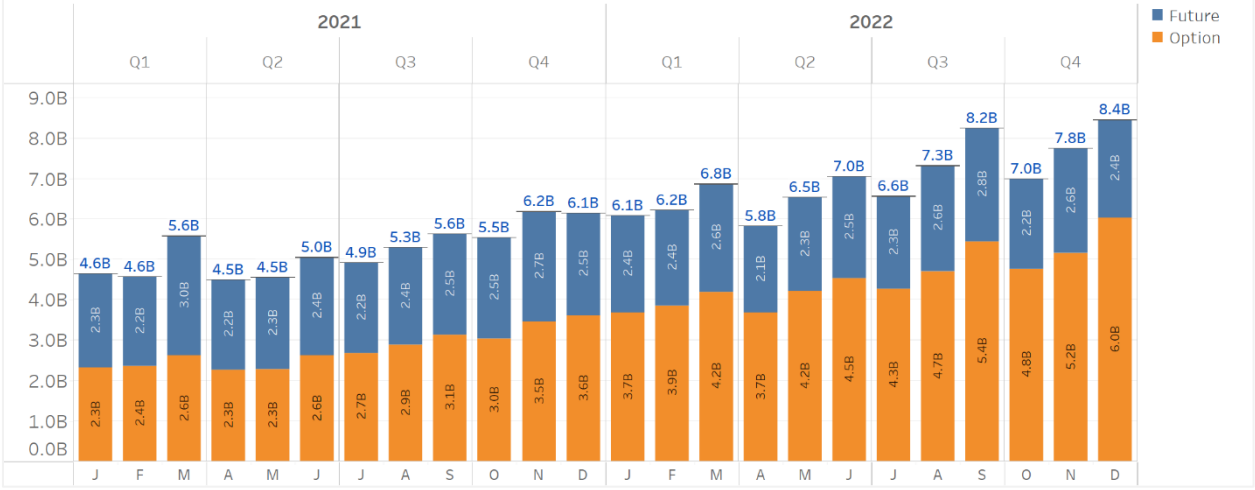
From what seemed a slow but steady economic recovery in 2021 was an inverted year for the equity markets seeing their second worst year on record. The 2022 equity markets were volatile and unforgiving, driven by the Russia-Ukraine war, high inflationary environment, the heightened interest rates and not to mention the slow economic growth globally. The S&P 500 saw a continued downward trend from 4,788 on 5 January 2022 to 3,805 on 29 December 2022. In addition, the volatility indices showed significant stresses in the equity markets on multiple occasions as can be seen in the chart on the RHS. At the height of the geopolitical events in February and March 2022, the VIX increased from 16.57 to 37.50 on 24 February, Nikkei VI increased from 19.40 to 29.37 on 7 March, and the VSTOXX increased from 18.64 to 49.64 on 4 March. Overall, the VIX and VSTOXX breached the 30 mark on four occasions within 2022.

[18] Data Sources: Nikkei VI, VIX, VSTOXX

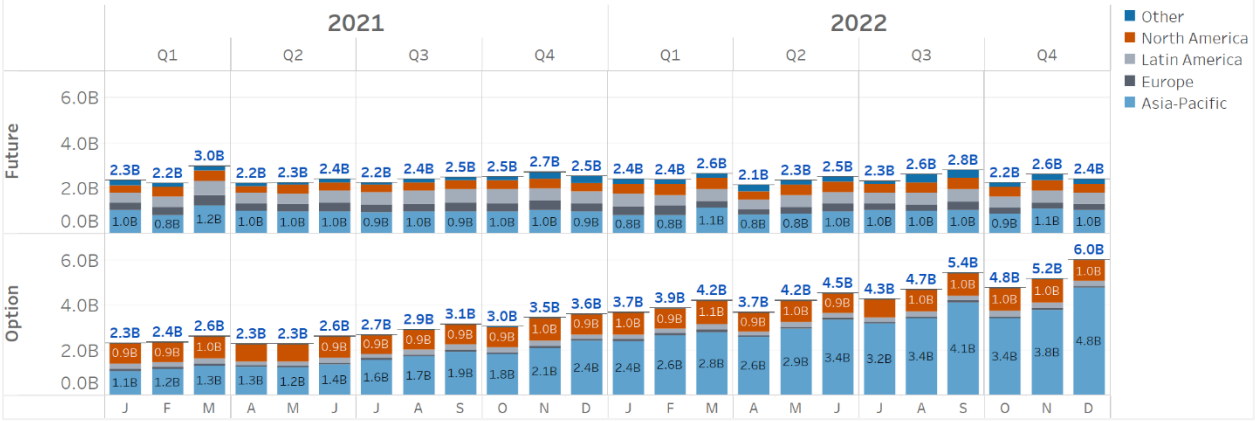
1.1.5 EXCHANGE TRADED DERIVATIVES ("ETD") MARKET

ETD FUTURES & OPTIONS | VOLUMES AND OPEN INTEREST ("OI") [19]

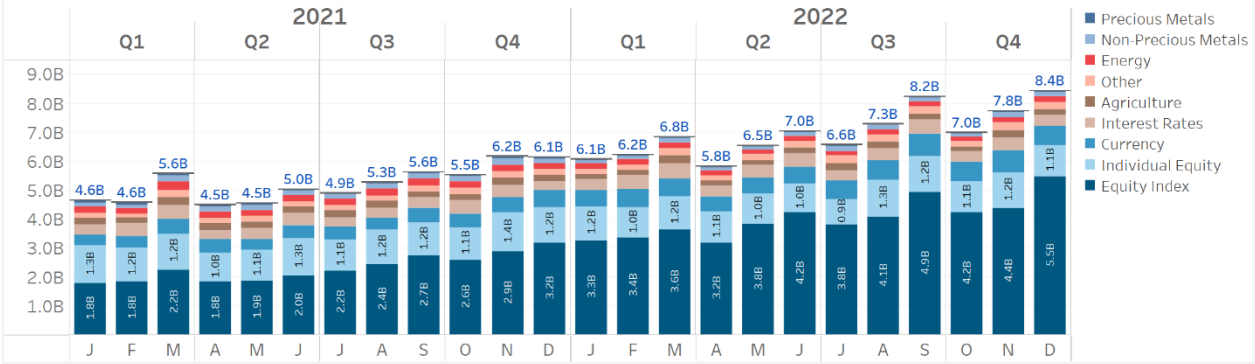
ETD Chart A: Volume | Futures & Options



ETD Chart B: Volume | Futures & Options | Regional Split



ETD Chart C: Volume | Futures & Options | Volume by Instrument



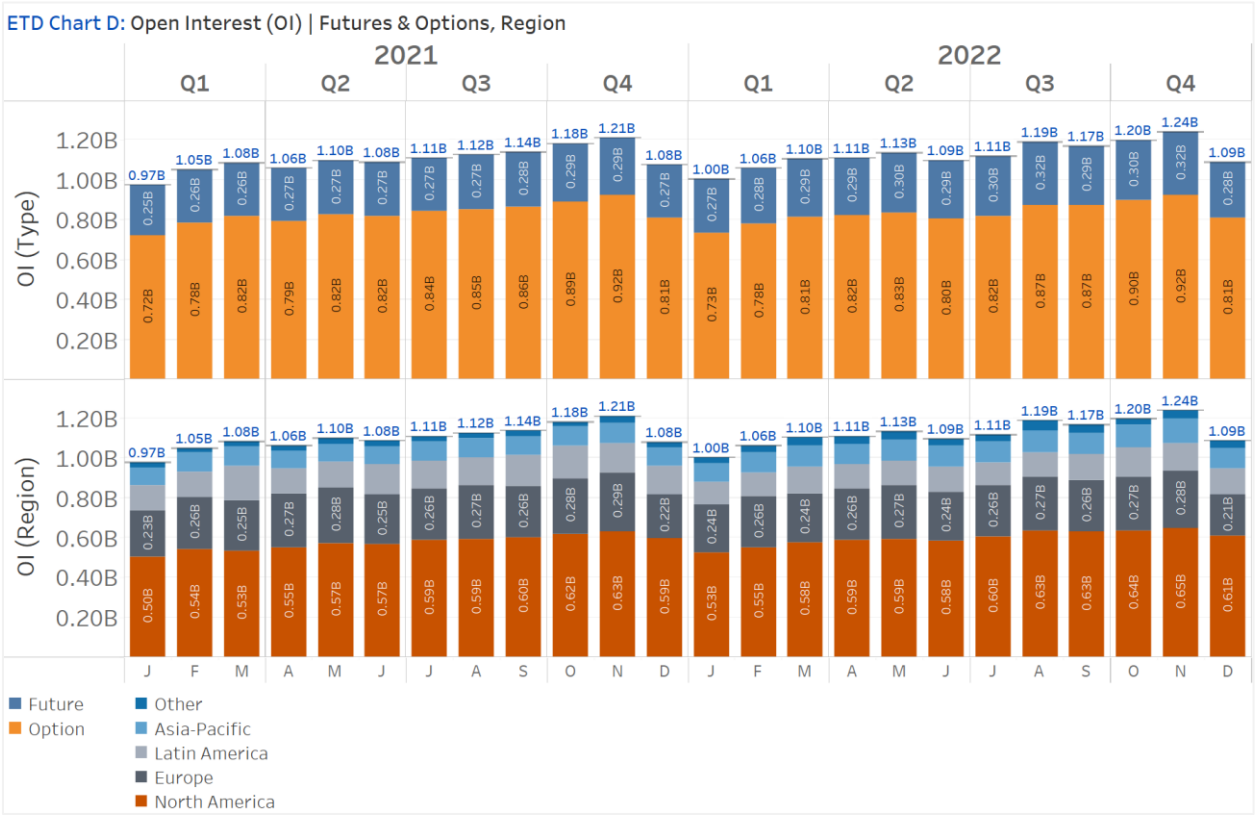
The charts above (ETD Chart A, B, and C) provide an overview of how volumes across futures and options contracts evolved over the last two years for 2021 and 2022. In terms of overall volumes, these increased consecutively for each quarter in 2022 with a 7.3%, 1.3% 13.9%, and 4.9% increase each quarter from Q1 – Q4 respectively. The largest increase was observed in Q3, and the year ended with volumes at 23.2 billion in Q4 and 83.8 billion for the entire year of 2022. Volumes increased 34.0% overall year-to-date. As can be seen from Chart A above, the primary increases were driven by increases in options volume to which we observe a change from 3.7 billion contracts in January 2022 to 6.0 billion contracts at December-end 2022, representing a 62% increase.

ETD Chart B provides the regional breakdown of futures and options volumes. As can be seen, there has been an increase in options volume since the start of the period in review. While futures volumes remained between 7.0 billion and 7.7 billion for 2022, options volumes increased from 11.7 billion to 15.9 billion, primarily due to the Asia-Pacific region.

ETD Chart C indicates the split between instruments. Equity volumes (Equity Index and Individual Equity) in 2022 increased 48.0% since 2021, followed by currencies with a 38.5% increase since 2021.

[19] Futures Industry Association ("FIA"), Exchange Traded Derivatives Tracker and CCP12 Member's data

ETD Chart D: Open Interest (OI) | Futures & Options, Region



The chart above (ETD Chart D) provides an overview of ETD volumes vs. OI from 2021 – 2022. As can be seen, for 2022, options volumes and OI increased steadily throughout the year.

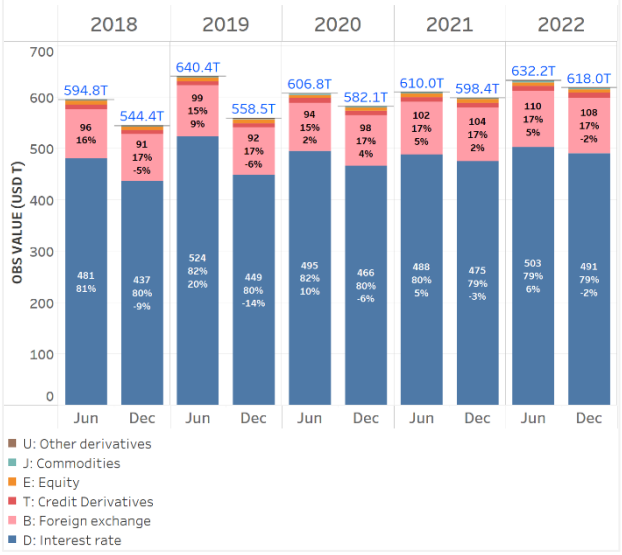
Options OI (ETD Chart D, top) was 0.73 billion in January, compared to 0.27 billion for futures. Options saw a steady increase in OI until November 2022, where it saw a shift from 0.92 billion to 0.81 billion. Futures on the other hand remained consistent month-on-month starting at 0.27 billion in January, reaching 0.32 billion in November, and then falling to 0.28 billion by December.

In terms of the regional split for OI (ETD Chart D, bottom), we observe that for 2022 the predominant driver of OI sat within North America where OI was 0.53 billion for January and then reaching 0.65 billion in November and 0.61 billion in December. OI, as expected in relation to the volume charts above, was the largest for Equity, followed by Interest Rate contracts.

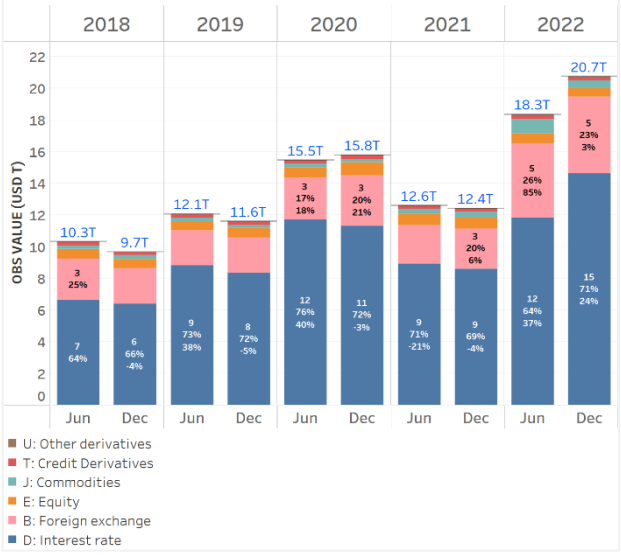
1.1.6 GLOBAL OVER-THE-COUNTER ("OTC") DERIVATIVES MARKET

Notional Amounts Outstanding & Gross Market Values ("GMV") [20]

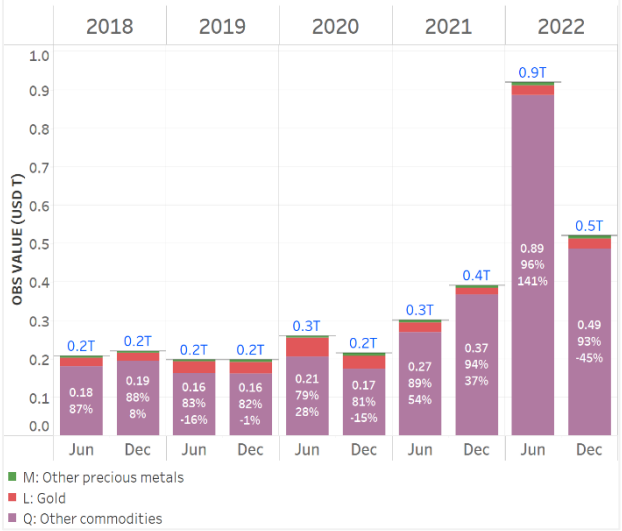
Global OTC Chart A: Notional Amounts Outstanding, (USD T)



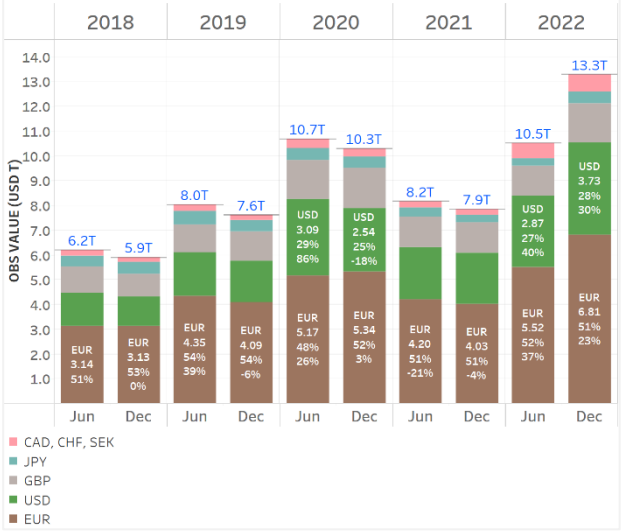
Global OTC Chart B: Gross Market Values (GMV) Outstanding, (USD T)



Global OTC Chart C: GMV Outstanding, Commodities (USD T)



Global OTC Chart D: GMV, Outstanding IRD (USD T)



The charts above provide an overview of the Bank for International Settlements ("BIS") OTC data as of December-end 2022. The BIS OTC derivatives statistics allow market participants to analyse the outstanding positions of approximately 70 major derivatives dealers, across 12 countries at two intervals throughout each year in June-end and December-end.

The OTC derivatives markets saw significant changes in 2022 given the unprecedented policy changes throughout the year which yielded high interest rates hikes, amidst a high inflation environment globally. As we can see in Chart A above, the notional value of outstanding OTC derivatives rose to USD 632.2 trillion at June-end 2022, up from USD 598.4 trillion from the end of 2021. This remained heightened in the latter half of 2022 where levels reached USD 618 trillion at December-end.

The GMV of outstanding OTC derivatives, summing positive and negative values, increased in the first half of 2022, to USD 18.3 trillion, a 47% increase from 2021 December-end figures. This increase was driven by interest rate contracts as shown from Chart B above, accounting for USD 12 trillion (64%) of the overall amount for that part of the year. It is important to also note that the value of commodity derivatives also surged, given the rising food and energy prices. The GMV further increased by 13% in the second half of 2022 to reach USD 20.7 trillion at year-end.

Charts C and D provide an overview of the GMV for commodities and selected interest rate derivative currencies. As shown from Chart C, the surge in the GMV for commodities was rather pronounced, given the geopolitical events in early 2022, coupled with the food and energy crisis. Chart D shows us that for the second half of 2022, as market rates increased above the rates prevailing at the start of interest rate derivatives ("IRD") contracts, their respective GMV increased. EUR-denominated IRDs increased by 37% in the first half of 2022, followed by 23% in the second half. USD-denominated IRDs increased by 40% and 30% in the first and second halves of 2022, respectively. GBP-denominated IRDs decreased by -1% and increased by 29% in the first and second halves of 2022, respectively.

[20] BIS OTC Derivatives Statistics

Gross Market Values ("GMV") and Gross Credit Exposure ("GCE")

Global OTC: Gross Market Values (GMV) and Gross Credit Exposure (GCE), (USD T)

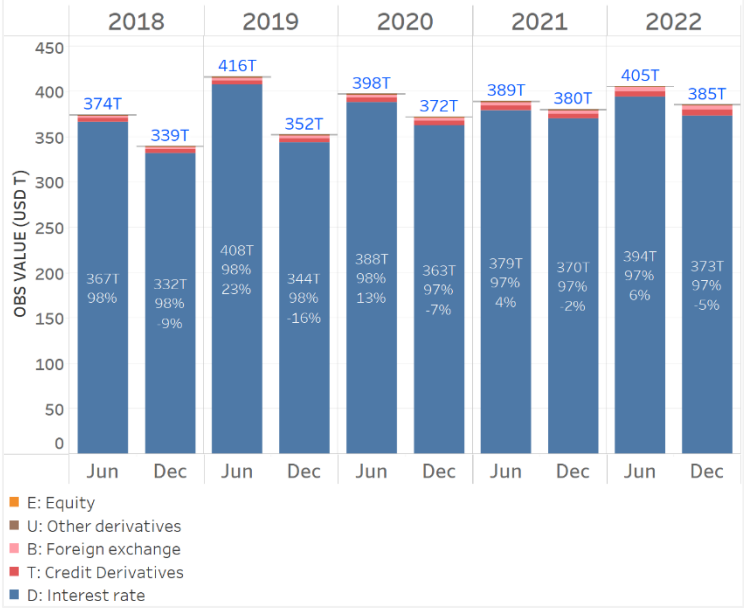
The chart opposite provides an overview of the global OTC derivatives GMV vs. GCE. As described by the BIS, the GCE is equal to the *GMV minus amounts netted with the same counterparty across all risk categories under legally enforceable bilateral netting agreements. GCE provides a measure of exposure to counterparty credit risk (before collateral).*

As shown, while the GMV increased considerably throughout 2022, so did that of the GCE. The GCE saw an increase from USD 2.5 trillion at the end of 2021, to USD 3.3 trillion by the first half of 2022. This was one of the largest rises in GCE (+30.1%) seen since the COVID-19 pandemic in 2020 (+35.7%).

Following this, the GCE then reached USD 3.7 trillion in the second half of 2022, accounting for a +11.4% increase from the first half.

Growth of Central Clearing – Notional Amounts Outstanding by Risk Category and Counterparty

Growth of Central Clearing: CCP Notional Amounts Outstanding, by Risk Category



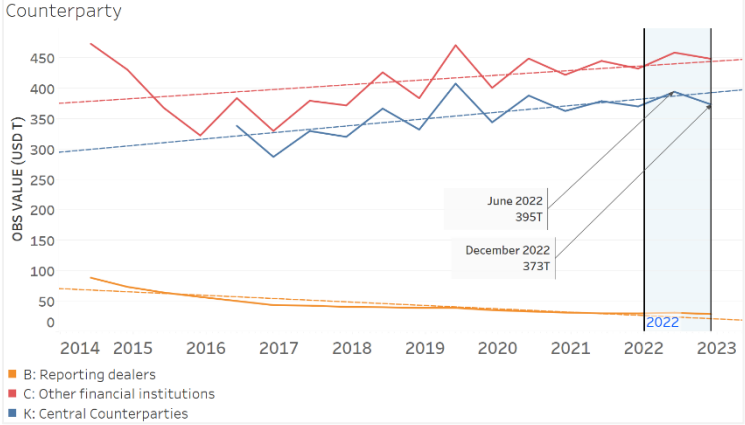
The chart opposite *(Growth of Central Clearing: CCP Notional Amounts Outstanding, by Risk Category)* provides an indication of how the different risk categories for OTC contracts have changed over time since 2018.

The first half of 2022 saw one of the highest levels reached by the cleared ecosystem to USD 405 trillion outstanding notional. This was the highest amount seen since the first half of 2019.

IRD increased +6%, followed by credit derivatives (+2%), foreign exchange ("FX") (+1%), other derivatives (-5%) and equity (-22%).

The second half of 2022 saw a slight dip to USD 385 trillion outstanding notional, primarily due to IRD decreasing by -5% as shown from the chart.

Growth of Central Clearing: IRD - CCP Notional Amounts Outstanding, by Counterparty



The chart opposite *(Growth of Central Clearing: IRD - CCP Notional Amounts Outstanding, by Counterparty)* indicates the overall growth of central clearing based on IRD.

As shown, OTC IRD have been on the rise since 2016, reaching USD 395 trillion and USD 373 trillion in notional amounts outstanding for June-end 2022 and December-end 2022, respectively.

1.1.7 MARGIN FOR UNCLEARED DERIVATIVES[21, 22, 23, 24]

Under the uncleared margin rules ("UMR") (please see UMR Overview box below), market participants are required to exchange initial margin ("IM") and VM with their counterparties to cover potential losses in case of default. These are generally financial institutions such as banks, hedge funds, broker-dealers, pension funds, and other market participants that engage in uncleared derivatives transactions. IM refers to the collateral posted at the initiation of a transaction to protect against the potential future exposure of the derivatives positions, while VM represents the collateral exchanged on a regular basis to account for changes in the value of the derivatives positions over the duration of the contract.

The application of the UMR varies depending on the jurisdiction and the entities involved. The scope may also extend to certain non-financial entities if their derivatives activities exceed specified thresholds set by regulators. These UMR regulations are important for several reasons.

Firstly, they aim to reduce counterparty credit risk by ensuring that appropriate collateral is exchanged between parties to cover potential losses. This mitigates the risk of a defaulting counterparty and helps support global financial stability.

Secondly, the UMR promotes transparency and risk management practices in the OTC derivatives market. By requiring the exchange of margin for uncleared transactions, market participants have an incentive to better assess and manage the risks associated with their uncleared derivatives positions. This enhances the overall risk management framework and reduces the likelihood of financial shocks. When comparing the BIS OTC data (previous pages) to the uncleared margin data from the International Swaps and Derivatives Association ("ISDA") Margin Survey year-end 2022, we can obtain a rough picture of the uncleared market in terms of volumes of contracts and margin posted/collected, respectively.

UMR Overview

The UMR are regulatory requirements that govern the exchange of IM and VM for OTC derivatives transactions that are not cleared through a CCP. Following the aftermath of the Global Financial Crisis ("GFC") of 2008, the G20 nations worked together to form a new financial regulatory reform agenda to cover the OTC derivatives markets and their respective market participants. One of the key recommendations was to implement additional margin requirements for non-centrally cleared derivatives – known as the UMR – with the aim to reduce systemic risk and promote central clearing. The UMR for derivatives originate from a global policy framework and schedule established by the Basel Committee on Banking Supervision ("BCBS") and the International Organization of Securities Commissions ("IOSCO").

The IM and VM requirements for phase-one entities took effect on 1 September 2016 in the US, Canada, and Japan, and on 4 February 2017 in the EU. VM requirements for all covered entities became effective on 1 March 2017. Phase-two entities were captured by the IM rules on 1 September 2017. Phase-three, four and five firms implemented the IM requirements on 1 September 2018, 2019, and 2021, respectively. The final implementation of these requirements came into force for phase-six entities on 1 September 2022.

UMR Phase-in Timetable:

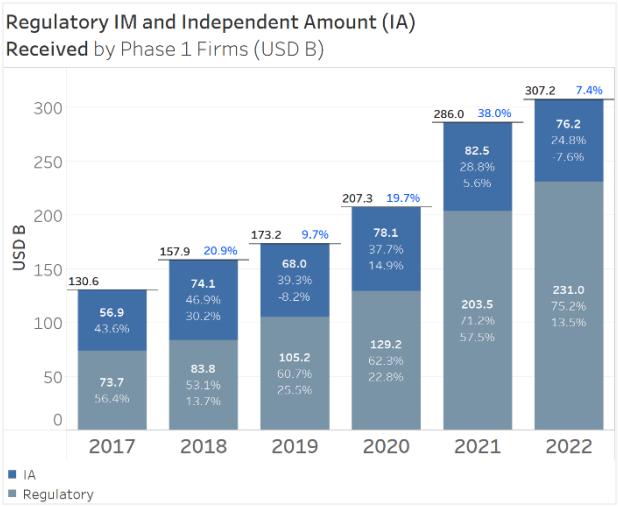
Date of phase-in	Category
4 February 2017	IM and VM. Entities with group notional amount above EUR 3 trillion (entities with the largest portfolios on a group basis)
1 March 2017	VM. All other entities (in scope)
September 2017	Entities with group notional amount above EUR 2.25 trillion
September 2018	Entities with group notional amount above EUR 1.5 trillion
September 2019	Entities with group notional amount above EUR 0.75 trillion
September 2021	Entities with group notional amount above EUR 50 billion
September 2022	Entities with group notional amount above EUR 8 billion

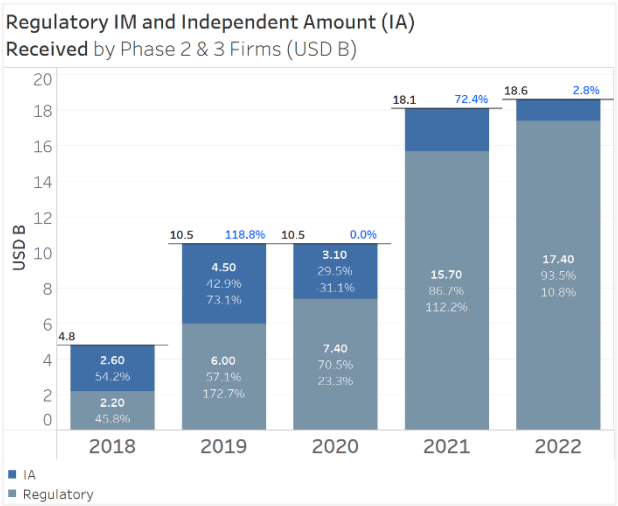
[21] BIS margin requirements for non-centrally cleared derivatives (December 2019)
[22] FCA - Margin Requirements for Uncleared Derivatives
[23] Eurex - UMR
[24] ISDA Margin Survey year-end 2022

The table above (UMR Phase-in Timetable) provides an overview of the UMR phase-in dates since 2017 for both IM and VM requirements across the different entities captured by the rules.
The ISDA Margin Survey found that the 20 phase-one firms collected USD 302.7 billion of IM for their non-cleared derivatives transactions at year-end 2022, an increase of 7.4%. USD 231 billion of the IM collected by phase-one firms was required under global margin regulations, represented by an increase of 13.5% from the previous year. USD 76.2 billion of IM collected by phase-one firms was representative of the Independent Amount ("IA") from counterparties for transactions not currently in scope of the non-cleared margin rules and/or transactions not covered by the margin rules, including legacy transactions.

With regard to VM collected by phase-one firms in 2022 for non-cleared derivatives, this increased by 5.0% to USD 983.7 billion, in comparison to USD 936.5 billion collected a year earlier. Out of this VM, USD 695.4 billion collected by phase-one firms was required under the margin regulations which was a 31.7% increase compared to USD 527.9 billion of regulatory VM collected previously for 2021 year-end.

The charts below *(Regulatory IM and IA, **Received** and **Posted** by Phase-one Firms (USD B))* provides an overview of the IM and IA either received or posted over the last six years. As shown, the total IM received in 2022 for phase-one firms increased by 7.4%, compared to the IM for phase-two and three firms which increased 2.8% for year-end 2022. Please see Appendix I for a guide to interpret the figures in each bar segment.





2. THE CCP MODEL

A CCP acts as an intermediary and legally interposes itself between buyers and sellers of the markets for which it clears, becoming the buyer to every seller and the seller to every buyer. It is a market risk neutral manager, not a risk-taker in the markets it clears and a creditworthy counterparty to its participants that guarantees the financial performance of the trades it clears, including in the event of a default of one of the parties by requiring its participants to collateralize and settle their trade exposure. After novation – the process which results in the interposition of the CCP between the buyer and the seller of the trade, a multilateral netting benefit (through the removal of bilateral exposures) emerges and complexity, counterparty credit risk, collateral requirements and liquidity needs of participants are reduced. Through trade offsets, gross exposure is reduced significantly, resulting in a more streamlined and manageable trade infrastructure, and a "matched-book".

Under the typical central clearing model, CCP's participants can either be CMs, which are approved by the CCP and are permitted to clear directly at the CCP, or they can be clients / non-clearing members, who do not directly face the CCP and must clear their trades via a clearing account through an appointed CM.

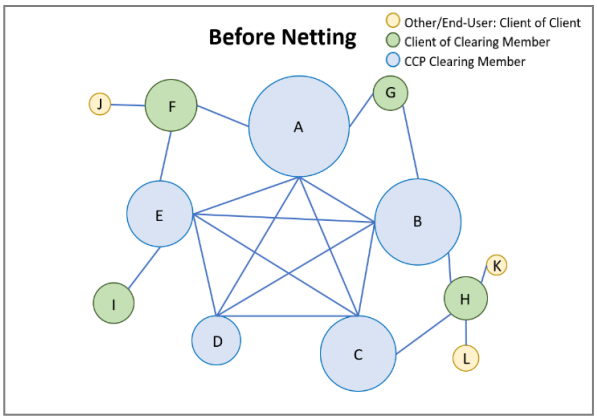


Figure 2-1: Bilateral World

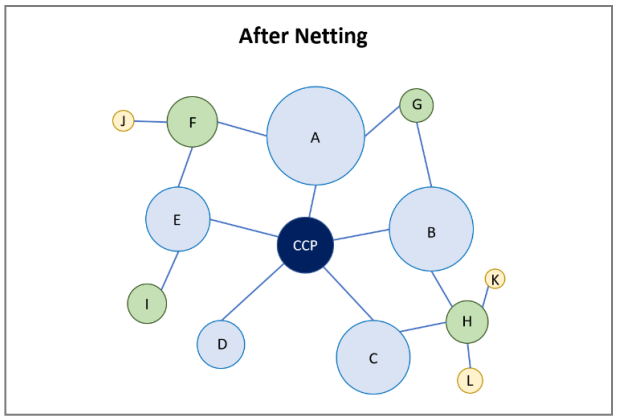


Figure 2-2: World with a CCP showing the multilateral netting benefits.

In order to reduce the impact of the default of one or more participants, CCPs have established a number of risk-mitigating techniques, in which CCPs address market, credit, and liquidity risks, among others. A CCP's membership requirements, which are the first line of defence and can differ for each CCP, are rigorous, so only qualified and commercially proficient members are accepted. Compliance with the CCPs' rulebooks is fundamental and constant monitoring through regular reporting and risk review is ensured. General requirements include, but are not limited to:

- Minimum equity capital requirements;
- Operational and administrative expertise; and
- Suitable risk-management capabilities.[25]

In addition to these general requirements, if a CM provides client clearing, it is subject to membership requirements that are designed to ensure that it is able to guarantee the financial performance of its customers to the CCP.

As the second line of defence, CMs are required to post collateral at the CCP to cover open positions they hold with the CCP. This includes the collection of IM and Default Fund[26] ("DF") contributions and exchange of VM.

IM is posted to protect against future risk exposures for open positions and IM requirements are carefully calculated by CCP margin models. In particular, IM is calculated in order to cover potential liquidation costs during adverse market moves in the expected close-out period of the default management process ("DMP"). While multilateral netting can substantially reduce the risk exposures faced by a CCP, the residual risk that remains, in part, is addressed

[25] CCP12, CCP Lines of Defence
[26] May also be known as Reserve Fund, Guarantee Fund, Clearing Fund, or Security Deposits.

through the CCP's collection of IM. IM requirements are established to meet a confidence level of at least 99% with respect to the estimated distribution of future exposures over the margin period of risk ("MPOR").

VM – exchanged between a CCP and the CM on at least a daily basis – captures the mark-to-market on a CM's open positions before settlement. That means that if a member's contract has increased in value, the CCP is obliged to pay the member the difference. Conversely, if the contract declines in value, the member is obliged to pay the difference to the CCP.

The remaining lines of defence, which represent a typical CCP default waterfall, include:

- The defaulting CM's resources, including the defaulter's margin (IM and any other additional margin of the defaulting CM held by the respective CCP), the defaulting member's DF contributions and any additional resources of the defaulting member available to the CCP;
- A layer of the CCP's own equity (commonly known as the "CCP Skin-in-the-Game" or "SITG"), if the defaulting CM's losses exceed the defaulting CMs resources;
- If a defaulting CM's losses also exceed the SITG, the DF contributions of non-defaulting CMs are mutualized and used. CCP DFs are sized to cover tail risks arising from the default of the CCP's largest CM, at a minimum, under extreme but plausible market conditions, however CCPs often size their DFs to cover the default of the two largest CMs; and
- Lastly, a CCP may also call for additional unfunded financial contributions from non-defaulting CMs (typically referred to as "assessments" or "cash calls") or deploy other recovery tools.

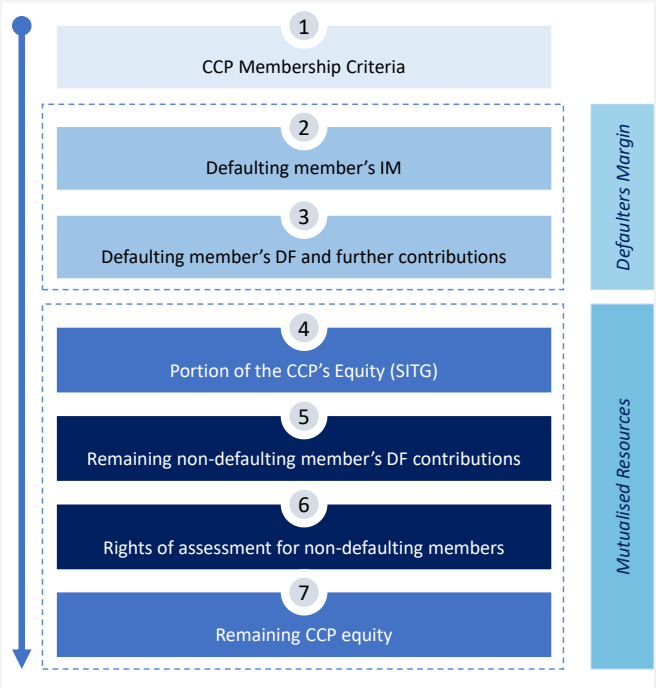


Figure 2-1 A typical CCP default waterfall

For more information on the central clearing model and CCPs' best practices please check the CCP12's Position Paper CCP Best Practices of May 2019.

3. CCP REGULATORY CONTEXT AND MARKET PRACTICES DEVELOPMENTS IN 2022

3.1 NEW ASSET CLASSES OR CHANGES IN PRODUCTS' UPTAKE IN CLEARING IN 2022

CCPs are continuously enhancing their services' and products' offering to meet the risk management needs of their participants. 2022 was no different in this regard – many CCPs have broadened the scope of their services, proving their operational resilience and technological innovativeness. In addition to that, during the course of last year, we also observed interesting changes in some of the products' uptakes at some CCPs, which illustrates new trends occurring in financial markets and market participants' behaviours that were noticeably different last year compared to the years before last. Many of the newly introduced instruments reflect the latest market trends, such as those related to the move to risk-free rates, environmentally friendly and sustainable activities, and cryptoassets. The following (non-exhaustive) list provides examples of such changes at CCPs which could be observed in 2022:

- At **CME Clearing**:
  - An exponential increase in SOFR futures and options – in terms of both volumes and OI[27] which marks the market shift away from US dollar Libor,
  - CBL Core Global Emissions Offset™ ("C-GEO™") futures launched on 7 March 2022, which are meant to help bring standardized benchmarks to the voluntary carbon markets[28],
  - 20-Year U.S. Treasury Bond futures launched on 7 March 2022, after the Treasury Department re-introduced the 20-year bond in May 2020[29],
  - Introduction of options on Micro Bitcoin and Micro Ether futures clearing on 28 March 2022, which further expanded CME's suite of cryptocurrency derivatives offerings[30],
  - Launch of an option contract on CME's physically-delivered Aluminium futures on 23 May 2022[31],
  - Launch of Canadian Wheat (Platts) futures on 13 June 2022 which are cash-settled and closely track the shipment of grains from Vancouver[32];
- At **Eurex Clearing**, the most relevant product extensions included:
  - New futures referencing Euro Short Term Rate ("€STR")[33] as the new benchmark risk-free rate which started trading on 23 January 2023[34],
  - OTC IRS in Nordic currencies (Swedish krona ("SEK"), Danish krone ("DKK"), Norwegian krone ("NOK"), Polish złoty ("PLN"), Czech koruna ("CZK"), and Hungarian forint ("HUF")[35],
  - Next generation ETD contracts which comprise three business initiatives – integration of weekly contracts, volatility strategies and basis trading[36] (with full scope testing taking place in 2022 and the production start date of 27 March 2023),
  - First futures on a Euro High Yield Index – cash-settled contracts on a Bloomberg Total Return Index denominated in euro, launched on 17 October 2022[37],
  - Dollar Non-Deliverable Forwards ("NDF") for six currency pairs: the Brazilian real, Chilean peso, Indian rupee, Indonesian rupiah, South Korean won and Taiwanese dollar, launched on 16 May 2022[38];
- At **HKEX**: Hong Kong's first carbon futures ETF (the CICC Carbon Futures ETF) launched on 23 March 2022[39];

[27] CME, Secured Overnight Financing Rate (SOFR) Futures
[28] CME, CME Group to Launch CBL Core Global Emissions Offset Futures(7 Feb 2022)
[29] CME, Introducing 20-Year U.S. Treasury Bond futures (5 May 2022)
[30] CME, CME Group to Launch of Micro-Sized Bitcoin and Ether Options (27 Mar 2022)
[31] CME, CME Group to Launch an Aluminum Option Contract on May 23 (25 Apr 2022)
[32] CME: CME Group to Launch Canadian Wheat (Platts) Futures on June 13 (26 Apr 2022)
[33] Eurex, Eurex launches new futures referencing €STR (14 Nov 2022)
[34] Eurex, Three-Month Euro STR Futures (€STR)
[35] Eurex, OTC Interest Rate Derivatives (8 Mar 2022)
[36] Eurex, Next Generation ETD Contracts
[37] Eurex, Euro High Yield Index Futures
[38] Eurex, EurexOTC Currency Clearing: Non-Deliverable Forwards (NDF) - Launch in Production (9 May 2022)
[39] HKEX, HKEX Welcomes Hong Kong'S First Carbon Futures ETF (23 May 2022)

- At **ICE Clear U.S.**:
  - Launch of two new, cash-settled thematic equity index futures contracts on 21 March 2022 (traded on ICE Futures U.S.)[40]:
    - the ICE Biotechnology Gross Total Return ("GTR") Index futures and
    - the ICE Semiconductor GTR Index futures,
  - ICE's first U.S. Residential Mortgage Rate Lock Index Futures launched on 13 June 2022[41];
- At **ICE Clear Europe**:
  - 10 new Nature-Based Solutions Carbon Credit futures contracts, allowing market participants to buy, sell, and hedge carbon credits from 2016 out to 2030, were launched on 15 August 2022[42],
  - Options on UK Carbon Emission Allowances ("UKA" Options) launched on 10 October 2022[43],
  - European LNG Futures for North-West and South-West Europe and Three Supporting French, German, and Italian Natural Gas Futures launched on 5 December 2022[44],
  - A FTSE® 100 Index Total Return Future ("TRF") launched on 14 November 2022[45];
- At **KDPW_CCP**: new clearing service of repo transactions concluded on the Treasury BondSpot Poland platform launched on 25th April 2022[46];
- At **Nasdaq**:
  - TM FRA – tailor made FRAs of a specific interbank deposit of a certain tenor (they can have any start date and end date and are also cash collateralized)[47],
  - SWESTR OIS (Overnight Index Swaps referencing the Swedish krona Short Term Rate) launched on 26 September 2022[48], aiming at replacing STIBOR-referencing contracts as soon as practicable;
- At **Nodal**:
  - a new set of physically delivered environmental products includes:
    - Verified Emission Reduction ("VER") Futures & Options: Carbon Offsetting and Reduction Scheme for International Aviation ("CORSIA") eligible and nature-based credits,
    - Certified Emission Reduction ("CER") Futures: Commitment Period 2; 2013+; and 2016+,
    - Global Emission Reduction ("GER")® Futures,
    - Carbon Removal Futures,
    - Renewable Natural Gas Certificate Futures,
    - NEPOOL Quad Qualified Renewable Energy Certificate Class 1 Futures,
    - Western Regional Energy Generation Information System ("WREGIS") Registered Renewable Energy Certificates from Center for Resource Solutions ("CRS") Listed Wind Energy Facilities front-half and back-half Futures,
    - listed since 17 June 2022[49], and
    - Washington Carbon Allowance ("WCA") futures contract and the National CRS Listed Wind Renewable Energy Certificate ("REC") futures contracts launched on 5 December 2022[50];
  - Cryptocurrencies-related futures and options:
    - Bitcoin futures launched on 27 June 2022[51],
    - Ether futures launched on 29 August 2022[52];

[40] ICE, ICE Launches Biotechnology Index Futures and Semiconductor Index Futures Contracts(21 Mar 2022)
[41] ICE, ICE To Launch U.S. Residential Mortgage Rate Lock Index Futures (31 March 2022)
[42] ICE, ICE Launches 10 Carbon Credit Futures Vintages Extending Out to 2030 (17 August 2022)
[43] ICE, ICE to Launch UK Carbon Allowance Options (25 August 2022)
[44] ICE, ICE to Launch European LNG Futures for North-West and South-West Europe and Three Supporting French, German and Italian Natural Gas Futures (27 October, 2022)
[45] ICE, ICE Expands Equity Derivatives Complex With the Launch of FTSE® 100 Index Total Return Future (18 October 2022)
[46] KDPW_CCP, KDPW_CCP Clearing House to Clear Repos (25 April 2022)
[47] Nasdaq, Margin methodology guide for Nordic fixed income products (26 January 2023)
[48] Nasdaq, Clearing of OIS contracts referencing SWESTR (20 June 2022)
[49] Nodal, Nodal Exchange Successfully Lists New Environmental Futures and Options (17 June 2022)
[50] Nodal, Nodal Exchange to Launch the First-Ever Washington Carbon Allowance and National Wind Renewable Energy Certificate Futures Contracts in Collaboration with IncubEx (14 November 2022)
[51] Coinbase, Coinbase Derivatives Exchange to make nano bitcoin futures available through leading brokers (23 June 2022)
[52] Coinbase, Coinbase Derivatives Exchange to add Nano Ether Futures Contract (25 August 2022)

- At **SGX**:
  - NikkoAM-StraitsTrading MSCI China Electric Vehicles and Future Mobility ETF launched on 20 January 2022[53],
  - Low carbon ETFs:
    - Lion-OCBC Securities Singapore Low Carbon ETF launched on 28 April 2022[54],
    - CSOP CGS-CIMB FTSE Asia Pacific Low Carbon Index ETF launched on 28 September 2022[55].

3.2 CCP STANDARDS AND REGULATIONS

After the GFC of 2008, CCPs' successful performance became the center of attention for many authorities and SSBs, which led to enhancements and codification of best practices in CCP risk management. On a global level, the Committee on Payment and Settlement Systems ("CPSS") (renamed as Committee on Payments and Market Infrastructures ("CPMI") in 2014) and the IOSCO took the lead in this work and adopted the Principles for Financial Market Infrastructures[56] ("PFMIs") in 2012. Following that, many jurisdictions enhanced their regulatory and supervisory frameworks for CCPs. The U.S. Dodd-Frank Wall Street Reform and Consumer Protection Act[57] of 2010 and the European Market Infrastructure Regulation[58] ("EMIR") of 2012 (adopted in the EU and retained by the UK after Brexit) are one of the most notable examples of this work.

PFMIs

In April 2012, with the aim to strengthen and preserve financial stability, CPMI and IOSCO released the PFMIs – the international standards for financial market infrastructures ("FMIs"), i.e., payment systems, central securities depositories ("CSDs"), securities settlement systems, CCPs and trade repositories. The standards cover all important aspects of FMIs, such as general organisation, credit and liquidity risk management, settlement and custody, default management, general business and operational risk management, access, efficiency, and transparency.

A few months later, in December 2012, CPSS and IOSCO published another document "Principles for financial market infrastructures: Disclosure framework and Assessment methodology", which prescribed the form and content of the disclosures expected of FMIs. To enhance the transparency of CCPs even further, in February 2015 CPMI and IOSCO released "Public quantitative disclosure standards for central counterparties". Both of these publications provide the basis for CCPs' robust qualitative and quantitative disclosures.

Local jurisdictions and international standard setters have continued to be bring forward various topics and proposals with respect to centrally cleared markets, including in 2022. The following non-exhaustive list provides some examples of market consultations to which CCP12 responded:[59]

- The Commodity Futures Trading Commission's ("CFTC") Request for information and comment on the Swap Clearing Requirements to Account for the Transition from LIBOR and Other IBORs to Alternative Reference Rates (January 2022),
- BCBS, CPMI, IOSCO's Consultative Report on Review of Margining Practices (January 2022),
- The European Securities and Markets Authority's ("ESMA") Consultation Papers on CCP resolution regime (January 2022),
- BoE's Consultation Papers on the approach to tiering incoming CCPs (EMIR Art. 25) and the approach to comparable compliance (EMIR Art. 25a) (February 2022),
- CPMI and IOSCO's discussion paper on client clearing: access and portability (February 2022),
- ESMA's consultation paper on the review of RTS No 153/2013 with respect to procyclicality of margin (March 2022),
- ESMA's call for evidence on an approach to Climate Risk Stress Testing of Central Counterparties (April 2022),

[53] SGX, Listing of NikkoAM-StraitsTrading China Electric Vehicles and Future Mobility ETF (20 January 2022)
[54] SGX, SGX Securities and OCBC Group deepen partnership with Singapore's first low carbon ETF (28 April 2022)
[55] SGX, Listing of CSOP CGS-CIMB FTSE Asia Pacific Low Carbon Index ETF (28 September 2022)
[56] CPSS, IOSCO, Principles for Financial Market Infrastructures (April 2012)
[57] Dodd-Frank Wall Street Reform and Consumer Protection Act
[58] Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories
[59] CCP12, Submissions

- OECD's Public Consultation Document "Pillar One – Amount A: Regulated Financial Services Exclusion" (May 2022),
- CFTC's Request for Comment on FTX Request for Amended DCO Registration Order (May 2022),
- FSB, CPMI and IOSCO Report "Central Counterparty Financial Resources for Recovery and Resolution (May 2022),
- BoE's Consultation Paper on Outsourcing and third-party risk management: Central Counterparties (July 2022),
- CFTC's Proposed Rule on Clearing Requirement Determination for IRS to Account for the Transition From LIBOR and Other IBORs to Alternative Reference Rates (July 2022),
- OECD's Progress Report on Amount A of Pillar One (August 2022),
- ESMA's Consultation Paper on the clearing and derivative trading obligations in view of the 2022 status of the benchmark transition (September 2022),
- BoE's Consultation paper on the fees regime for incoming central counterparties (September 2022),
- CFTC's Notice of Proposed Rulemaking on Governance Requirements for DCOs (October 2022),
- Securities and Exchange Commission's ("SEC") Proposed Rule on Clearing Agency Governance and Conflicts of Interest (October 2022),
- CFTC's Request for Information on Climate-Related Financial Risk (October 2022),
- CPMI and IOSCO's Discussion paper on central counterparty practices to address non-default losses (October 2022),
- FSB's Consultation on Crypto-asset Activities (December 2022).

The work undertaken by the international SSBs and local policy-makers in 2022 was to a high degree focused on CCPs' margining practices, transition to RFRs and its influence on clearing obligations, climate risk, third-party risk, CCPs' governance, CCPs' recovery and resolution framework, client clearing, practices related to non-default losses ("NDL"), and cryptoasset activities. Some of these topics are elaborated on in the following sections.

3.3 CCP RECOVERY AND RESOLUTION REGIMES

CCP Recovery and resolution

A CCP recovery is a process addressing default and non-default events with the aim to restore the CCP's financial soundness and to enable the continuation of its critical functions. A CCP resolution occurs when its authorities conclude that the CCP in distress should not go through normal insolvency proceedings as it would cause financial instability. For over a decade, CPMI, IOSCO, and FSB have worked on and established a robust set of recommendations on CCP recovery (Link) and resolution (Link).

Further work on CCPs recovery and resolution framework, with a special emphasis on the resolution part, was conducted in 2022 by the SSBs and some local regulators, most notably ESMA.

At the international level, the FSB, CPMI, and IOSCO Report "Central Counterparty Financial Resources for Recovery and Resolution" of March 2022[60] ("the Report") was the main food for thought and subject of discussions amongst the industry. Generally, CCP12 welcomes the ongoing work of international policymakers to support the stability of the broader financial system. However, based on the results of the scenario analysis covered in the Report, we found it unnecessary to undertake further work on CCP resources and/or alternative tools given, in part, CCPs' strong performance against the scenarios evaluated. The Report's findings clearly demonstrated the CCPs' resilience. It needs to be also underlined that the applied stress scenarios were in many cases extreme and implausible and thus, should not be the basis for further work on CCP resources. Additionally, it is important to recognize that CCPs' risk management practices greatly mitigate the likelihood of an event arising to a recovery event in the first place. Moreover, an introduction of new or alternative resources from CCPs could undermine participants' risk management incentives, which would be detrimental to the CCPs' safety and thus to the market's stability.

At the EU level, the authorities were consulting market participants on draft regulatory technical standards related to the content of CCP resolution plans, the guidelines on methodology to value each contract prior to termination, valuation of CCPs assets and liabilities in resolution, and the guidelines on the application of the circumstances under

[60] FSB, CPMI, and IOSCO Report "Central Counterparty Financial Resources for Recovery and Resolution" (10 March 2022)

which a CCP is deemed to be failing or likely to fail. In its contribution to this public ESMA outreach, CCP12 emphasised the importance of flexibility, comprehensiveness, fairness, and proportionality in setting the rules for resolution plans. These would be necessary to ensure that resolution authorities are able to update the plans for any future innovations and changes in CCPs, and to reflect the diversity of CCPs' risk profiles and the scope of products cleared. A need to differentiate CCPs from banks was reiterated as the application of the same recovery and resolution rules to both types of financial entities could be very detrimental to financial stability given the significant differences between CCPs and banks. Furthermore, in CCP12's opinion, CCPs should not be subject to early or unnecessary intervention from the side of resolution authorities as it could very well undermine the incentives characterising the central clearing model and the well-designed DMP. It could also create uncertainty as to how the CCP's rulebook operates and eventually undermine financial stability by pre-emptively pushing the CCP into resolution.

3.4 CPMI AND IOSCO CLIENT CLEARING AND PORTING

Client clearing

Client clearing is a service provided by CMs to firms which are not CMs at a CCP and these firms traditionally depend on intermediaries (i.e., CMs) to access CCPs and thus indirectly clear their trades at CCP. There is a number of different client clearing models supported by CCPs, some of which enable clients to directly access CCP services.

Porting

One of the possible methods of dealing with a CM's default is to transfer positions of the clients of the defaulting CM to another, solvent CM – a process commonly referred to as "porting". It is a generally preferred way compared to its alternative which is position liquidation. Due to significant differences between regulatory regimes across the global, some jurisdictions provide more supportive legal solutions that facilitate porting which has led to the development of various porting practices in different markets.

In September 2022, CPMI and IOSCO published a final paper on Client clearing: access and portability[61] which elaborated on information collected through, amongst others, feedback received from the industry to the public consultation of CPMI and IOSCO at the end of 2021[62]. It analysed and considered matters related to access to CCPs (including direct and sponsored access models) and effective porting practices, based on prior outreach to the industry in the form of surveys, workshop, and interviews. CCP12 agreed with the SSBs' observation that no further guidance on the PFMIs was necessary or desirable in this context, thanks to the PFMIs' comprehensiveness and due to the diversity of CCPs and the markets they serve. It was also noted that alternative access models' development is at a very early stage and the models still need time to mature[63]. In CCP12's opinion, the activity and uptake of direct and sponsored models would be greater if there was improved understanding by market participants of the legal requirements, the set-up, and operational processes. We identify the need for further education of clients and regulators on how different models work and the roles and responsibilities of each participant in the client clearing process under these models.

In terms of porting, CCP12 agrees that it would be worthwhile to promote work that supports the porting of clients' positions and assets (the alternative of which is a less desirable liquidation process). In some jurisdictions, porting is currently hindered by legal requirements which may prevent it from being successful – and such issues should be addressed by local regulators. Porting can be also more challenging for CCPs which operate under customer net margining regimes. Apart from account structures providing full margining of client positions, there are also other tools, the use of which could considerably facilitate porting, such as pre-emptive identification of potential alternate client clearing service providers, a lack of a legal requirement to obtain explicit positive ex-ante client consent for porting, and waivers of anti-money laundering ("AML"), know-your-customer ("KYC"), and capital requirement for a limited period of time during the porting phase.

CCP12 members have decided to explore the topic of porting further. One of the case studies included in this AMR is dedicated to the different porting frameworks in the EU's regime (represented by Eurex Clearing) and in the CFTC's regime (represented by CME Clearing) to show the contrasting features of both and highlight what practices are

[61] CPMI, IOSCO, Client clearing: access and portability (September 2022)
[62] CPMI, IOSCO, A discussion paper on client clearing: access and portability (November 2021)
[63] One example of such a new access model is the ISA Direct Indemnified Model launched by Eurex in July 2022, aimed mainly at hedge funds and pension funds in the repo market.

effective. The CCP12 community has also commenced the internal process of sharing expertise and information on legal solutions to better understand the existing practices and regulatory regimes in order to determine best practices and learn of each other.

3.5 CPMI AND IOSCO ANALYSIS ON CCP PRACTICES TO ADDRESS NDLs

NDLs

NDLs are losses which may result from a risk event other than a default of a CM. There are different types of NDLs which CCPs may face, such as related to operational, investment, custody, legal, cyber, climate, and general business risks, however, different CCPs may use different categorisations for NDLs, depending on their business models and characteristics of products cleared and markets they serve.

Risks related to non-default events do not necessarily cause financial losses and therefore addressing different types of NDLs should be addressed using different tools. Their heterogeneity requires a great degree of expertise and adjustments to individual CCPs – their characteristics and markets they serve.

In the second half of 2022, CPMI and IOSCO published a discussion paper on central counterparty practices to address non-default losses [64] with the aim to facilitate the sharing of existing practices and to foster dialogue on CCPs' management of NDLs. These types of losses are well addressed in the PFMIs but, contrary to default losses, they are heterogeneous. CCP12 therefore welcomed this analysis of SSBs, however, in our opinion, it should not imply a need for additional standards or guidelines [65]. CCPs' history and past performance, also in times of unprecedented stresses (such as due to the GFC of 2008, COVID-19 pandemic, or the Russia-Ukraine war and the resultant crisis, increased inflation and volatility), demonstrated their resilience and ability to effectively manage the risks they face, including NDL-related risks. CCP12 firmly believes that the main emphasis in the NDL-related risks' management should be placed on the appropriate preventative measures that mitigate the likelihood of NDLs occurring in the first place. CCP12 believes that both the CCPs' and their regulators' main emphasis in the realm of management of NDL-related risks should continue to be on CCPs' taking the appropriate preventative measures that mitigate the likelihood of NDLs. CCPs conduct appropriate evaluation (e.g., scenario testing) of the different NDLs they face based on their individual structures and clearing offerings. Any attempt to shift the focus from NDL prevention to the CCPs' amassing more financial resources to cover NDLs will most likely not help to prevent NDLs, or deal with them effectively.

Notwithstanding the above, CCP12 is a strong proponent of transparency and appreciates further information sharing. That is why we have commenced internal discussions aiming at enhanced exchange of views among CCPs on practices relating to NDLs.

3.6 CCP GOVERNANCE REQUIREMENTS

CFTC proposed a rulemaking in July 2022 [66] to require Derivatives Clearing Organizations ("DCOs") to establish one or more risk management committees ("RMCs") and one or more risk advisory working groups ("RWGs") with prescribed standards on the composition, activities, policies, and procedures of the committees and groups. Subsequent to the public comment period, CFTC finalized the rule in June 2023 [67]. The changes will require CCPs to establish RMCs that include CMs and customers that they should consult on all matters that could materially affect the risk profile of the DCO. RWG members will be expected to provide risk-based input (as opposed to commercially-driven input) from a broad array of market participants, such that a diverse cross-section of the DCO's CMs and customers of its CMs are represented, regarding all matters that could materially affect the risk profile of the DCO.

[64] CPMI-IOSCO, A discussion paper on central counterparty practices to address non-default losses (August 2022)
[65] CCP12, Response to CPMI and IOSCO Discussion paper on central counterparty practices to address non-default losses (October 2022)
[66] CFTC, Proposed Rulemaking on Governance Requirements for Derivatives Clearing Organization (July 2022); CCP12, Response to CFTC's Notice of Proposed Rulemaking on Governance Requirements for Derivatives Clearing Organizations (October 2022)
[67] CFTC, Final Rule: Governance Requirements for Derivatives Clearing Organisations (June 2023)

The Securities and Exchange Commission ("SEC") also proposed changes to CCP governance requirements in its rule proposal on Clearing Agency Governance and Conflicts of Interest.[68] The proposed rule is intended to improve the governance of clearing agencies by reducing the likelihood of conflicts of interest at the board of directors level, enhance the role of the board in oversight of third-party providers, and increase transparency with respect to the board's consideration of market participants' input in risk-related matters. While CCP12 welcomed the SEC's intention to continuously improve the safety and transparency of the financial markets and their participants, it cautioned against being overly prescriptive given the diversity of clearing agencies, including with respect to their ownership structures, and their need to tailor their structures and governance to the markets and products they clear.[69]

CCP12 welcomes when authorities follow a principles-based approach to governance arrangements as it helps avoid the risks of prescribing governance requirements that fail to take into account the different markets and market structures of CCPs.

3.7 DEFAULT MANAGEMENT AUCTIONS

Collective industry work has been achieved since the publication of the CPMI and IOSCO's report "Central counterparty default management auctions – Issues for consideration" (June 2020)[70] which encouraged the industry to collaborate and work on further development of default management auctions practices.

CCP default management auctions – Issues for consideration

In June 2020, CPMI-IOSCO published the paper "Central counterparty default management auctions – Issues for consideration", to provide a description of the matters for CCPs to consider when planning and conducting default management auctions and to identify best practices in development of, and improvements to, default management auction rules, governance arrangements, and procedures to address these issues. The three categories of work that the Policy Steering Group of CPMI-IOSCO sought industry action are:

- The first category includes several operational issues (such as methods of communication and formats for auction files) where there is a broad industry consensus to support further development and where CCPs should be well-positioned to advance these issues, bringing such work to closure.
- The second category includes areas (governance of a CCP's DMP, use of traders in default management groups, the scope of client participation) where there are differing views among CMs and other stakeholders.
- The third category includes potential nascent and emerging practices (synchronizing DMPs, identification of potential hedges between CCPs) that may require further coordination and harmonisation among the DMPs of multiple CCPs.

Following the 2021 joint association paper on auction category 1 issues - Terminology and Operational Aspects.[71], CCP12 in collaboration with other trade associations published two joint papers on 1 December 2022, to continue the efforts in addressing other auction practices issues in category 2:

1. CCP12, European Association of CCP Clearing Houses ("EACH"), Futures Industry Association ("FIA"), FIA Principal Traders Group ("FIA PTG"), ISDA and Managed Funds Association ("MFA") jointly published an association paper on Client Participation.[72],
2. CCP12 and EACH jointly published a CCP paper on CCP Governance and Default Management Groups.[73].

The areas covered within the category 2 papers were as follows:

- Benefits and practical considerations on offering client participation by CCPs,
- Governance of a CCP's DMP, and Default Management Groups' ("DMGs") governance, design, and composition.

[68] Securities and Exchange Commission, Proposed rule on Clearing Agency Governance and Conflicts of Interest (August 2022)
[69] CCP12, Response to SEC Proposed rule on Clearing Agency Governance and Conflicts of Interest (October 2022)
[70] CPMI-IOSCO, Central counterparty default management auctions – Issues for consideration (June 2020)
[71] CCP12, EACH, FIA, ISDA, Joint association paper on auction category 1 issues - Terminology and Operational Aspects (February 2021)
[72] CCP12, EACH, FIA, FIA PTG, ISDA and MFA, Joint association paper on auction category 2 issues – Client Participation (September 2022)
[73] CCP12, EACH, Joint association paper on auction category 2 issues – CCP Governance and Default Management Groups (September 2022)

In addition to the work of CCP12 with other trade associations, FIA and ISDA also jointly published a paper, "Governance of CCP Default Management Processes and the Role of Default Management Groups" as part of industry efforts to address the auction category 2 issues.

Further industry work and collaboration are expected to continue efforts in enhancing the default management auction practices.

3.8 CCP MARGINING PRACTICES

Following the period of heightened market volatility in March 2020 as a result of the COVID-19 pandemic, abundant research and analysis have been conducted under the theme of margining practices for more transparency and disclosure on procyclicality, model performance, and responsiveness to volatility. International policy-makers have collected feedback through consultation and a series of outreach sessions for potential international policy consideration.

BCBS-CPMI-IOSCO published the report on the Review of margining practices[74] in September 2022, following the industry feedback of the consultative report on the Review of margining practices published in October 2021[75]. The report analysed the margining practices for centrally and non-centrally cleared markets, considering both IM and VM, during March 2020. The report identified six potential areas for further work in centrally cleared and non-centrally cleared markets:

1. Increasing transparency in centrally cleared markets
2. Enhancing liquidity preparedness of market participants as well as liquidity disclosures
3. Identifying data gaps in regulatory reporting
4. Streamlining VM processes in centrally and non-centrally cleared markets
5. Evaluating the responsiveness of centrally cleared IM models to market stresses with a focus on impacts and implications for CCP resources and the wider financial system
6. Evaluating the responsiveness of non-centrally cleared IM models to market stresses

Reducing Margin Procyclicality

The concept of procyclicality refers to changes in risk management practices that are positively correlated with business or credit cycle fluctuations and that may cause or exacerbate financial instability. CCPs employ various practices to proactively manage procyclicality, including relating to margining.

Article 28 of the Commission Delegated Regulation (EU) No 153/2013 with regard to regulatory technical standards ("RTS") on requirements for CCPs states that EU CCPs "shall limit procyclicality to the extent that the soundness and financial security of the CCP is not negatively affected. This shall include avoiding when possible disruptive or big step changes in margin requirements and establishing transparent and predictable procedures for adjusting margin requirements in response to changing market conditions." EMIR puts forward three options for EU CCPs to reduce the procyclicality of their IM models, referred to in Article 28(1)(a-c) of the RTS:

a) Charging at least 25% margin buffer on top of the IM computed by the CCP;
b) Assigning at least 25% weight to stressed observations in the lookback period;
c) Ensuring a margin floor on the margins using a 10-year lookback period.

In the EU, the market events in March and April 2020 led ESMA to evaluate the RTS on anti-procyclicality ("APC") margin measures. ESMA published a consultation report "Review of EMIR RTS on APC Margin Measures"[76] on 27 January 2022, to seek industry comments on the proposals relating to EMIR's APC margin measures for EU CCPs, such as further granularity on the design, the use of specific tools, and the general provision for APC CCP policies.

CCP12 responded[77] to the consultation paper and reiterated that IM levels were adjusted appropriately according to the established risk management practices of EU CCPs to reflect the new market conditions, and therefore, suggested that improvements should be reviewed on a more holistic basis across financial markets. In this

[74] BCBS-CPMI-IOSCO, Review of margining practices (September 2022)
[75] BCBS-CPMI-IOSCO, Consultative report Review of margining practices (October 2021); CCP12, Response to the consultative report (January 2022)
[76] ESMA, Consultation Paper for Review of RTS No 153/2013 with respect to procyclicality of margin (January 2022)
[77] CCP12, Response toto ESMA's consultation paper on review of RTS No 153/2013 with respect to procyclicality of margin (March 2022)

comprehensive assessment, liquidity risk practices of CMs, clients, and other market participants should be evaluated to identify where the vulnerabilities are and how to support proper liquidity preparedness for the next crisis.

CCP12 continues to engage with policy-makers on these topics and expects to continue to do so in 2023.

3.9 CCP THIRD PARTY RISK MANAGEMENT ("TPRM")

Following the FSB's "Discussion Paper on Regulatory and Supervisory Issues Relating to Outsourcing and Third Party Relationships" in 2020[78], BoE published a consultation paper "Outsourcing and third party risk management: Central Counterparties" in April 2022[79]. The proposals and the draft Supervisory Statement ("SS") apply to all forms of outsourcing (i.e., third party arrangements) by UK CCPs. The draft SS focused on practices relating to TPRM, including data security, business continuity, and exit planning, such that any outsourcing is executed in a safe and resilient manner in line with the Bank's response to the "Future of Finance" report[80].

In line with the CCP12 position paper of 2019 on "CCP Best Practices. Third Party Risk Management"[81], in its response[82] to the BoE consultation paper, CCP12 emphasised the importance of the principles-based approach that international standards have embraced in many cases, like PFMIs, which enables CCPs to manage risks effectively and efficiently. CCP12 was concerned with the highly detailed nature of the BoE's consultation as detailed requirements could unintentionally undermine the ability of the UK CCPs to manage their outsourcing arrangements and third-party risks most effectively, noting it is of the utmost importance that UK CCPs maintain the necessary flexibility to manage the relationships with disparate types of third parties with which they engage.

TPRM Program

Broadly, the objective of a CCP's TPRM program (which may also be known as Vendor Management Program, or Vendor-Managed Services Program) is to identify, manage, and monitor risks posed by any third-party relationship to a CCP. A CCP's vendors or the external entities providing services to the CCP are considered third parties.

Effective TPRM programs are proactive in their risk management approach to third parties with an aim to identify risks before they materialise, and not just reactive when incidents occur. This can become particularly important when third parties become integral to a CCP's ongoing operations. To manage this risk, a TPRM program assesses third-party risk and works with the business owners to implement sufficient risk controls and risk mitigation strategies prior to onboarding and then throughout the engagement with the third-party.

Effective third-party risk management is a necessity for all CCPs.

3.10 CLIMATE-RELATED FINANCIAL RISK

With increasing attention drawn to the climate-related risk topics, multiple policy-makers have published reports and requested comments to better inform the understanding of the risk as it relates to financial markets:

- ESMA's "Call for Evidence on climate risk stress testing for CCPs" in February 2022[83],
- CFTC's "Request for Information ("RfI") on Climate-Related Financial Risk" in June 2022[84].

In its paper of February 2022, ESMA mentioned the assessment of climate risk within EU CCPs is still in its infancy at the level of individual EU CCPs, and initiated the effort to introduce four pillars of climate risk stress testing for EU CCPs, namely the physical risk, rapid transition risk, business risk, and collateral replacement risk. In its RfI, CFTC

[78] FSB, Discussion paper: Regulatory and Supervisory Issues Relating to Outsourcing and Third-Party Relationships (November 2020)
[79] BoE, Consultation Paper for Outsourcing and third party risk management: Central Counterparties (April 2022)
[80] BoE, Future of Finance (June 2019)
[81] CCP12, CCP Best Practices Third-Party Risk Management – A CCP12 Position Paper (July 2019)
[82] CCP12, Response to Bank's Consultation Paper on Outsourcing and third-party risk management: Central Counterparties (July 2022)
[83] ESMA, Call for evidence An approach to Climate Risk Stress Testing of Central Counterparties (February 2022)
[84] CFTC, Request for Information on Climate-Related Financial Risk (June 2022)

noted that the effects of climate change and the transition to a low-carbon economy present emerging climate-related financial risks, which fall into two broad categories – physical risks and transition risks.

In response[85] to these consultations, CCP12 highlighted that the secondary effects stemming from physical risk, such as increased volatility within the applicable period of risk, are already recognized in many CCPs' financial risk management practices (e.g., margining and stress testing frameworks), where relevant to products that they clear. Given the short-term risk horizon of the products many CCPs clear, it is highly unlikely that transitional climate-related financial risks would impact a CCP's financial risk management practice. From CCP12's perspectives, the likelihood of certain climate related risks materializing within a short period of 2-5 days is minimal. CCPs are best suited to appropriately design their stress testing frameworks in a manner that captures the unique risks of the products they clear and to focus on the core risks they manage (e.g., market, credit, liquidity, and operational risks) and the typical period of risk for centrally cleared products.

Climate-related Financial Risk

Climate risks are usually categorised as either relating to physical risks or transition risks. Further granularities in classification may be developed with other considerations taken into account depending on the context.

Physical risks are generally are characterized by harm caused by acute, climate-related events such as hurricanes, wildfires, floods, and heatwaves; and chronic shifts in precipitation patterns, sea level rise, and ocean acidification. Transition risks generally are characterized by stresses to certain financial institutions or sectors that result from shifts in policy, regulations, customer and business preferences, technology, credit or insurance availability, or other market or social forces that can affect business operations. The potential impacts of both physical risks and transition risks are generally highly dependent on the unique characteristics of a CCP and its offerings, but it is important to be mindful of the short-term period of risk a CCP manages, as compared to the period of time in which the impacts of climate risk may be realized.

[85] CCP12, Response to ESMA's call for evidence on an approach to Climate Risk Stress Testing of Central Counterparties (April 2022), CCP12, Response to CFTC's Request for Information on Climate-Related Financial Risk (October 2022)

4. CCP DATA AND RESILIENCE IN 2022

4.1 CCP TRANSPARENCY

Transparency is foundational to efficient, fair, and sound financial markets. With that in mind, over the years, CCPs have adopted best practices to further promote confidence and provide the market with a level of comfort that CCPs have robust risk management frameworks and maintain adequate resources. CCPs have had a long-standing practice of providing publicly available rulebooks, which are the contracts that determine and organize market participants' rights and obligations.

CCPs also prepare public qualitative disclosure frameworks in accordance with the internationally recognized PFMIs published in April 2012. To complement the disclosure frameworks, CCPs also publish quantitative data quarterly in accordance with the Public Quantitative Disclosure ("PQD") standards published in February 2015. A more comprehensive summary of the history of CCPs' disclosures can be found in the CCP12 Paper "Perspective on Transparency" published in November 2021.[86] The following sections present a selection of the most important CCP disclosures with selected analysis for 2022.

PQD

In 2015, CPMI-IOSCO published PQD standards for CCPs as an important component of the set of PFMI public disclosure requirements, while also encouraging CCPs to use a common PQD template. CCP12 supports CPMI-IOSCO's efforts to improve the level of standardization and transparency of CCP disclosures.

Our members collaboratively worked to create a common PQD template in 2015 and officially released the CCP12 PQD Template in 2017. Several updates of the document have been provided over the years, notably the latest CCP12 PQD template was published in February 2021, and the PQD Frequently Asked Questions ("FAQ") Guide. The latter provides details of the CCP12 PQD Template such as 'Disclosure Title', 'Reference', 'Description' and 'Reporting Frequency', as well as an FAQ section for each disclosure, to give additional guidance to market stakeholders when evaluating a CCP's PQDs. The further updated PQD FAQ Guide in May 2022 will continue to help guide all market participants to interpret CCPs PQDs.

In light of CCP12's ongoing market engagement with CCP12 members, global market participants and regulators, a change in the PQD publication timeline from three to two months after the quarter-end was made in May 2022 which has been recognised as a positive step to aiding market participants' ability to obtain PQD data more swiftly, without compromising the CCPs requirements for data accuracy, internal approvals, and, in some cases, regulatory approvals. This is part of CCP12's ongoing efforts to enhance and accommodate market views to address better risk management practices across the industry.

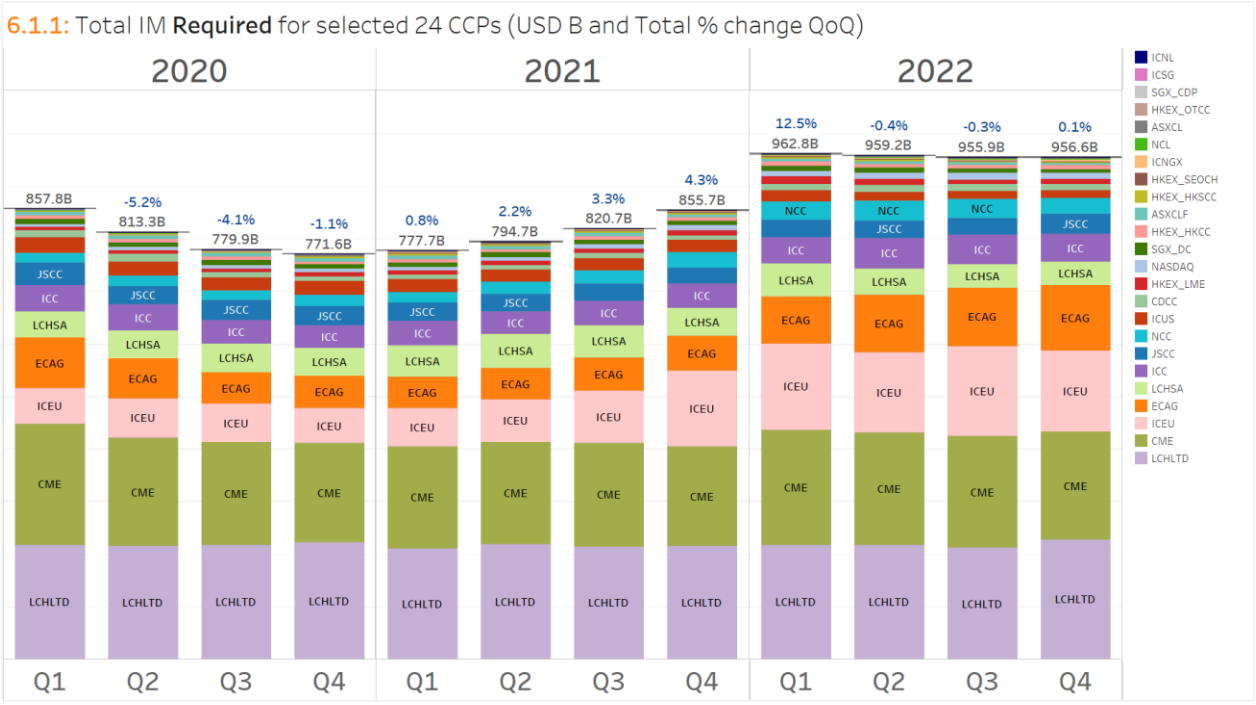
4.2 IM, VM AND DF ANALYSIS

The PQDs provide market participants with a high level of transparency into the cleared markets through various disclosures. The high level of standardization across the disclosures makes it straightforward for market participants to analyse cleared markets across each CCP.[87, 88, 89]

In the following sections, we explore the trends across IM, VM, and DF data with a special focus on the developments throughout 2022. For this we have looked at a broad group of CCP12 members' PQDs and analysed the developments from Q1 2020 until Q4 2022 across a selected 24 CCPs detailed in the subsequent pages, unless otherwise stated in the charts and descriptions.[90]

[86] CCP12, Perspective on Transparency (November 2021)
[87] CPMI-IOSCO: Public Quantitative Disclosure Standards for Central Counterparties (February 2015)
[88] CCP12 PQD Template
[89] CCP12 PQD FAQ
[90] Selected global 24 CCPs (from the CCP12 membership)

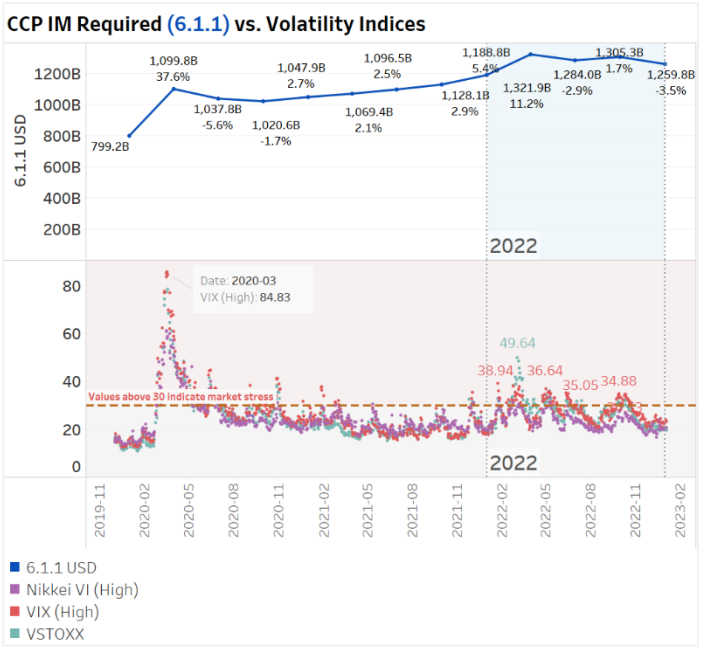
4.2.1 TOTAL IM (REQUIRED) ANALYSIS

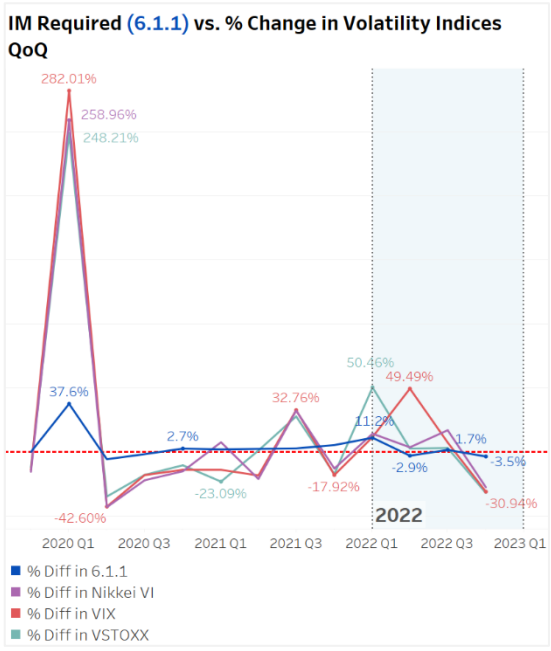


The chart above provides an overview of the Total IM (Required) levels for the combined 24 selected CCPs between 2020 and 2022. For the year under review, IM levels in 2022 were higher than those of the previous year, however, remained stable quarter-over-quarter.

It is important to note that margin increases are related to various factors. Overall, the crisis in Ukraine served as a reminder of the importance of effective risk management and the need for robust margin requirements in financial markets. In comparison to VM (as we see in section 4.2.3), changes in VM were much more significant.

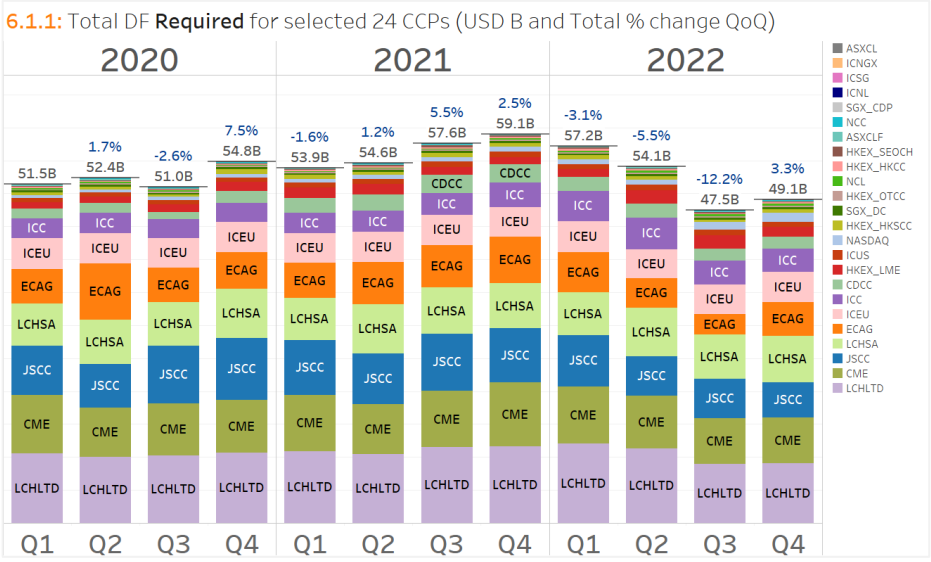
4.2.1.1 IM (REQUIRED) VS. VOLATILITY INDICES (All GLOBAL CCPS)





The charts above provide an overview of the global CCP IM (Required) vs volatility indices (**for all 33 CCP12 members who publish PQDs – equivalent to 52 CCPs**). As can be seen from the chart on the LHS, for 2022, global IM (Required) levels remained stable and relatively flat from 2022Q1 to 2022Q4, despite significant geopolitical market stresses and heightened market volatility denoted by the Nikkei VI, VIX, and VSTOXX. When comparing with the chart on the RHS which denotes the percentage change in the IM and volatility indices QoQ, we observe that for 2022Q1 and 2022Q2, global IM (Required) increased by 11.2% and decreased by -2.9% respectively. For the same period, the VSTOXX saw a 50.46% increase in Q1 and the VIX saw a 49.49% increase in Q2 indicating the stresses in the equity markets. However, during this period IM (Required) levels remained subdued, owing to the robust and well-calculated margining practices at CCPs.

4.2.2 TOTAL DF (REQUIRED) ANALYSIS

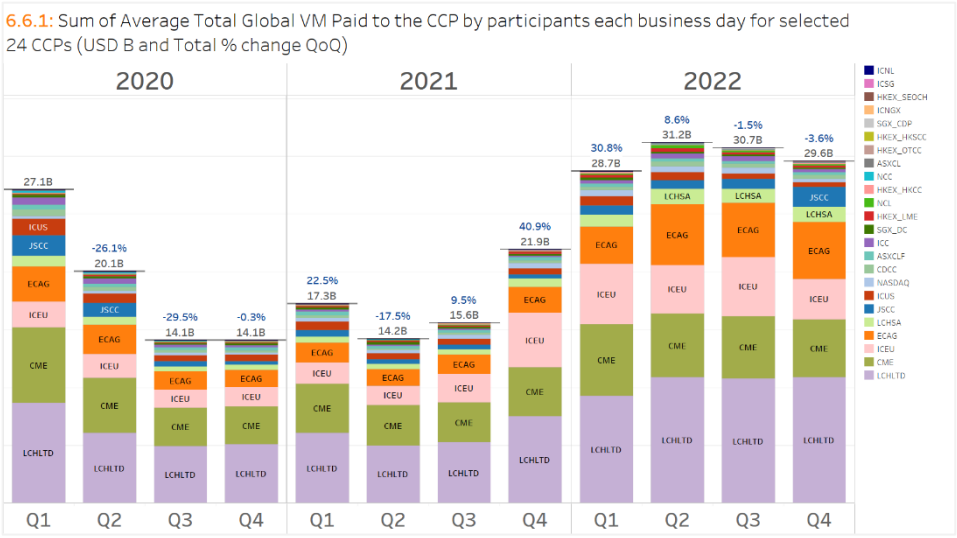


The chart opposite (Total DF (Required) Analysis) provides an overview of the DF levels from 2020 – 2022. The DF levels are the funds set aside by CCPs to cover potential losses in case a CM defaults on its obligations.

During the height of the COVID-19 pandemic in 2020, DF levels began to increase, until the end of 2021.

As seen for 2022, the DF levels reduced from USD 57.2B in 2022 Q1 to USD 49.1B in 2022 Q4. It is important to note that while the DF decreased, the IM increased for 2022, offsetting this amount (shown in the previous page).

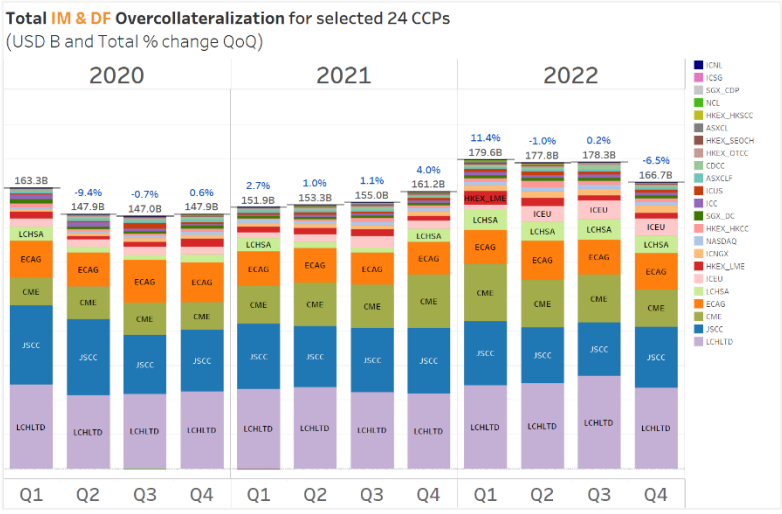
4.2.3 TOTAL VM ANALYSIS



Since the start of 2022, the VM levels have remained heightened, compared to the previous years. The Russia-Ukraine war caused market turbulence, which led to increased volatility in certain financial markets.

As can be seen, the average total global VM paid to CCPs by their participants each business day (selected 24 CCPs) reached in excess of USD 28B from 2022 Q1 onwards.

4.2.4 TOTAL IM AND DF OVERCOLLATERALISATION[91]



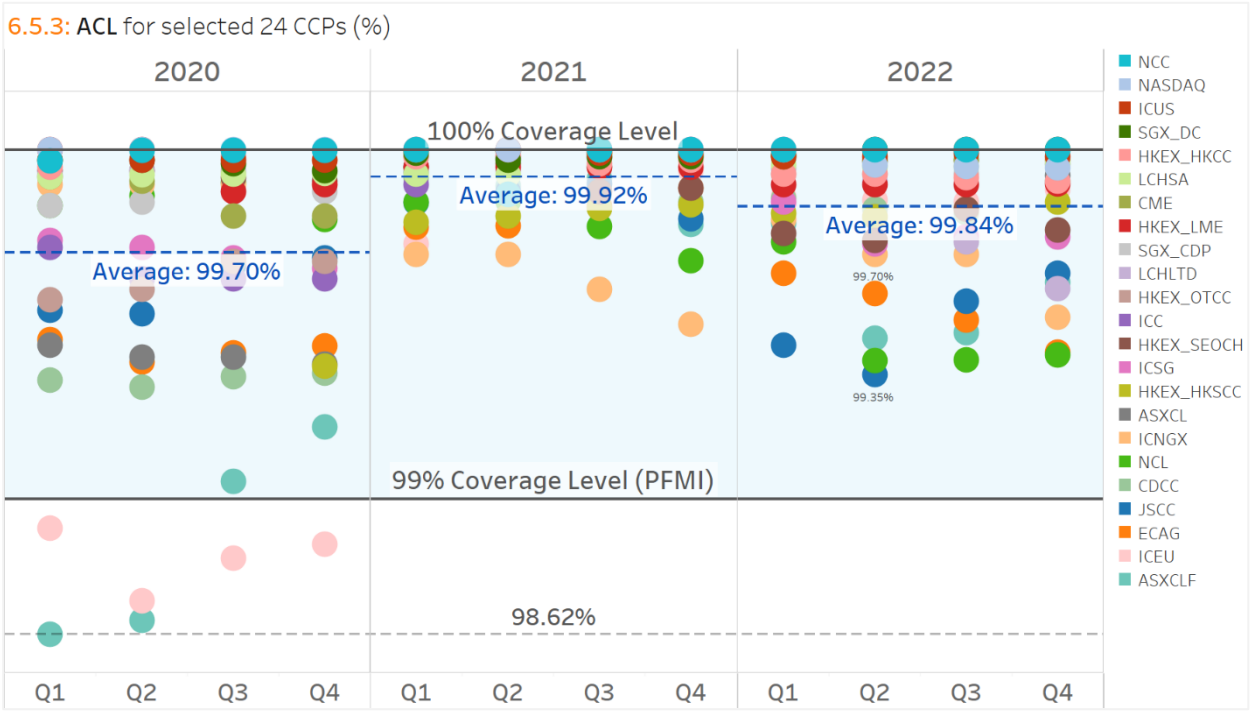
The chart opposite (Total IM and DF Overcollateralization) indicates an overview of the total overcollateralization per CCP, reported at the quarter-end.

Global CCP Overcollateralization provides a sense of how a CCP is collateralized when comparing the IM and DF held amounts against their respective required amounts.

For 2022, CCPs were approximately 10% more over collateralized in aggregate across all 24 CCPs, however on an individual CCP level, this differed as can be seen from the chart.

[91] Calculated as (Total IM and DF Held PostHaircut) minus (Total IM and DF Required). Disclosures (6.2.15 + 4.3.15) – (6.1.1 + 4.1.4) = Total Overcollateralization

4.2.5 RESULTS OF BACKTESTING OF IM – ACHIEVED COVERAGE LEVEL (ACL)



The chart above (Results of Backtesting of IM – Achieved Coverage Level (ACL) indicates how the ACL for the selected 24 CCPs has changed over time since 2020. The blue dashed line indicates the average percentage per year across all 24 CCPs combined: 99.70% for 2020, 99.92% for 2021, and 99.84% for 2022.

Backtesting is an important technique that a CCP utilizes to affirm that its IM model is performing as expected and that the assumptions within the model are appropriate. A CCP should assess its IM coverage by performing an ex-post comparison of observed profit and loss moves of a given portfolio against the IM required.

According to the PFMIs, a 99.00% coverage standard is used for backtesting a CCP's IM model, however, a CCP may use a higher (percentile) benchmark. As can be seen from the above metrics, global CCPs on average achieved above 99.00% in all instances from recent years indicating the appropriateness of their margin models.

For 2022, we see that all CCPs selected had an ACL of 99.35% and above, where the majority of all the CCPs selected had an ACL of 99.70% and above, beyond that of the standard PFMI requirements. For further information, please see the CCP12 White Paper – Primer on Initial Margin.

4.3 CCP CORE SYSTEM AVAILABILITY AND OTHER STATISTICS

As part of the PQDs, CCPs report the quantity and duration of operational failures affecting their core clearing systems over the previous 12 months on a quarterly basis, where:

- **Core Systems:** enable the acceptance and novation of trades and provide the calculation of margin and settlement obligations.
- **Loss of Availability:** an incident that results in an interruption of the CCP's ability to perform its own functions in relation to trade acceptance and novation or calculation of margin and settlement obligations. An incident that compromises the CCP's ability to correctly perform the aforementioned functions is also considered a 'loss of availability', even if there is no actual outage. Failure to a back-up site without interruption to services would not count as a loss of availability.

54 CCPs, under PQD disclosure 17.4, on average reported a 99.97% core system availability for the previous 12-month period spanning January 1, 2022, through December 31, 2022. This demonstrates the high degree to which global CCPs remained operationally resilient during 2022 and were able to meet the demand of the clearing processes without the need to close operations, or reduce operations.

4.4 CCP12 QUARTERLY TRENDS REPORT

For further statistics please see the release of the CCP12 PQD Quarterly Trends Report released in mid-June 2023. Further details can be found at: **https://ccp12.org/pqd/**

5. CASE STUDIES

CCP12 MEMBER CASE STUDIES INCLUDED:

CCP		CASE STUDY
CME + Eurex	*CME Clearing + Eurex Clearing*	Comparison of porting mechanisms in EU and US regimes
ComDer	*Comder Contraparte Central S.A*	The origins of OTC trade repositories and the benefits of the new derivatives trade repository in Chile: Personal view by Pablo Rodriguez, CRO, Comder CCP
ICE	*Intercontinental Exchange*	The implementation of IRM 2.0 at ICUS
NSE	*National Stock Exchange of India Ltd*	Successful migration to T+1 settlement cycle in India
SHCH	*Shanghai Clearing House*	A stress test on legal risk in CCP default management – China's first financial market test case

Disclaimer: The following case studies reflect the views and opinions of the authors from the respective CCPs and do not necessarily represent the position of all CCPs which are members of CCP12.

CME Group EUREX

6. CME AND EUREX: COMPARISON OF PORTING MECHANISMS IN EU AND US REGIMES

Abstract

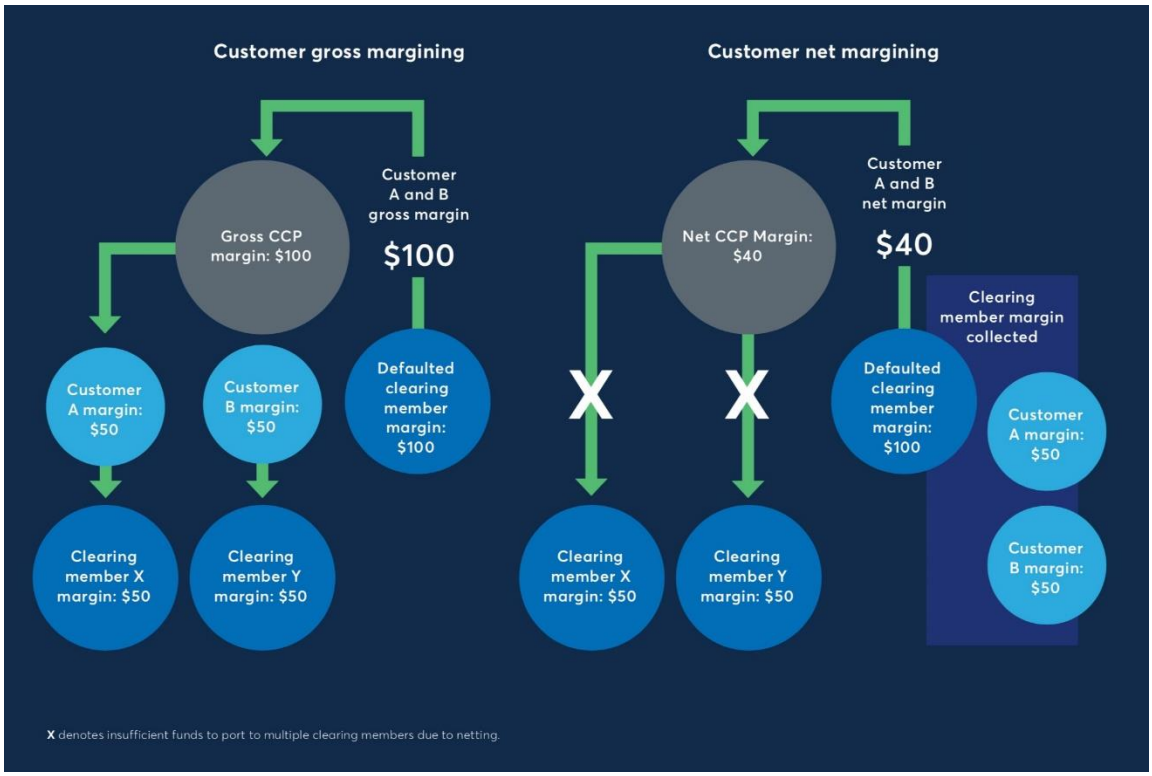
In the event of a Clearing Member default at a CCP, CCPs endeavor to transfer client positions and collateral from the defaulting Clearing Member to a non-defaulting Clearing Member, often referred to as "porting". Porting enables the clients of the defaulting Clearing Member to maintain their exposures, ultimately providing them continuity of clearing services. However, we have observed that due to the differing regulatory frameworks (e.g., account segregation), which leads to different risk management practices at CCPs across jurisdictions, CCPs employ different approaches to porting. The two case studies that follow outline the differences in how porting may occur at Eurex Clearing, a European-based CCP, and CME Clearing, a U.S.-based CCP regulated by the CFTC.

6.1 CME Clearing's Case Study on the Customer Porting Process

The following paragraphs in this case study outline the porting process for customers of a theoretical defaulted clearing member at CME Clearing, a CFTC-registered CCP. The ability to successfully port customers of a defaulted clearing member of CME Clearing registered as a Futures Commission Merchant ("FCM") ("Clearing Member")[92] is an essential component of CME Clearing's DMP.[93] The overarching goal of the porting process is to find a healthy Clearing Member to take on the customer accounts, including positions and margin, of the defaulted Clearing Member as soon as practicable. This is intended to provide uninterrupted market access to the customers of the defaulted Clearing Member. Over the years, CME Clearing has established a robust porting process in coordination with its Clearing Members.

In addition to CME Clearing's DMP, the likelihood of porting success is increased as a result of CME Clearing's gross margining practices for **all** customers. In particular, with customer gross margining, CME Clearing sets the minimum performance bond level as the sum of the requirement calculated for each individual customer account, meaning a customer's positions cannot offset another unaffiliated customer's positions, as is permitted in a net margining regime. Gross margining improves the likelihood of porting as a result of each customer's positions being independently fully margined at the CCP-level, which provides the flexibility to port to multiple different Clearing Members if necessary and appropriate. In comparison, a CCP that allows for customer net margining may find it more difficult to port, as there is insufficient margin at the CCP to cover each individual client's position on a standalone basis and receiving clearing members would likely be reluctant to take on individual customer portfolios that are under margined, particularly in times of market distress. In particular, a CPMI-IOSCO report on *Client clearing: access and portability* rightfully notes that "*net margined accounts may be more challenging to port than gross margined accounts…If the client accounts subject to net margining change as the accounts are transferred, either by including additional accounts or by splitting the accounts, the margin offsets could change. Where margin offsets change, there is a risk that the client's margin requirement will increase and the collateral held for such an account may be inadequate at the receiving*" clearing members.[94] As an example, below is a simplistic diagram that outlines the additional flexibility gross margining provides compared to net margining when porting clients:

[92] Note, this definition of "Clearing Member" is only applicable with respect to CME Clearing's case study on the customer porting process.
[93] CME Clearing has, historically, always been successful in porting the direct customers of defaulted Clearing Members.
[94] CPMI-IOSCO, Client clearing: access and portability, page 11 (September 2022)



To improve the probability of successful porting of a customer's positions, CME Clearing conducts "white knight" analysis that is designed to, on an *ex ante* basis, identify Clearing Members with similar and/or complimentary risk and business profiles to leverage in managing a default. As part of this analysis, CME Clearing examines Clearing Members' customer profiles, exchange memberships, financial resources, capital requirements, and other factors, as applicable. While this analysis cannot guarantee porting, it provides a means to proactively manage the risk of a potential or actual Clearing Member default. However, CME Clearing does gauge Clearing Members' interests in accepting customers for porting in the event of a Clearing Member default during regular Clearing Member due diligence visits.

Further, CME Group Exchange Rules, as required under CFTC regulations, provide CME Clearing with the immediate right to transfer non-defaulting customer positions and associated margin value from a defaulted Clearing Member to another Clearing Member through a bulk transfer. This is supported by CME Group Exchange Rules that require each Clearing Member to grant a first-priority, unencumbered security interest in all collateral posted to CME Clearing. CME Clearing would consider executing a bulk transfer given the prevailing facts and circumstances and, in an effort, to successfully port customers in a timely manner. This bulk transfer approach through "negative consent" has successfully allowed CME Clearing to port customers to non-defaulting Clearing Members efficiently and quickly, allowing customers to continue to maintain market access and manage their risks. Customers who have been ported to a non-defaulting Clearing Member at the direction of CME Clearing (in conjunction with the defaulted Clearing Member, its bankruptcy trustee or the CFTC, as applicable) have the right to subsequently transfer their accounts to a new Clearing Member of their choice. Additionally, the CFTC has adopted requirements to facilitate porting in its bankruptcy rules, such as CFTC Regulation 190.07(b)(3) which allows up to six months for the transferee to re-paper required disclosures and CFTC Regulation 190.10 which allows for the transfer of the KYC paperwork to the transferee FCM.

The porting process is designed to be equitable and timely. CME Clearing further supports the ability to successfully complete this process by including porting exercises in its regular default management drills. These drills are designed to ensure that all Clearing Members that support customer clearing are familiar with CME Clearing's porting process, communication protocols, and systems used by CME Clearing to collect and distribute customer information.

With CME Clearing's robust risk monitoring measures, where a Clearing Member is showing signs of significant distress, CME Clearing initiates the process of evaluating healthy Clearing Members who support customer clearing, leveraging the information from the "white knight" analysis, while also collecting as much information as practicable

on the distressed Clearing Member's customers and their portfolios. Leveraging the information gained through "white knight" analysis, CME Clearing is better prepared to identify one or multiple potential Clearing Member(s) that are well suited to take on the distressed Clearing Member's customers in a timely manner and communicate any necessary information to those identified Clearing Members in order to gauge their interest in accepting customers for porting. While porting the customer of a defaulted Clearing Member to a single non-defaulting Clearing Member may be the most efficient course of action, this solution may not always be available. Where a single non-defaulting Clearing Member cannot take on all the customer accounts of a defaulting Clearing Member, CME Clearing will endeavor to identify multiple Clearing Members in good standing that are able to accept one or several subsets (e.g., account type or asset class groupings) of the defaulted Clearing Member's customers.

The porting process includes the following elements, and is designed to be completed within the MPOR:

Customer Information

Having comprehensive information on a defaulted Clearing Member's customers is critical to supporting an effective porting process. This includes, but may not be limited to, the following customer information obtained from the Clearing Member:

- Identifying information about each customer including a legal entity identifier if available;
- Customers' relationship with other Clearing Members (if any);
- Portfolio and position details; and
- Information about daily settlement VM and IM collateral.

A substantial amount of information is available as a part of CME Clearing's ongoing risk management processes and daily reporting requirements. As required by CFTC regulations, CME Group Exchange Rules require Clearing Members submit daily reports to CME Clearing that include legal entity identifiers and end-of-day gross positions of each individual customer account within a segregation origin. This provides CME Clearing with transparency into the risk profiles of each Clearing Member's customers. Further, daily reporting requirements for ETDs require that customers' positions that exceed reportable levels be identified to CME Clearing, referenced as "Large Traders". While CME Clearing continually monitors the changing exposures of a Clearing Member's customer accounts, these Large Trader customers are subject to heightened daily monitoring. Although CME Clearing has access to a substantial amount of information through its ongoing risk management practices, the defaulted Clearing Member's assistance with respect to providing more granular information about certain customers may be helpful in supporting an effective porting process.

Identification of Potential Clearing Members to Accept Customers for Porting

As mentioned above, CME Clearing's "white knight" analysis endeavors to identify potential Clearing Members with the ability to accept customers for porting. When a Clearing Member is demonstrating signs of significant distress, CME Clearing will work with the Clearing Member to port the customers to the new Clearing Member, ideally prior to being declared formally insolvent or in default.[95] First and foremost, potential receiving Clearing Members must have the risk management expertise to accept the distressed Clearing Member's customers for porting. Generally, a Clearing Member may be considered a strong potential candidate for accepting a distressed Clearing Member's customers for porting if they satisfy the following:

- Have the CME Group Exchange memberships required to clear the products of the distressed Clearing Member's customers and demonstrated risk management expertise in the relevant asset classes;
- Demonstrate capital sufficiency to meet the increased financial obligations associated with accepting the distressed Clearing Member's customers—e.g., CFTC capital requirements for FCMs;
- Have the ability to take or make deliveries in relevant products, where applicable to the distressed Clearing Member's customers; and
- Have similar and/or overlapping customer bases to the distressed Clearing Member's and/or have the ability to risk manage the types of customers of the distressed Clearing Member.

[95] If the Clearing Member is insolvent and a petition in bankruptcy court has been filed, such transfers may be subject to the approval of the bankruptcy trustee and/or the CFTC. The CFTC's Bankruptcy Rules favor porting.

Once a potential pool of receiving Clearing Members for porting is identified, CME Clearing may rank these Clearing Members taking into account the number of overlapping customer relationships they have with the defaulted Clearing Member.

Communication with the Selected Clearing Members

Clearing Members selected to participate in the porting process are invited to download the customers' information from CME Clearing's web-based portal or take the information directly from the distressed Clearing Member if feasible. Customers' information, including on their portfolios, is distributed in standard formats, already established between CME Clearing and its Clearing Members via normal processes used in business-as-usual. CME Clearing employs rules-based confidentiality protections and pre-existing non-disclosure agreements, where applicable, to share confidential information with Clearing Members regarding customers. Clearing Members are then able to conduct analysis on the customers to decide on whether they are willing to accept them for porting or not. Once the participating Clearing Members have made their decisions, they communicate them via the CME Clearing Auction Platform or through email to CME Clearing. CME Clearing then evaluates these decisions and awards customer portfolios on a first-come-first-serve basis. If possible, and with all other factors being equal, CME Clearing uses its best efforts to pre-arrange the porting of a large group of customers to a single Clearing Member.

Porting of the Distressed Clearing Member's Customers to Receiving Clearing Member(s)

Once CME Clearing has evaluated the participating Clearing Member's decisions and awarded the customer portfolios, the positions and collateral of the customers are ported to the selected Clearing Member(s) following the same operational processes that are used by CME Clearing as part of its normal operations.

Non-Ported Customers

If CME Clearing was unable to port a customer or customers, they would be liquidated per CME Clearing's standard default management protocol and CME Group Exchange Rules. For liquidation of futures and options portfolios, CME Clearing has a roster of well-qualified bidders for each asset class and access to the central limit order book, and for IRS products, the participation in default management auctions is mandatory for all IRS Clearing Members.

6.2 Eurex Clearing's Case Study on the Client Porting Process

The following paragraphs in this case study outline the process and outcome for clients of a theoretical defaulted CM at Eurex Clearing, a major European CCP. Eurex Clearing assumes the defaulted CM to be a stylized top 10 CM at Eurex Clearing, with large and complex portfolio structure. Typically, such a CM would have 40 to 150 client accounts at Eurex Clearing. Describing the exact steps taken by each of these 100+ clients would be cumbersome. As such, Eurex Clearing presents a simplified representation of client account archetypes at Eurex Clearing in Table 1, serving as an illustrative example.

Under EMIR, which governs the majority of Eurex Clearing client clearing models, clients typically engage with the CCP on a Principal-to-Principal basis. This means that two trades are established: one between the CM and the CCP, and another between the client and the CM. Consequently, Eurex Clearing generally lacks a direct legal relationship with the clients of its CMs. Eurex Clearing has the technical capability to transfer a client's collateral and trades from one member to another, however, it cannot create a legally binding contract between the member and its client and thus, relies on its clients to reach a contractual agreement with a replacement CM prior to the execution of the transfer.

Eurex Clearing provides a designated "porting period" during which the client is given the opportunity to identify a replacement CM willing to accept the transfer of their positions and collateral. This porting period concludes at 1pm on the day following the default for all disclosed clients. However, upon client requests and subject to Eurex Clearing's approval, the porting period can be extended.

At Eurex Clearing, a CM with a significant number of substantial-sized clients is typically a large bank and often a systemically relevant institution. Therefore, the default of such a CM at Eurex Clearing is likely to be associated with high market volatility and sharp declines across various asset classes. The success of the porting process at Eurex Clearing largely depends on the willingness and capacity of CMs to onboard the defaulted client's portfolios. In the hypothetical scenario outlined in this case study, Eurex Clearing assumes that most institutions exercise caution, have a highly limited risk appetite, and face resource constraints.

Client at Eurex Clearing	Eurex Clearing Model/Segregation type[96]	Type of institution	Eurex Market[97]	IM (Mn €)	Number of existing clearing relationship at Eurex (excluding the defaulted member)
Client 1	NOSA	Unknown	ETD (FI & Equity)	500	0
Client 2	GOSA	Small arbitrage hedge fund	ETD (Equity)	10	0
Client 3	GOSA	Large liquidity provider	ETD (FI & Equity)	50	1
Client 4	ISA	Small pension fund	IRS	50	0
Client 5	ISA	Medium pension fund	IRS	100	1
Client 6	ISA	Large pension fund	IRS	250	3
Client 7	15 different ISA accounts (one per fund)	Large asset manager	IRS	15 times 30	2

Table 1: Hypothetical CM client set-up at time of Termination for Eurex Clearing

Upon the Termination of the CM, Eurex Clearing publishes a Termination notice on its website, informs relevant authorities, as well as CCP12 and all disclosed clients of the defaulted member. Eurex Clearing promptly initiates its hedging and liquidation procedures for the proprietary positions of the defaulted member, while clients commence their own porting procedures. We illustrate below the potential porting process on a client-by-client basis under Eurex Clearing's current regime:

Theoretical Client 1 at Eurex Clearing:

Market participants connected to Eurex Clearing in a Net Omnibus Segregated Account ("NOSA"), along with other clients, must be ported together[98].

Firstly, clients in a NOSA at Eurex Clearing must identify each other through the insolvency administrator's assistance (assuming they have been appointed). They can then coordinate to find a common CM to which they can collectively request to be ported. The chosen CM must accept all clients in the account, and likewise, all clients in the account must accept the replacement CM for the process to be successful. Due to the potential lack of familiarity among clients, this coordination is likely to extend the time required for porting arrangements and obtaining client consent, reducing the probability of a successful porting for NOSAs at Eurex Clearing.

Theoretical Client 2 at Eurex Clearing:

Eurex Clearing's Gross Omnibus Segregated Accounts ("GOSA") contain the positions of a single client, which are gross-margined, allowing for individual porting. Additionally, clients in GOSA are disclosed to Eurex Clearing, enabling communication between stakeholders and improving the chances of successful porting compared to NOSA.

However, the success of porting for GOSA clients at Eurex Clearing relies on the acceptance of a replacement CM, as well as express consent by the clients in the GOSA. The exact criteria for CM to accept a portfolio are not fully known to Eurex Clearing. It is expected by Eurex Clearing that CMs will generally be less inclined to accept new customers during the porting process compared to existing ones[99] due to regulatory and legal considerations (such as KYC/

[96] NOSA = Net Omnibus Segregated Account, includes an unknown number of undisclosed clients (to Eurex Clearing), which benefit from net margining within the account, and whose collateral is deposited in a shared pool that typically secures multiple client accounts. GOSA = Gross Omnibus Segregated Account, includes a single client disclosed to Eurex Clearing, and margin separately from any other clients, but whose collateral is deposited in a shared pool that typically secures multiple client accounts. ISA = Individually Segregated Account, includes a single client disclosed to Eurex Clearing, and margined separately from any other clients, whose collateral is specifically assigned to cover for this specific account.

[97] Main markets by client activity at Eurex are ETD (Exchange Traded Derivatives) including mainly Equity, Fixed Income and FX futures and options, and OTC IRD (Over-The-Counter Interest Rate Derivatives) including mainly FRA, IRS, and inflation swaps. Smaller asset classes also see some activity but are ignored in this paper for simplification.

[98] See CPMI-IOSCO Client clearing: access and portability (bis.org), page 22: "In jurisdictions that require pretransfer consent and offer net margining for clients, unanimous pre-transfer consent from all of the clients is necessary to move all the clients to a single CCSP".

[99] *Ibid.*, page 18: "CCSP that has agreed to be an alternative or backup is more likely to accept the client's positions held at a defaulting CCSP. However, an alternative or backup CCSP typically does not guarantee that it will accept any or all of the positions that need to be ported in any particular circumstance."

AML and establishing new contractual relationships), credit risk assessments, and prioritizing existing clients with long-standing relationships if resource constraints arise.

Client 2 has no further clearing relationships at Eurex Clearing and may turn to Eurex Clearing for assistance in the porting process. Eurex Clearing and Client 2 approach several surviving CMs to explore the possibility of porting. The success of porting for Client 2 heavily relies on the number of clients vying for porting, as it determines the CMs' ability to allocate resources promptly for accepting new customers.

Theoretical Client 3 at Eurex Clearing:

Client 3 (GOSA) benefits from having an alternative CM, significantly increasing its chances of a successful porting at Eurex Clearing. Client 3 would promptly approach its surviving CM to seek approval for porting. The CM is likely to assess the portfolio against its existing risk limits for this client. Typically, the CM requests portfolio data from Eurex Clearing, which, in turn, seeks consent from Client 3 to share the data. Upon receiving consent, Eurex Clearing provides the portfolio data. Its assumed Client 3 operates as a liquidity provider with relatively low risk portfolio (around €50 million IM) and high daily risk limits. As such, Eurex Clearing anticipates that the CM should be able to grant approval expeditiously as long as the risk falls within its predefined risk appetite for this client.

Theoretical Client 4 at Eurex Clearing:

Just like under GOSA-rules, Individually Segregated Accounts ("ISA") are disclosed to Eurex Clearing and gross margined. Unfortunately, Client 4 did not establish a second clearing relationship prior to the default, and therefore, Eurex Clearing assumes that Client 4 encounters the same challenges as Client 2.

Theoretical Clients 5 & 6 at Eurex Clearing:

Clients 5 and 6 have alternative CMs already in place, increasing the likelihood of successful porting at Eurex Clearing. Client 6 approaches its preferred CM, which coincidentally is also the only surviving CM for client 5[100].

Similar to the situation faced by client 2, the ability of CMs at Eurex Clearing to process clients' requests during porting may depend on market conditions. The number of clients and their existing or attempted alternative CM relationships during porting are likely to impact the capacity of CMs' of Eurex Clearing to handle client demand[101]. In this scenario, Eurex Clearing assumes that the CM is overwhelmed with requests and prioritizes addressing client 6 first, while client 5 is requested to wait[102].

Due to client 6's substantial directional position, Eurex Clearing expects the CM to conduct additional risk checks and follow detailed approval procedures to temporarily increase their risk limit[103]. However, Eurex Clearing assumes that by its cut-off time at 10 pm on the day following termination, the approval procedure for client 6 cannot be finalized. Furthermore, Eurex Clearing assumes in this scenario the risk assessment for client 5 has barely commenced (the CM received portfolio data from Eurex Clearing for client 5 around that time). Both clients request an extension of the porting period from Eurex Clearing. Eurex Clearing considers two factors in its decision:

- Level of collateralization[104]. For this example, Eurex Clearing assumes client 5 has a collateralization ratio of about 35% and client 6 has a ratio of 50%.
- Probability of successful porting based on the current progress of the process.

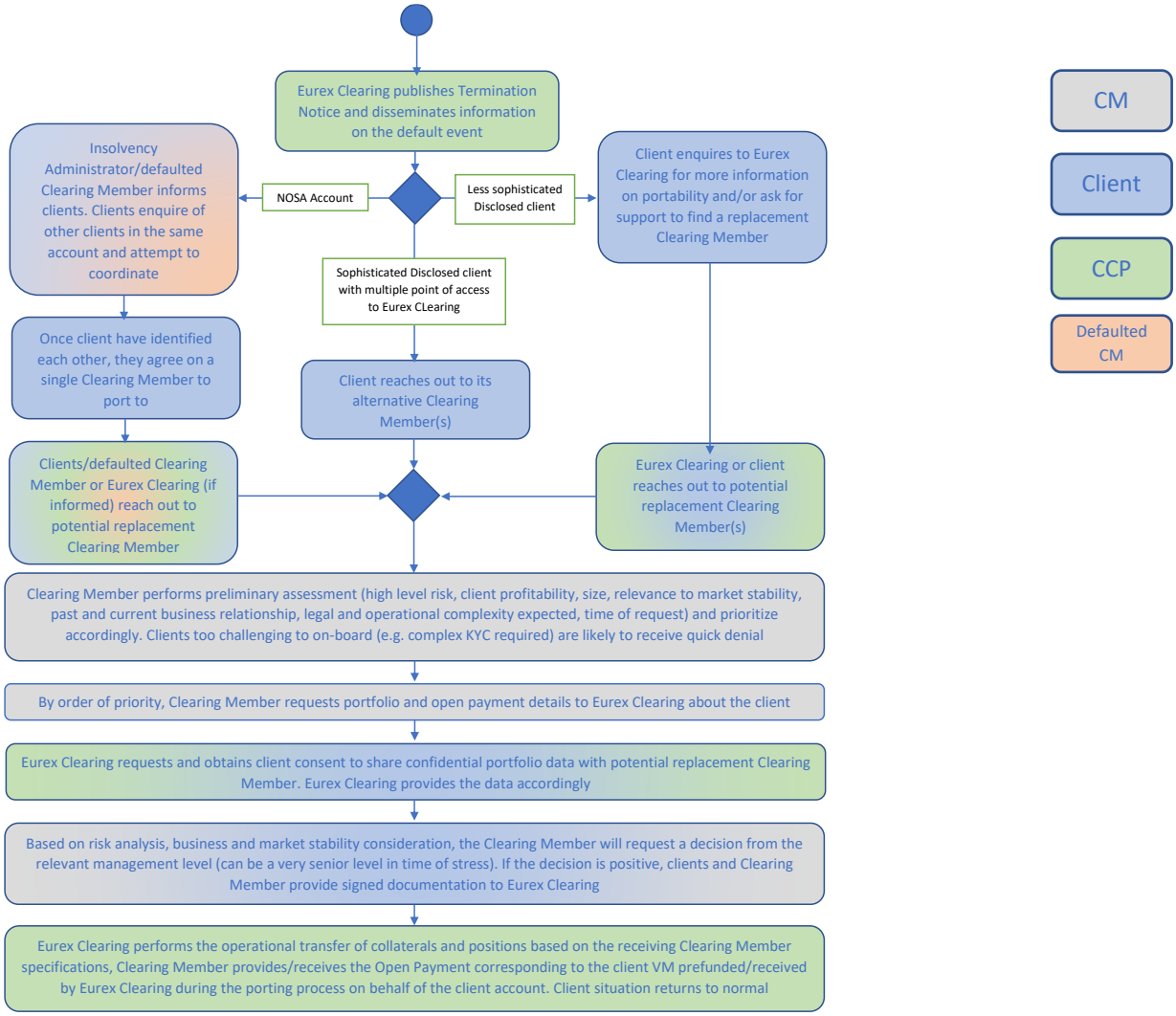
Eurex Clearing evaluates the probability of porting for each client based on their feedback and the feedback from their CMs. Eurex Clearing determines that the success probability for client 6 is relatively high due to the CM's significant progress in the risk assessment[105]. Although client 6 has a relatively low collateralization level, it is not immediately running out of margin. Eurex Clearing is likely to grant a 4-hour extension (until 5 pm) for client 6. Regarding client 5, the probability of successful porting is unknown in this scenario since the process has not started on the CM's side. Given the alarmingly low margin level, Eurex Clearing is likely to deny a porting period extension for client 5, resulting in its liquidation at 1 pm.

[100] Arbitrary for the sake of the example.
[101] *Op.cit.*, CPMI-IOSCO A discussion paper on client clearing, page 13: "Since porting a large number of clients quickly can be challenging […]".
[102] Also arbitrary for the sake of example. Eurex Clearing does not have access to its CM's ability to process high demand for porting, nor to assess fully how such member would prioritize if necessary.
[103] Exact process may vary from a member to another, but it is a general market standard to assess the risk on-boarded by a client prior to portfolio transfers/acceptance, even though this process may be accelerated in times of stress.
[104] Measured by Eurex Clearing as available collateral allocated to the account (as collateral value, meaning counting haircut discounts) divided by the Total Margin Requirements. The lower the ratio, the lower the likelihood of an extension.
[105] Eurex Clearing expects that the CM would be able to indicate a high probability of acceptance based on at least partial risk analysis at this stage.

Theoretical Client 7 at Eurex Clearing:

Client 7 operates under a "Fund Manager set-up" provided by Eurex Clearing. This means that a single fund manager manages multiple funds, each with its own legal entity. Although client 7 consists of 15 independent clients, they are represented by a single point of contact, the fund manager. This setup offers operational efficiencies while ensuring proper segregation of each fund. Despite having multiple ISAs and two existing CMs, it cannot be assumed that all CMs have completed the necessary KYC procedures for each of the 15 individual funds managed by client 7. Each fund is considered a separate client, and in this scenario, Eurex Clearing assumes that assessing all 15 accounts within the short porting period and limited resources during a stress scenario can be highly challenging[106].

As each of the accounts is considered a client of its own, the approval for porting can vary from one to the other. Additionally, if a porting period extension is requested, Eurex Clearing will decide on such request for each account independently, based on its level of collateralization. The number of accounts Eurex Clearing will successfully port is likely correlated to the availability of documentation for each of the accounts to the multiple CMs, the capacity of the member to assess many accounts, and the collateralization level of each account individually.



Internal

Figure 6-1: high level porting process at Eurex Clearing across stakeholders

[106] As already explained, this can highly vary depending on circumstances.

7. COMDER: THE ORIGINS OF OTC TRADE REPOSITORIES AND THE BENEFITS OF THE NEW DERIVATIVES TRADE REPOSITORY IN CHILE; PERSONAL VIEW BY PABLO RODRIGUEZ, CRO, COMDER CCP

Abstract

The opacity of the derivatives market was at the center of the stage of the GFC and fueled the panic seen during the worse days of the crisis. The American International Group ("AIG") problems revealed during the weekend of the Lehman default demonstrated that not enough information was available about the risk exposures of large financial institutions to the derivatives instruments and other asset classes and, for that reason, regulators were ready to make the necessary changes to improve transparency of key financial firms and restore confidence in the market. The inclusion of OTC derivatives Trade Repositories ("TR") was one of the big changes.

By centralizing the collection, storage, and dissemination of data, a TR can enhance the transparency of transaction information to relevant authorities and the public and, most importantly, they can promote financial stability.

Chilean regulators and the local financial community already benefited from the information provided by the local TR, especially to manage financial stability. Now, Chilean regulators can do stress tests of derivatives positions at the industry level, size collateral calls (especially in non-central bank money) and analyze the impact of extreme market volatility on non-bank institutions. In other words, Chilean regulators now have enough information about the risk exposures of large financial institutions in Chile.

7.1 PANIC FUELED BY OPACITY IS WORSENED DURING A FINANCIAL CRISIS

For the readers of my 2021 AMR case study, you will remember my tales as a market risk manager during the GFC. During this period, we witnessed broad panic across the markets, and I too experienced this panic myself. In fact, during the worst moments of the financial crisis, I decided to take some of my money out of the bank and keep it under my mattress. What created that panic in my mind was always the lack of information about the large financial institutions, especially in terms of derivatives (at that time, I was in charge of the market risk area of the IRD in a bank) and what was in its balance sheets, or using more formal academic words: panic was always fueled in my mind by the opacity in the information available to the public.

In the last years, many of the top US regulators in charge during the 2007-2009 GFC told their experiences in openly written books or through interviews about the GFC. Reading the books and interviews, particularly of the former Board of Governors of the Federal Reserve System Chairman Ben Bernanke, the former Treasury Secretary Hank Paulson, the former Federal Reserve Bank of New York ("NY Fed") Chairman Tim Geithner, and others emphasized the panic that they felt especially between September 13 to 16 of 2008, during the weekend of Lehman default. Mr. Bernanke, in his Nobel prize lecture, said: "I concluded that the financial panic was the primary cause of the GFC"[107].

But it was not Lehman's default that was the worst moment for Chairman Bernanke. He generally refers that the most terrifying moment of the crisis, and also the one that made him most angry, was the AIG situation that ended with an 85-billion-dollar bailout on September 16, 2008. Paradoxically, the size of the problem was just noticed by regulators by mid-day on September 13, 2008[108, 109].

[107] Ben S. Bernanke, Distinguished Senior Fellow, Brookings Institution, December 8, 2022. **Banking, Credit, and Economic Fluctuations,** Nobel Lecture.
[108] 60 minutes interview to Chairman Ben Bernanke, minute 5:15 of the interview
[109] Day 2: Responding to the Global Financial Crisis, former Federal Reserve Chairman Ben Bernanke and former Treasury Secretaries Tim Geithner and Hank Paulson, The Brookings Institution, minute 11 of the interview

7.2 THE AIG "SAGA"

Even though regulators had been dealing with the financial crisis for almost a year, the AIG situation was not a big concern for them until the weekend of the Lehman default. Regulators knew that AIG was having problems—its shares prices had been moving down all the previous week—but nobody expected a catastrophic situation with financial stability consequences globally. It was just during the mid-day of Saturday, September 13, 2008 that the bad situation of AIG started to surround the meeting rooms at the NY Fed, where all the regulators and bankers of Wall Street were meeting together to save Lehman Brothers. Around noon on that day, Treasury Secretary Hank Paulson received a piece of paper showing AIG's day-by-day liquidity. According to AIG's projections, the company would run out of cash in a few days[110, 111, 112, 113].

AIG found itself in such a situation mainly due to the activities of one division within the company, AIG Financial Products. That division wrote credit default swaps ("CDS") on over USD 500 billion of assets, including USD 78 billion on collateralized debt obligations relating to residential mortgages of which USD 63 billion had exposure to subprime mortgages[114].

AIG officials admitted on that day that part of the AIG liquidity problem stemmed from losses in its derivatives business and the impact of an imminent credit rating downgrade that would trigger the requirement to post additional collateral. That estimation of liquidity needs was around USD 40 billion on Saturday, then the next day (after Lehman was declared dead by regulators), the company's shortfall increased to USD 50 billion (USD 10 billion increase in just one day!). Finally, on September 16, 2008, the NY Fed provided an emergency USD 85 billion loan to keep AIG, a global company with about USD 1 trillion in assets before the financial crisis, from liquidity insolvency. At the end of the history, AIG lost USD 99 billion just in 2008 and received over USD 180 billion in taxpayer funds to prevent its default[115, 116].

After weeks of regulators communicating to the public that no more bailout or taxpayer money would be available to save another financial institution, they decided to rescue an insurance company. The argument given by the regulators was that the disorderly failure of AIG, the world's largest insurance company, would have undoubtedly led to even greater financial chaos and a far deeper economic slump than the very severe one that the world had already experienced[117].

This whole story reveals that the opacity of the derivatives market was at the center of the stage and fueled the panic seen during the worst days of the GFC. The AIG situation demonstrated that not enough was known about the risk exposures of key institutions to the derivatives instruments and other asset classes, and, for that reason, regulators were ready to make the necessary changes to improve transparency and restore confidence in the market.

7.3 G20 DERIVATIVES REFORMS, FMIs, CREATION OF TRs

As we know, the 2007-2009 GFC hit almost all developed nations and the G20 nations committed to make important regulatory reforms like Basel III framework – to support the resilience of the international banking system through higher capital as well as margin requirements for non-centrally cleared transactions, the OTC derivatives market reform where G20 leaders agreed to move it to central clearing and, where appropriate, exchange or electronic trading of standardized OTC derivatives, and the reform introducing reporting of all transactions to TRs.

The solution to the opacity in the derivatives markets was through the mandate of the G20 reforms that all OTC derivatives transactions should be reported to TRs. Essentially, a TR is an entity that maintains a centralized electronic record (database) of derivatives transaction data. For this reason, TRs have emerged as a new type of FMIs and have grown in importance in developed countries, particularly in the OTC derivatives market.

[110] Henry M. Paulson, On the Brink: Inside the Race to Stop the Collapse of the Global Financial System (2010)
[111] Timothy F. Geithner, Stress Test: Reflections on Financial Crises (2014)
[112] Ben S. Bernanke, The Courage to Act: A Memoir of a Crisis and Its Aftermath (2015)
[113] Fin. Crisis Inquiry Comm'n, Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the United States 352 (2011)
[114] AIG, Third Quarter 2007 Residential Mortgage Presentation, AIG 40 (8 November 2007)
[115] AIG, 2008 Annual Report, page 42
[116] Remarks of Commissioner Brian D. Quintenz, CFTC at the ICDA 39th Annual European Summit (Bürgenstock) (2018)
[117] Federal Reserve, Federal Reserve Board, with full support of the Treasury Department, authorizes the Federal Reserve Bank of New York to lend up to $85 billion to the American International Group (AIG) (September 2008)

At the same time, FMIs are multilateral systems among participating institutions, including the operator of the system, and it is broadly recognized that safe and efficient FMIs contribute to maintaining and promoting financial stability and economic growth. Due to the critical role that FMIs play in the markets, they have to be well managed and for that reason, regulators developed the PFMIs, which are the international standards for FMIs on risk management.

By centralizing the collection, storage, and dissemination of data, a TR can serve an important role in enhancing the transparency of transaction information to relevant authorities and the public, and the most important thing is that they are promoting financial stability. What we have seen in the last years is that the centralization and quality of the data that a TR maintains were able to improve the market transparency and the provision of this data to relevant authorities and the public in line with their respective information needs.

7.4 IMPLEMENTATION OF THE TR IN CHILE

Chile is not a member country of the G20, so the mandates mentioned before do not apply directly to Chile. However, Chile has been very fortunate to be a member of CPSS-IOSCO Steering Group which was responsible for the development of the PFMIs. For this reason, since the beginning of the implementation of the PFMIs standard, Chile has been promoting the implementation of the PFMIs to all local FMIs.

In 2015, the Central Bank of Chile and Chile's Ministry of Finance requested the World Bank to undertake a standalone Review of Standards and Codes ("ROSC") module of the PFMIs of the CPMI and IOSCO. This was a big step for Chile because it was the first recognition that the FMIs in Chile observe the standards written in the PFMIs.

But also, it was a big challenge for the Central Bank of Chile because, in the context of this PFMI assessment, it is worth noting that there was no recognition of a TR in Chile, or the legal and regulatory framework to cover TRs. Therefore, a formal assessment of TRs was not undertaken. The conclusion was that the Central Bank of Chile should develop a plan of action to remove the existing barriers – legal and technological – to develop a TR function that will enable Chilean authorities to meet international expectations and best practices in the global derivatives markets.

The Central Bank of Chile took the challenge and in the years after the assessment, all the legal and regulatory frameworks to mandate derivatives trade reporting were developed. Also, the Central Bank of Chile implemented the technological system that permits building a TR, which is called Integrated Derivatives Information System or SIID. In the established system, banks, institutional investors, and other residents that carry out derivative operations will report their transactions following the best practices and international recommendations.

The SIID started to release information on derivatives, traded by local banks, at the end of 2022, and as we will see in the next sections, the benefits of this information released by the Central Bank of Chile have been of high importance for all the Chilean market participants, and especially for ComDer, the derivatives Chilean Clearing House.

7.5 INFORMATION RELEASED BY THE CENTRAL BANK OF CHILE

Since the release of the SIID, the eyes of the Chilean financial community have been on the information provided by the Central Bank of Chile every day. The SIID has allowed the participants of these markets to access information not seen before. The information provided by the SIID is split into three different asset classes: FX, inflation, and rates.

The SIID shows the volume of derivatives traded by local banks. Also, keep in mind that Chile is a country with a nominal GDP of around 300 billion dollars. This information is to put in context the size of the local derivatives market. According to the SIID, the volume of FX products traded by local banks was 2.3 trillion dollars in the year 2022, split by 1.3 trillion in derivatives and 1 trillion in the spot market. Following the FX market, there was the IRD market with a yearly volume of 400 billion dollars in 2022. Finally, the smallest derivatives market in Chile was the inflation market with a volume of 200 billion dollars in 2022.

In terms of the desegregation of information provided by the SIID, here is where information started to get interesting. First, the SIID provided the volume traded by Chilean banks with the different types of counterparties named by: foreign entities, pension funds, insurance companies, brokerage houses, government institutions, real sector companies, and mutual funds.

Then the SIID also provides the information by the tenor which depends on the types of derivatives and how the time buckets are built. In the case of NDF, which is the most transacted derivative in Chile, the buckets are up to 7 days, 8 to 30 days, 31 to 90 days, 91 to 180 days, 181 to 360 days, 361 to 720 days, and more than 2 years. In the case of the IRD, the buckets presented are 3 months, 6 months, 9 months, 12 months, 18 months, 2 years, 5 years, 10 years, and more.

Third, and where the information gets even more interesting, is that the SIID provides the net volume by the side of the transactions done by counterparty types and by tenors. This means that in the case of NDFs, it is possible to know if counterparty types are buying or selling FX derivatives, and by which tenors. In the following chart, it is possible to appreciate how this information is shown.

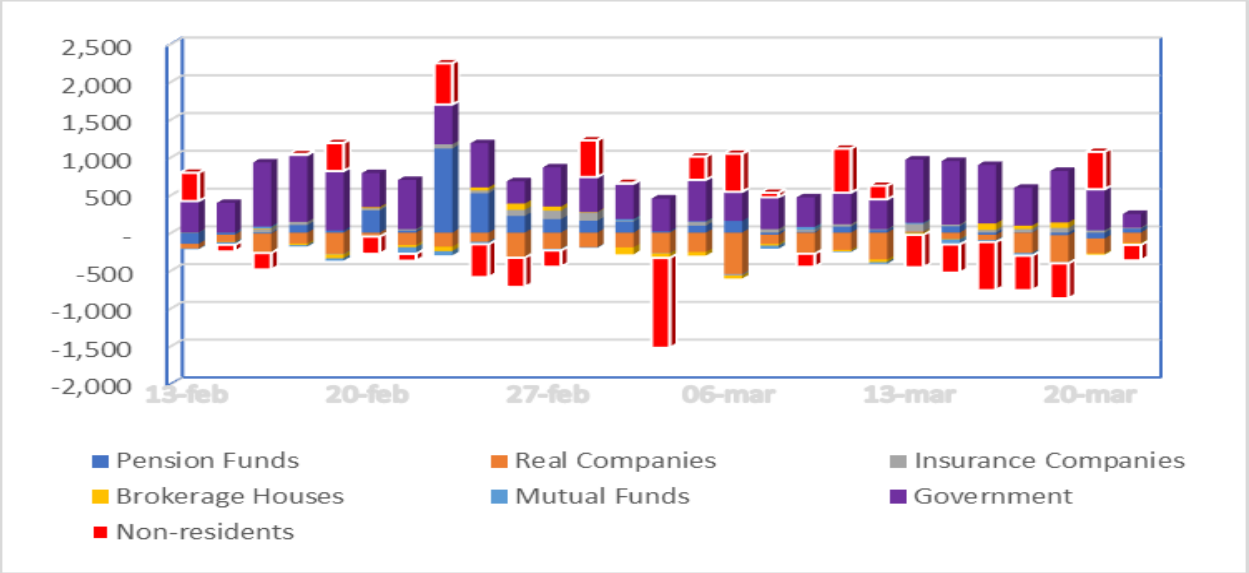


Figure 7-1 Net banks daily FX NDF turnover (millions of dollars)

For example, in this chart, it is possible to see how the FX intervention program is performed by the Central Bank of Chile every day (purple bar) and which sectors are absorbing the sales done by the Central Bank of Chile (you can see buying foreign entities represented by red bars).

Finally, and where all the information is useful for financial market stability is that the SIID also provides all the information previously explained for the outstanding position kept by the different counterparty types. In the next section, we will see all the benefits of this data for counterparty risk management purposes.

7.6 CONCLUSIONS

Since the release of the information presented by the SIID, there have been multiple benefits for the financial community in Chile. First, the data released by the Central Bank of Chile has been well received by the financial industry. It was possible to see this reception because, during Q1 of 2023, we did presentations to many top officials in the financial industry, in the public and the private sector, to show them the information provided by the SIID. It was incredible to see how everyone was surprised by the numbers. Remember that local banks in Chile traded ten times the Chilean GDP in derivatives. Everyone expressed gratitude for showing a complete map of the Chilean derivatives traded by local banks. It was something never seen before.

Second, the SIID is a big step related to the available information used by ComDer especially to manage counterparty risk in default scenarios. Now, it is possible to know with precision the liquidity in the markets for the derivatives

products cleared by ComDer. In addition, the information provided by the SIID of derivatives transactions done by counterparties different than banks permits the assessment of new possibilities of clearing, especially in client clearing.

Third, thanks to the SIID, the Central Bank of Chile, the Comision para el Mercado Financiero (local financial regulator), and the Minister of Finance will benefit from useful information to manage financial stability. In Chile, analysis like stress tests of derivatives positions at the industry level, collateral calls (especially in non-central bank money), and the impact of extreme market volatility on non-bank institutions are now possible thanks to the new Chilean TR. In other words, regulators now have enough information to know about the risk exposures of key institutions in Chile. Finally, I hope the story told here throughout this case study will help other countries outside of the G20 nations to develop TRs and benefit in the same way that Chile and its financial markets have done.

8. ICE: THE IMPLEMENTATION OF IRM 2.0 AT ICUS

Abstract

ICUS is a CFTC-registered DCO and provides clearing services for equity index, interest rates, and agricultural futures and options traded on ICE Futures U.S. which includes ICE's benchmark MSCI® equity index futures.

ICUS traditionally used ICE Risk Model 1 ("IRM1"), a parametric model, to calculate IM requirements for all of its cleared products. However, ICUS transitioned its equity index and interest rate contracts from IRM1 to IRM2 in Q1 2022 following a 12-18 month implementation phase with regulators, CMs, vendors, and customers.

IRM2 is the result of a multi-year effort within ICE to design, develop, and implement a new portfolio-based model. Migrating to such a new risk model is a large undertaking for a CCP due to the review and approval process across relevant committees, external validators, CMs, and regulators. In addition, implementing a new risk model requires a long lead-time for CMs and vendors, to understand impact to cleared portfolios and schedule required development and testing to integrate to the new model.

This case study provides an overview of why ICUS chose to implement a new risk model and the process undertaken to migrate from IRM1 to IRM2 for the equity index and interest rate contracts.

8.1 WHY MIGRATE FROM IRM1 to IRM2?

IRM1 is a parametric model within which a multiplicity of parameters are "defined" and are used for the ultimate computation of margin. The number of parameters required is currently in hundreds of thousands and are kept under constant review to ensure they remain representative of current market conditions. Most importantly, in addition to being operationally intensive, the use of specific parameters for each and every charge or credit is not optimally efficient from a statistical standpoint, particularly so when applying IM offsets between products.

IRM2, in contrast, models the portfolio as a whole rather than measuring risk by instrument and allows for all possible offsets to be reflected in the final IM value creating risk-appropriate capital efficiencies for CMs and their customers. At its core, IRM2 is based on established, best practices which aligns with the approach of CMs' own risk management approaches. The benefits of IRM2 include:

- **Accuracy & Risk-based Capital Efficiency:** Risk-based capital efficiency via portfolio level margining approach; Passing statistical tests (e.g., backtests, calibration, sensitivity and procyclicality analyses).
- **Responsiveness:** Dynamic reaction to changing market levels and conditions.
- **Stability:** Limiting procyclicality by avoiding big step margin changes in response to changing market conditions.
- **Ease of Implementation and Replication:** Enabling customer transition and adoption**;** Transparency with users.
- **Easily Maintained:** Scalability with increasing products**;** Automated design.

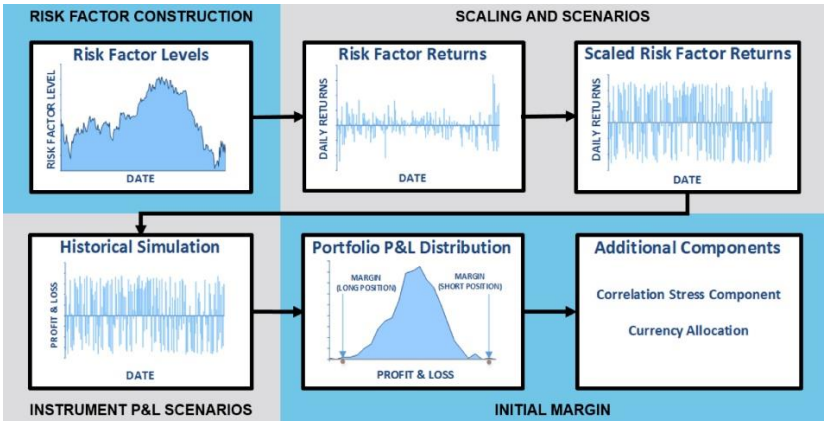
8.2 IRM2 METHODOLOGY

IRM2 utilizes a Filtered Historical Simulation ("FHS") Value-at-Risk ("VaR") approach that models the behavior of a portfolio as a whole rather than measuring risk on an instrument-by-instrument basis. IRM2 leverages a portfolio-level perspective by capturing all relationships and diversifying effects within a portfolio. Unlike IRM1, there is no need to configure the thousands of separate array parameters.

IRM2 IM FLOW

Risk Factor: Risk Factors are representations of the factors driving valuation changes. They may be a price, return or rate.

Risk Factor Construction: Risk Factors are constructed from prices of observable instruments.



Total IRM2 Margin Requirement

Scaling & Scenarios: The return Risk Factors are scaled in order to produce scenarios that reflect current market volatility and incorporate various risk and regulatory requirements.

Instrument P&L Scenarios: Instrument P&Ls simulations are generated by using top day risk factors derived prices, and scenario prices derived using scaled risk factor scenarios. Pricing functions are used in the transformation of the Top Day Risk Factors (Base Price) as well as Scaled Scenarios (Simulated Price) back to observable instrument prices.

IM: The instrument P&L simulations are aggregated at the portfolio level and then combined with other components designed to comply with regulatory and risk requirements producing a final IM.

The overall IRM2 portfolio margin requirement comprises two components, the portfolio's IM and separately, the portfolio's Liquidity Risk Charge ("LRC"). In turn, the IM and LRC components encompass sub-components which are designed to capture specific risk elements. Collectively, the risk elements support the deep granularity of the overall IRM2 model.

8.3 IRM2 IM Sub-Components

IRM2 IM consists of several sub-components which collectively estimate portfolio market risk based upon the network of instrument pricing relationships within the portfolio.

- **Base IM:** The Base IM represents the base market risk derived from the FHS and portfolio time series returns.
- **Correlation Stress Charge ("CSC"):** The CSC incorporates the potential impact of extreme zero correlation between the portfolio instruments.
- **Diversification Benefit Cap ("DBC"):** Similar to a spread charge found in IRM1, the DBC value represents an increase in IM that ensures offsets between different product groups do not exceed specific thresholds.

LRC Sub-Components
LRC estimates the cost of liquidating positions over the course of the margin horizon and consists of the two sub-components below:

- **Concentration Charge ("CC"):** The CC covers the additional risk associated with liquidating concentrated positions that exceed a predetermined volume threshold.
- **Bid-Ask Charge ("BAC"):** The BAC provides protection against liquidation costs arising from crossing the bid-ask spread of any given market. The BAC is applicable to all positions in all portfolios regardless of size.

8.4 MIGRATION FROM IRM1 TO IRM2

Migrating to a new risk model involves extensive coordination in the design, development, and backtesting of the model; independent validation; CM consultation; regulatory approval; completion of required governance; and external parallel testing and readiness. ICUS transitioned its equity index and interest rate contracts from IRM1 to IRM2 in Q1 2022 following

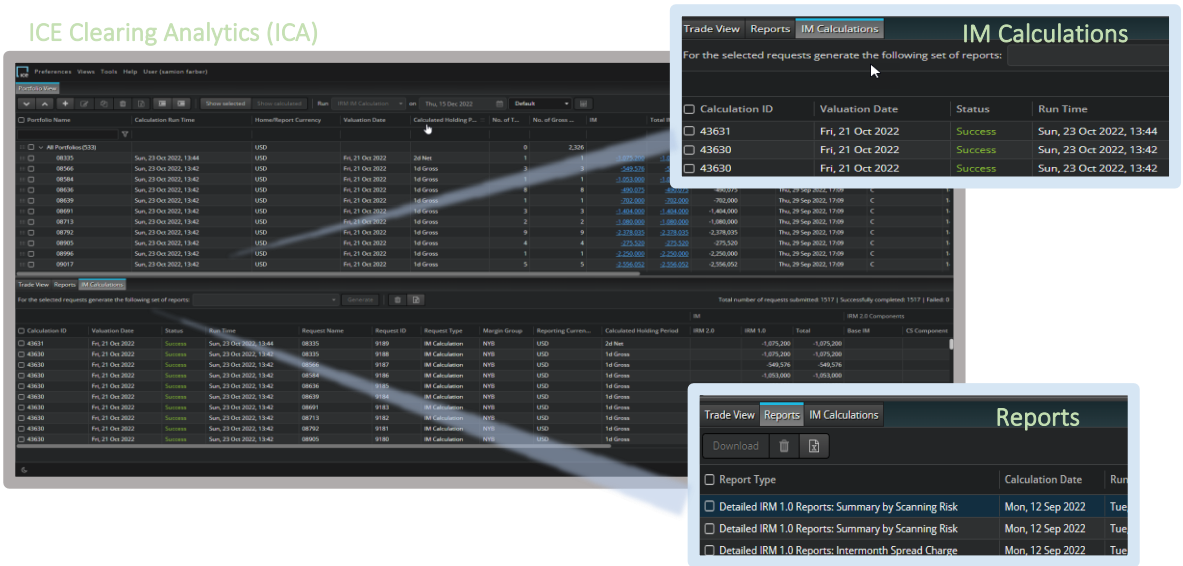
a 12-18 month implementation phase with regulators, CMs, vendors, and customers. Key milestones of the transition included:

- **Model Design & Development:** IRM2 was developed following current best practices in risk management and subjected to rigorous backtesting and sensitivity analysis.
- **CM Consultation:** ICUS held multiple detailed sessions with CMs to review and discuss the risk model and impact on cleared portfolios.
- **Independent External Validation:** ICUS enlisted established, industry experts from outside the organization to undertake independent review of IRM2 and its results.
- **Vendor & CM Readiness:** ICUS collaborated with vendors and CMs to update integrations to support replication of IRM2. ICUS operated IRM2 in parallel with the existing IRM1 model for a number of months. During this period, CMs had access to both IRM2 and IRM1 margin results and data allowing for direct comparison and review.
- **ICUS Governance:** Relevant internal reviews, and committee and board approvals were completed for the adoption of IRM2.
- **Regulatory Approval:** All model documentation, together with internal and external validation reports, were submitted to the regulator for its review and formal approval.

8.5 RISK MODEL TRANSPARENCY

ICE understands the importance of risk model transparency and the ability for CMs, vendors, and customers to be able to replicate margin requirements. The following options are available for margin replication:

- **ICE Clearing Analytics ("ICA"):** In conjunction with the IRM2 launch, a new web-based platform was launched to allow users to calculate IM and related margin add-ons. ICA fully supports IRM1 and IRM2. Users can:
    - Simulate margin calculations on combinations of portfolios and selected positions
    - View full margin composition of portfolios
    - Export portfolios, positions, and generated requests into Excel
    - Access a 24-hour ICA helpdesk for support when needed, as well as access training for CMs and their customers.
- **User Replication:** Daily parameter files can be consumed directly from ICUS to replicate IRM2, generally used by CMs and vendors for high frequency margin calculations.
- **Vendor Integration:** A number of vendors have integrated to ICUS to provide IRM2 margin services to CMs and customers.



8.6 FUTURE MIGRATION SCHEDULE

ICE is planning to extend IRM2 to support additional cleared products, and is actively working with regulators, CMs, and vendors in relation to energy contracts cleared at ICE Clear Europe.

9. NSE: SUCCESSFUL MIGRATION TO T+1 SETTLEMENT CYCLE IN INDIA

Abstract

Between February 2022 and January 2023, CCPs in India successfully migrated the settlement cycle for cash equities from T+2 to T+1, being one of the very few markets to achieve T+1 settlement in equities. The implementation in India is particularly remarkable considering a multilaterally netted delivery-versus-payment ("DvP") settlement in a fully interoperable framework. Trades can be executed on any exchange, margined, and settled through any CCP, and securities transferred in any CSDs, at the choice of the market participants.

Indian FMIs implemented the necessary procedural and system changes; and were able to settle the first trade under T+1 settlement within 6 months from regulatory enablement. The securities with least market cap were put under T+1 settlement to begin with, and subsequently, all securities were incrementally migrated under T+1 over the next 1 year in the order of their market capitalization. This approach helped successfully achieve a significant change within a short span of time and without any issues.

9.1 EQUITIES SETTLEMENT IN INDIA: OBJECTIVES AND ENABLERS FOR T+1 SETTLEMENT

9.1.1 BENEFITS AND RISKS OF MIGRATION TO T+1 SETTLEMENT

The essence of benefits and risks of shorter settlement cycles is well articulated in the PFMIs.[118] Longer settlement cycles result in greater exposure and consequent risk for the CCP and the market participant. *"The longer the period from trade execution to settlement, the greater the risk that one of the parties may become insolvent or default on the trade, the larger the number of unsettled trades, and the greater the opportunity for the prices of the securities to move away from the contract prices, thereby increasing the risk that non-defaulting parties will incur a loss when replacing the unsettled contracts (PFMI Annex C, 3.13)"*. In addition, earlier settlement reduces the collateral requirements for the participants and makes trade proceeds available to end investors much faster, thereby enabling quicker reinvestment or usage of such funds.

However, shorter settlement cycles may lead to issues, especially for foreign investors. As the PFMI note: *"Reducing the cycle is neither costless nor without certain risks. This is especially true for markets with significant cross-border activity because differences in time zones and national holidays, and the frequent involvement of multiple intermediaries, make timely trade confirmation more difficult […] substantial system improvements may be essential for shortening settlement cycles. Without such investments, a move to a shorter cycle could generate increased settlement fails" (PFMI Annex C, 3.15)".*

9.1.2 MARKET INFRASTRUCTURE IN INDIA

India has a vibrant equities market with wide participation. NSE, the largest exchange in the country, is the third largest in the world in terms of number of transactions.[119] NSE Clearing is a subsidiary of NSE and is the largest CCP in equities. However, there is no vertical integration between Exchange-CCP-CSD. There are three exchanges, two CCPs and two CSDs in India, with all of them being fully interoperable. The interoperability is achieved mainly by the linkages of CCPs with other market infrastructures. The CCPs provide clearing services for trades executed on all exchanges in India, and also maintain a peer-to-peer inter-CCP link to clear and settle trades executed on an exchange wherein the buy side and the sell side is sought to be cleared through different CCPs in India. The CCPs effectively manage the inter-CCP risk and carry out inter-CCP settlement in a DvP mode. The CMs can provide securities towards their obligations in any of the two CSDs in India and can also designate a preferred CSD to receive securities due to them. The CCPs manage inter-CSD movement of securities. Equities CCPs in India settle funds in commercial bank money; and have appointed several settlement banks for this purpose. NSE Clearing maintains

[118] CPMI-IOSCO, Principles for financial market infrastructures, Annex C, Recommendation 3. (April 2012)
[119] World Federation of Exchanges, Statistics (December 2022)

relationships with 15 settlement banks. Once again, the CMs have a choice of maintaining their settlement accounts with any of the banks.

CCPs in India have evolved highly capable systems and procedures to complete the entire settlements, including funds settlement in settlement banks, securities settlements in the CSDs, as well as inter-CCP DvP settlements within 2.5 hours.

9.1.3 MARKET PARTICIPANTS AND SETTLEMENT PRACTICES

The market participants in India can be classified into four broad categories: domestic institutional investors, foreign portfolio investors, proprietary trading firms, and non-institutional domestic clients. The contribution to the turnover in equities market by these four categories is approximately 11%, 14%, 27%, and 48% respectively.[120]

Indian regulations mandated shortening of settlement cycle from T+3 settlement to T+2 settlement in the year 2003, being one of the earliest jurisdictions to adopt T+2 settlement. While the settlement cycle remained as T+2 for nearly next twenty years, the last few years have seen practically the entire securities deliveries taking place on T-day or T+1 day itself, using the irreversible delivery instructions enabled by CSDs in India.

The CSDs in India allow submitting such irreversible delivery instructions in favor of the CCP at any time, including prior to the trade or any time after the trade until settlement. Such instructions are irrevocable and freeze the securities in the seller's account, which are certain to be delivered to the CCP on settlement day. In India, while such instructions are strictly optional, the margin requirements are exempted if and when such instruction is submitted. The margin exemptions have made these instructions a common practice among the market participants. Under T+2 settlement, most non-institutional investors in India submitted these instructions on T-day itself, while custodians for institutional investors submitted these instructions on reconciliation and trade confirmation by the end of business hours on T+1 day.

Further, the efforts by the government and the central bank have spurred a "digital payments boom" in India: the digital payments have grown with 50% annual growth rate over the past five years, while the growth rate for United Payments Interface ("UPI"), India's unique, real-time, 24x7 available mobile payment system, has been 160% annually.[121] Even the Real-Time Gross Settlement ("RTGS"), the large value payment operated by Reserve Bank of India (the central bank) is available on 24x7 basis.

With the advances in the payment systems and securities settlement systems in India, the situation was ripe for shortening of settlement cycles. Two key issues that needed to be addressed were: (i) additional time required by foreign portfolio investors, considering their requirement to convert foreign currency to Indian rupees ("INR"), for completing INR-denominated settlements; and (ii) procedural and technological changes required by the FMIs and securities industry to adopt the T+1 settlement cycle.

9.1.4 REGULATORY ENABLEMENT

Securities and Exchange Board of India ("SEBI"), the capital markets regulator, enabled the introduction of T+1 rolling settlement by FMIs in India, on optional basis, on September 7, 2021[122], allowing the exchanges to independently choose the securities they wish to designate for T+1 and T+2 settlement.

9.2 IMPLEMENTATION APPROACH

The FMIs in India had three key objectives while designing the implementation roadmap for T+1 settlement. These included: (i) achieving uniformity in settlement practices, (ii) ensuring early implementation with a clear roadmap, and (iii) ensuring smooth settlement processing for trades by foreign portfolio investors, considering the time zone differences and the need of currency conversions. These were addressed as follows:

[120] NSE, Market Pulse, Figure 112 (February 2023)
[121] IMF, "How India's Central Bank Helped Spur a Digital Payments Boom" (October 2022)
[122] SEBI, "Introduction of T+1 rolling settlement on an optional basis" (September 2021)

9.2.1 UNIFORMITY OF PRACTICES

The regulations allowed exchanges in India to exercise their choice of settlement cycle separately for each security and independently of decisions by other exchanges.

Under the interoperable framework, CCPs in India carry out net settlement of transactions in securities for trades across exchanges. While it may conceptually be possible to adopt the framework for a situation where a single security follows different settlement cycles across exchanges, such difference could have led to confusion in practice.

Although the regulations allowed for continuance of T+2, the FMs in India collaborated and agreed for a common approach. Committed to shortening settlement cycles, the FMIs agreed to implement T+1 settlement for all securities and also agreed to follow common timelines.

9.2.2 EARLY IMPLEMENTATION AND MIGRATION ROADMAP

The FMIs in India agreed for an early implementation and an incremental migration roadmap. The FMIs issued a joint press release providing the roadmap for implementation of T+1. It was agreed to introduce T+1 in few securities as early as February 2022, i.e., within 6 months from the date of regulatory guidelines, and thereafter incrementally migrate all securities under T+1 settlement by January 2023.[123] The exchanges decided to begin with the bottom 100 securities in terms of market capitalization and incrementally add the next 500 securities in terms of market capitalization. The last tranche of migration of about 250 securities in January 2023 contained the securities with highest market capitalization.

This approach provided a decisive clear roadmap for implementation, as well as allowed market participants some time to put in place the requisite systems and operational procedures, since the volumes are, generally and roughly speaking, in direct proportion with the market capitalization. Although this approach required parallel settlement under T+1 as well as T+2 depending upon the security, it de-risked the operational risks from a single day movement of all securities under T+1. Had any operational issues arisen in the early days of T+1 settlement – they would have had limited impact.

9.2.3 ADDRESSING THE NEEDS OF FOREIGN INVESTORS

As noted under PFMI, short settlement cycles can create more operational difficulties for trade confirmations for foreign investors, due to the involvement of multiple intermediaries such as global custodians and local custodians, currency conversions etc.

Without changing the prevalent timelines for trade confirmations by custodians, a late afternoon T+1 settlement would still have been possible, by implementing necessary changes and process optimizations at the FMIs in India. However, such settlement would have offered limited benefit to investors, as it may have been difficult to use the sale proceeds in money markets or securities markets/mutual funds etc. on the same day. The FMIs therefore decided to maintain the present settlement timings, i.e., pay-out of funds and securities to be given out by the CCP in India before 1330 hours.

Under the prevalent T+2 settlement in India, the trade confirmations for some limited non-institutional categories of foreign investors (e.g., family offices) needed to be completed by 1900 hours on the T-day itself, while the bulk of trade confirmations, on account of foreign portfolio investors, were permitted until 1 PM on T+1 day. Advancement of all confirmations by custodians to 1900 hours on T-day would have created substantial difficulties in timely trade confirmations. It was decided to reduce the advancement of confirmation timings as much as possible, while ensuring the same settlement timings (i.e., hours) when moving from T+2 to T+1 settlement in India. This required substantial changes at the CCPs as well as custodians, who devoted substantial time in the designing of the process and agreed on the trade confirmations to be completed by 0700 hours.

[123] NSE, Press Release: Roadmap for introduction of T+1 rolling settlement cycle in equity market (November 2021)

9.3 SETTLEMENT SCHEDULE AND PROCEDURES

This figure provides the operational activities and timelines under the T+2 and current T+1 settlement model in India.

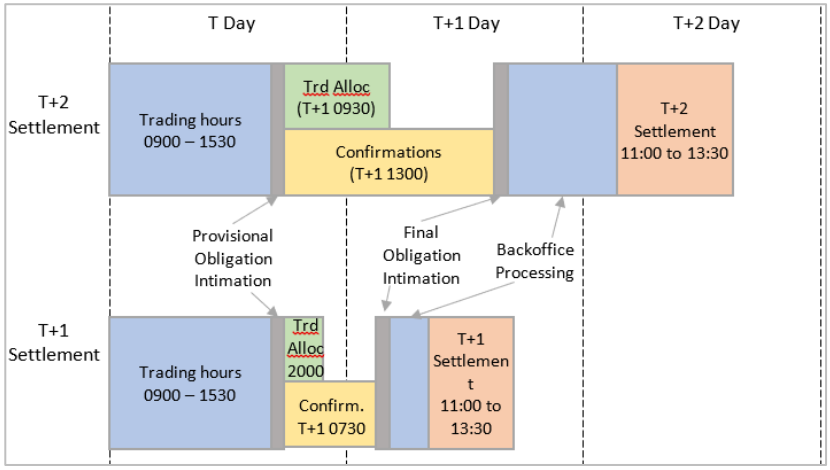


Figure 9-1 Operational procedures and timelines under T+2 and T+1 settlements

A brief description of the operational procedures and timelines in India is provided in the Table below.

Activity	T+2 settlement	T+1 settlement
Trading hours	T day; 0915-1530	T day; 0915-1530
Trade modifications (customer ID only)	T day; 1615	T day; 1615
Provisional obligation intimation (Pending trade confirmations)	T day; 1730	T day; 1730
Trade allocation (Identification of custodian for custodian settled trades)	T+1 day; 0930	T day; 2000
Reconciliation and trade confirmation by custodians	T+1 day; 1300	T+1 day; 0730
Final obligation intimation (based on actual confirmations)	T+1 day; 1430	T+1 day; 0900
CCP: Intimation of obligations to settlement banks and CSDs, inter-CCP reconciliation and determination of inter-CCP obligation etc.	*No defined timelines, but very limited turnaround time under T+1 settlement*	
Cut-off for pay-in of funds and securities by CMs to CCPs through settlement banks and depositories	T+2 day; 11:00	T+1 day; 11:00
Reconciliation of funds and securities received, inter-CCP settlement	*Intermediate processing*	
Pay-out of funds and securities by the CCP to receiving members	T+2 day; 13:30	T+1 day; 13:30

9.4 CONCLUSIONS

In general, the technology and infrastructure to shorten settlement cycle to T+1 may already exist with many CCPs and participants in the securities industry. The impediment to shorten the settlement cycle may not be an inadequacy of technology itself, but assessing and managing the change in complex interconnected legacy operational procedures spanning across several stakeholders, and the significant operational risks in case of any settlement failures.

NSE Clearing believes that migration under T+1 settlement in a small timeframe is a landmark achievement of Indian FMIs. A critical success factor for this achievement was stakeholder commitment, a staggered approach with early implementation for some securities, and a decisive clear roadmap for incremental migration of remaining securities.

10. SHANGHAI CLEARING HOUSE: A STRESS TEST ON LEGAL RISK IN CCP DEFAULT MANAGEMENT – CHINA'S FIRST FINANCIAL MARKET TEST CASE

Abstract

China has been committed to developing a modern legal framework for financial markets. China's first financial court, established in Shanghai, initiated the Financial Markets Test Case Scheme. In October 2022, SHCH together with 4 CMs, jointly filed the application for a case test on major legal issues in CCP default management. The test case is the first financial market test case in China and the world's first central clearing financial test case.

The case tests the legitimacy of SHCH's default management rules and the rationality of the DMP. Upon completion of procedures including materials and evidence submission, information disclosure, third-parties consultation, and public trial, the Court published the judicial opinion of this test case. The judicial opinion held that SHCH default management rules met the requirements of validity and were legally binding from a judicial perspective. The Court also recognized the rationality of SHCH's DMP.

The test case enhances the legal certainty of China's FMIs' rules and promotes compatibility with international financial market practices. Furthermore, it could serve as a useful reference for developing the legal framework for the cleared markets in global emerging economies.

10.1 INTRODUCTION TO THE FINANCIAL MARKETS TEST CASE SCHEME AND THE SHANGHAI FINANCIAL COURT

The Financial Markets Test Case Scheme ("the Scheme") refers to the proceeding in which financial institutions, transacting parties, or other parties concerned petitioned to the Shanghai Financial Court ("the Court") to consider, as a test case, any dispute in relation to facts and legal issues with high relevance to the market that may arise from a proposed or ongoing cutting-edge financial activity which requires urgent legal clarification, and upon the hearing of which the Court provides clear guidance on the rules to the financial markets. The judicial opinion for a test case could also serve as a reference for future rulings on similar cases. The Scheme is formulated to address the important, pressing, and typical legal issues in the financial markets, to meet the needs of financial innovation for clear legal guidance, to prevent financial risks, and to support the development of China's financial markets legalization. In order to ensure judicial justice, the transparency and openness of test case trials, the Court simultaneously launched an Internet Service Platform of the Scheme. The platform is used to publicize all evidence materials, third party opinions, trial records, and judicial opinion of test cases.

The Scheme was pioneered by the Court, China's first specialized financial court. Established in August 2018, the Court is responsible for civil and commercial cases arising from financial market transactions, asset management, securities issuance and underwriting, bankruptcy of financial institutions, financial civil and commercial cases or financial administrative cases in which FMIs or financial market regulators are defendants. The establishment of the Court is an innovative step in the development of China's financial judiciary. It provides centralized jurisdiction over financial cases, enhances legal specialties on financial cases, creates favorable legal environment for financial markets, and offers high-quality and efficient judicial services for Shanghai international financial center.

10.2 CHINA'S FIRST FINANCIAL MARKET TEST CASE: SHCH CCP DEFAULT MANAGEMENT TEST CASE

China's first financial market test case was launched in October 2022. SHCH, together with Bank of Communications, Shanghai Pudong Development Bank, Industrial Bank and Société Générale (China), jointly filed the application for a case test on major legal issues in CCP default management in China.

Description of the test case: The case tests the legitimacy of SHCH's default management rules and the rationality of the DMP. The case simulates a default scenario where CM A failed to perform its margin payment obligations in SHCH's FX central clearing service. SHCH determined CM A to be in default based on the relevant default rules and conducted DMP, including portfolio splitting, risk neutralization, and auction. Losses associated with the default management were covered by the financial resources of Defaulting CM A. Defaulting CM A then sued SHCH for failing to achieve optimal hedging results and auction prices in the DMP, and claimed for the loss of its margin.

The legal issues of the test case: First, the legitimacy of SHCH Rulebook.[124] That is, whether the SHCH Rulebook is legally effective, whether it constitutes part of the "Central Counterparty Clearing Agreement", and whether it applies to CM A. Second, the rationality of the DMP. That is, whether the DMP of SHCH is reasonable, whether there are excess losses in this case due to improper DMP, and whether SHCH shall be liable for the losses.

Third-party consultation: The test case attracted wide attention. The Court solicited third-party opinions from the public through the Internet Service Platform. Experts from the financial, legal, and academic sectors, including China Financial Futures Exchange, HSBC, King & Wood, Fangda Partners, Peking University, submitted their third-party opinions to give an in-depth interpretation of the test case, from the perspectives of the material facts of the case, current state of Chinese laws, regulations and judicial interpretation, and the practice of domestic and international financial markets.

Public trial: In December 2022, the Court publicly heard this test case. In addition to the three judges, two professors with rich experience in financial supervision and industry practices were invited to join the panel and provide professional support. The test case was tried through a hearing of the above-mentioned legal issues. The lawyers representing the two parties conducted multiple rounds of debates based on relevant legal provisions and judicial practices, comparable international rules and precedents. Employees of SHCH testified in court and were questioned about the details of the DMP and the rationality of the hedging strategies. The trial attracted wide attention from the public. The audience included representatives from government agencies, FMIs, financial and legal institutions, and academia.

Court's judicial opinion: In February 2023, the Court published the judicial opinion of this test case. The Court put forward the applicable legal principles for this test case: 1) financial rules and regulations that comply with the basic principles of China's Civil Code shall be adopted in prior; 2) fully respect domestic and foreign financial market practices; 3) comprehensively consider the coordination of rules in financial supervision and financial trial. On this basis, the judicial opinion held that SHCH default management rules met the requirements of validity and were legally binding from a judicial perspective. The Court also recognized the rationality of SHCH's DMP.

For the first legal issue, the judicial panel held that SHCH Rulebook satisfies the following four conditions: (i) reasonable notification to CMs; (ii) CMs agree to comply with the rules; (iii) for rules that require regulatory approval to be effective, regulatory approval has been obtained; and (iv) the content of the rules is fair and reasonable. Therefore, these rules are legally binding for CMs, including the Defaulting CM A.

As for the second legal issue, the judicial panel held that rationality of the DMP should be judged from both procedural and substantive aspects. In terms of the procedure, the DMP complied with the SHCH Rulebook. Meanwhile, for substantive aspects, there is no obvious unreasonableness or bad faith in SHCH's actions, and the optimality of the default management result cannot be judged by the ex-post changes in the market prices.

[124] Refers to "Rules of Central Counterparty (CCP) Clearing Services", "Guidelines of Central Counterparty (CCP) Clearing Services", "the Guidelines on Default Management of Central Counterparty (CCP) Clearing Services", "the Articles of Default Management Committee (DMC)".

10.3 IMPORTANT IMPLICATIONS OF THE FINANCIAL TEST CASE

First, it enhances the legal certainty of China's FMIs' rules and strengthens the financial market participants' preparedness and capability of mitigating relevant legal risks. As the "systemic risk manager" of financial markets, CCPs set default management rules and formulate default management plans in specific circumstances, which concern the stability of financial markets and the interests of all relevant parties. This test case focuses on judgment criteria of the legitimacy and rationality of CCPs' default management in China. The full exchange of views between the parties and the publication of the Court's judicial opinions makes the process an ex-ante "legal risk stress testing" for potential disputes in CCP default management in China. This test case also provides clear guidelines and stable expectations for China's derivatives market participants, which is conducive to reducing judicial costs, improving market efficiency, and preventing systemic financial risks.

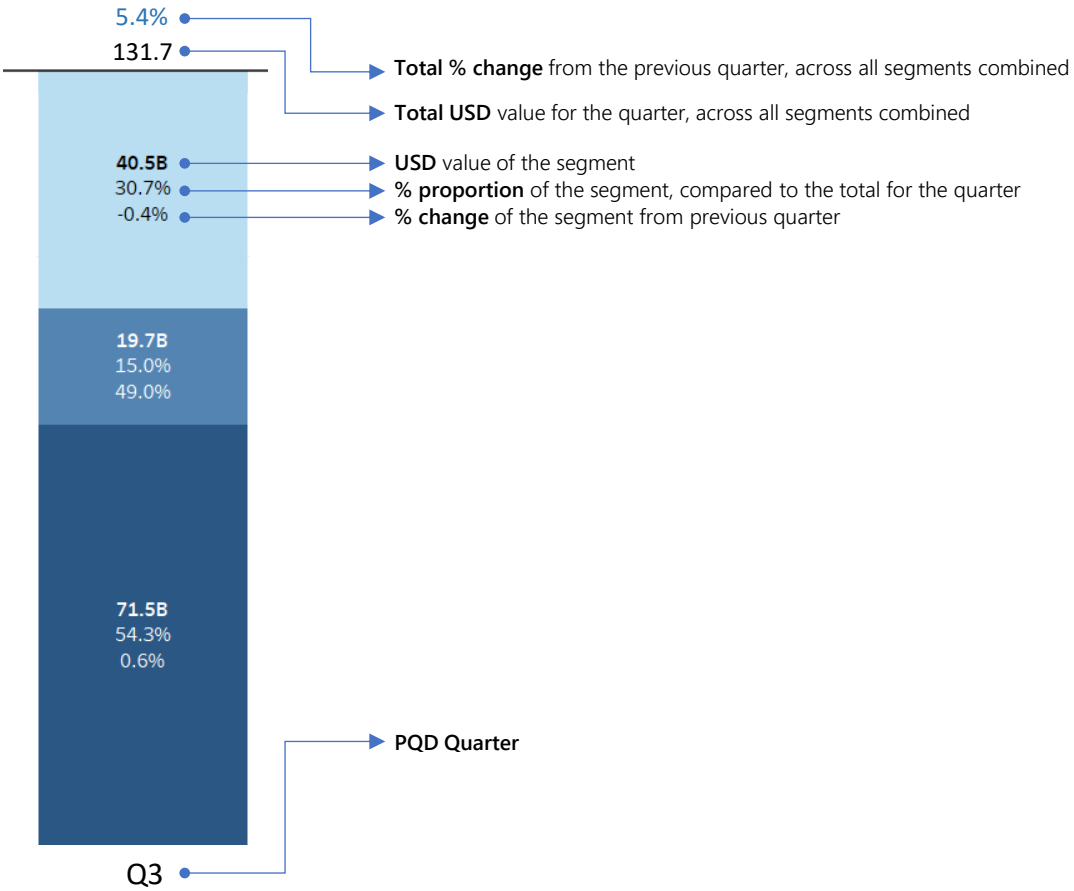
Second, it promotes compatibility with international financial market practices and supports the institutional opening-up of China's financial market. Full respect for domestic and foreign financial market practices is one of the applicable legal principles clarified in this case. In support of the case, SHCH has sorted out laws and regulations of several jurisdictions, rulebooks of international CCPs, relevant judicial precedents, and provided thousands of pages of relevant materials. The Court fully listened to the views of all parties during the pre-trial procedure and the trial, and the judicial opinion was also in line with the relevant judicial practices in international financial markets. This innovative judicial initiative is conducive to promoting the judicial environment compatible with the rules and practices of the international market and supporting the opening-up of the China's financial market.

Third, it could serve as a useful reference for developing the legal framework for the cleared markets in global emerging economies. In practice, when financial innovation is ahead of law-making, disputes will arise due to the lack of clear rules. The associated legal risks would hinder the development of financial markets. The Scheme works as an innovative measure to deliver judicial services for financial innovation and development. Although the majority of G20 nations have implemented clearing mandate, the progress of relevant legislation and the development of judicial environment have been uneven from a global perspective.

The CCPs' DMP aims to ensure efficiency and safeguards the interests of the entire market, which might lead to dissatisfaction of the defaulting party, causing disputes and even lawsuits. Legal uncertainty in CCP default management in China may impair market participants' confidence in the CCP and affect the development of financial markets. The first application of China's Financial Markets Test Case Scheme in the field of CCP default management in China could provide a reference on the legitimacy of CCPs' rulebooks and the rationality of CCPs' DMP for global emerging economies. The Scheme itself could also provide a path for global emerging economies to improve the judicial service for financial markets.

11. APPENDIX I: PQD BAR CHART KEY

For certain PQD charts throughout section 4.2, bar charts may have three values per bar segment and two values per individual column. These can be interpreted as follows:



12. ABOUT CCP12

CCP12 is the global association for CCPs, representing 42 members who operate over 60 individual central counterparties (CCPs) across the Americas, EMEA, and the Asia-Pacific region.

CCP12 promotes effective, practical, and appropriate risk management and operational standards for CCPs to ensure the safety and efficiency of the financial markets it represents. CCP12 leads and assesses global regulatory and industry initiatives that concern CCPs to form consensus views, while also actively engaging with regulatory agencies and industry constituents through consultation responses, forum discussions, and position papers.

For more information, please contact the office by e-mail at office@ccp12.org or through our website by visiting www.ccp12.org.

13. CCP12 MEMBERS