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March 2025

The Value of OTC Derivatives: Empowering Organizations to Manage Risks, Enhance Returns and Optimize Liquidity

CONTENTS

1. Executive Summary

The over-the-counter (OTC) derivatives market is a cornerstone of the global financial system, enabling corporations, governments and financial institutions around the world to manage risk, enhance returns, optimize liquidity and efficiently allocate capital. This creates value for users by fostering predictability, reducing costs, protecting against losses and dampening the impact of volatility on earnings – in turn, generating value for the broader economy by bringing greater stability and giving companies the confidence to borrow, invest and hire.

A review of 1,187 companies in seven major stock indices shows 87.1% use OTC derivatives

Essential Role in Global Finance

- OTC derivatives act as a foundational layer in modern financial markets, allowing firms to tailor solutions for specific risks, bringing certainty and stability to their operations and enhancing value.
- They are used in advanced economies and emerging markets alike, helping to stabilize operations, manage growth and maintain financial resilience, creating economic value.

High Adoption Across Sectors

A review of 1,187 companies in seven major stock indices shows 87.1% use OTC derivatives, indicating near-universal acceptance of these instruments and the value they bring.

- Both financial and non-financial entities embrace derivatives to hedge risks tied to interest rates, currencies, commodities, equities and credit and to optimize returns, reflecting their flexibility and practicality.

Industry-specific Applications

- **Manufacturers:** Use interest rate and currency swaps to lock in predictable debt costs, safeguarding profitability against rate hikes and giving firms the confidence to borrow and invest.
- **Exporters:** Manage foreign exchange (FX) swings with forwards and options, ensuring stable conversion rates when receiving overseas revenues and preserving value even during unpredictable FX markets.
- **Food Producers:** Smooth out volatile crop prices through futures and forwards, which can help sustain farmer incomes and bring value to consumers by helping to control prices.
- **Energy Producers/Distributors:** Hedge oil, gas or electricity price risks, protecting consumers from severe price spikes and stabilizing operating budgets.
- **Asset Managers:** Use swaps, options and other derivatives to balance portfolio exposures, enhance returns and protect against market downturns, creating value for investors by preserving and creating wealth.
- **Pension Funds:** Employ swaps and other derivatives to shield retirement assets from shifts in interest rates, inflation and equity markets and to augment returns, bringing value to retirees by preserving long-term pension payouts.
- **Insurance Companies:** Use a variety of derivatives to mitigate interest rate, inflation and equity risks, and efficiently adjust and optimize their risk profile, ensuring sufficient reserves to pay out future claims and maintain solvency.

- **Banks:** Hedge interest rate mismatches between deposits and loans, maintaining lending capacity and strengthening balance sheets, enabling them to continue to lend and provide value to the real economy.

- **Mortgage Providers:** Manage interest rate and prepayment risks to keep home financing widely accessible, supporting efficient and stable housing markets and allowing individuals to borrow cost-effectively.

Key Benefits and Broader Impact

- **Risk Mitigation and Certainty:** Derivatives can reduce earnings volatility and lock in financing terms, enhancing company value and enabling entities to plan confidently and make strategic investments.

- **Enhanced Capital Allocation:** By transferring or offsetting specific risks, firms can redeploy savings into new projects, fostering investment and business expansion.

- **Support for Economic Growth:** Stable corporate operations and improved access to funding lead to increased hiring, stronger investment pipelines and broader market development, contributing to economic value.

- **Efficient Market Functioning:** Hedgers and investors collectively contribute to deeper liquidity, tighter spreads and more accurate price discovery, benefiting all market participants.

Derivatives help firms mitigate risk, enhance certainty and stability, reduce costs, dampen the impact of market volatility and enhance financial performance and company value. This ultimately contributes to investment, job creation and economic growth.

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Reshaping the Landscape: Regulatory Reforms

The regulatory framework for derivatives has been comprehensively overhauled since the 2008 financial crisis, with the implementation of several key changes designed to mitigate counterparty risk, enhance transparency and strengthen the resilience of financial markets.

- Standardized derivatives are **required to be centrally cleared** through central counterparties (CCPs). By pooling collateral and enforcing margin requirements, CCPs reduce counterparty credit risk. According to the Bank for International Settlements (BIS), approximately 77% of interest rate derivatives and 68% of credit default swaps (CDS) were centrally cleared in the first half of 2024, with initial margin (IM) posted to CCPs exceeding $392.2 billion by the end of 2023 – more than double compared to 2017 (see Figure 1).

- **Margin rules for non-cleared derivatives** have been introduced to ensure bespoke instruments that are vital to the risk management strategies of pension funds, insurance companies and other end users are backed by high-quality collateral. Major dealers collected $1.4 trillion in IM and variation margin (VM) in 2023, up 38% since 2018 (see Figure 2).

- Revised **capital requirements** have boosted banks' resilience, as common equity Tier 1 (CET1) ratios among major banks nearly doubled from 7.6% in 2011 to 13.1% in 2023 and are projected to reach 13.6% under final Basel III rules. This is supported by a more than doubling of total bank capital from €2.1 trillion to €5.3 trillion over the same period (see Figure 3).

- **Comprehensive reporting mandates** require OTC trades to be reported to trade repositories, improving regulators' ability to track systemic risks.
- The **shift to regulated trading platforms** has advanced price transparency and liquidity. In the US, 57.7% of interest rate derivatives traded notional occurred on swap execution facilities (SEFs) during the first nine months of 2024, with 33.3% traded on multilateral trading facilities (MTFs) and organized trading facilities (OTFs) in Europe in the third quarter of 2024.

Figure 1: Percentage of Derivatives Centrally Cleared and Initial Margin

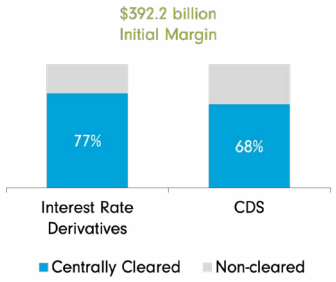


Figure 2: Margin for Non-cleared Derivatives ($ trillion)

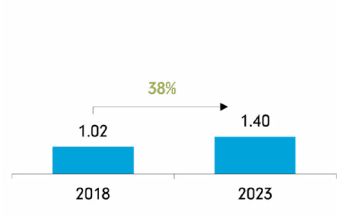
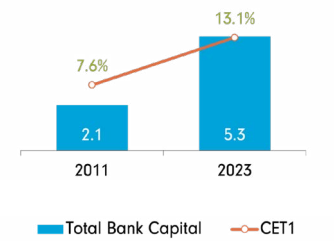


Figure 3: Level of Total Capital (€ trillion) and Average CET 1 Ratio (Percentage)



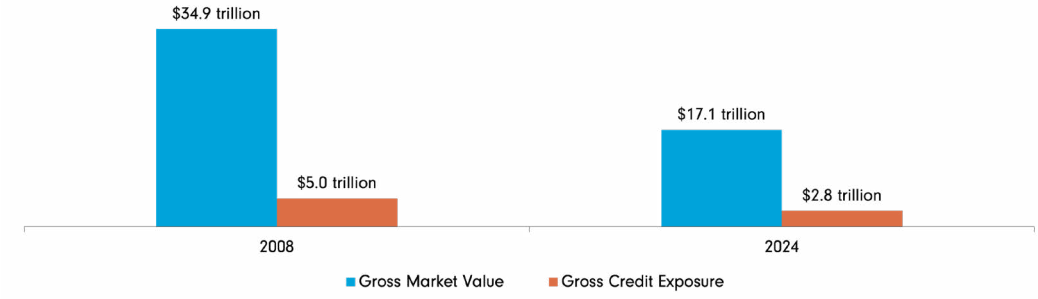
Source: ISDA and the Bank for International Settlements (BIS)

Market Size and Structure

Risk Exposure

The OTC derivatives market stood at $729.8 trillion in notional outstanding as of June 30, 2024, but this number does not reflect true risk exposure. A more meaningful metric is gross market value (the cost of replacing all open contracts at current prices), which stood at $17.1 trillion as of June 30, 2024. This risk can be reduced by netting, which allows two parties to consolidate offsetting payments under various derivatives into a single net payment from one to the other. Exposure after netting – known as gross credit exposure – totaled $2.8 trillion as of mid-2024 (see Figure 4). This exposure is further reduced by the collateral that market participants are now required to post for cleared and non-cleared derivatives.

Figure 4: Gross Market Value and Gross Credit Exposure



Source: BIS

Ecosystem of OTC Derivatives

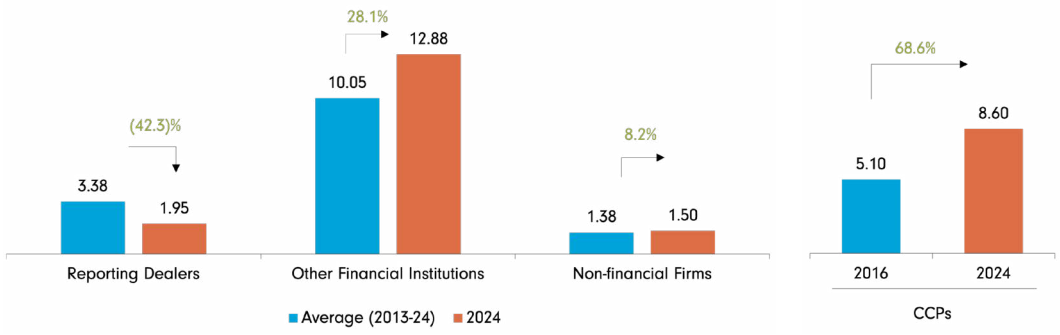
The OTC derivatives market relies on an interconnected ecosystem of reporting dealers, financial institutions, non-financial customers, trading platforms and CCPs, facilitating trading, clearing and risk management.

As per the BIS reporting classification, **reporting dealers** serve as intermediaries and liquidity providers, maintaining limited directional risk. Outstanding trades among reporting dealers have declined in recent years due to regulatory capital constraints and broader participation from other entities, with the gross market value of interest rate, FX and equity derivatives falling to $1.9 trillion by mid-2024 – roughly 40% lower than the average gross market value from 2013 to June 2024.

Other financial institutions, such as smaller banks, pension funds, insurance companies, asset managers and hedge funds, use derivatives for hedging risks and enhancing returns. The gross market value of their interest rate, FX and equity derivatives reached $12.9 trillion as of June 30, 2024, up 30% compared to the average from 2013 to June 2024.

Trading with **non-financial firms**, including corporations and government entities, has remained relatively stable at $1.5 trillion in gross market value, reflecting consistent demand for hedging and liquidity management. Meanwhile, the gross market value of trades with CCPs has grown from $5.10 trillion in 2016 to $8.60 trillion by mid-2024, signaling the increased emphasis on central clearing since the financial crisis (see Figure 5).

Figure 5: Gross Market Value of OTC Derivatives for Different Participants ($ trillion)



Source: BIS

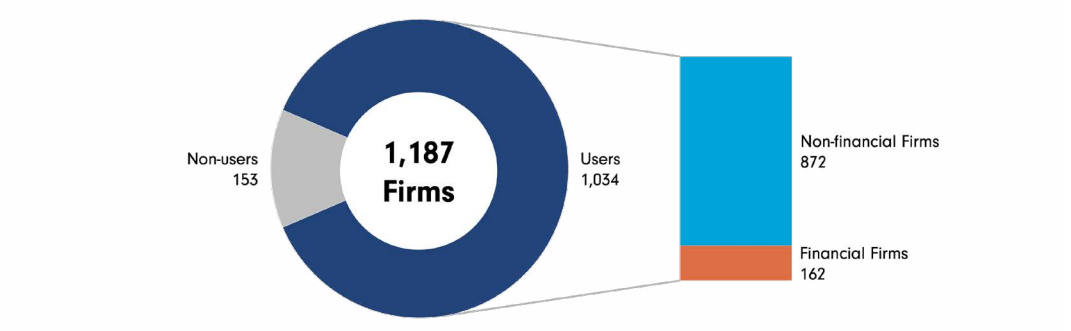
Applications and Value of OTC Derivatives

OTC derivatives help businesses, governments and investors around the world to manage risks, stabilize operations, optimize cashflows and enhance returns. By helping to create certainty and stability, derivatives give users the confidence to lend, borrow and invest, which contributes to economic growth.

- Expand Research, a Boston Consulting Group (BCG) firm, reviewed the annual reports of 1,187 entities listed on major equity indices, including the S&P 500 (US), Nikkei 225 (Japan), ASX 200 (Australia), Hang Seng Index (Hong Kong), STI (Singapore), FTSE 100 (UK) and Eurostoxx 50 (Europe). The findings revealed that **87.1% (1,034 companies) utilize OTC derivatives**. This widespread adoption spans both financial and non-financial sectors, with 86.6% of non-financial firms (872 out of 1,007) and 90% of financial firms (162 out of 180) employing OTC derivatives (see Figure 6).

By helping to create certainty and stability, derivatives give users the confidence to lend, borrow and invest, which contributes to economic growth

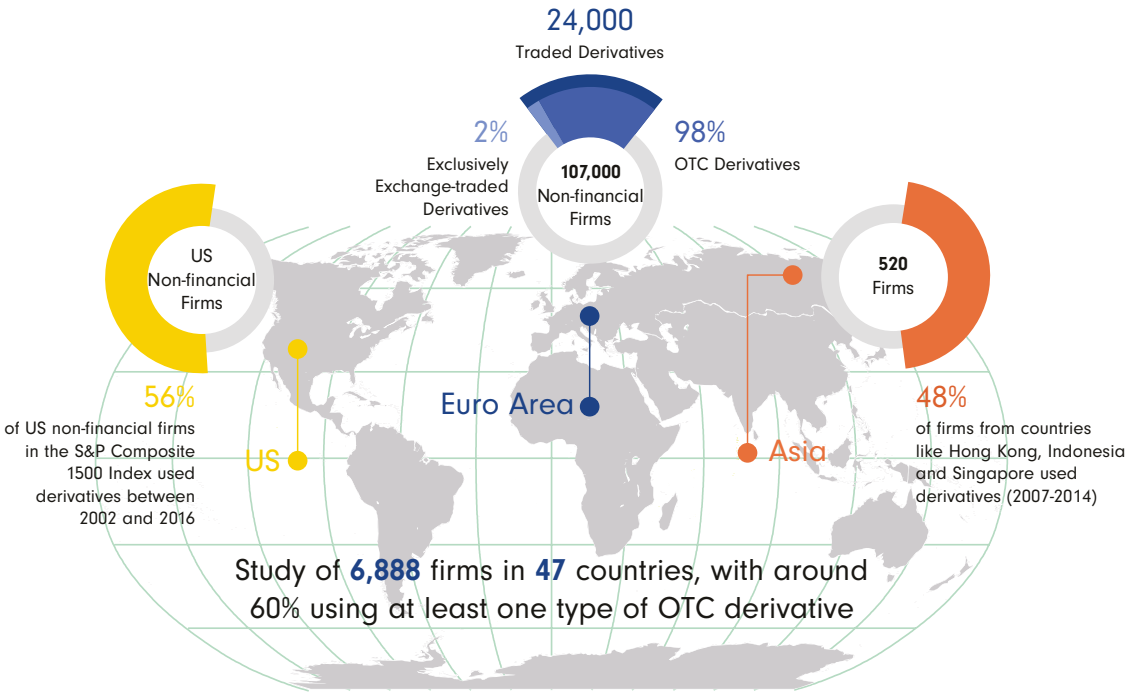
Figure 6: Number of Firms Across Key Equity Indices Using OTC Derivatives



Source: Expand Research analysis

- OTC derivatives are widely used across regions and sectors. A study of 6,888 non-financial firms in **47 countries** found 60% of these entities used at least one type of OTC derivative for risk reduction, with derivatives users having lower cashflow volatility and systematic risk. In the **euro area**, a BIS review found 24,000 out of 107,000 non-financial firms engaged in derivatives, with 98% employing OTC derivatives and 2% exclusively using exchange-traded derivatives. Similarly, 56% of **US** non-financial firms in the S&P Composite 1500 Index used derivatives between 2002 and 2016 to manage risk exposures. In the **Asia-Pacific** region, 48% of 520 firms from countries like Hong Kong, Indonesia and Singapore used derivatives between 2007 and 2014 to hedge FX and interest rates, primarily with FX forwards and interest rate swaps (IRS) (see Figure 7).

Figure 7: Global and Regional Adoption of OTC Derivatives



Source: Multiple research reports

OTC derivatives are essential for risk management, optimizing investments and facilitating liquidity, which helps to enhance economic stability

Microeconomic Applications

OTC derivatives are essential for risk management, optimizing investments and facilitating liquidity, which helps to enhance economic stability. They support private and public entities across sectors and regions, making them integral to the modern financial system.

Risk Transfer

OTC derivatives are key tools for managing a broad spectrum of financial risks arising from fluctuations in interest rates, foreign exchange rates, commodity prices and credit events. Their customizable features allow entities to hedge exposures effectively either on a one-to-one or portfolio basis, aligning with accounting[1] and regulatory requirements.

Hedging Interest Rate Risks

Governments and corporations hedge against interest rate volatility to stabilize cashflows, protect earnings and enhance creditworthiness. Interest rate derivatives mitigate cost spikes, ensure predictable cashflows and lower funding costs by locking in debt issuance rates.

A BIS study analyzing over 80,000 financial statements from more than 14,000 companies in the euro area, US and UK between 2007 and 2022 found that approximately half of firms with variable-rate debt hedged their interest rate risk (see Figure 8). Those that hedged tended to be larger firms with lower cash reserves and higher variable-rate debt, and they maintained stable interest coverage ratios and experienced less decline in equity value during interest rate hikes compared to non-hedged firms (2% decline in equity value versus a 6% decline for unhedged firms).

Figure 8: Examples of Uses of Interest Rate Derivatives for Hedging Interest Rate Risk

Nikon	Ørsted	Dell Technologies	Fifth Third Bank	CaixaBank
$150 million (Notional)	$3 billion (Notional)	Undisclosed	$8 billion (Notional)	€11.9 billion (Notional)
IRS	IRS	IRS	IRS	IRS
To convert floating-rate debt to fixed-rate exposure	To adjust a bond portfolio's maturity profile and manage interest rate risk effectively	To convert variable interest rates on structured financing debt into fixed rates	To convert commercial and industrial loans from fixed to floating rate	To convert fixed-rate loans into floating-rate loans

Source: Company annual reports

Reducing and Managing FX Risks

Global operations expose entities to currency fluctuations, affecting cashflows and asset values. Hedging FX risk stabilizes financial results, preserves asset values and enhances planning accuracy.

A study of 2,339 companies in East Asia-Pacific economies (2011-2021) found that 80% had foreign currency debt and 30% used FX derivatives. Derivatives users faced lower FX losses during depreciations, losing 0.48% of their earnings before interest and tax (EBIT) on average, compared to 1.87% for non-users. Many multinational corporations actively use FX derivatives to hedge currency risks arising from their global operations, creating certainty and stability in their earnings (see Figure 9).

[1] To satisfy hedge accounting requirements, changes in the value of the hedges must closely mirror changes in the value of the hedged item. This creates an incentive to ensure the hedge is customized to closely meet the hedged item to avoid balance-sheet volatility

Figure 9: Examples of Uses of FX Derivatives for Hedging Risk

EssilorLuxottica	Grupo Bimbo	Tata Consultancy Services	Unilever
€4.8 billion (Notional)	~$100 million (Notional)	~$1 billion (Notional)	€1.4 billion (Notional)
FX Forwards	FX Forwards	Currency Options	Currency Derivatives
To hedge currency risks on business and financing operations	To hedge currency risk tied to raw material purchases across multiple currencies	To hedge export revenue using FX derivatives across US dollar, sterling and euro contracts	To hedge currency risk on global sales, purchases and borrowings to which cashflow hedging accounting is applied

Source: Company annual reports

Hedging stabilizes revenues, shields firms and consumers against price spikes and ensures operational stability by managing input costs, helping to reduce volatility for consumers

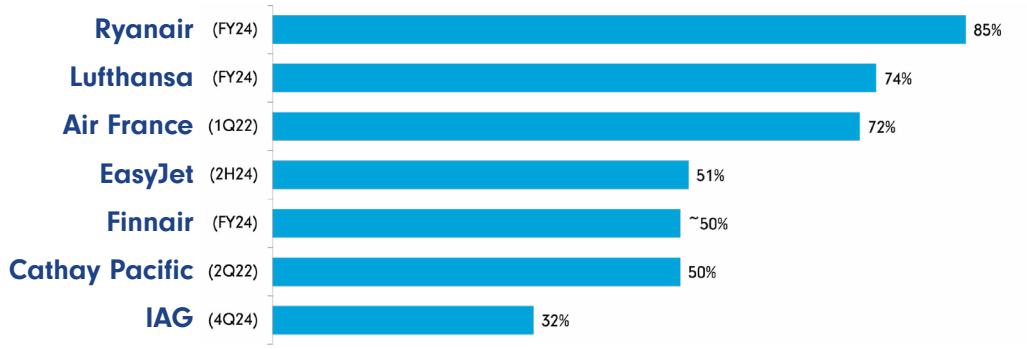
Reducing and Managing Commodity Price Risk

Commodity price volatility risks arise from supply disruptions and inelastic demand. Hedging stabilizes revenues, shields firms and consumers against price spikes and ensures operational stability by managing input costs, helping to reduce volatility for consumers.

Usage in the Aviation Industry

The airline industry, essential for global economic growth, faces significant fuel price volatility. Effective risk management, particularly fuel hedging, ensures financial stability and affordable ticket prices. A 2023 study highlighted fuel hedging strategies by non-US airlines, with Air France hedging 72% of fuel needs in early 2022, later reducing coverage to 63%. Cathay Pacific hedged 100% of fuel consumption in the first quarter of 2022, dropping to 50% in the following three-month period, demonstrating varying approaches to managing fuel costs. Similarly, airlines like Ryanair (85%), Lufthansa (74%) and Finnair (50%) used derivatives to hedge 2024 fuel needs against price volatility (see Figure 10).

Figure 10: Hedging of Fuel Needs by Airlines



Source: Reuters and research report

Usage in the Agricultural Sector

Agricultural derivatives are used for managing price volatility and stabilizing income for farmers. In 2020, 94% of futures trading and 87% of options trading by US farmers focused on corn and soybeans. These derivatives support efficient risk transfer, benefiting farmers and consumers by promoting price stability in agricultural markets. Many corporates also use derivatives to hedge commodity price risks (see Figure 11).

Figure 11: Examples of Usage of Commodity Derivatives by Corporates

AB InBev	Tesco	Kraft Heinz
$2.72 billion (Notional)	£93 million (Notional)	$954 million (Notional)
Commodity Derivatives	Commodity Contracts	Commodity Contracts
To hedge price volatility on aluminum, energy, corn and wheat	To hedge exposure to diesel price fluctuations	To hedge price risk related to raw materials, such as dairy products, vegetable oils, corn and coffee beans

Source: Company annual reports

Supporting Energy Markets

Derivatives markets are essential for managing energy sector risks, particularly during extreme price volatility. They stabilize operations for traders, ensure critical service continuity and support price stability. In electricity markets, derivatives help align supply and demand, enabling distribution operators to plan and avoid short-term market risks. For natural gas, derivatives optimize storage, balancing electricity markets during supply-demand fluctuations. In Europe, participation in energy derivatives markets rose by 30% in 2022, with 25% of 1,700 participating firms originating from the oil, gas and energy sectors, and the remaining 75% primarily from energy-intensive industries like transport and manufacturing. Companies and governments use energy derivatives to manage price volatility, with governments leveraging them to achieve broader social goals (see Figure 12).

Figure 12: Examples of Usage of Commodity Derivatives

EDF	Puget Sound Energy	Mexico	Uruguay
€2.38 billion (Fair Value)	$109.5 million (Assets) $223.8 million (Liabilities)	-	6 million Oil Barrels
Commodity Derivatives	Energy Derivatives	Put Options	Asian Call Option
To hedge price variations in energy markets, such as electricity, gas and oil products through cashflow hedges	Contracts consisting of electric and natural gas portfolio for hedging energy supply and costs	To hedge oil prices to support its public finances	To hedge oil prices to manage the impact of increases on its fiscal budget and the economy

Source: Company annual reports

Managing Credit Risk

Credit risk represents the potential for loss when borrowers fail to meet obligations on their debt, loan or derivatives contracts. Firms use credit derivatives to hedge against defaults, optimize capital and maintain institutional stability – all crucial for economic health. Multiple regional banks like **KeyCorp**, **Huntington** and **Allied Irish Bank (AIB)** use credit derivatives to manage credit risk. KeyCorp, for example, held $121 million in credit derivatives notional for managing lending and swap exposures in 2023.

Liquidity Management

Liquidity management enables corporates and governments to optimize cashflows, access currencies, manage funding needs and maintain stability. Using derivatives like IRS, currency swaps and forwards, entities can align inflows and outflows, access funding in different currencies and hedge volatility. Benefits include securing fixed exchange rates, locking in favorable funding costs and ensuring sufficient resources for operations and investments.

Supporting Commercial Trade and Foreign Currency Financing

FX swaps and forwards are vital for commercial trade, helping companies manage currency fluctuations and access currencies for liquidity purposes. These instruments mitigate short-term exchange rate volatility, ensuring stable costs and revenues.

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In 2016, non-financial firms held $7.5 trillion of $58 trillion in total outstanding FX derivatives obligations, with $5.1 trillion linked to $21 trillion in global trade. An additional $2.4 trillion in cross-currency swaps hedged foreign-currency-denominated bonds, enabling firms to decouple funding needs from currency exposure. These derivatives enable global commerce, facilitating smoother operations, allowing firms to manage their risks and supporting financial market stability (see Figure 13).

Figure 13: Examples of Usage of Cross-currency Swaps by Corporates

AT&T	Harley-Davidson
$38 billion (Notional)	$1.42 billion (Notional)
Cross-currency Swaps	Cross-currency Swaps
To switch foreign-currency-denominated debt from fixed-rate or floating-rate foreign currencies to fixed-rate US dollars at issuance	To mitigate the impact of foreign exchange and interest rate fluctuations on its foreign-currency-denominated debt

Source: Company annual reports

Enhancing Access to Funding

Derivatives enhance investment capacity by improving access to capital and reducing borrowing costs. A study of 2,718 loans involving 1,185 entities found 50.1% of those firms used derivatives, boosting investment spending by 13% of the sample's average level of investment and lowering loan spreads by 29%.

Derivatives also help firms manage interest rate costs on future debt, providing predictability amid volatility. Debt management offices (DMOs) in developed nations use swaps to align debt portfolios with investor demand, particularly during volatile market conditions. These strategies optimize funding needs and reduce borrowing risks (see Figure 14).

Figure 14: Examples of Usage of Derivatives for Hedging Risk on Future Debt Issuances

NextEra Energy	Colgate-Palmolive
$10 billion (Notional)	$700 million (Notional)
Forward-starting IRS	Forward-starting IRS
To hedge against interest rate risk tied to its anticipated debt issuances	To mitigate the risk of variability in interest rates for future debt issuances

Source: Company annual reports

Assisting with Liquidity in and for Mergers and Acquisitions (M&A)

M&A activity drives demand for deal-contingent derivatives to manage currency and interest rate risks from deal announcement to closure. A study (1998–2012) found 61% of US acquirers used derivatives before deals, with 47.5% employing interest rate derivatives and 42.7% using FX derivatives. Firms managing financial risks are more likely to use cash, secure external borrowing and benefit from reduced costs. Effective risk management not only mitigates market risks but also supports strategic acquisitions and eases financing constraints (see Figure 15).

Figure 15: Examples of Usage of Derivatives for Supporting Strategic Acquisitions

Takeda	Bristol Myers Squibb	Parker Hannifin
$30.6 million (Notional)	$10.4 billion (Notional)	£6.4 billion (Notional)
Forward Contract	Deal-contingent IRS	Deal-contingent FX Forward
To protect itself from foreign currency risks during its acquisition of TiGenix	To hedge interest rate risk associated with anticipated financing to fund the acquisition of Celgene	To guard against the appreciation of sterling during its acquisition of Meggitt

Source: Company annual reports

Investment Positions

OTC derivatives are vital for asset managers, hedge funds and institutional investors, allowing them to hedge against price drops, customize risk exposures, diversify portfolios and adjust positions quickly. These tools enable efficient responses to market changes, helping investors optimize strategies and enhance returns.

Structured investment products with embedded derivatives are also used by some investors, offering tailored solutions for yield enhancement and portfolio customization. Some integrate quantitative investment strategies like momentum and volatility harvesting to provide efficient access to a variety of investment approaches.

Macroeconomic Implications

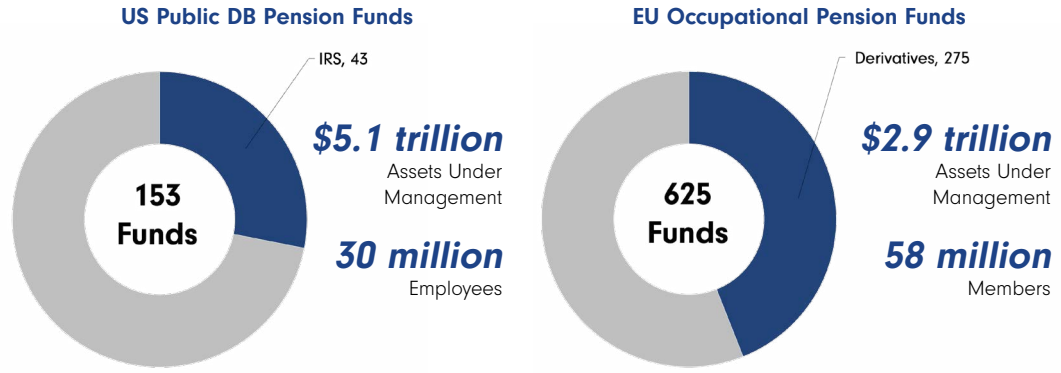
Derivatives play an important societal and economic role by enabling pension funds to pay retirees, insurance companies to pay policyholders and banks to support the housing market by providing mortgages. Robust derivatives markets also improve the functioning of emerging market and developing economies (EMDEs), provide certainty and stability in the financing of infrastructure projects and contribute to achieving sustainable development goals.

Pension Funds and Insurance Firms: Supporting Retirement Savings, Premium Stability and Solvency

Pension funds are among the largest global investors, managing assets that can exceed their home country's GDP. They typically use derivatives to manage interest rate, inflation, FX and equity price risks and to support dynamic asset allocation and liability-driven investment strategies.

In the US, public defined benefit (DB) pension funds manage $5.1 trillion in assets for 30 million employees, with 43 out of 153 funds using IRS to hedge duration risk. In Europe, 88,800 occupational pension funds manage €2.9 trillion for 58 million members, with 275 out of 625 pension funds using derivatives (see Figure 16). According to a 2024 study, it was estimated that Dutch occupational pension funds held about 27.6% of non-centrally cleared swap positions in Europe as of 2020.

Figure 16: Usage of OTC Derivatives by US Public Pension Funds and European Occupational Pension Funds



Source: Commodity Futures Trading Commission (CFTC), European Insurance and Occupational Pensions Authority (EIOPA)

Insurance companies manage risks for policyholders while tackling demographic shifts, climate change and technological disruption. Life insurers provide steady retirement income through annuities, while property and casualty insurers maintain reserves for losses. They use derivatives to hedge annuity guarantees, manage interest rate and equity risks, reduce currency and credit exposures and ensure liquidity for claims.

As of 2021, the US insurance industry held derivatives positions totaling $3 trillion in notional value, with 95% dedicated to hedging. Life insurers accounted for 98% of this exposure, primarily using swaps and options. In Europe, insurers extensively use OTC derivatives, focusing on macro hedging (59%), efficient portfolio management (25%) and micro hedging (24%) (see Figure 17).

Figure 17: Examples of Usage of Derivatives by Insurance Firms

AXA	AIA
€200.4 billion (Notional)	$3.2 billion ((Notional of US Dollar Contracts) $2 billion ((Notional of Chinese Yuan Contracts)
Interest Rate Derivatives	Currency Derivatives
To manage duration gaps, hedge convexity risks between assets and liabilities, minimize the cost of group debt and limit volatility of financial charges	To manage FX risk arising from insurance and reinsurance contract liabilities and financial assets and liabilities across multiple currencies

Source: Company annual reports

Adding to GDP and Economic Growth

A study by the Milken Institute found that derivatives contributed an additional $149.5 billion to US real GDP between 2003 and 2012, making it 1.1% higher than it would have been otherwise. This boost added around 500,000 jobs and increased industrial production by 2.1% by the end of 2012.

Assisting Developing Countries

Assisting Debt Management Offices (DMOs) in Developing Countries

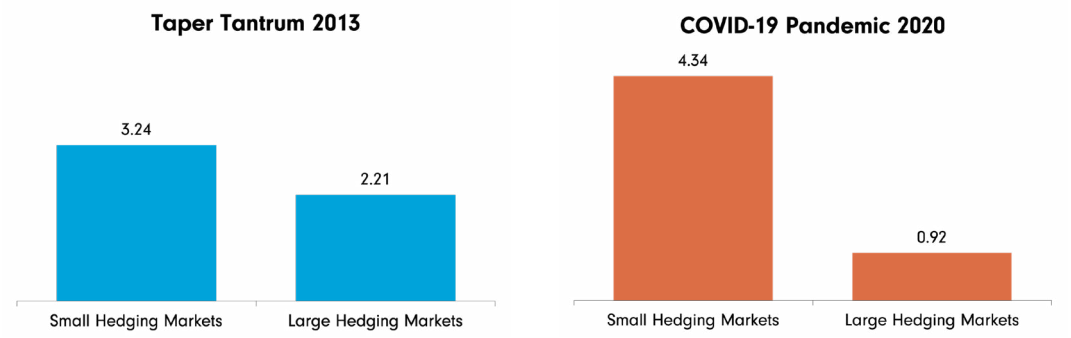
EMDEs are vulnerable to FX risk due to their reliance on foreign-currency-denominated debt, a result of underdeveloped domestic capital markets. Exchange rate fluctuations can unpredictably increase the domestic cost of debt servicing, destabilizing fiscal positions. A joint survey by the International Monetary Fund (IMF) and the Currency Exchange Fund (TCX) found that only

45% of EMDE DMOs have dedicated FX risk management strategies, and few use derivatives like currency swaps due to legal and market limitations. OTC derivatives enable users to hedge FX risk by adjusting debt currency composition and allowing access to cheaper funding, while promoting sustainable debt management and long-term financial stability.

Resilience During Shocks

Liquidity in EMDEs with well-developed hedging markets proved more resilient during major shocks, as shown by a BIS study analyzing changes in bid-ask spreads for five-year government bonds. Events like the 2013 taper tantrum and the 2020 COVID-19 pandemic showed larger spread increases in EMDEs with underdeveloped hedging markets. For example, spreads widened by 3 basis points (bp) during the taper tantrum and about 4bp during COVID-19, underscoring the stabilizing role of robust hedging markets in mitigating fixed-income market turmoil (see Figure 18).

Figure 18: Changes in Bid-Ask Spreads (bp) for Five-year Government Bonds for EMDEs with Small vs Large Hedging Markets



Source: BIS

Usage by Emerging Market Economy Banks

Banks in EMDEs play a critical role in supporting economic growth but face significant risks, including credit, interest rate and liquidity risks. Derivatives are essential tools for managing these exposures. Without derivatives, banks would need to closely align assets and liabilities, limiting their ability to provide long-term, lower-cost financing and increasing costs for borrowers. Advanced economies extensively use interest rate derivatives, with gross market values equating to 7% of bank assets compared to below 1% in EMDEs (emerging Asia: 0.29%; Latin America: 0.1%). As EMDE banks' balance sheets become more complex and asset durations increase, robust derivatives markets are necessary to hedge risks effectively, ensure stability and enable long-term financing critical for growth (see Figure 19).

Figure 19: Examples of Usage of Derivatives by Banks in EMDEs

Banco de Bogotá	SBI
~$1.5 billion (Notional)	~$6.9 billion (Notional)
IRS	IRS
To mitigate the fair value risk of its fixed-rate deposits by using IRS that exchange fixed-rate flows for flows indexed to the reference banking indicator	To hedge asset-liability risks, mainly structured to receive fixed rates and pay floating rates, using the Secured Overnight Financing Rate benchmark

Source: Company annual reports

Enabling Infrastructure Financing

Infrastructure projects in EMDEs face a $1.5 trillion annual financing gap, with derivatives like IRS and cross-currency swaps crucial for managing interest rate and FX risks. A 2019 World Bank study found 78% of financiers reduced EMDE project funding due to hedging challenges. Project developers face lower hedging ratios (50%-75% in the power sector), shorter hedges and higher costs, which could translate into higher end-user tariffs. Derivatives are essential to mitigate risks, improve project viability and attract private investment, ensuring infrastructure development in regions with less-developed local currency markets.

Supporting Mortgages

Derivatives play a critical role in supporting mortgage providers by enabling banks to hedge the risks posed by fixed-rate mortgages and free up capacity to continue lending. Many lenders look to transfer risk, reduce capital requirements and raise funding by issuing mortgage-backed securities (MBSs). The US MBS market is one of the largest and most liquid global fixed-income markets, with more than $12 trillion of securities outstanding. In Europe, covered bonds – debt securities where investors have recourse to the issuer and a pool of assets that typically remain on the issuer's balance sheet – have also become an important source of long-term financing for mortgage lenders.

Derivatives play a critical role in supporting mortgage providers by enabling banks to hedge the risks posed by fixed-rate mortgages and free up capacity to continue lending

Both securitization vehicles and covered bond issuers typically use derivatives to manage interest rate and currency risks in the mortgage pool. Specifically, interest rate and currency swaps are used to ensure the disparate fixed and floating cashflows from the underlying mortgages are sufficient to meet the fixed coupon payments on the asset-backed securities or covered bonds. Without that certainty, these securities would typically receive lower ratings from rating agencies and would be less attractive to investors – making it more expensive for mortgage lenders to raise financing for new loans (see Figure 20).

Figure 20: Examples of Usage of Derivatives by Banks Involved in Housing Finance

Jyske Realkredit (Fully Owned Subsidiary of Jyske Bank)	Royal Bank of Canada	Banco BPM
DKK 58.8 billion (Notional)	C$93.5 billion (Notional)	€4.35 billion (Covered Bond)
IRS	Interest Rate Contracts	IRS
Jyske Bank had 352.7 billion Danish krone in mortgage loans and 351.8 billion Danish krone in issued bonds in 2023. IRS are used to manage interest rate risks on certain issued bonds to align with the interest on the mortgage loans	RBC securitizes insured residential mortgages through the National Housing Act MBS program, primarily selling pools to the government-sponsored Canada Housing Trust. It manages interest rate risks with interest rate derivatives totaling C$93.5 billion, supporting C$86.7 billion in fixed-rate assets, including residential mortgages	The bank operates a covered bond program, supported by €7.3 billion in residential mortgages and €4.35 billion in covered bonds. IRS hedge mismatches between loan and bond cashflows, maintaining stability in funding operations

Source: Company annual reports

Achieving Sustainable Development Goals

Countries worldwide have pledged to reduce carbon emissions, requiring trillions of dollars in infrastructure investments funded through financial markets. The United Nations Conference on Trade and Development (UNCTAD) estimates that between $5 trillion and $7 trillion is needed annually until 2030 to meet sustainable development goals, with a current financing gap of about $4.3 trillion. Derivatives play a critical role by allowing companies to hedge risks associated with sustainable investments and capital raising, facilitating efficient capital allocation toward green initiatives. They also help enhance transparency, price discovery and market efficiency, fostering long-term investment strategies.

New derivatives linked to sustainability measures have emerged, including sustainability-linked derivatives, CDS related to environmental, social and governance (ESG) factors and renewable energy derivatives, which integrate ESG considerations into financial markets (see Figure 21). These instruments incentivize sustainable practices and could help achieve the UN's 2030 sustainable development goals. Derivatives are also used to hedge against extreme weather events, supporting climate resilience efforts.

Figure 21: Examples of Usage of ESG-linked Derivatives

Siemens Gamesa	Olam	New World Development
€250 million (Notional)	One-year US Dollar/Thai Baht Forward	HK$1 billion (Notional)
IRS	FX Forward	IRS
The ESG-linked swap ties ESG rating changes to charitable donations, with HSBC donating for improvements and Siemens donating for declines, without affecting hedging costs	The FX forward executed with Deutsche Bank integrates ESG targets. Meeting these goals results in discounts while supporting 10 UN Sustainable Development Goals (UNSDGs)	The IRS was conducted with DBS Hong Kong and is linked to UNSDGs. It hedges interest rate risk while earning sponsorship for social innovation projects upon achieving sustainability-focused business targets

Source: Press releases

Conclusion

OTC derivatives are extensively used by a wide variety of entities around the globe – including corporates, pension funds, agricultural companies, governments, insurance companies, asset managers, banks and hedge funds – to transfer risks, create certainty and stability and enhance returns. Derivatives markets contribute to vibrant, competitive, robust and liquid financial markets, ultimately promoting economic growth.

OTC derivatives are extensively used by a wide variety of entities around the globe – including corporates, pension funds, agricultural companies, governments, insurance companies, asset managers, banks and hedge funds – to transfer risks, create certainty and stability and enhance returns

2. Introduction

2.1. EVOLUTION AND HISTORICAL PERSPECTIVE OF DERIVATIVES

Derivatives have a rich history, dating back thousands of years, with origins in agricultural and commercial trade. As early as the second millennium BC, risk mitigation techniques were referenced in the Code of Hammurabi, one of the earliest codes of law from ancient Mesopotamia. In ancient Greece, the philosopher Thales is credited with pioneering options contracts by securing rights to olive presses ahead of an abundant harvest. Similarly, during the Roman Empire, government-regulated commodity prices laid the groundwork for derivatives-like instruments in trade.

A major milestone occurred in 1730 with the establishment of the Dojima Rice Exchange in Osaka, Japan – one of the earliest commodities futures trading bourses[2]. In Europe, derivatives trading on FX, commodities and other underlyings emerged in the 16th century in Spain and the Netherlands, spreading to England, France and Germany in the 17th and 18th centuries[3]. In 1865, the Chicago Board of Trade introduced the first standardized futures contracts, a big step on the path to the development of modern derivatives markets.

The evolution of derivatives accelerated during the 20th century, fueled by the liberalization of global markets, technological advancements and increasing demand for sophisticated risk management tools. Today, derivatives are indispensable for managing risks across sectors, from agriculture to finance, shaping modern global markets and institutions.

ISDA was established in 1985 to bring greater standardization to the growing OTC derivatives market through the development of common legal documentation and best practices, providing the foundations for the industry to grow at scale. Legal standards remain a critical part of ISDA's work, along with the development of mutualized industry solutions that aim to bring greater efficiency to the market.

Advances in quantitative finance and modelling have ensured pricing and hedging practices are based on established mathematical principles, further strengthening the position of derivatives as an indispensable tool in global financial markets

Mathematical Foundations

Advances in quantitative finance and modelling have ensured pricing and hedging practices are based on established mathematical principles, further strengthening the position of derivatives as an indispensable tool in global financial markets. In 1900, Louis Bachelier[4] presented his thesis, *Théorie de la Spéculation*, which is now seen as the birth of modern mathematical finance. His work included a formula to value financial options.

This foundation was later expanded by economists Fischer Black, Myron Scholes and Robert Merton, who developed the Black-Scholes-Merton model in the 1970s. This model became the modern basis for calculating the fair value of options and other derivatives. It considers factors like the underlying asset's price, time to expiration, volatility, interest rates and dividends to determine accurate prices. These mathematical methods help ensure derivatives are priced fairly, allowing buyers and sellers to manage risks effectively.

[2] Pau Ali, 2001, *Review of 'Building the Global Market: A 4000 Year History of Derivatives' by E J Swan (2000) by Paul Ali :: SSRN*

[3] 2008, Weber, *A Short History of Derivative Security Markets by Ernst Juerg Weber :: SSRN*

[4] Louis Bachelier, *Project MUSE - Louis Bachelier's Theory of Speculation*

2.2. HOW THE REPORT IS STRUCTURED

This report offers a comprehensive analysis on how and why OTC derivatives are used by different types of entities to manage risk and optimize investments and how derivatives drive competition, market liquidity, cost reduction and economic growth. It also explores the size of the market and recent regulatory reforms to enhance the resilience of the financial system.

Report Structure

- **Applications and Value of OTC Derivatives:** Detailed in Section 3 of the report, this chapter provides analysis of how OTC derivatives are used and the value they bring from a micro and macro perspective.
    - Regional and Global Adoption of OTC Derivatives: This section explores the extensive use of derivatives by entities in different industries across the globe. It highlights key studies that analyze global and regional OTC derivatives usage patterns and delves into adoption rates, sectoral variations and the benefits of derivatives in mitigating risks, enhancing firm value and optimizing investment decisions.
    - Microeconomic Implications: This section explores the role of OTC derivatives in financial risk management across various sectors. It examines their use in hedging interest rate fluctuations, currency risks, commodity prices, credit events and liquidity management. Using real-world examples, the report highlights how these tools support operational stability, enhance investment strategies and align risk management with users' needs. It also highlights the use of derivatives by institutional investors to optimize portfolios and improve returns.
    - Macroeconomic Implications: This section analyzes the role of OTC derivatives in fostering financial stability, economic growth and efficient capital allocation. It examines the use of derivatives by pension funds to secure retirement incomes, insurers to manage demographic and asset price risks, mortgage lenders to hedge the risks posed by fixed-rate mortgages and free up lending capacity and a variety of entities to support sustainable development goals. It also highlights the role that derivatives play in enhancing GDP growth and economic resilience in developing nations.
- **Concluding Remarks:** Section 4 summarizes the value of OTC derivatives in terms of risk mitigation, economic stability and strategic financial management and sets out some key considerations.
- **Appendices:** The appendices provide context on the regulatory framework for derivatives and the size of the market globally and by asset class.
    - Regulatory Reforms: This section outlines the post-financial-crisis regulatory reforms, including mandatory clearing of standardized derivatives, mandatory margining of non-cleared derivatives, changes to bank capital requirements, reporting of all OTC derivatives to trade repositories and the trading of standardized derivatives on exchanges or electronic trading platforms where appropriate. It details the objectives of these reforms, implementation progress and impact on market resilience and transparency. It also draws attention to challenges posed by regulatory fragmentation across jurisdictions, as well as the enduring role of non-cleared derivatives in managing bespoke risks.

- Market Size and Structure: This section looks at the size, structure and evolution of the OTC derivatives market. It examines trends in gross market value, risk exposure and the size of interest rate, FX, equity, commodity and credit derivatives markets. It also summarizes the interconnected ecosystem of the derivatives market, including dealers, financial institutions, non-financial firms and CCPs.

This report underscores the critical role of OTC derivatives in modern finance and their continual adaptation and relevance to a dynamic global economy.

3. Applications and Value of OTC Derivatives

3.1. REGIONAL AND GLOBAL ADOPTION OF OTC DERIVATIVES

OTC derivatives help businesses, governments and investors manage financial risks, stabilize operations and optimize returns. They have been widely adopted across the globe and provide a powerful means of creating certainty and stability and improving financial performance. Derivatives empower firms to navigate uncertain markets, take investor preferences into account, reduce risks from asymmetric outcomes and optimize and adjust risk profiles, which ultimately drives sustainable growth and enhances economic stability.

Derivatives empower firms to navigate uncertain markets, take investor preferences into account, reduce risks from asymmetric outcomes and optimize and adjust risk profiles, which ultimately drives sustainable growth and enhances economic stability

3.1.1. Global Usage of OTC Derivatives

A review conducted by Expand Research (a firm owned by BCG) of annual reports mainly for the reporting year 2023 from entities listed on major equity indices – including the S&P 500 (US), Nikkei 225 (Japan), ASX 200 (Australia), Hang Seng (Hong Kong), STI (Singapore), FTSE 100 (UK) and Eurostoxx 50 (Europe) – revealed that:

- Of the 1,187 entities reviewed across these indices, 1,034 (87.1%) actively utilize OTC derivatives.
- This adoption was observed across both financial and non-financial sectors. Among the 1,007 non-financial firms, 872 (86.6%) employ OTC derivatives (see Figure 22). Similarly, 162 of the 180 financial firms (90%) use OTC derivatives (see Figure 23).

Figure 22: Non-financial Firms

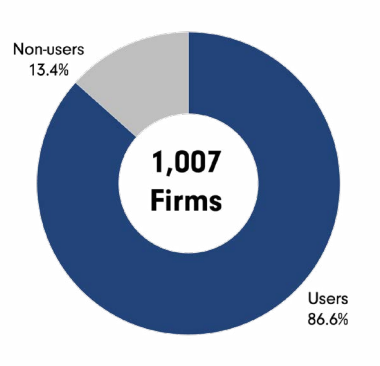
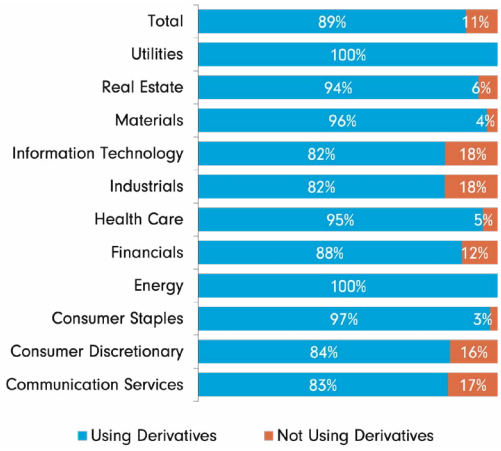


Figure 23: Financial Firms

Source: Expand Research analysis

The use of OTC derivatives is widespread among entities in different sectors for each of the indices, as shown in Figure 24 to Figure 30.

Figure 24: S&P 500 (US)



Source: Expand Research analysis

Figure 25: Hang Sang Index (Hong Kong)

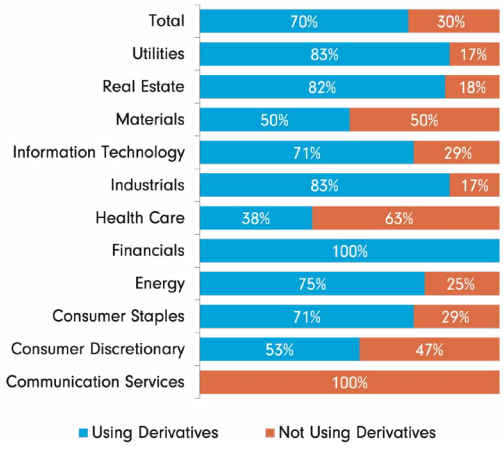
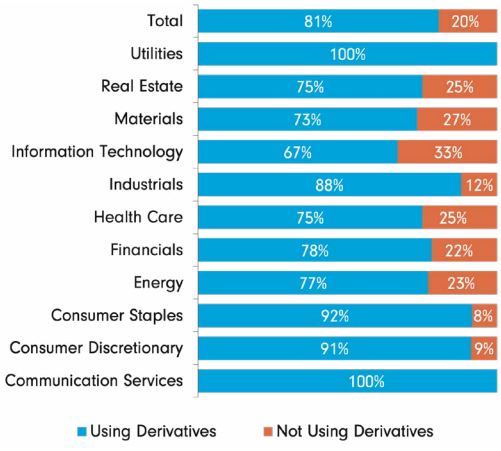


Figure 26: ASX 200 (Australia)



Source: Expand Research analysis

Figure 27: Nikkei 225 (Japan)

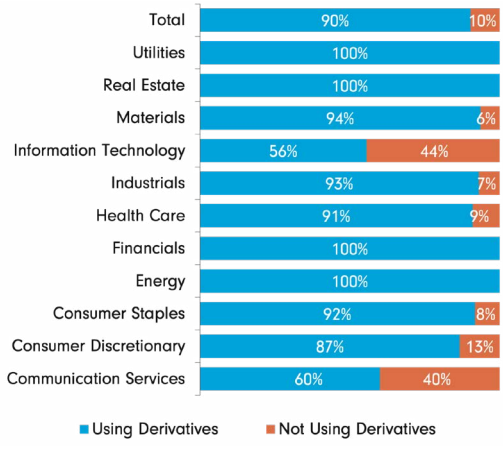
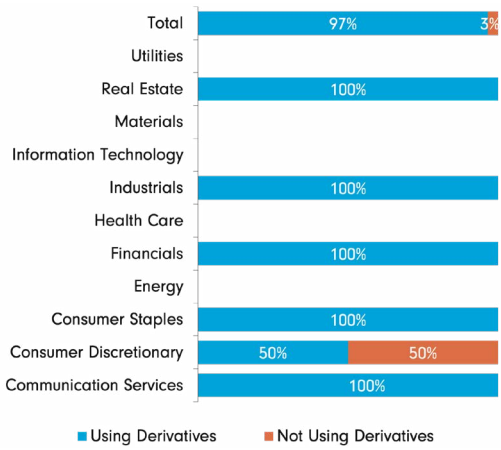


Figure 28: STI (Singapore)



Source: Expand Research analysis

Figure 29: FTSE 100 (UK)

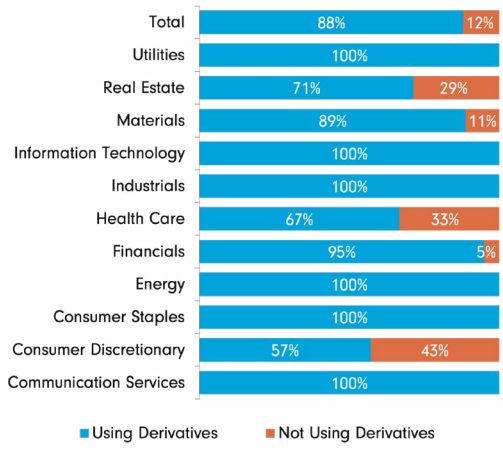
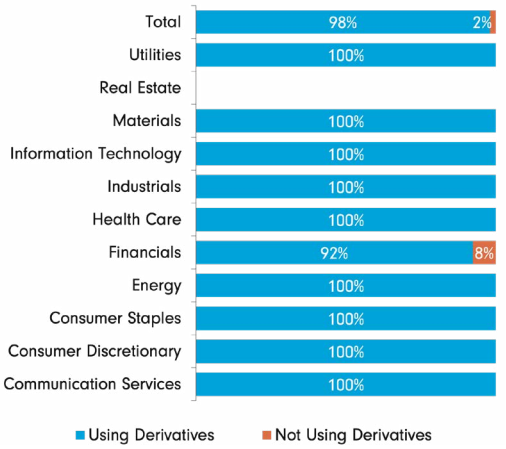


Figure 30: Eurostoxx 50 (Europe)



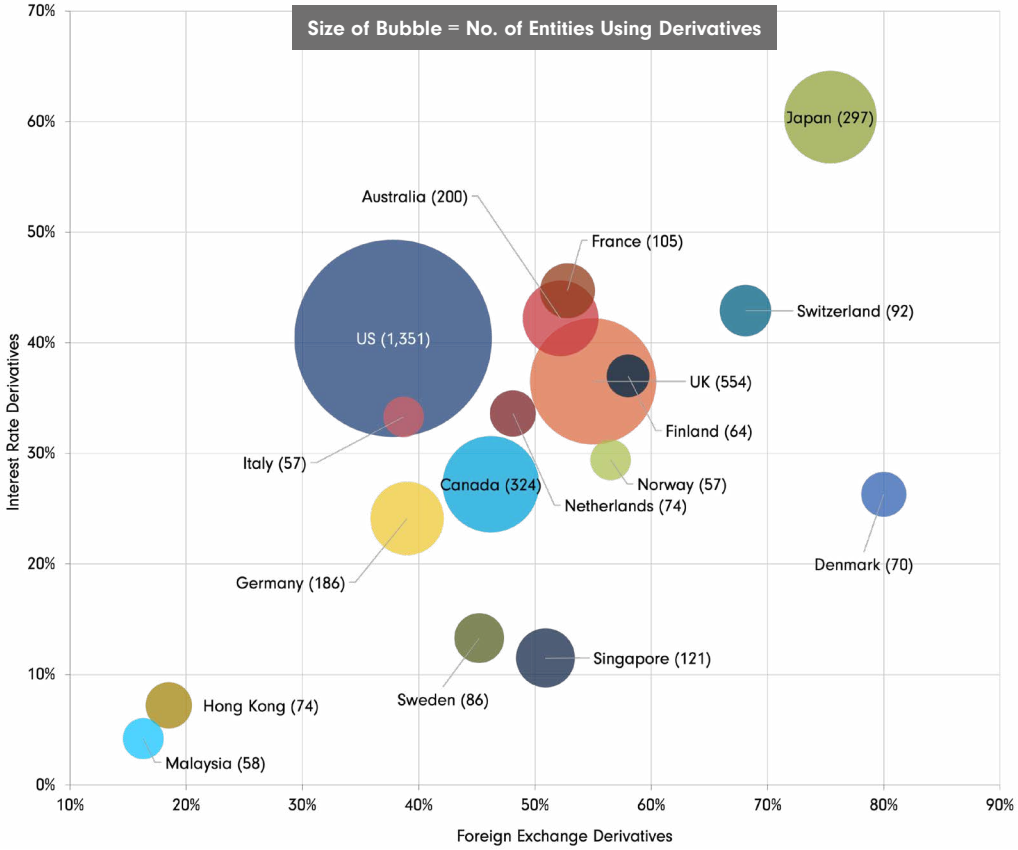
Source: Expand Research analysis

Another study[5], which reviewed a sample of 6,888 non-financial firms across 47 countries, including Australia, Brazil, Canada, China, France, Germany, India, Italy, Japan, Mexico, Singapore, South Africa, the UK and the US, indicated that around 60% of non-financial firms used at least one type of OTC derivative for some form of risk reduction. These derivatives users had lower cashflow volatility and systematic risk compared to non-users. The study also revealed that hedging would likely reduce a firm's cost of capital and influence investment decisions and profitability, potentially resulting in higher values and risk-adjusted returns.

Derivatives usage among firms varied widely by country. In China, 12.5% of firms used derivatives based on a sample of 32 companies versus 100% in Chile (from a sample of 13 firms). The highest numbers were recorded in the US and the UK, where approximately two-thirds of firms used derivatives – over 1,300 out of a sample of more than 2,000 companies in the US and more than 500 out of a sample of approximately 800 in the UK (see Figure 31).

[5] Söhnke M. Bartram, Gregory W. Brown, Jennifer S. Conrad, 2013, *The Effects of Derivatives on Firm Risk and Value by Söhnke M. Bartram, Gregory W. Brown, Jennifer S. Conrad :: SSRN*

Figure 31: Firms Across Multiple Countries Use OTC Interest Rate and FX Derivatives



Source: Research paper: The Effects of Derivatives on Firm Risk and Value by Söhnke M. Bartram, Gregory W. Brown, Jennifer S. Conrad

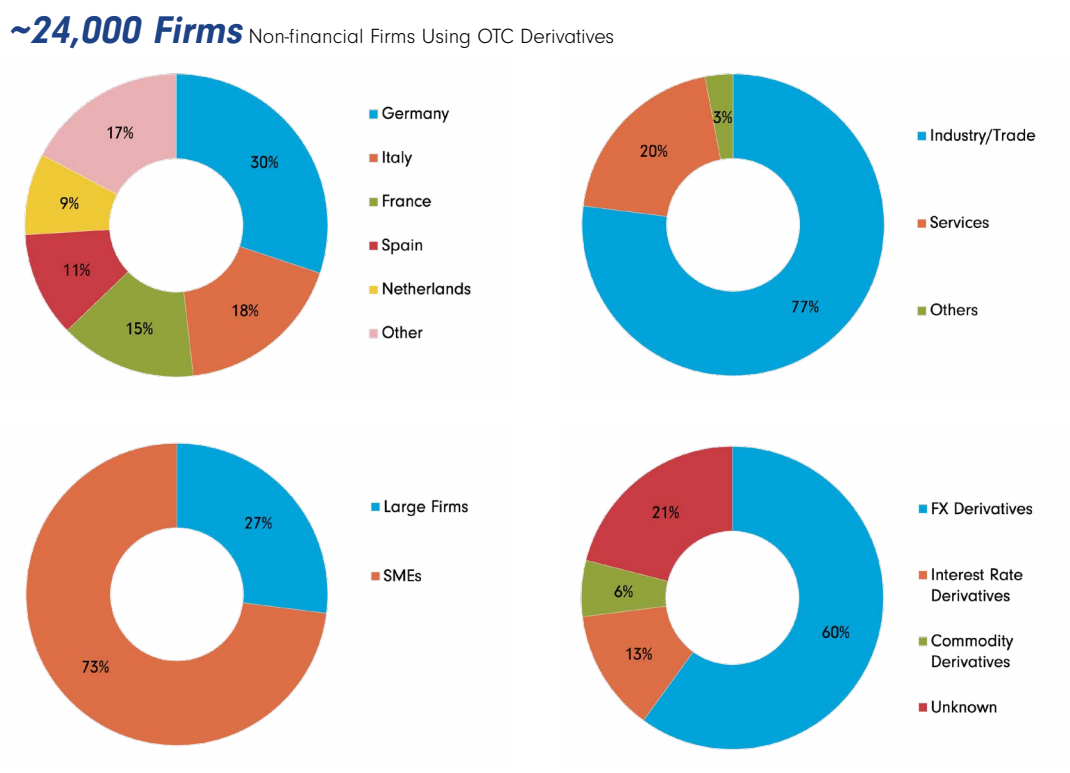
3.1.2. OTC Derivatives are Widely Used Across Regions

A BIS review[6] found most derivatives trading in the euro area takes place on an OTC basis. Using data reported under the European Market Infrastructure Regulation, the analysis showed that around 24,000 out of 107,000 non-financial firms had at least one registered derivatives transaction (from November 2017 to May 2018), with 98% trading OTC derivatives and 2% exclusively using exchange-traded derivatives. Over 80% of these firms were based in Germany, Italy, France, Spain and the Netherlands. Most (77%) operated in industry or trade, while 20% were in services. Large firms[7] made up 27% of the sample, with the rest comprising small and medium-sized enterprises. Of the 24,000 firms, 60% traded FX derivatives, 13% used interest rate derivatives and nearly 6% employed commodity derivatives, with limited information on the balance of the sample (See Figure 32).

[6] Bank for International Settlements (BIS), 2018, *An insight into the derivatives trading of firms in the euro area*

[7] The term 'large firms' refers to those with more than 250 employees or with turnover greater than €50 million and total assets greater than €43 million

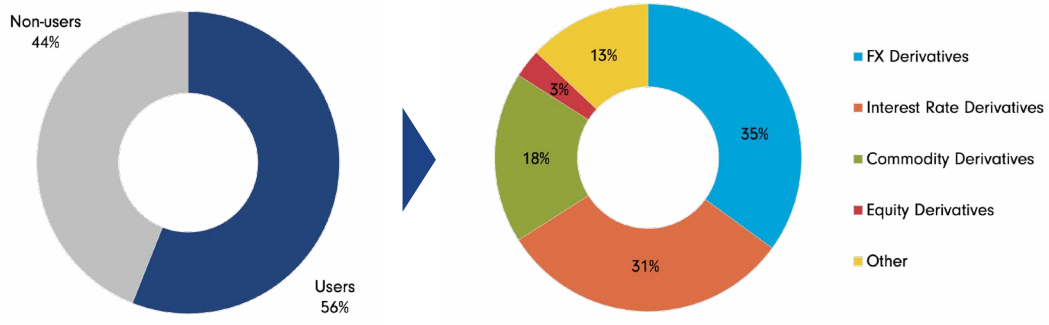
Figure 32: Number of Firms in Euro Area Using OTC Derivatives



Source: BIS

In the US, a review[8] of non-financial firms in the S&P Composite 1500 Index from 2002 to 2016 found that around 56% on average used derivatives to manage risk exposures. The study showed that 35% of firms used FX derivatives, 31% employed interest rate derivatives, 18% utilized commodity derivatives and 3% used equity derivatives during the period (see Figure 33).

Figure 33: Percentage of Non-financial Firms in S&P Composite 1500 Index Using Derivatives (2002-2016)



Source: Research paper: Corporate Risk Exposures, Disclosure and Derivatives Use: A Longitudinal Study by Ekaterina E. Emm, Gerald D. Gay, Honglin Ren

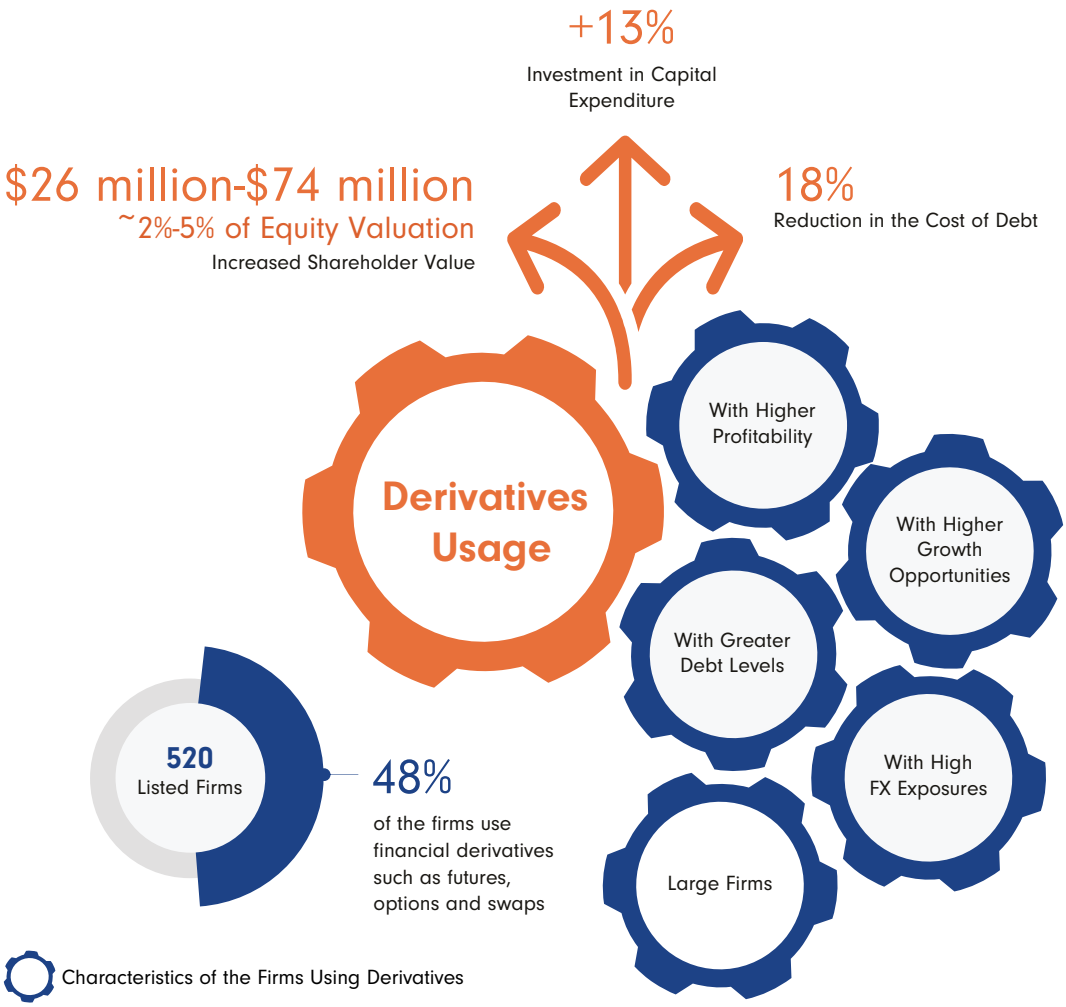
[8] Emm,Gay and Ren, 2019, *Corporate Risk Exposures, Disclosure and Derivatives Use: A Longitudinal Study by Ekaterina E. Emm, Gerald D. Gay, Honglin Ren :: SSRN*

Entities in Asia Pacific have also embraced financial derivatives as a key tool for risk management, with derivatives usage enhancing firm value through risk reduction, increased investment and lower financing costs. A study[9] examined the use of financial derivatives by 520 listed companies in eight Asian countries from 2007 to 2014, exploring how derivatives affect firm valuation and risk management. About 48% of these firms used financial derivatives such as futures, options and swaps. Derivatives users were typically larger firms with higher foreign exchange exposure, greater debt levels, more growth opportunities and higher profitability.

The study found that the intensity of derivatives usage was positively associated with firm valuation, increasing shareholder value by between $26 million and $74 million (approximately 2%-5% of equity valuation). This positive effect was more pronounced in entities with strong corporate governance, suggesting that effective oversight enhances the benefits of hedging. Derivatives usage was also linked to reduced firm risk, evidenced by lower cashflow and earnings volatility and stock return risk.

Additionally, hedged firms invested about 13% more in capital expenditure than non-hedged firms, promoting value-enhancing investments. Increased hedging intensity also led to a reduction in the cost of debt (roughly an 18% drop based on the average cost of debt) (see Figure 34).

Figure 34: Benefits for Firms Using Derivatives in Asia



Source: Research paper: The Usage of Derivatives in Corporate Financial Risk Management and Firm Performance by Kin-Wai Lee

[9] Kin-Wai Lee, 2019, The Usage of Derivatives in Corporate Financial Risk Management and Firm Performance *V24N2-1.pdf (cyut.edu.tw)*

For the purposes of this report, the applications of OTC derivatives are divided into two categories:

- **Microeconomic Impact:** Effects on individual companies or specific sectors, directly affecting businesses and potentially having a broader effect within that sector.

- **Macroeconomic Impact:** Influence on the broader economy, including financial stability, assistance to developing economies, creation of lending capacity, societal benefits and overall economic growth.

While these classifications focus on the effects within each group, they are interconnected. Some macroeconomic effects naturally stem from microeconomic actions; in turn, macroeconomic changes influence individual microeconomic decisions. This creates a dynamic interaction where impacts flow between the two levels.

3.2. MICROECONOMIC APPLICATIONS

OTC derivatives provide an essential mechanism for managing risks, optimizing investments and facilitating liquidity, thereby enhancing economic stability. Across sectors and regions, derivatives support both private corporations and public entities, making them an integral part of modern financial systems and day-to-day financial management.

3.2.1. Risk Transfer

In today's dynamic global economy, businesses, governments and financial institutions are exposed to a variety of financial risks arising from fluctuations in interest rates, FX and equity and commodity prices, as well as company defaults and other credit events. OTC derivatives have become essential tools for managing these risks. These hedging needs emerge from several inherent factors, some of which are outlined in Figure 35.

Figure 35: Reasons for Hedging

Divergent Preferences Among Market Participants	• Borrowers might prefer fixed interest rates for predictability, while lenders might favor floating rates to benefit from potential rate increases. • OTC derivatives allow these parties to align their preferences by swapping exposures.
Divergent Risks	• Equity holders may tolerate more volatility for higher returns, whereas creditors prioritize stability to ensure debt repayment. This discrepancy necessitates effective risk management strategies.
Market Volatility and Investor Expectations	• Investors might prefer companies to focus on their core competencies and not reward unnecessary financial volatility. For example, an investor that puts money into a pharmaceutical company might be willing to take exposure to whether the company develops vital new drugs but may not be willing to see company value eroded by FX volatility on overseas earnings.
Other Asymmetries	• OTC derivatives provide companies with the flexibility to guard against scenarios like defaults, large drawdowns or discontinuities, and can help institutions address customer reactions to price changes, which may limit the passing of increased costs onto consumers. They can also help companies navigate differences in the cost of capital (eg, preserving internal capital rather than using external capital). By incorporating derivatives into their risk management strategies, companies can reduce the likelihood of being caught in adverse scenarios that could compromise their financial health.

OTC derivatives provide companies with the flexibility to customize their hedging strategies to match specific risks they seek to manage. This customization not only enhances risk management effectiveness but also facilitates compliance with accounting and regulatory requirements, such as qualifying for hedge accounting[10] treatment under International Financial Reporting Standard (IFRS) 9 or Accounting Standards Codification (ASC) 815. Some hedges are conducted on a one-to-one basis – for example, using a currency forward to hedge a specific foreign currency transaction – while other risks are hedged on a portfolio basis, such as employing IRS to manage the interest rate risk of a portfolio of variable-rate loans.

3.2.1.1. Hedging Interest Rate Risks

Governments and private-sector firms face risks from fluctuations in interest rates that can impact cashflows, earnings and asset values. Actively managing this risk is essential to maintaining financial stability and supporting strategic, long-term planning. The key reasons why governments and corporations hedge interest rate risks are outlined in Figure 36.

Figure 36: Reasons for Hedging Interest Rate Risk

Why Participants Hedge Interest Rate Risks	• Many firms and governments raise financing via debt instruments for expansion, growth and investment. By managing interest expenses, corporations can protect profit margins, while governments can shield public spending from sudden spikes in interest costs, helping to maintain essential programs.
	• Consistent and predictable interest expenses can help improve financial ratios for corporations (such as the interest coverage ratio) and lead to better fiscal metrics for governments, boosting creditworthiness and potentially lowering borrowing costs.
	• Locking in fixed or predictable interest rates through derivatives like IRS ensures interest related cashflows (for corporations) and budgeted interest expenses (for governments) remain stable, even as market interest rates fluctuate.

Scale of Usage

A recent BIS study[11] of interest rate risk management by non-financial firms reviewed over 80,000 financial statements from more than 14,000 companies across the euro area, the US and the UK between 2007 and 2022. The study revealed that:

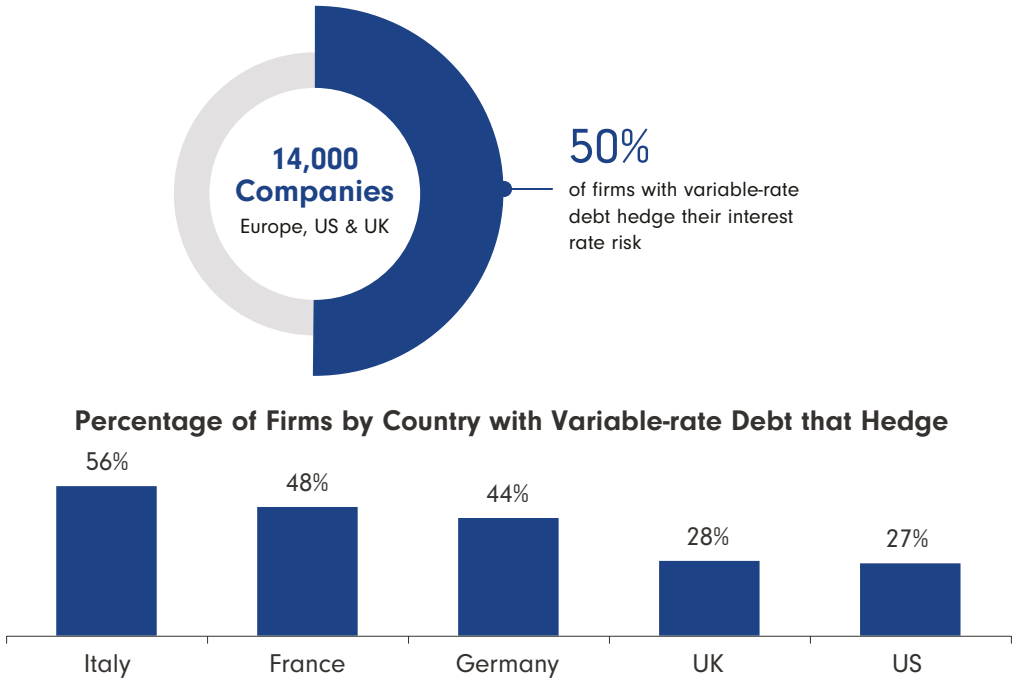
- Around 50% of firms with variable-rate debt hedge their interest rate risk, ranging from just under 30% in the US to almost 60% in Italy (see Figure 37). These firms use interest rate hedges to navigate different preferences between borrowers and lenders and varying preferences through time, and to reduce unwanted – potentially excess – volatility.

[10] Hedge accounting aligns the accounting treatment of a hedge instrument with the risk it aims to mitigate. This approach allows gains and losses on both the hedged item and the hedging instrument to be recorded in the same period, accurately reflecting the company's financial position and risk management efforts. There are three main types: fair value hedges (offsetting changes in asset or liability values); cashflow hedges (hedging future cashflow variability); and net investment hedges (for foreign currency exposure in foreign operations). Hedges must meet strict documentation, effectiveness and consistency standards to qualify under regulatory accounting rules

[11] BIS, 2023, *Interest rate risk of non-financial firms: who hedges and does it help? (bis.org)*

- Larger firms with smaller liquidity buffers and higher variable-rate debt are more likely to hedge. Bigger companies tend to hedge more because they are likely to be able to afford the costs of hedging – for instance, having a team to manage it.

Figure 37: Percentage of Firms by Country with Variable-rate Debt that Hedge



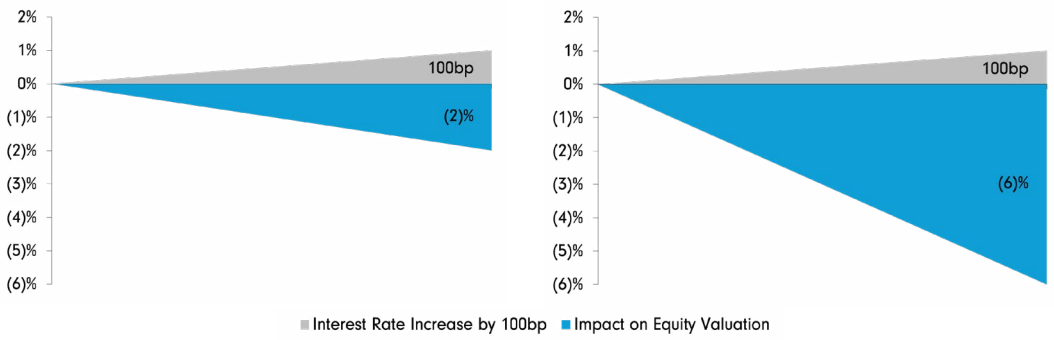
Source: BIS

- Interest rate hedges effectively protect firms against rising rates. Companies without these hedges face a drop in interest coverage ratios (earnings before interest and taxes to interest expenses), while those with hedges maintain more stable ratios. This protection is also evident in equity valuations: for example, when interest rates rise by 100bp, firms without hedges experience an average 6% decline in equity value compared to a 2% drop for hedged firms (see Figure 38).

Figure 38: Hedging Variable-rate Debt Shields Firms from Interest Rate Hikes (Impact on Market Capitalization Following a 1% Rise in Interest Rates)

38A: Impact on Hedged Firms

38B: Impact on Non-hedged Firms



Source: BIS

Examples:

Nikon, an imaging technology company, had most of its interest-bearing liabilities consisting of bonds and borrowings as of March 31, 2024. For floating-rate borrowings, it has used IRS contracts to hedge exposures, achieving the effect of fixed-rate borrowings. It mitigates the interest rate risk associated with its long-term floating-rate borrowings by securing fixed cashflows using IRS contracts. As a result, its exposure to interest rate risk is limited and the impact from rate changes is immaterial. The company had entered into interest rate derivatives contracts worth around ¥23 billion notional (around $150 million) to pay fixed and receive floating rates against long-term borrowings of approximately ¥91 billion (around $600 million)[12] .

Ørsted, a Danish renewable energy company, reported IRS holdings (pay fixed/receive variable) that were accounted for at fair value through profit and loss amounting to 21.8 billion Danish krone (approximately $3 billion in notional) as of December 31, 2023. These IRS are generally used to adjust the maturity profile of the company's bond portfolio and thereby reduce its interest rate risk. The company had bond debt with varying maturities totaling 70.6 billion Danish krone (approximately $10 billion)[13].

Dell Technologies Inc, a technology company based in the US, employs IRS to hedge against the variability in cashflows related to interest payments on its structured financing debt. These swaps effectively convert the variable interest rates of the structured financing debt into fixed rates, aligning them with the fixed rates received from fixed-term customer leases and loans. In support of its international financing operations, the company has initiated revolving structured financing debt programs connected to its fixed-term lease and loan products sold in Canada, Europe, Australia, New Zealand and the Middle East. The debt associated with these programs carries a variable interest rate, and its duration is determined by the terms of the underlying loan and lease payment schedules. As of February 2, 2024, Dell Inc's structured financing facilities had the following debt capacities, each secured exclusively by loan and lease payments and associated equipment from its respective regions: Canada, $336 million; Europe, $544 million; Australia and New Zealand, $296 million; and the Middle East, $150 million[14].

Fifth Third Bancorp, a regional US bank, uses derivatives as part of its interest rate risk management strategy to mitigate earnings volatility caused by fluctuations in market interest rates. These derivatives may include IRS, floors, caps, forward-starting IRS, options and swaptions. As of December 31, 2023, Bancorp held IRS with a notional value of $8 billion on its commercial and industrial (C&I) loans, receiving fixed rates and paying floating rates. Additionally, it entered into forward-starting IRS with a notional value of $6 billion on the C&I loans, also receiving fixed rates and paying floating rates[15].

Swedbank, a Nordic-Baltic banking group based in Sweden, manages interest rate risk on its fixed-rate public loans (mortgages) and non-maturing deposits (such as on-demand deposits), both of which are hedged on a portfolio basis using IRS. The nominal amounts covering portions of loans or deposits in each time bucket are hedged through IRS. As of December 31, 2023, Swedbank held IRS with a notional value of 346,835 million Swedish krona (approximately $31.5 billion) against loans to the public (mortgages) and 5,201 million Swedish krona (approximately $472 million) against deposits and public borrowings[16].

[12] Nikon consolidated financial statement, 2024, *Consolidated Financial Statements FY2024 (nikon.com)*

[13] Orsted annual report, 2023, *orsted-ar-2023.pdf*

[14] Dell Technologies form 10-k, 2023, *Form 10-K for Dell Technologies INC filed 03/25/2024*

[15] Fifth Third Bancorp form 10-k, 2023, *FITB-12.31.23-10-K*

[16] Swedbank annual report, 2023, *download*

CaixaBank, a Spanish financial institution, uses derivatives including IRS and options to manage its exposure to interest rate fluctuations. As of December 31, 2023, it employed various hedging instruments across both its asset and liability portfolios to address risks linked to fixed-rate products such as loans, deposits and issued debt securities. For example, CaixaBank implemented hedges using IRS and options with a total notional value of €11.9 billion to convert fixed-rate loans into floating-rate loans. Additionally, it hedged demand accounts (deposits) by using IRS with a notional amount of €20 billion to shift these from fixed rates to floating rates[17].

Key Takeaways:

1. **Preserving Stability and Strategic Flexibility:** Derivatives like IRS help both governments and corporations convert floating-rate debt into predictable, fixed-rate obligations. This stability not only mitigates short-term shocks – by preventing sudden spikes in interest costs – but also enables longer-term strategic planning. In the public sector, stable financing costs safeguard essential programs. In the private sector, predictable interest expenses help maintain profit margins and free up capacity for growth-oriented initiatives.

2. **Adoption of Interest Rate Hedges:** A consistent interest expense profile can enhance key financial measures – such as interest coverage ratios – leading to stronger creditworthiness and potentially lower borrowing costs. Investors reward firms and governments that demonstrate proactive risk management through higher equity valuations and better access to credit markets. As a BIS study highlights, nearly half of the companies with variable-rate debt hedge their exposures, underscoring how critical these tools are in signaling prudent financial stewardship.

3. **Tailoring Solutions for Diverse Risk Profiles:** The breadth of hedging strategies across multiple companies shows that interest rate derivatives are used in a variety of ways. Different industries, regions and capital structures dictate unique hedging requirements. From managing structured financing programs to portfolio-level hedges against mortgage or deposit exposures, derivatives empower institutions to calibrate their interest rate risk precisely in line with their operational needs, risk tolerance and strategic objectives.

3.2.1.2. Reducing and Managing FX Risks in Operations, Investment and Funding

The global economic system is interconnected, with both corporations and governments playing critical roles in international markets. Entities that operate on a global basis have production, distribution and operations spanning multiple countries, while governments (for instance, those in emerging economies) may have debt in non-domestic currencies. Consequently, effective currency risk management is essential for the financial health of both corporations and governments. FX risk represents the potential for financial losses stemming from currency fluctuations, which can impact cashflows, earnings and the value of foreign-currency-denominated assets and liabilities. The rationale for managing FX risk is outlined in Figure 39.

[17] Caixa Bank annual report, 2023, *CAIXABANK_2023_CAC_ING.pdf*

Figure 39: Reasons for Hedging FX Risks

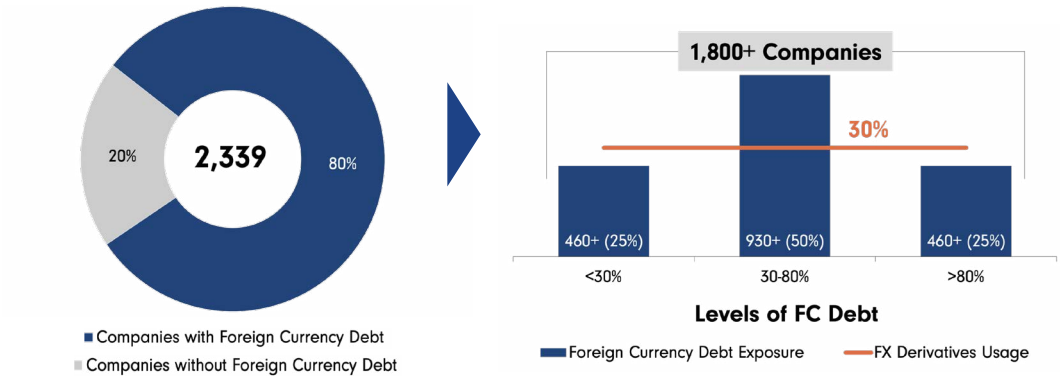
Why Participants Hedge FX Risks	• Firms can reduce variations in financial results by managing the impact of currency fluctuations on profit margins and overall earnings, providing more reliable financial performance.
	• For entities with significant foreign operations or investments, hedging safeguards the value of those assets against currency depreciation, preserving capital and investment returns.
	• Hedging FX risks allows for more accurate budgeting and long-term planning by stabilizing currency-related costs, which is particularly useful for governments and firms with multi-year projects and cross-border commitments.
	• With stable FX exposure, entities can avoid sharp increases in foreign-currency-denominated debt costs, enhancing credit profiles and potentially securing lower financing rates.

Scale of Usage

A study[18] published in 2024 examined 2,339 companies that were constituents of representative equity indices[19] in the Executives' Meeting of East Asia-Pacific Central Banks economies[20] (EMEAP) from 2011 to 2021. The findings revealed that:

- Nearly 80% of companies (about 1,800+ entities) in the study had debts denominated in foreign currencies at the end of 2021. Within this group of companies:
  - 50% (about 930+ entities) had more than 30% of their debts in foreign currencies.
  - 25% (about 460+ entities) had a foreign currency debt ratio exceeding 80% (see Figure 40).
- Around 30% of the foreign currency borrowers (about 550 entities) were found to employ FX derivatives in 2021.

Figure 40: Percentage and Number of Firms with Foreign Currency Debt and Average FX Derivatives Usage (Percentage)



Source: Hong Kong Monetary Authority (HKMA)

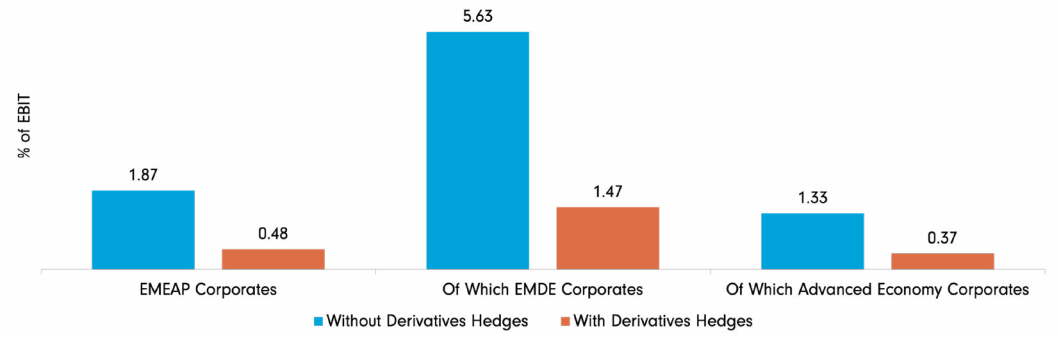
[18] Hong Kong Monetary Authority, 2024, *Foreign Exchange Risks and Hedging of Corporates in EMEAP Economies (hkma.gov.hk)*

[19] The indices include the ASX 300, CSI 300, HSI, IDX Composite, Nikkei 225, KOSPI Composite, KLCI, NZX 50, PSEi, STI and SET 100

[20] East Asia-Pacific economies include Australia, mainland China, Hong Kong, Indonesia, Japan, South Korea, Malaysia, New Zealand, the Philippines, Singapore and Thailand

- The differences in hedging activity had a significant impact on financial performance. The study estimated the effects of the local currency depreciating against the US dollar over the year and revealed that:
    - Companies using FX derivatives lost only 0.48% of EBIT due to FX losses versus 1.87% for non-users. This shows that using derivatives reduced FX losses by around 75% and cut unwanted and potentially unrewarded excess volatility.
    - For emerging market economy borrowers, the reduction was even greater: a loss of 1.47% of EBIT for derivatives users compared to 5.63% for non-users (see Figure 41).

Figure 41: Average FX Losses (as a Percentage of Earnings Before Interest and Taxes) by Usage of FX Derivatives



Source: HKMA

Examples:

EssilorLuxottica, a Franco-Italian company that produces eyewear and operates in numerous countries, faces exposure to various currencies due to its global operations. By the end of 2023, the company had entered into FX derivatives to hedge currency risks arising from its business and financing operations. It used derivatives to sell over 16 currencies and to buy more than 10 currencies, primarily against the euro, totaling €4.8 billion in hedging contracts. US dollars and Chinese renminbi contracts against the euro were the most significant, making up more than half of the total value of these contracts[21].

Grupo Bimbo, a Mexican multinational food company with a presence in more than 33 countries, uses foreign exchange forwards to hedge its currency risks tied to raw material purchases across the globe. These raw materials include essentials like wheat and sugar. As of December 31, 2023, it held a slew of forward contracts – the main ones being MXP/USD totaling Mex$602 million (around $30 million), USD/CLP amounting to $45 million and USD/CAD equating to $29 million – with the vast majority maturing between one and six months[22].

Tata Consultancy Services (TCS), an Indian company specializing in information technology services and consulting, reported that export revenue constituted 93.5% of its total standalone revenue from April 1, 2023, to March 31, 2024. During this period, TCS's foreign exchange revenues were around ₹193,000 crores (approximately $22.8 billion) as of March 31, 2024. While TCS's revenues are denominated in various foreign currencies, a large portion of the costs are denominated in Indian rupee, exposing TCS to currency fluctuations.

[21] EssilorLuxottica annual report, 2023, *EssilorLuxottica_DEU_2023_Mise_en_ligne_UK.pdf*

[22] Grupo Bimbo annual report, 2023, *Annual Report Grupo Bimbo 2023 - Behind our actions_2.pdf (d2rwhogv2mrkk6.cloudfront.net)*

As part of its risk management strategy, TCS uses various derivatives instruments, such as FX forwards, currency options and futures contracts. As of March 31, 2024, TCS had entered into currency options that had been designated as cashflow hedges across 19 US dollar contracts, 29 sterling contracts and 28 euro contracts. The notional amounts were $475 million, £230 million (approximately $290 million) and €235 million (approximately $247 million). The total notional value across these contracts amounted to around $1 billion and the collective fair value of these contracts was ₹46 crores (around $5.4 million).

As of March 31, 2024, TCS also used derivatives not designated as hedging relationships (including FX forwards, currency options and futures contracts) with an outstanding notional value of ₹50,982 crores (around $6 billion)[23].

Unilever, a UK fast-moving consumer goods company, faces major currency risks due to its international sales, purchases and borrowings. Given this global reach, fluctuations in FX rates can impact sales, purchases and borrowings. To safeguard against these risks, Unilever relies on forward FX contracts, with each operating company responsible for managing its own currency exposures. By the close of 2023, Unilever had €1.4 billion notional amount in outstanding currency derivatives to which cashflow hedge accounting is applied, with its largest exposures being euro[24] (-€951 million) and sterling (-€372 million), followed by US dollar (€363 million). A 10% rise in foreign currencies against the respective functional currencies of group companies would have led to a €25 million loss in the income statement and a €142 million equity loss on account of hedging future trade-related cashflows and applying cashflow hedge accounting. A 10% drop in foreign currencies against the respective functional currencies would have had an equal but opposite effect[25].

Key Takeaways:

1. **Derivatives Can Materially Reduce Earnings Volatility and Protect Margins:** Derivatives serve as a potent tool in limiting unwanted swings in profitability. By locking in exchange rates, companies can substantially reduce the risk of significant hits to EBIT and shield core operations from currency movements.

2. **Widespread Global Usage Underscores their Strategic Importance:** With most large multinational firms carrying foreign-currency exposures – and a meaningful proportion actively hedging those exposures – derivatives have proven indispensable in today's interconnected markets. Their adoption by diverse sectors (from manufacturing to IT services) highlights the universal priority of mitigating FX risks.

3. **Stabilized Cashflows and Credit Profiles Empower Long-term Planning:** By delivering more predictable financial outcomes, derivatives allow companies and governments to manage budgets, secure favorable financing and chart cross-border expansion with greater confidence. With currency risks held in check, entities can focus on operational growth rather than being derailed by foreign exchange fluctuations.

[23] Tata Consultancy Services annual report, 2024, *Integrated Annual Report 2023-2024*

[24] Euro exposure relates to group companies having non-euro functional currencies

[25] Unilever annual report, 2023, *Unilever Annual Report and Accounts 2023*

3.2.1.3. Reducing and Managing Commodity Price Risk and Fluctuations

Commodities markets facilitate the transportation, transformation and storage of key raw materials (including electricity) on their journey from producers to consumers. They are real economy goods with a finite supply, so issues with supply have a direct impact on prices, particularly in view of often inelastic demand in the short term. Commodity price risk is the potential for financial loss that governments and corporations face due to fluctuations in commodity prices. Typical rationales for managing commodity price risks are described in Figure 42.

Figure 42: Reasons for Hedging Commodity Risk

Why Participants Hedge Commodity Price Risk	• Commodity markets are essential in moving raw materials from producers to consumers. With limited supplies and often inelastic short-term demand, disruptions (like geopolitical tensions, weather events or production issues) can lead to sudden price spikes. Governments and corporations hedge against these risks to protect against unplanned costs.
	• For governments, especially those in commodity-dependent countries, hedging stabilizes revenue from exports like oil or agriculture. This can help to steady broader economic conditions and avoid adverse effects on public spending and investment, ensuring more stable growth.
	• Commodities producers and consumers hedge against changes in physical commodity prices (eg, a producer would hedge against a price decline with short commodity futures positions) and fluctuations in various bases and spreads (eg, calendar spreads, product spreads and location spreads)[26].

Using Fuel Price Hedges is Widespread in the Aviation Industry

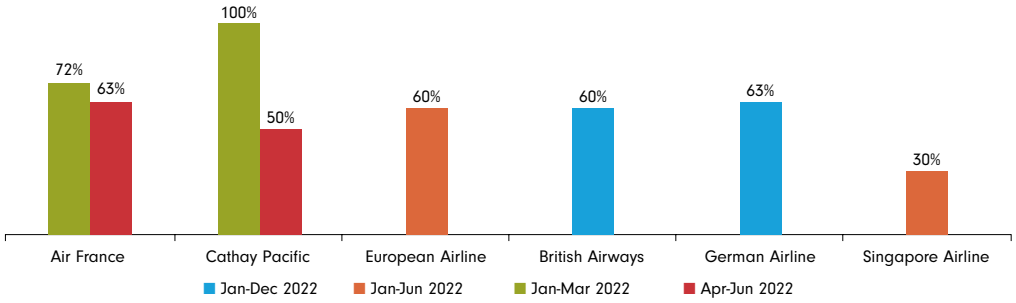
The airline industry is a vital component of the global economy, providing high-speed transportation for freight and passengers, which contributes to financial growth. Due to the industry's high exposure to fuel price volatility, effective risk management strategies – particularly fuel hedging – are essential for maintaining financial stability and providing airline tickets at affordable prices.

A 2023 study[27] reviewed the extent of fuel hedging carried out by mainly non-US airlines, which are exposed to fuel priced in US dollars but have non-US-dollar revenues. For example, the study revealed that Air France hedged 72% of its fuel requirements for January to March 2022, reducing coverage to 63% for April to June 2022. Cathay Pacific fully hedged (100%) its fuel consumption during the first quarter of 2022, before shrinking it to 50% by the second quarter (see Figure 43).

[26] Financial Stability Board (FSB), 2023, *The Financial Stability Aspects of Commodities Markets*

[27] McGill University, 2023, *Analysis of the Jet Fuel Price Risk Exposure and Optimal Hedging in the Airline Industry (researchgate.net)*

Figure 43: Percentage of Oil Hedged by Airlines



Source: Research paper: Analysis of the Jet Fuel Price Risk Exposure and Optimal Hedging in the Airline Industry

Examples:

Airlines[28] such as **Ryanair** (which hedged 85% of its fuel requirements for 2024), **Finnair** (with over 50% hedged for the same year) and **Lufthansa** (which hedged 74% of its 2024 fuel needs) use derivatives to mitigate future fuel price volatility. **EasyJet** hedged 76% of its fuel needs for the first half of 2024 and 51% for the second half, while **International Airlines Group** – the owner of British Airways and Iberia – hedged 58% of its fuel needs for the first quarter of 2024, 49% for the second quarter, 39% for the third quarter and 32% for the final three months of the year. For these airlines, fuel costs represent a substantial portion of operational expenses, and fluctuations in global fuel prices and foreign exchange rates can significantly impact profitability. By employing derivatives to hedge their fuel needs, they can manage expenses more effectively, protect profit margins and achieve financial stability, which facilitates better financial planning and budgeting.

Qantas Airlines, an Australian airline, employs hedging strategies to combat volatile fuel prices and currency fluctuations. Utilizing options and swaps on jet fuel, gas oil and crude oil, as well as FX forwards and currency options, the airline safeguards against adverse movements in US-dollar-denominated fuel prices and the AUD/USD exchange rate. Based on 2024 financial statements, Qantas hedged 27 million barrels of fuel with a hedging price range of between A$115 and A$148 per barrel[29].

Hedging Price Risks has a Deep History in the Agriculture Sector

Derivatives are used in the agriculture sector to manage price volatility and ensure income stability. Derivatives are an effective tool for efficient risk transfer and mitigation for the world's farming communities. Markets for agricultural futures and other derivatives in the US and elsewhere serve at least two critical roles. First, they allow markets to resolve imbalances by providing reliable and fair benchmarks for prices. Second, they reduce price volatility in a resource-constrained world by removing the economic incentive to hoard physical supplies. They allow farmers to quantify and transfer risks they want to avoid to entities willing and able to hold those risks. Provision of this risk protection to the farmer reduces earnings volatility and thus price volatility, benefiting all parties, including consumers that may never get involved in derivatives markets[30].

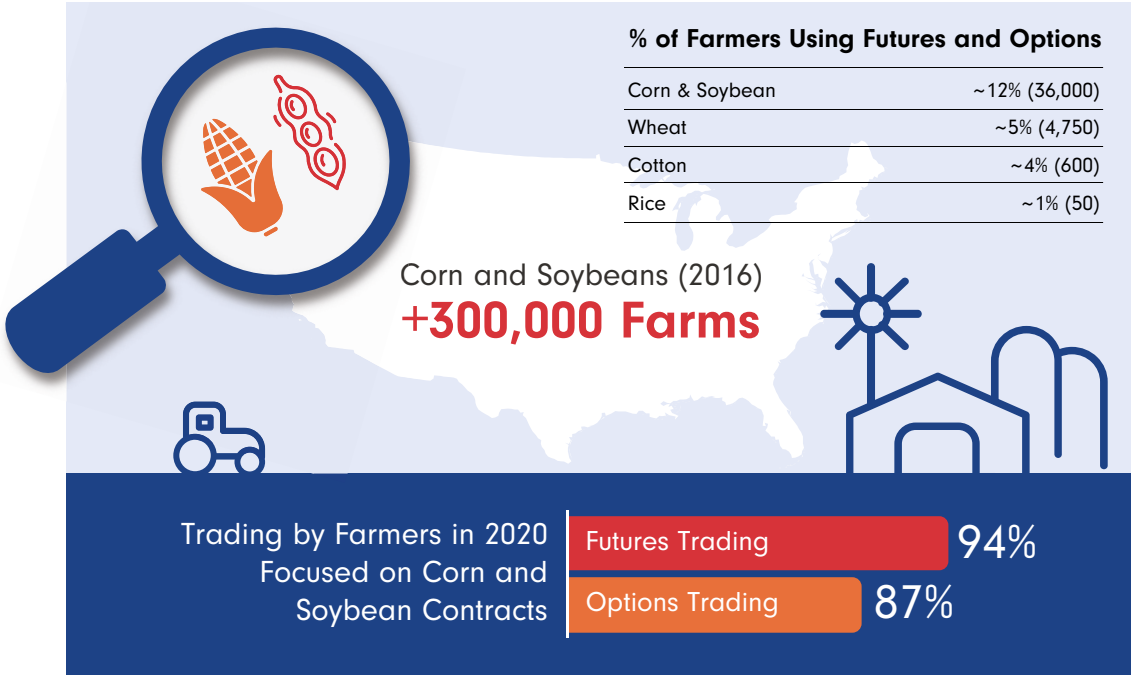
[28] Reuters, 2023, *How European airlines have hedged against fuel price increases | Reuters*

[29] Qantas annual report, 2024, *2024-Annual-Report.pdf (qantas.com)*

[30] Commodity Futures Trading Commission (CFTC), 2018, *CFTC Chairman J. Christopher Giancarlo Response to Bollettino | CFTC*

For example, US farmers use agricultural derivatives like futures and options to lock in prices before harvest. It is estimated that approximately 94% of futures trading and 87% of options trading by farmers in 2020 focused on corn and soybean contracts. This heavy concentration reflects the higher production levels of these crops and the larger number of farms cultivating them. In 2016, over 300,000 farms produced corn or soybeans – many growing both – compared to about 95,000 farms for wheat, 15,000 for cotton and 5,500 for rice. Moreover, futures and options are more commonly used by corn and soybean farmers: around 12% of these farmers (approximately 36,000) utilized futures contracts compared to 5% of wheat farmers (about 4,750), 4% of cotton farmers (around 600) and 1% of rice farmers (about 50) (see Figure 44)[31].

Figure 44: Usage of Futures and Options Contracts by US Farmers



Source: US Department of Agriculture

Examples:

AB InBev, a Belgium-based brewing company, depends heavily on raw materials like malted barley, wheat, corn, rice, water, glass and aluminum for its production processes. To manage commodity price volatility, AB InBev utilizes both fixed-price purchasing contracts and commodity derivatives. As of December 31, 2023, the company's commodity derivatives exposure in notional terms reached $2.72 billion, with the most significant hedges being $1.78 billion in aluminum, $249 million in energy, $289 million in corn and $163 million in wheat. AB InBev emphasized that changes in the prices of commodities that are being financially hedged would not materially impact its 2023 profits. This is because these these commodities are hedged using derivatives contracts, which are designated under hedge accounting in accordance with accounting rules[32].

[31] US Department of Agriculture, 2020, *Farm Use of Futures, Options, and Marketing Contracts*

[32] AB InBev annual report, 2023, *assets/2e5c7fb020194c1a8ee80f743d0b923e/c45d833164dc4e0a849c890cae931f4c (builder.io)*

Tesco Plc, a UK groceries and general merchandise retailer, is exposed to various commodity price risks, particularly relating to diesel used for its own operations. As part of its risk management strategy, the company has a policy to hedge a minimum of 50% of its forecasted uncommitted exposure to diesel price fluctuations within the next 12 months. To achieve this, Tesco executes forward derivatives contracts to hedge future diesel purchases for its own use. These contracts are denominated in the same currency and volume as the anticipated purchases, maintaining a hedge ratio of 1:1. As of February 24, 2024, the company had forward commodity contracts with a notional value of £93 million, hedging diesel purchases at rates ranging from £493 to £828 per ton[33].

Kraft Heinz, a US-headquartered food and beverage company, faces price risk related to anticipated purchases of various commodities, primarily used as raw materials. To manage this risk, it engages in commodity purchase contracts, mainly for items like dairy products, vegetable oils, corn, coffee beans, wheat products, meat, sugar cane and cocoa beans. It also uses commodity futures, options and swaps as economic hedges to stabilize the costs of these commodities, as well as for diesel fuel, packaging materials and natural gas. As of December 31, 2023, the company's derivatives portfolio included commodity contracts with a notional value of $954 million[34].

Supporting Energy Markets and Price Stability

Derivatives markets play a crucial role in hedging risks within the energy sector, particularly during periods of extreme price volatility. They act as a buffer against market risk for energy traders[35], enabling them to continue operations and ensuring the continuity of essential services to households and corporations[36]. They are also used at a country level for maintaining price stability to mitigate the impact on citizens.

In the case of electricity, where the opportunities for efficient storage are limited, derivatives facilitate the smooth matching of supply and demand over time. For instance, operators of the distribution network in any city would tend to contract the daily provision of power several months in advance to avoid the large operational (and possibly financial) risk of relying on next-hour or day-ahead markets. Electricity generators also value the ability to plan their supply, contracting their sales well in advance of delivery. In the natural gas market, derivatives help to optimize the management of storage capacity. This indirectly helps to balance electricity markets when short-term supply/demand gaps arise. This is because natural gas can be activated and deactivated whenever demand fluctuates, in contrast with intermittent sources such as solar or wind generation[37].

Energy sector companies, including producers and suppliers, are prominent users of energy derivatives. Their participation in these markets has increased in recent years, with around 25% of 1,700 firms active in the euro area energy derivatives market between September 2021 and October 2022 belonging to the energy production chain, including oil and gas extraction and energy distribution. The remaining participants (around 75% of 1,700 firms) are primarily from energy-intensive sectors, such as transport and manufacturing. On average, the number of firms active in energy derivatives increased by 30% between January and September 2022[38] (see Figure 45).

[33] Tesco annual report, 2024, *Tesco Annual Report 2024*

[34] Kraft Heinz form 10-k, 2023, *khc-20231230*

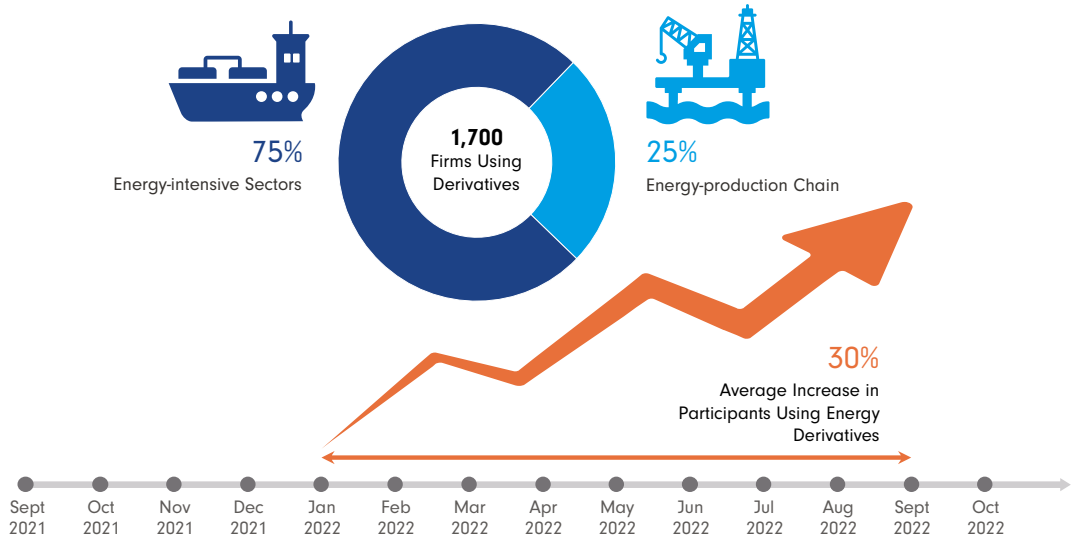
[35] Energy traders are entities engaged in the physical energy market that also utilize energy derivatives primarily for hedging activities

[36] European Central Bank (ECB), 2022, *Financial stability risks from energy derivatives markets*

[37] BIS, 2022, *Margins and liquidity in European energy markets in 2022 (bis.org)*

[38] ECB, 2022, *Financial stability risks from energy derivatives markets*

Figure 45: Number of Firms Using Energy Derivatives in Europe



Source: European Central Bank

Examples:

EDF, a France-based electricity producer, uses a range of commodity derivatives for hedging. The company is exposed to price variations on wholesale energy markets – electricity, gas, coal and oil products – and the CO2 emissions quota market, which can significantly affect its financial statements and consumer prices. To mitigate these risks, EDF hedged its forecast sales and purchases using futures, forwards, options and swaps through cashflow hedges. For example, it used commodity derivatives to hedge electricity, which had a fair value of (€1.75) billion, and gas heat Energy, which had a fair value of (€636) million at the end of December 31, 2023[39].

Puget Sound Energy, a US company supplying electricity and natural gas, uses energy derivatives to manage price volatility and stabilize costs for customers. As of December 31, 2023, the company held $109.5 million in assets and $223.8 million in liabilities of energy derivatives contracts that consisted of an electric portfolio and a natural gas portfolio for hedging energy supply and costs. Gains and losses in the electric portfolio are recorded as purchased power or electric generation fuel costs under the power cost adjustment (PCA[40]) mechanism. For natural gas, fair value adjustments are deferred under ASC 980 (accounting for regulated utilities), with realized gains and losses recorded as gas costs through the purchased gas adjustment (PGA[41]) mechanism[42].

[39] EDF financial statements, 2023, *EDF_Consolidated Financial Statements_2023*

[40] Power cost adjustment is a regulatory mechanism that allows utilities to adjust rates they charge for electricity based on the actual costs of purchasing or generating power. Any gains or losses from a utility's hedging activities related to electricity are reflected as either purchased power costs or electric generation fuel costs, which means they are passed on to customers, providing transparency and stability in electricity pricing

[41] Purchased gas adjustment is regulatory mechanism whereby any fair value changes in natural gas derivatives contracts are deferred, following ASC 980, which governs how utilities account for costs under regulatory frameworks. This means the company doesn't immediately record these gains or losses. Instead, they are passed through to customers as natural gas costs once the hedges are settled

[42] Puget Sound Energy form 10-k, 2023, *psd-20231231 (sec.gov)*

Since the early 2000s, the **Mexican Treasury** has operated an insurance-like program to hedge against declines in crude oil prices, which could otherwise significantly constrain government spending. According to the IMF, Mexico uses oil price hedging to support its public finances, and creditors view the country's finances as protected against the risk of lower oil prices. As a result, they demand a smaller premium for the risk of default. The IMF estimates that without hedging, Mexico's sovereign borrowing costs would be approximately 19bp higher. Each fall, Mexico purchases put options for the coming year that give it the option to sell its oil at a predetermined locked-in price[43,44].

In 2016, the **Ministry of Finance of Uruguay**[45] and the treasury department of the World Bank worked together to design and execute an oil price hedging program. The program was established to 'buy certainty' – ie, pay for insurance protection to moderate the negative impact of significant oil price increases on Uruguay's fiscal budget and the overall economy. They executed an option to hedge 6 million barrels of oil.

Key Takeaways:

1. **Importance of Commodity Hedging:** OTC derivatives help governments, corporations and producers manage commodity price volatility, ensuring operational stability and financial resilience against market fluctuations.

2. **Government Revenues:** Governments in commodity-dependent economies use hedging to manage price volatility, protect public spending and mitigate economic volatility.

3. **Corporate Risk Management:** Companies hedge against price fluctuations in commodities, fuel and raw materials to stabilize costs, manage budgets and protect profit margins.

4. **Agricultural Applications:** Derivatives provide farmers with tools to manage price volatility, stabilize incomes and optimize resource allocation in sectors like corn, soybean and wheat production.

5. **Energy Sector Benefits:** Energy producers and consumers use derivatives to manage risks, ensure supply stability and balance fluctuating demand, particularly in electricity and natural gas markets.

3.2.1.4. Managing Credit Risk

Credit risk is the possibility of a financial loss occurring when a borrower or counterparty fails to meet its debt obligations as agreed. It represents the risk that a lender or investor may not receive the owed principal and interest, potentially leading to disrupted cashflows and increased collection costs. Typical rationales for hedging credit risk are outlined in Figure 46.

[43] Jain Family Institute, 2023, *JFI Hacienda Hedge 2023.09.06 (jainfamilyinstitute.org)*

[44] International Monetary Fund (IMF) Blog, 2018, *To Hedge or to Self-insure? The Benefits of Mexico's Oil, Hedging Program, By Fabian Valencia (imf.org)*

[45] Sovereign Debt Management Forum, 2016-2017, *https://deuda.mef.gub.uy/innovaportal/file/19723/4/wb-debt-forum_innovative-risk_management-solutions-for-contingent-exposures_the-case-of-uruguay-final-october-2016.pdf*

Figure 46: Reasons for Hedging Credit Risk

Why Participants Hedge Credit Risk	• Firms can use credit derivatives to hedge against bankruptcy, failure to pay and restructurings that affect debt instruments, transferring credit risk and optimizing capital.
	• Credit risk hedging helps to maintain the stability of financial institutions, which is vital for economic health.

Examples:

KeyCorp[46], a regional bank in the US, buys and – under limited circumstances – sells credit protection through the credit derivatives market. The bank purchases credit derivatives to manage the credit risk associated with specific commercial lending and swap obligations, as well as exposures to debt securities. As of December 31, 2023, it held credit derivatives with a notional value of $121 million. Its credit derivatives may comprise single-name CDS, index CDS or risk participation agreements[47].

Huntington, a regional US bank, indicated it may use credit derivatives to manage credit risk within its portfolio by purchasing credit protection on certain loan products. In the fourth quarter of 2023, Huntington completed a synthetic credit risk transfer transaction involving CDS to mitigate credit risk on a $3 billion portfolio of on-balance-sheet prime indirect auto loans, which improved its regulatory capital ratios by reducing the risk-weighted assets (RWA) on this loan pool by about $2.4 billion[48].

AIB, an Ireland-based bank, employs several methods to mitigate risks related to individual credits, including transaction structuring, collateral and guarantees. The bank also occasionally purchases credit derivatives to hedge credit risk, although usage remains modest and is subject to the standard credit approval process. As of December 31, 2023, AIB had outstanding credit derivatives with a notional value of €83 million[49].

Key Takeaways:

1. **Importance of Credit Risk Hedging:** Hedging credit risk allows financial institutions to safeguard against potential losses from borrower defaults, ensuring stable cashflows and optimized capital allocation. By using instruments like credit derivatives, institutions can transfer risk, maintain financial stability and support the broader economic system.

2. **Thematic Approach of Credit Risk Management:** Financial institutions use a variety of strategies to manage credit risk effectively. Many banks leverage credit derivatives to transfer risk associated with specific debt securities, loans or lending portfolios. These transactions often help reduce RWAs, improve regulatory capital ratios and optimize capital allocation, freeing up additional lending capacity to the real economy. In addition to derivatives, institutions rely on traditional credit risk mitigation methods, including collateral and guarantees.

[46] KeyCorp form 10-k, 2023, *key-20231231*

[47] A risk participation agreement is a transaction in which the lead participant has a swap agreement with a customer. The lead participant (purchaser of protection) then enters into a risk participation agreement with a counterparty (seller of protection), under which the counterparty receives a fee to accept a portion of the lead participant's credit risk. If the customer defaults on the swap contract, the counterparty to the risk participation agreement must reimburse the lead participant for the counterparty's percentage of the positive fair value of the customer swap as of the default date. If the customer swap has a negative fair value, the counterparty has no reimbursement requirements

[48] Huntington form 10-k, 2023, *2023 Annual Report*

[49] AIB annual report, 2023, *AIB Group plc AFR Dec 2023*

3.2.2. Liquidity Management

Liquidity management for corporates and governments is the process of optimizing cashflows, managing funding needs and maintaining adequate liquidity levels. By utilizing derivatives such as IRS, currency swaps and forward contracts, entities can effectively manage liquidity risks by aligning the timing of cash and currency inflows and outflows and accessing funding in different currencies or interest rate environments. Typical rationales for derivatives use in liquidity management are outlined in Figure 47.

Figure 47: Applications of Derivatives for Liquidity Risk Management

Reasons for Derivatives use in Liquidity Management	• Firms can obtain access to different currencies and hedge against market volatility – for example, if a corporation has US dollars but needs euros in one month's time, derivatives can be used to secure access (at a fixed exchange rate).
	• In order to optimize their costs, entities may prefer to lock in favorable rates or reduce funding costs by managing interest rate and foreign exchange risks.
	• Firms may use derivatives to ensure adequate resources are available for operational needs and long-term investments, thereby safeguarding financial stability.
	• An entity may decide to issue debt in foreign currency to access a new investor base or tap into other funding opportunities, then use a cross-currency swap to eliminate interest rate and currency mismatches.

3.2.2.1. Supporting Commercial Trade and Foreign Currency Financing

FX swaps and forwards play a crucial role in supporting commercial trade by mitigating risks associated with currency fluctuations and providing access to currencies. These instruments not only allow companies engaged in international trade to manage short-term exchange rate volatility, ensuring more predictable costs and revenues, but also help to access currencies to manage liquidity in day-to-day operations. This is vital for importers and exporters to manage short-term currency exposures and needs, supporting smoother operations in a volatile global market[50].

Non-financial firms accounted for $7.5 trillion of the $58 trillion of total outstanding payment obligations of FX swaps, forwards and currency swaps in 2016, according to the BIS. Of this $7.5 trillion:

- $5.1 trillion was used to access or manage currencies within the $21 trillion in annual global trade, meaning firms covered a substantial amount of global trade-related FX risks at that point in time. A $1 billion increase in quarterly global trade in goods and services over half a year is associated with a $660 million increase in non-financial entities' swap/forward positions.

- The remaining $2.4 trillion of payment obligations in cross-currency swaps was used to hedge risks from foreign-currency-denominated bonds, covering about half of the $4.8 trillion in bond exposure – in effect, creating a more global funding market, giving firms the ability to decouple funding needs from currency needs. A $1 billion increase in international securities outstanding coincides with a $290 million rise in non-financial firms' cross-currency swaps, according to the BIS study. These figures highlight the critical importance of OTC derivatives in supporting the infrastructure of global commerce and financial systems (see Figure 48).

[50] BIS, 2017, *FX swaps and forwards: missing global debt? (bis.org)*

Figure 48: Outstanding Payment Obligations of FX Swaps, Forwards and Currency Swaps and their Connection with Trade and Outstanding Debt

$1 billion increase in international securities outstanding coincides with a **$290 million rise** in non-financial firms' cross-currency swaps

$1 billion increase in quarterly global trade in goods and services over half a year is associated with a **$660 million increase** in non-financial entities' swap/forward positions

Source: BIS

Examples:

AT&T Inc, a US-headquartered telecommunications company, uses cross-currency swaps to switch foreign-currency-denominated debt from fixed-rate or floating-rate foreign currencies to fixed-rate US dollars at issuance, removing interest rate and foreign currency exchange risk associated with the underlying interest and principal payments. "We expect gains or losses in our cross-currency swaps to offset the gains and losses in the financial instruments they hedge," the company said in its annual report. It had cross-currency swaps with a notional value of $38 billion and a fair value of $(3.1) billion outstanding on December 31, 2023[51].

Harley-Davidson, Inc, a US-based motorcycle manufacturer, had outstanding debt in the form of foreign-currency-denominated medium-term notes, which exposes Harley-Davidson Financial Services (HDFS) to fluctuations in the US dollar's value relative to other currencies and interest rates. HDFS is engaged in the business of financing and servicing wholesale inventory receivables and retail consumer loans, primarily for the purchase of Harley-Davidson and LiveWire motorcycles. As of December 31, 2023, the company's exposure was linked to the euro. To mitigate the impact of foreign exchange and interest rate fluctuations on its foreign-currency-denominated debt, Harley-Davidson utilized cross-currency swaps with an outstanding notional value of $1.42 billion[52].

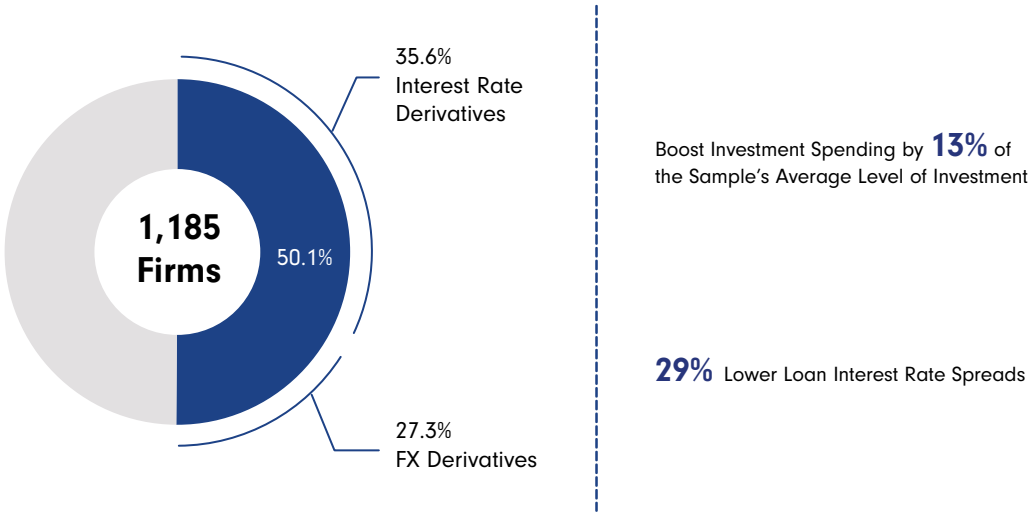
[51] AT&T annual report, 2023, *T-2023.12.31-10K-2024-02-23-15-25 (att.com)*

[52] Harley Davidson form 10-k, 2023, *hog-20231231*

3.2.2.2. Enhance Access to Funding

In a study[53] of 2,718 loan contracts from 1,185 firms, 50.1% used interest rate and/or FX derivatives, with 35.6% using interest rate derivatives and 27.3% utilizing FX derivatives. The study examined the effects of financial risk management policies on firms' access to capital (the price of bank loans) and their ability to invest. The companies using derivatives were able to boost investment spending by about 13% of the sample's average investment level and pay lower interest rate loan spreads by around 29% (see Figure 49).

Figure 49: Percentage of Firms Using Interest Rate and/or FX Derivatives and Impact on Investment and Loan Spreads



Source: Research Report: The Real and Financial Implications of Corporate Hedging by Murillo Campello, Chen Lin, Yue Ma, Hong Zou

Companies frequently use derivatives on future debt to manage their interest rate costs, especially in times of interest rate volatility. This strategy is common among highly rated firms that have a clear understanding of their upcoming funding needs. For companies, movements in interest rates play a key role in determining their overall borrowing costs. For example, if a firm plans to issue a 10-year bond in a year's time to refinance maturing debt, it may be able to secure favorable rates now by executing a forward-starting IRS. This allows it to lock in future rates, giving better cost predictability for future debt issuances.

DMOs in developed countries use derivatives to maintain an optimal debt maturity structure that aligns with the nation's funding needs and manage interest rate exposures efficiently. The demand for federal debt varies across different maturity segments, leading to deviations between the ideal supply structure planned by the government and actual investor demand. The use of derivatives is critical for managing large public debt portfolios, especially in times of market volatility and shifting monetary policies. Swaps allow government debt to align with market conditions and the preferences of potential investors. These swaps can be crucial for achieving a balanced and efficient debt portfolio, where short-term cost savings are weighed against the stability of longer-term commitments.

[53] Murillo Campello, Chen Lin, Yue Ma, Hong Zou, 2024, *The Real and Financial Implications of Corporate Hedging by Murillo Campello, Chen Lin, Yue Ma, Hong Zou :: SSRN*

Examples:

NextEra Energy, a US-based utility company, entered into a $10 billion forward-starting IRS in 2022 to hedge against interest rate risk tied to its anticipated debt issuances, according to regulatory filings. This was aimed at mitigating the impact of potential interest rate hikes on its future borrowing costs[54].

Colgate-Palmolive, a US-headquartered personal care products company, uses forward-starting IRS to mitigate the risk of variability in interest rates for future debt issuances. The notional of these forward-starting IRS was $700 million as of December 31, 2021[55].

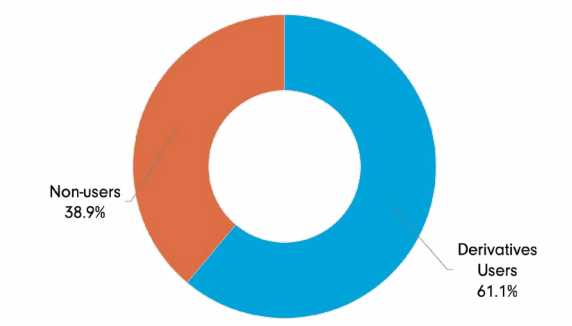
Germany's DMO incorporates swap transactions as part of its overall issuance program to ensure the federal government's debt portfolio has an optimal maturity structure. This strategy is designed to address the needs of investors while balancing cost savings from short-term debt and the security offered by longer-term (typically more expensive) debt. By adjusting the maturity structure of its debt, the federal government ensures it can meet its financing requirements efficiently and with minimal risk. At the end of 2022, the gross volume of swap contracts concluded by the federal government amounted to €258.2 billion, which corresponds to a portfolio reduction of €75 billion over the course of 2023. Both fixed-rate payer and receiver positions for money and capital market swaps were recorded, ensuring the government's financial position remains optimal within its legal framework[56].

3.2.2.3. Assist with Liquidity in and for Mergers and Acquisitions (M&A)

M&A activity can increase demand for deal-contingent derivatives trades, which banks offer to corporates and private equity firms looking to manage financial market moves ahead of the completion of major acquisitions. Deal contingents are a type of derivative that companies and investors can use to manage moves in currencies or interest rates between announcing a deal and when it closes, which only become active if the transaction closes.

A study[57] of 1,738 US M&A deals from 1998 to 2012 found that 1,061 transactions (61.1%) were executed by firms that utilized derivatives. Among the sample, 61% of acquirers used interest rate and/or FX derivatives. Around 47.5% of the sample acquirers used interest rate derivatives and 42.7% used FX derivatives in the fiscal year before announcing acquisitions.

Figure 50: Use of OTC Derivatives by US Firms Prior to Deal Announcement



Source: Research report: Financial Hedging and Corporate Investment by George Alexandridis, Zhong Chen, Yeqin Zeng

[54] NextEra Energy form 10-q, 2022, *0000753308-22-000081 (investis.com)*

[55] Colgate-Palmolive form 10-k, 2022, *Form 10-K for Colgate Palmolive CO filed 02/16/2023*

[56] *Portfolio Management - Deutsche Finanzagentur (deutsche-finanzagentur.de)*

[57] George Alexandridis, Zhong Chen, Yeqin Zeng, 2021, *Financial Hedging and Corporate Investment by George Alexandridis, Zhong Chen, Yeqin Zeng :: SSRN*

Firms engaged in financial risk management programs are more likely to finance acquisition deals with cash, use external borrowing and benefit from lower borrowing cost. This aligns with the idea that managing financial risk helps companies execute inorganic investment plans by easing financing constraints. It highlights how managing these risks not only shields firms from market risks but also supports their strategic investment efforts.

Examples:

Takeda, a Japanese pharmaceutical company, used a forward contract to protect itself from foreign currency risks during its acquisition of TiGenix, a biotechnology firm. By applying hedge accounting, Takeda ensured that the financial impact of the hedging contract was directly reflected in its acquisition costs. Specifically, a basis adjustment was made, meaning the effective value of the forward contract – ¥3,381 million (approximately $30.6 million as of March 31, 2019) – was added to the recorded goodwill at the time of the acquisition. Therefore, the benefit from the currency hedge was incorporated into the total purchase price of TiGenix, aligning the accounting treatment with the economic effect of reducing currency risk[58].

Bristol Myers Squibb, a US pharmaceutical company, executed a deal-contingent forward-starting IRS in the second quarter of 2019, with an aggregate notional principal amount of $10.4 billion, to hedge interest rate risk associated with the anticipated issuance of long-term debt to fund an acquisition of Celgene, another pharmaceutical company. The deal-contingent forward-starting IRS was terminated upon the completion of the Celgene acquisition. The swaps served as a pre-hedge for the debt Bristol Myers Squibb planned to issue to finance the acquisition, as detailed in its public filings[59].

Parker Hannifin, a US motion and control technologies firm, agreed to acquire its London-listed rival Meggitt in 2021. To guard against the appreciation of sterling – potentially inflating the purchase price – the company entered into deal-contingent FX forward contracts in October 2021. These contracts had an aggregate notional amount of £6.4 billion and their settlement was contingent upon closing the proposed acquisition[60].

Key Takeaways:

1. **Liquidity Management:** Corporates and governments use derivatives such as IRS, currency swaps and forwards to align cash and currency inflows and outflows, access a variety of currencies, secure funding across multiple currencies and safeguard their liquidity positions.

2. **Derivatives Support Global Trade and Funding:** FX swaps and forwards help firms stabilize costs and revenues, ensuring more predictable short-term financing and reducing the impact of currency volatility on import and export activities.

3. **Hedging Boosts Funding and Investment Capacity:** By locking in favorable interest rates and managing currency exposures, firms using derivatives can secure lower borrowing costs, invest more aggressively and achieve better access to capital.

4. **Supporting Strategic Growth Initiatives:** M&A-related deal-contingent trades protect acquirers from adverse interest rate and currency movements between deal announcement and closing, easing the financing and execution of corporate expansion plans.

[58] Takeda annual report, 2023, *Takeda Pharmaceutical Company Limited*

[59] Bristol Myers Squibb form 10-q, 2020, *0000014272-20-000279 (d18rn0p25nwr6d.cloudfront.net)*

[60] Parker Hannifin form 10-k, 2022, *ph-20220630 (sec.gov)*

3.2.3. Investment Positions

OTC derivatives are extensively utilized in investment positioning by institutional investors, hedge funds, pension funds and asset managers to gain exposure to various markets. This approach allows investors to more effectively allocate capital, efficiently leverage investment opportunities and take exposure to specific sectors or risks, leading to better investment outcomes. Figure 51 highlights the ways in which OTC derivatives are used for investment.

Figure 51: Derivatives Usage for Investment Positions

Using Leverage and Unfunded Exposure	• By using derivatives, investors can control large positions with limited capital, amplifying potential returns.
Investing into Specific Market Characteristics	• Derivatives empower investors to target and fine-tune their market exposure, allowing them to capitalize on specific market dynamics that align closely with their investment goals. By focusing on particular market characteristics – such as harnessing price fluctuations independent of dividend effects or isolating credit spreads without liquidity risks – investors can construct customized portfolios aligned with their objectives. Derivatives also allow investors to gain exposure to markets that may be difficult to trade directly.
Accessing Purely Derivatives-based Exposures	• Some market exposures, like implied volatility, are inherently derivatives-based. OTC derivatives provide a direct means to invest in these exposures, which are not accessible through traditional securities.
Focusing Risk Management	• OTC derivatives enable investors to tailor their risk exposure to align with their investment objectives. By effectively managing and mitigating specific risks, investors can protect their portfolios from adverse market movements. This targeted risk management supports sustained investment performance and safeguards the financial stability of investment portfolios. Derivatives also facilitate efficient portfolio management and asset allocation.
Structured Investment Products	• Structured investment products are designed to help investors enhance yields and achieve specific financial goals, particularly in a low-interest-rate environment. By embedding derivatives, these instruments provide customized exposures and payoffs, serving as alternatives to traditional fixed-income securities. • Some integrate quantitative investment strategies, which provide efficient access to a range of systemic, rules-based investment strategies like momentum, value and volatility harvesting. These solutions cater to diverse objectives, including capital protection, income generation and market participation, while aligning with individual risk-return preferences.

Role of Speculation

Some investors may take a short-term view in search of returns, often referred to as speculation. Economic evidence, market microstructure research and financial studies have found that speculation enhances liquidity, improves price efficiency and makes markets more complete. Without speculators willing to express an investment view, markets would likely have wider bid-offer spreads, reduced immediacy and fewer opportunities for risk management.

Speculators, as informed traders, help move prices closer to fundamental values by taking short positions in overpriced assets and long positions in assets deemed to be underpriced. This increases the liquidity and depth of markets, which can reduce the costs of transacting and enhance the overall functioning of financial markets. Companies seeking to hedge benefit from the presence of speculators as it means there is a greater diversity of participants looking to express alternative views. This contributes to increased liquidity and greater capacity to manage risks efficiently[61].

Examples:

BlackRock, an asset manager with more than $11 trillion in assets under management (AUM), offers multi-asset funds that blend equity, fixed income and alternative investments. These multi-asset funds, comprising around $870 billion and representing about 9% of BlackRock's long-term assets under management, provide investors with tailored solutions aligned with specific benchmarks and within defined risk budgets and use strategies that aim to minimize downside risk through use of derivatives[62]. For example, the **BlackRock High Yield Portfolio** aims to maximize total return by balancing income generation with disciplined investment strategies. As of September 30, 2024, it managed approximately $25.4 billion in assets. To support its investment approach, the portfolio utilizes various OTC derivatives, including CDS for buying and selling protection on specific entities and broader indices, total return swaps, interest rate derivatives and FX agreements. The portfolio's average notional exposure across these derivatives includes $1.17 billion in total return swaps, $512 million in CDS sell protection and $700.9 million in FX forwards[63].

PIMCO, a global investment manager with around $2 trillion[64] in AUM as of September 30, 2024, oversees multiple funds that use derivatives for both hedging and strategic investment purposes. For example, its Income Fund, which held $70.5 billion in assets as of December 31, 2023, allocated at least two-thirds of its assets to a diverse portfolio of fixed-income instruments across various maturities. As of the same date, the Income Fund reported fair value of $4.5 billion in derivatives assets and $3.2 billion in derivatives liabilities. It had a range of derivatives including CDS on corporate, sovereign and US municipal issuers, CDS on credit indices, IRS and interest rate swaptions. The CDS contracts enable the fund to sell protection, earning fixed-rate income, or buy protection to hedge against potential defaults[65].

[61] ISDA, 2010, *speculationrn.pdf*

[62] BlackRock form 10-k, 2023, *0000950170-24-019271 (d18rn0p25nwr6d.cloudfront.net)*

[63] BlackRock High Yield Fund, 2024, *afs-retail-taxable-3-en.pdf*

[64] PIMCO at a Glance, 2024, *https://www.pimco.com/gbl/en/documents/b0866aca-5616-4f79-a1cc-dbc720ba4317*

[65] PIMCO, 2023, *https://fund-ui.pimco.com/fund-detail-api/api/funds/documents/content/view?documentId=sRIolu0XTPMR90CTg2T6KqrxdUcpOLe-rmYDOd2C3zU3KqOKxki4fkhTgXgIfihu*

As of August 31, 2024, the **Fidelity Total Bond Fund** managed $39.5 billion in assets and employed derivatives such as swaps, swaptions and FX forwards, with derivatives assets and liabilities valued at $33.9 million and $31.2 million, respectively. The fund's strategy includes a wide range of derivatives – forward foreign currency contracts, options and swaps – that are based on underlying assets, indices or reference rates and can be traded either on exchanges or over the counter. These instruments serve to enhance returns, gain exposure to specific assets, facilitate transactions in foreign-currency-denominated securities and manage various financial risks[66].

Quantitative funds reflect the synergy of data, advanced mathematics and cutting-edge technology. **Citadel Advisors**, with over $51 billion in AUM, **Bridgewater Associates**, managing $124 billion in assets, **Millennium Management**, with over $57 billion in AUM, and **D.E. Shaw Group**, which manages over $45 billion in assets, all offer funds that employ quantitative strategies. These funds harness sophisticated quantitative models, advanced analytics and an interdisciplinary team to implement investment strategies, including risk parity and multi-strategy approaches[67].

Key Takeaways:

1. **Efficient Capital Allocation and Targeted Exposures:** Investors can deploy OTC derivatives to amplify potential returns in a capital efficient way. By focusing on specific market factors – such as price movements, credit spreads or volatility – investors can construct customized portfolios aligned with their objectives, even in markets that may be hard to access directly.

2. **Tailored Risk Management and Structured Products:** Through derivatives, institutional investors and asset managers can fine-tune risk exposures, hedge unwanted risks and enhance portfolio stability. Structured investment products further enable them to achieve specific goals – like capital protection or yield enhancement – by embedding derivatives.

3. **Role of Speculation:** Speculators provide liquidity, tighten bid-offer spreads and help move prices closer to fundamental values by taking positions in under or overpriced assets. This activity supports hedgers, fosters market resiliency and broadens the range of available risk management options.

[66] Fidelity, 2024, *https://institutional.fidelity.com/app/literature/annual-report/789692/total-bond.html*

[67] Mavefund, 2023, *Exploring the World of Quantitative Hedge Funds: Six Trailblazing Players*

3.3. MACROECONOMIC APPLICATIONS

Macroeconomic impact refers to the value of OTC derivatives for the broader economy, including financial stability, economic growth and addressing societal challenges.

3.3.1. Pension Funds and Insurance Firms: Supporting Retirement Savings, Premium Stability and Solvency

3.3.1.1. Pension Funds

Pension funds are powerhouse institutional investors, with assets that often rival or surpass the GDP of their home countries (see Figure 52). In 2023, pension assets reached 198.1% of GDP in Denmark, 181.8% in Iceland, 147.1% in the Netherlands, 142.5% in the US and 129.9% in Australia[68,69]. With such massive financial clout, their hedging decisions carry significant economic and societal weight.

Figure 52: Total Assets in Pension Plans as a Percentage of GDP from 2019-2023

Country	2019	2020	2021	2022	2023
Denmark	220.8	229.7	227.4	195.0	198.1
Iceland	174.6	206.8	215.7	181.3	181.8
Netherlands	190.3	209.6	206.0	145.5	147.1
US	149.8	169.6	170.7	135.1	142.5
Australia	135.4	132.0	147.5	131.1	129.9
Sweden	99.6	108.1	117.8	99.8	106.6
UK	107.2	124.2	122.1	83.5	79.3
Israel	62.9	67.9	70.5	61.0	63.6

Source: Organisation for Economic Co-operation and Development (OECD)

Pension funds mainly invest in a mix of bonds and equities, and these instruments account for more than 70% of their assets (although this asset mix can vary across jurisdictions)[70]. Pension funds face the challenge of growing their assets to meet the future needs of retirees, while guarding against market downturns and volatility that could erode value and affect their ability to pay out to retirees. To manage these dynamic challenges, many pension funds use derivatives to meet several objectives, including:

- To control risks from changes in interest rates, inflation, foreign exchange values and equity prices.
- To adjust portfolio investments due to changing market conditions.
- To gain exposure to a market characteristic, market or asset class that is difficult to access because of transaction costs, liquidity or other considerations.
- To achieve a dynamic asset allocation as part of a pension plan's liability-driven investment (LDI) strategy.

[68] Organisation for Economic Co-operation and Development (OECD), 2023, *28970baf-en.pdf (oecd-ilibrary.org)*

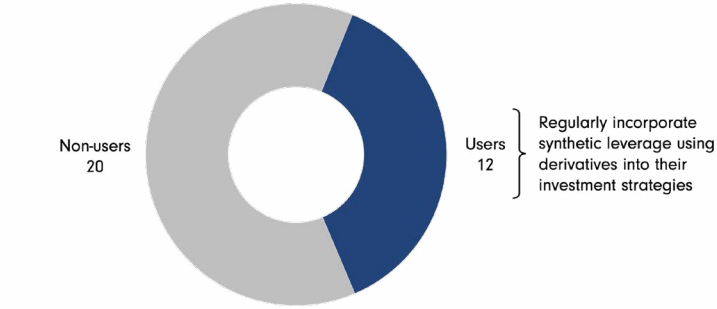
[69] OECD, *OECD Data Explorer Assets earmarked for retirement*

[70] OECD, 2023, *Pension Markets in Focus 2023 | Pension Markets in Focus | OECD iLibrary*

Usage Across Jurisdictions

A 2023 survey by the International Organisation of Pension Supervisors (IOPS) covering 32 members, representing 40% of the membership, found that 12 regularly incorporate derivatives into their investment strategies to cost-effectively gain exposure to specific assets or markets or hedge investment risks (see Figure 53). For instance, Chile reported that its pension funds often use synthetic leverage (derivatives) to increase exposure to foreign currencies, and Croatia noted that its pension funds often rely on FX derivatives, such as forwards and swaps, to hedge currency risks[71].

Figure 53: Number of Members Using Derivatives for Achieving Leverage

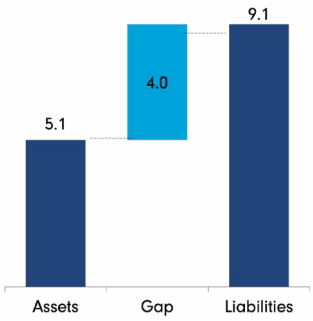


Source: IOPS

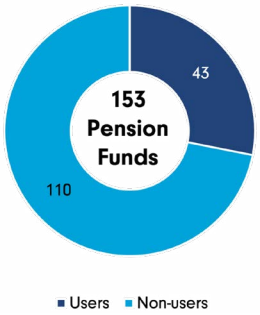
Based on data from the US Federal Reserve, US public DB pension funds oversaw approximately $5.1 trillion of assets to support the retirement of over 30 million state and local government employees as of 2020, and the present value of the liabilities owed by these funds to current and future retirees was roughly $9.1 trillion[72]. These pension plans have interest rate risk due to the mismatch between the long duration of their liabilities and the shorter duration of their assets. A 2023 study[73] conducted by researchers at the CFTC found that 43 out of 153 pension funds in their core sample were believed to use IRS. Using standard linear duration risk analysis techniques and features of US public pensions obtained from multiple sources, it was estimated that a 1% reduction in interest rates could lead to economic losses exceeding $800 billion across the sector (see Figure 54). This highlights the essential role of interest rate derivatives, particularly IRS, in managing asset-liability duration risk.

Figure 54: Number and Percentage of US Public Pension Funds Using IRS

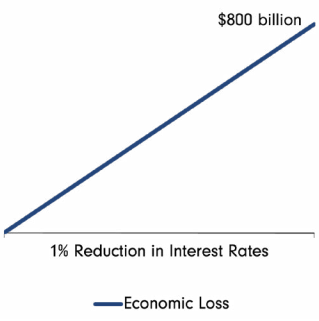
54A: Assets vs Liabilities ($ trillion)



54B: IRS Usage



54C: Loss Due to Interest Rate Reduction ($ billion)



Source: CFTC

[71] International Organisation of Pension Supervisors (IOPS), 2023, *Supervision of Pension Funds' Selected Investment Activities*

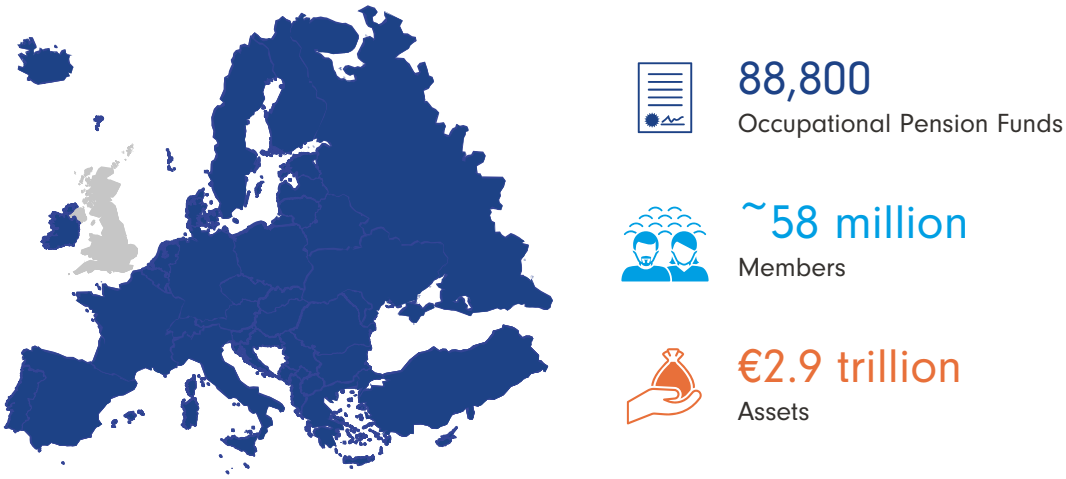
[72] Federal Reserve, *www.federalreserve.gov/releases/z1/dataviz/pension/funding_status/table/*

[73] Allen Carrion, and John Coughlan, 2023, *Public Pension Duration Risk, Interest Rate Swap Usage, and Transparency*

In the European Economic Area (EEA):

- At the end of 2021, there were around 88,800 occupational pension funds holding assets worth €2.9 trillion on behalf of around 58 million members. In terms of assets under management, the largest occupational pensions funds are in the Netherlands, Germany, Sweden and Italy. Dutch occupational funds have almost €1.9 trillion in AUM and account for nearly two thirds of the occupational pensions market (see Figure 55)[74].

Figure 55: Size of the Occupational Pension Funds Sector in Europe



Source: European Insurance and Occupational Pensions Authority (EIOPA)

- Occupational pension funds, particularly those with DB plans, have long-term obligations to pay pre-determined pensions far into the future. These obligations are sensitive to changes in interest rates: when interest rates fall, the present value of these future liabilities increases, meaning the pension fund needs to set aside more money to cover them. Conversely, a rise in interest rates reduces the amount needed. To manage this interest rate risk and stabilize their financial health, pension funds use strategies that include investing in fixed-income assets like bonds, as well as interest rate derivatives. Derivatives, such as IRS, enable them to synthetically increase asset sensitivity to interest rates, aligning asset and liability durations more closely. In these swaps, occupational pension funds typically pay a floating rate and receive a fixed rate, helping them to manage interest rate fluctuations effectively.

- Dutch occupational pension funds have predominantly operated DB schemes. According to a study originally published in June 2023[75], it was estimated that they held about 27.6% of non-centrally cleared swap positions in Europe as of 2020. They use IRS to hedge against interest rate risk in their liabilities, as this requires only a small initial investment and allows them to allocate a larger portion of their investments to more remunerative asset classes. This strategy not only protects the funds' ability to meet future pension obligations but also potentially enhances returns for retirees. In 2023, Dutch senators approved an overhaul of the pension system, which means the country's occupational pension system will transition from DB to defined contribution by 2028[76]. This shift will change asset allocation, and the usage of derivatives is expected to be modified accordingly, aligning with practices in countries that have defined contribution schemes.

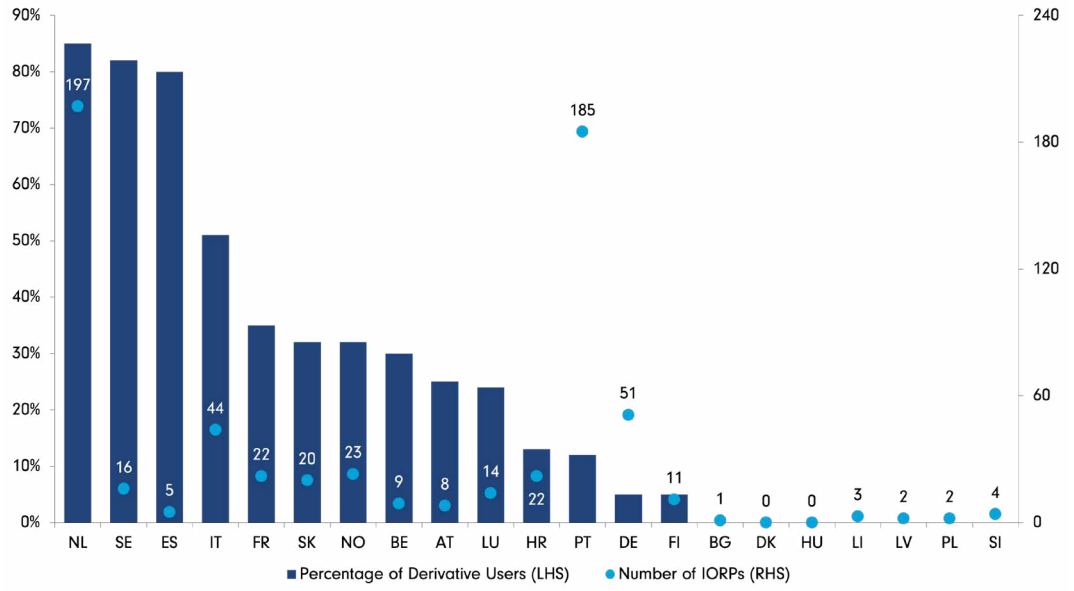
[74] European Insurance and Occupational Pensions Authority (EIOPA), *2023, 2023-09-24 - IORPs landscape factsheet.pdf*

[75] Kristy A.E. Jansen, Sven Klingler, Angelo Ranaldo, Patty Duijm. 2023, *Pension Liquidity Risk * by Kristy A.E. Jansen, Sven Klingler, Angelo Ranaldo, Patty Duijm :: SSRN*

[76] Financial Times, 2023, *Dutch senators approve pensions overhaul*

- In 2022, 275 out of 625[77] EEA occupational pension funds used derivatives to help match their assets and liabilities. Derivatives are used by pension funds across different countries in the EEA (see Figure 56).

Figure 56: Number of Institutions for Occupational Retirement Provision and Percentage of Derivatives Users by Country



Source: EIOPA

The societal benefits gained from pension funds using derivatives are substantial. By employing these financial instruments, pension funds enhance their financial stability through efficient risk management. This is because derivatives allow them to hedge against various risks, including interest rate fluctuations, inflation and currency movements, enabling the funds to remain robust and capable of meeting their long-term obligations to beneficiaries. This proactive approach secures retirement incomes for individuals, who can rely on their pensions with confidence, knowing that pension funds are diligently safeguarding their financial futures. By effectively managing potential risks, pension funds help ensure that retirees receive the income they depend on, regardless of market volatility.

Furthermore, the use of derivatives can contribute to overall economic stability by reducing the likelihood of significant pension shortfalls. This mitigation of risk decreases the chance of economic shocks that could arise from underfunded pension schemes. Consequently, it supports not only the financial wellbeing of individual retirees but also the broader economy by maintaining confidence in the financial system.

[77] EIOPA, 2023, *Financial Stability Report (europa.eu)*

Examples:

The **National Pension Service** (NPS) of South Korea, which has around 890.5 trillion Korean won (approximately $620 billion) of AUM, entered a $10 billion currency swap with the Bank of Korea in 2022. This agreement ensures stable access to foreign currency, crucial for NPS's expanding global investments. Through this arrangement, when the demand for foreign currency rises, NPS secures it via the Bank of Korea, benefiting from longer maturities, lower transaction risks and reduced expenses. This strategic partnership supports the pension fund's efforts to manage its foreign currency needs more efficiently while minimizing costs[78].

Norway's Government Pension Fund reported AUM of approximately 15.8 trillion Norwegian krone (around $1.5 trillion) in its 2023 annual report. The fund disclosed the use of multiple OTC derivatives, including interest rate derivatives with a notional value of 464 billion Norwegian krone (approximately $42 billion) and FX derivatives with a notional value of 977 billion Norwegian krone (around $89 billion)[79].

Demographic Developments

Over the past 30 years, ageing populations in advanced economies have significantly contributed to a decline in real (inflation-adjusted) interest rates. In 2018, a study[80] found that demographic changes account for about 75% of the 2.1% (210bp) drop in real interest rates between 1980 and 2015. This trend is expected to continue, with projections indicating an additional 0.37% (37bp) reduction by 2050. However, uncertainties remain about how individuals adjust their savings in response to longer life expectancies and how emerging markets will integrate into the global economy. These factors add complexity to projecting future interest rates and economic stability.

In this context, OTC derivatives will play an increasingly important role. As real interest rates decline due to demographic changes, pension funds and insurers face heightened interest rate and longevity risks. OTC derivatives such as IRS enable these entities to hedge against unfavorable movements in interest rates, managing the mismatch between their long-term liabilities and assets without reallocating significant capital into low-yielding long-term bonds. Longevity swaps could also help hedge exposures if life expectancy is longer than expected.

AstraZeneca, a UK-Swedish pharmaceutical and biotechnology company, indicated that its UK DB scheme represents 65% of the company's total DB obligations. To mitigate exposures related to rising life expectancy over the next 75 years, the pension trustees have implemented a longevity swap. This swap covers approximately 8,000 pensioners from the UK pension fund, equivalent to $2.4 billion in pension liabilities. A one-year increase in life expectancy would raise pension obligations by $214 million, but this would be partially offset by a $108 million increase in the value of the longevity swap[81].

[78] National Pension Fund Annual report, 2022 *Publications > Annual Reports - National Pension Service Investment Management (nps.or.kr)*

[79] Norges Bank investment management, 2023, *GPFG Annual report 2023*

[80] Noëmie Lisack, Rana Sajedi, Gregory Thwaites, 2018, *Demographic Trends and the Real Interest Rate by Noëmie Lisack, Rana Sajedi, Gregory Thwaites :: SSRN*

[81] AstraZeneca annual report, 2023, *AstraZeneca_AR_2023.pdf*

Key Takeaways:

1. **Strengthens Pension Systems and Broader Financial Stability:** From Chile to the Netherlands, many pension funds use derivatives to protect their ability to meet retiree obligations. By managing the impact of rate changes or exchange-rate volatility, pension funds not only shore up their balance sheets but also bolster overall market resilience. Stable pension funds reduce the likelihood of large, system-wide shocks that can ripple through economies when pension promises are underfunded.

2. **OTC Derivatives Are Crucial for Managing Long-term Liabilities:** A recurring theme is that pension funds – especially those with long-dated, DB obligations – face significant interest rate and longevity risks. OTC derivatives like IRS help them align asset durations with liabilities at a lower capital outlay than buying large amounts of long-term bonds. This alignment is particularly crucial in an environment of lower interest rates and demographic shifts.

3. **Societal and Economic Benefits:** Effective derivatives use underpins stable pension payouts, helping to ensure retirees receive reliable income streams. This stability supports public confidence, mitigates potential economic shocks from underfunded pensions and fosters healthier financial ecosystems.

3.3.1.2. Insurance Companies

Insurance companies are financial institutions that provide a range of products designed to protect individuals and businesses from the financial risks associated with uncertain future events. They play a crucial role in managing and mitigating various risks for their policyholders. Insurance companies face several business challenges, such as demographic shifts, extreme weather events exacerbated by climate change, emerging regulatory and capital requirements, technological disruption and cybercrime.

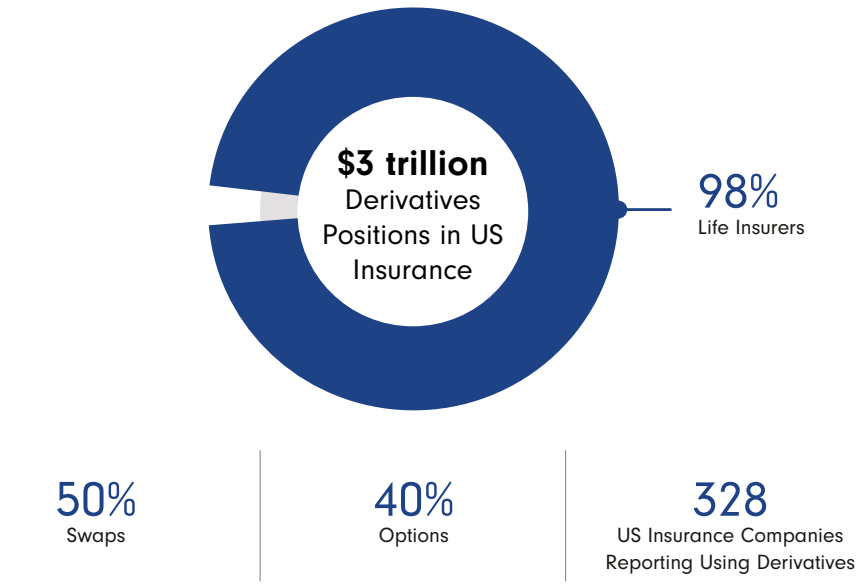
Life insurance companies offer annuities, which guarantee a minimum level of income in retirement, regardless of market performance. Therefore, insurance companies must manage a range of investment risks so they can meet their obligations to annuity owners to provide a steady income stream during retirement. Similarly, insurers in the property and casualty sector must maintain a sufficient level of reserves to pay claims to their clients for insured losses. Managing this investment portfolio is vital to the insurer's long-term success. Insurance companies adopt investment strategies to ensure they have sufficient assets available to meet their future obligations while maintaining adequate liquidity for paying claims promptly. These challenges lead insurance companies to use derivatives for a variety of reasons, including:

- To hedge contractual protections associated with annuity guarantees.
- To manage interest rate exposures on fixed maturity investments, long-term debt and guaranteed interest rates on insurance contracts.
- To limit equity risk, either at a portfolio or macro level, to protect against a decline in equity market prices.
- To reduce foreign currency exposures on foreign-currency-denominated investments and liabilities.
- To limit credit risk on certain investments in corporate debt instruments.
- To manage liquidity positions, including the ability to pay benefits and claims when due.

Scale of Usage

At the end of 2021, the US insurance industry reported derivatives positions totaling $3 trillion in notional value. Derivatives are primarily used by insurers to manage risks in their asset and liability portfolios, with roughly 95% of their derivatives exposure dedicated to hedging. Life insurers held the majority of this exposure, accounting for 98% of the industry's notional value. Swaps and options were the most commonly used derivatives, representing approximately 50% and 40% of total exposures, respectively. Derivatives usage is concentrated among large insurers that have over $10 billion in actively invested assets, with 328 US insurance companies reporting using derivatives (see Figure 57)[82].

Figure 57: Degree of Usage of Derivatives by US Insurance Companies



Source: National Association of Insurance Commissioners

In Europe, insurance companies make extensive use of OTC derivatives[83], with most countries in the EEA actively utilizing them. On average, 59% of derivatives usage is focused on macro hedging, in which companies protect themselves from broad market risks like interest rate fluctuations or inflation, helping them to maintain stability across their entire portfolios. Another 25% on average use derivatives for efficient portfolio management, which helps insurers optimize returns while managing risk, allowing them to balance investment returns and safety. An additional 24% utilize them for micro hedging, which targets specific risks associated with individual investments or liabilities, further ensuring financial health. Only 8% on average use derivatives for asset and liability matching, where insurers align their assets with future obligations to ensure they can meet long-term commitments (see Figure 58).

A 2020 survey[84] from Germany's Federal Financial Supervisory Authority (BaFin) and discussions with German insurers indicated a continued rise in the notional volume of derivatives among insurers. While most use derivatives for hedging purposes – such as exchange rate hedging via forward contracts due to investments in foreign currency bonds – some employed them to boost yields, notably through fund structures that implement derivatives strategies like earning option premiums.

[82] National Association of Insurance Commissioners (NAIC), 2021, *Derivatives YE 2021 (naic.org)*

[83] EIOPA, 2023, *European Insurance Overview report 2023 - EIOPA (europa.eu)*

[84] Federal Financial Supervisory Authority (BaFin), 2022, *BaFin - Current topics - Are derivatives the solution?*

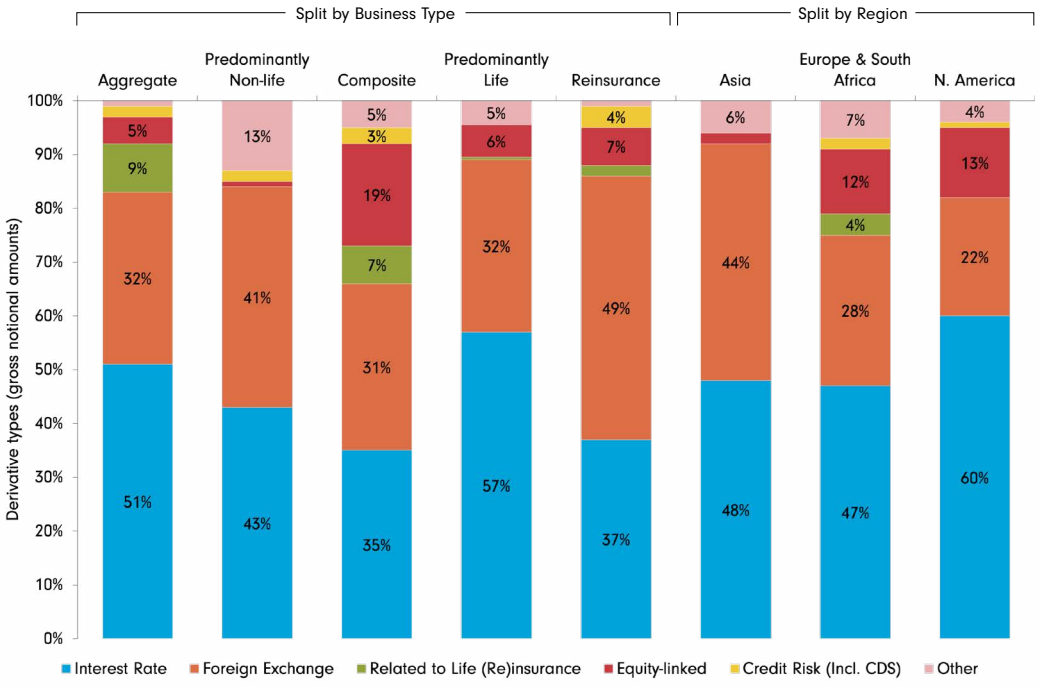
Figure 58: Use of Derivatives by Purpose in Certain EU Countries

Country Name	Efficient Portfolio Management %	Macro Hedge %	Micro Hedge %	Matching A&L %
Austria	51%	22%	27%	
Belgium	8%	45%	46%	0%
Germany	21%	66%	13%	0%
Denmark	93%	6%	1%	1%
Spain	18%	6%	13%	63%
Finland	40%	60%		
France	2%	64%	34%	0%
Ireland	25%	72%	3%	0%
Italy	14%	62%	23%	2%
Netherlands	12%	86%	2%	
Norway	31%	69%	1%	
Sweden	57%	42%	1%	

Source: EIOPA

In its 2023 global insurance market report, the International Association of Insurance Supervisors (IAIS)[85] indicated that the main types of derivatives used at a global level are interest rate derivatives (especially in life insurance), followed by FX derivatives (primarily used by insurers investing in foreign assets) and, to a lesser extent, equity-linked derivatives (see Figure 59). In the life (re)insurance sector, derivatives are sometimes used to manage exposures to changes in life expectancy and mortality rates – for instance, through longevity swaps and mortality bonds.

Figure 59: Derivative Types Split by Gross Notional Amounts



Source: IAIS

[85] International Association of Insurance Supervisors (IAIS), 2023, *Global-Insurance-Market-Report-2023.pdf (iaisweb.org)*

A 2024 survey by Milliman involving 57 life insurance companies from North America, Europe and Asia revealed that insurers have adapted their risk management practices and derivatives usage in response to interest rate hikes, as well as regulatory changes like the margin rules for non-cleared derivatives, Solvency II, IFRS 17 and the Financial Accounting Standards Board's long-duration targeted improvements. For example, insurers reported a substantial increase in the extent to which they centrally clear their trades as a result of the margin rules.

Most respondents – almost 90% – expect derivatives use to increase or remain the same over the next two years. Interest rate risk was the largest market exposure, followed by equity, currency and credit risks. Managing economic profit and loss volatility was the most important hedging objective, especially in North America, followed by accounting profit and loss volatility[86].

Examples:

AXA, a large multinational French insurance company, faces significant interest rate risk from contracts offering guaranteed benefits. This risk arises because the financial assets purchased with funds from contract holders might not be enough to meet these guarantees and expected payouts. To manage this, AXA uses derivatives strategies to minimize the risks linked to guaranteed liabilities.

As of December 31, 2023, the notional amount of interest rate derivatives instruments totaled €200.4 billion. AXA utilized IRS (79% of the total notional amount), interest rate options (13%) and futures and forwards (9%). These instruments were primarily used to manage duration gaps and hedge convexity[87] risk between assets and liabilities as part of asset-liability management strategies – mainly in France (€86.4 billion), Japan (€13.8 billion) and Hong Kong (€14.8 billion). The company also hedged interest rate risk and interest volatility risk associated with guaranteed minimum benefits on variable annuity products, with a notional amount of €47.6 billion, mainly at AXA Life Europe. Additionally, derivatives are used to minimize the cost of group debt and limit volatility of financial charges within the company, with a notional amount of €7.3 billion.

As of December 31, 2023, AXA also held currency derivatives with a notional value of €149.1 billion. These included currency futures and forward contracts (55% of the notional amount), currency option contracts (26%) and currency swaps (17%). A primary purpose of these currency derivatives is to reduce fluctuations in the value of net foreign-currency-denominated assets due to exchange rate movements, partially protecting the value of AXA's net foreign currency investments in its subsidiaries. The notional amount of derivatives used to hedge foreign currency exposure was €27 billion at year-end 2023. Currency derivatives are also employed to manage foreign exchange mismatches between assets and liabilities in the group's insurance subsidiaries. For instance, the Swiss operation uses derivatives to hedge exchange rate risks from investments in non-Swiss-franc-denominated equities and debt instruments (mainly in euro and US dollar) with a total notional of €22.3 billion as of year-end 2023[88].

AIA Group, a US-Hong-Kong-based insurance and finance corporation, faces FX rate risk due to its operations in multiple Asian markets and the need to convert various currencies into US dollars for financial reporting. The balance sheet values of operating units and subsidiaries are not hedged against the group's reporting currency, the US dollar. In general, assets, liabilities and regulatory capital in each business unit are matched to the local currency, except for equities other non-fixed-income assets held in different currencies. Bonds in non-functional currencies are hedged using cross-currency swaps or foreign exchange forward contracts.

[86] Millman, 2024, *Milliman Derivatives Survey 2024 - Executive Summary*

[87] Convexity refers to the non-linear relationship between interest rate changes and the value of assets and liabilities. A mismatch in convexity can lead to imbalances, as assets and liabilities may react differently to changes in interest rates

[88] AXA annual report, 2023, *Universal registration document 2023 (axa-contento-118412.eu)*

AIA holds significant insurance and reinsurance contract liabilities across currencies, including $75 billion in US dollars and $37 billion in Chinese yuan. In terms of financial assets, AIA held $118 billion in US dollars and $44 billion in Chinese yuan. To manage foreign exchange risk, AIA utilizes currency derivatives. For instance, AIA had a negative net position in currency derivatives of $3.2 billion in US dollars and $2 billion in Chinese yuan[89].

Key Takeaways:

1. **Role of Derivatives in Risk Management:** Insurance companies around the world rely on derivatives to manage diverse risks, including fluctuations in interest rates, inflation, currencies, equity prices and credit events. These instruments ensure financial stability by aligning asset portfolios with long-term liabilities and mitigating volatility.

2. **Adapting to Evolving Market and Regulatory Requirements:** Rising interest rates, stricter margin rules and accounting changes have prompted many insurers to expand their derivatives programs. This allows them to effectively manage economic and accounting volatility, ensuring they maintain robust capital positions under shifting global standards.

3. **Societal Impact:** Derivatives play a key role in maintaining the financial stability of insurance companies, helping to ensure they can meet their obligations and protect the long-term financial security of policyholders.

3.3.2. Adding to GDP and Economic Growth

OTC derivatives play a role in driving economic growth, job creation and industrial expansion. By enabling more efficient risk management, derivatives allow businesses to take on new projects, expand their operations and make significant capital investments, which, in turn, stimulates the broader economy.

According to Expand Research, a firm owned by BCG:

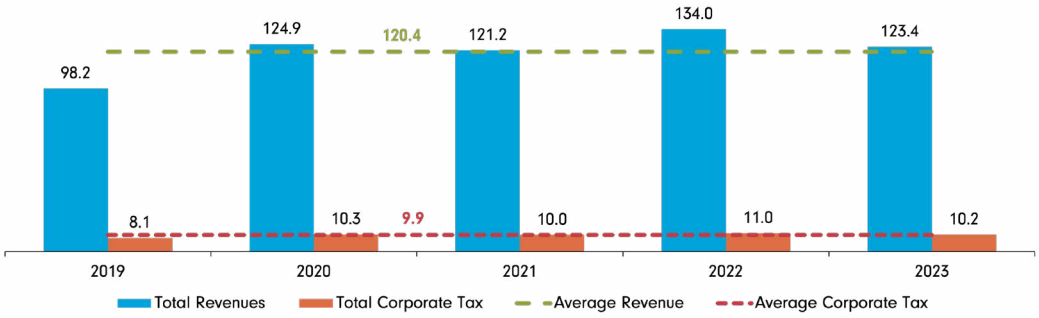
- Global revenues from OTC derivatives activities, generated by major reporting dealers and post-trade service providers, averaged $120.4 billion annually between 2019 and 2023. During this period, operating costs – including salaries – accounted for approximately 60% of total revenues. According to Organisation for Economic Co-operation and Development corporate tax statistics, which are based on data from 90 jurisdictions, the effective average corporate tax rate in 2023 was 20.2%[90]. Applying this tax rate to the net operating margin of OTC derivatives activities, it is estimated that reporting dealers and post-trade service providers collectively contributed approximately $9.9 billion annually in corporate taxes worldwide during the 2019–2023 period (see Figure 60).

OTC derivatives play a role in driving economic growth, job creation and industrial expansion. By enabling more efficient risk management, derivatives allow businesses to take on new projects, expand their operations and make significant capital investments

[89] AIA annual report, 2023, *2024041200326.pdf.coredownload.inline.pdf (aia.com)*

[90] OECD, 2024, Corporate Tax Statistics 2024, OECD Publishing, Paris, *https://doi.org/10.1787/9c27d6e8-en*

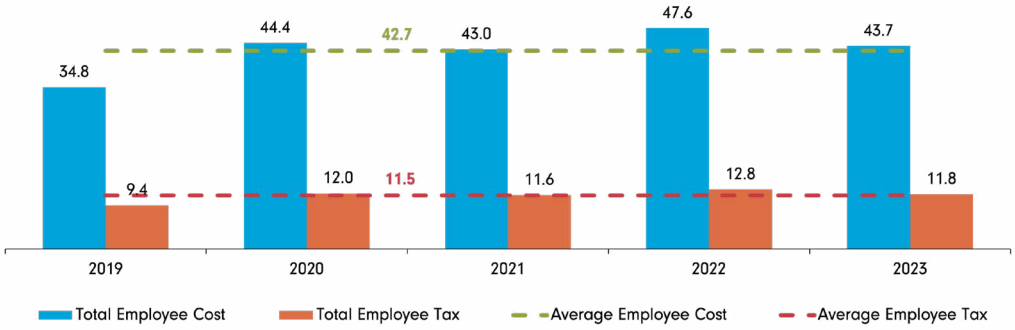
Figure 60: Estimated Global Revenues and Corporate Tax from OTC Derivatives ($ billion)



Source: Expand Research

- It is also estimated that major reporting dealers and post-trade service providers involved in OTC derivatives activities employed an average of 500,000–600,000 people worldwide between 2019–2023. During this period, approximately 60% of the total costs incurred by these entities were related to salaries. Given the average personal tax rate of 27% over the same time frame, this translates to an estimated contribution of $11.5 billion annually in personal taxes, further enhancing government revenues (see Figure 61).

Figure 61: Estimated Employee Costs and Employee Tax ($ billion)



Source: Expand Research

It is estimated by the Milken Institute[91] that:

- Between 2003 and 2012, the use of derivatives contributed an additional $149.5 billion to US real GDP, making it 1.1% higher than it would have been without these financial instruments. This economic boost not only increased production but also had a direct impact on employment, adding around 500,000 jobs and raising industrial production by 2.1% by the end of 2012.

- Banks' use of derivatives played a critical role by extending greater credit to the private sector, which contributed to an increase of $2.7 billion per quarter in real GDP, while non-financial firms' derivatives use added $1 billion per quarter by improving their ability to undertake capital investments (see Figure 62).

[91] Milken Institute, Deriving the Economic Impact of Derivatives, 2014, *Derivatives-Report.pdf (milkeninstitute.org)*

Figure 62: Contribution of Derivatives to US Economy 2003-2012

Source: Milken Institute

These combined effects demonstrate how derivatives foster a more robust economic environment by providing businesses with the tools they need to manage financial risks, thereby supporting growth, job creation and industrial development.

3.3.3. Improving Capital Allocation

A study by the BIS[92] examined the relationship between capital allocation and financial development across six countries: China, India, Japan, Mexico South Korea and the US. The findings revealed that more developed financial systems are better at efficiently allocating capital investments.

When financial development levels are low, rapid capital accumulation tends to worsen the efficiency of allocation. However, this trend reverses at higher levels of financial development, where faster capital accumulation improves allocative efficiency. This indicates that developed financial systems – those with a higher financial development index – are more effective in resource allocation.

Financial development is measured using a financial development index constructed by Sahay et al (2015), building on earlier work by Čihák et al (2013) and others. This index defines financial development as a combination of depth (the size and liquidity of markets, such as debt securities issued by financial or non-financial firms as a percentage of GDP), access (the ability of individuals and companies to access financial services) and efficiency (the ability of institutions to provide financial services at low cost with sustainable revenues and the level of activity in capital markets).

The various facets of financial development are supported by effectively functioning OTC derivatives markets. This, in turn, leads to better allocation of capital across multiple sectors.

[92] BIS, 2017, *Capital misallocation and financial development: A sector-level analysis (bis.org)*

3.3.4. Assisting Developing Countries

In EMDEs, where GDP, exchange rates, interest rates and capital flows can be relatively more volatile than those of advanced economies, derivatives could be especially important in enhancing risk management and enabling access to capital[93].

3.3.4.1. Why are OTC Derivatives Important for DMOs in Developing Countries?

EMDEs are vulnerable to FX risk due to their dependence on foreign-currency-denominated debt, often a consequence of less developed domestic capital markets. Exchange rate fluctuations significantly impact the domestic currency value of this debt, creating unpredictable debt servicing costs and potentially destabilizing fiscal positions. Exchange rates are typically among the most volatile financial variables affecting outstanding debt stock and the future cost of servicing that debt. This vulnerability is further exacerbated by the susceptibility of EMDEs to external shocks, including terms-of-trade volatility, sudden stops in capital flows and natural disasters, which can trigger or amplify exchange rate fluctuations[94].

- Drawing on end-2021 data[95], low-income countries (LICs) generally carry a higher proportion of foreign currency debt compared to emerging markets (EMs) (see Figure 63). This disparity is further evident at the regional level, with Sub-Saharan Africa and the Middle East, Central Asia and North Africa exhibiting particularly high levels of foreign currency debt (see Figure 64).

Figure 63: Government Foreign Currency Debt: EM vs. LIC (%, simple average)

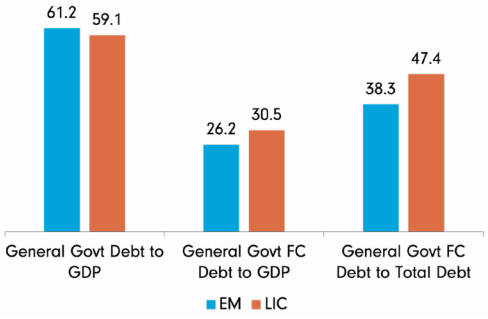
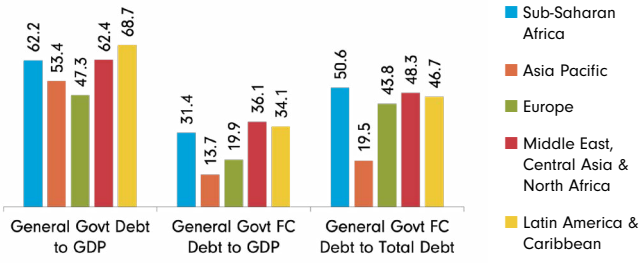


Figure 64: Government Foreign Currency Debt: By Region (%, simple average)



Source: IMF

A joint IMF and TCX survey of 30 EMDEs[96] provided insights into their FX and interest rate risk management practices. It revealed:

- Only 45% of responding EMDE DMOs had a dedicated foreign currency risk management strategy, and 58% reported having explicit targets for foreign currency risk exposure. About 43% of DMOs assess the impact of interest rate fluctuations on interest payments.

- The survey pointed to limited experience with derivatives instruments. Only a couple of countries had used currency or interest rate swaps, and only one had used futures or options.

[93] ISDA, 2022, *Policy-Framework-for-Safe-andEfficient-Derivatives-Activity-in-Emerging-and-Developing-Markets.pdf*

[94] IMF, 2024, *Managing Foreign Exchange Rate Risk: Capacity Development for Public Debt Managers in Emerging Market and Low-Income Countries*

[95] IMF, 2024, *Managing Foreign Exchange Rate Risk: Capacity Development for Public Debt Managers in Emerging Market and Low-Income Countries*

[96] The survey included the following countries: Angola, Benin, Bosnia and Herzegovina, Cambodia, Chad, Chile, Republic of Congo, Costa Rica, Gabon, The Gambia, Grenada, Guatemala, Guinea, Hungary, Jamaica, Kyrgyzstan, Lebanon, Madagascar, Mali, Nepal, Niger, Papua New Guinea, Suriname, Swaziland, Togo, Trinidad and Tobago, Uganda, Ukraine, Uruguay and Uzbekistan

- This limited usage is attributed to various factors, including legal restrictions (with 45% lacking legal authority to use derivatives), macroeconomic instability, shallow investor bases and underdeveloped financial markets.

OTC derivatives, particularly currency swaps, offer a tool for managing FX risk. These instruments provide flexibility in modifying the currency composition of debt and hedging against unfavorable exchange rate movements. For instance, a DMO can use a currency swap to effectively convert newly issued foreign currency debt into local currency, hedging the FX risk associated with future debt service payments. This allows governments to access potentially cheaper international funding while mitigating currency risks. Swaps can also be used to proactively restructure existing debt portfolios to achieve a desired currency composition, potentially at a lower cost and with greater speed than traditional methods like debt buybacks or new issuances.

By integrating OTC derivatives into their risk management toolkit, EMDEs could mitigate FX risk and achieve sustainable debt management outcomes. Managing their FX risk exposure could also help promote long-term financial stability.

Examples:

Indonesia, one of the largest borrowers from the International Bank for Reconstruction and Development (IBRD), had 95% of its loans denominated in US dollars as of June 2021. To diversify currency risk, the World Bank treasury[97] executed market transactions at the request of Indonesia's DMO to convert two loans totaling $700 million from US dollar variable rates to fixed euro rates. This reduced Indonesia's US dollar obligations to 92% of its total foreign currency debt. To further reduce exposure, Indonesia diversified its loan portfolio by opting for new loans in euro and yen. By August 2023, the share of US-dollar-denominated obligations dropped to 86%. Additionally, the loan conversions lowered the share of variable-rate IBRD loans from 93% to 90%, offering more stability in repayment. Market projections as of July 2023 suggested these conversions could generate potential savings of $177 million, which could be redirected towards Indonesia's development goals.

[97] The World Bank, 2023, *https://thedocs.worldbank.org/en/doc/e57b3783b10700d022421e57ce54cb09-0340012023/original/Case-Study-Indonesia-currency-risk-management.pdf*

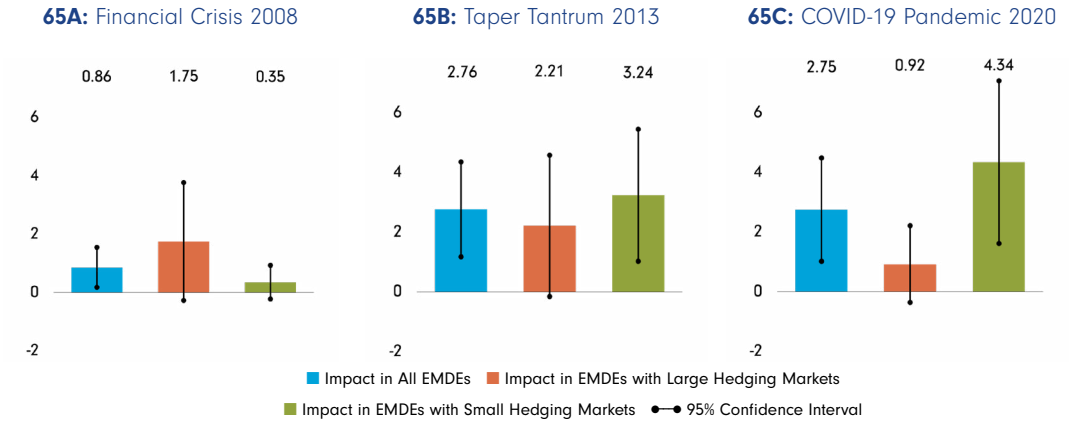
3.3.4.2. Showing Greater Resilience During Shocks

Liquidity in EMDEs[98] with well-developed hedging markets is more resilient to major shocks. A BIS study[99] compared liquidity by measuring the changes in bid-ask spreads of five-year government bonds in the 90 days before and after the 2008 financial crisis, the 'taper tantrum' in 2013 and the COVID-19 pandemic in 2020. Although bid-ask spreads widened during all three events, EMDEs with small hedging markets experienced a more significant impact except during the Lehman crisis:

- The smallest effect was after the Lehman Brothers bankruptcy, at around 0.4bp (see Figure 65A, last bar on right).
- After the 2013 taper tantrum, spreads moved by around 3bp (see Figure 65B, last bar on right).
- The largest move was after the COVID-19 pandemic, at over 4bp (see Figure 65C, last bar on right).

In EMDEs with more developed markets, liquidity conditions appeared more resilient – in particular, amid the turmoil in fixed income markets during the COVID-19 pandemic.

Figure 65: Liquidity is Less Stable in EMDEs with Less Developed Hedging Markets (Change in Government Bond Bid-Ask Spread in Basis Points)



Source: BIS

3.3.4.3. Usage of Interest Rate Derivatives by Emerging Market Economy Banks

Banks are vital financial intermediaries in EMDEs, supporting economic growth through lending, deposit management, sovereign debt investment and facilitating foreign trade. However, these activities expose them to risks, such as credit risk from lending, interest rate risk on assets and liabilities and liquidity risk due to maturity mismatches. Effective management of interest rate risk is essential and derivatives play a key role[100]. Without these tools, banks would need to closely match assets and liabilities, significantly limiting the amount and type of credit they can extend.

- Banks often face imbalances between assets and liabilities. Assets like government bonds are fixed rate, illiquid and long-term, while liabilities such as customer deposits are short-term, withdrawable and carry floating rates. Without derivatives, banks might focus on shorter-dated or floating-rate loans, restricting their ability to provide lower-cost, longer-term financing to borrowers. This leads to higher costs and uncertainty for companies, impeding their ability to invest and grow.

[98] The term 'EMDEs' in this context refers to 16 countries: Brazil, Chile, China, Colombia, Hungary, Indonesia, India, Mexico, Malaysia, Peru, Philippines, Poland, Romania, Thailand, Republic of Türkiye and South Africa

[99] BIS, 2024, *Towards liquid and resilient government debt markets in EMEs*

[100] ISDA, 2022, *Policy-Framework-for-Safe-andEfficient-Derivatives-Activity-in-Emerging-and-Developing-Markets.pdf*

- By using derivatives, banks can separately manage floating-rate risk on the liability side and fixed-rate risk on the asset side. This allows them to structure assets and liabilities in ways that better meet customer needs and support the broader economy.

- Government financing can also be affected without the use of derivatives. If governments aim to lengthen the maturity of their debt to reduce rollover risks, they may face higher costs or less demand because banks cannot manage the risk of longer maturities. Using derivatives to hedge longer-dated bonds can mitigate this issue.

- Emerging markets often exhibit greater volatility, potentially leading to liquidity events and spikes in interest rates if hedging isn't possible. The prudent use of derivatives to hedge exposures helps absorb these shocks, supporting financial stability and economic growth.

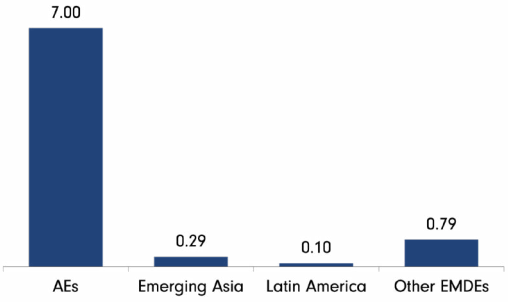
A BIS study[101] indicated that the use of interest rate derivatives is much greater among banks in advanced economies[102] (AE) than those in EMDEs, which included emerging Asia[103], Latin America[104] and other emerging market economies[105].

- For the median AE banking system, the gross market value of interest rate derivatives was equivalent to almost 7% of bank assets in early 2022. In EMDEs, it was below 1% (emerging Asia, 0.29%; Latin America, 0.1%; and other emerging market economies, 0.79%) (see Figure 66A).

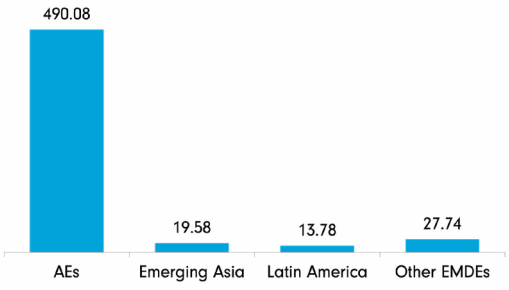
- For the median AE, the notional value of interest rate derivatives was about five times larger than bank assets. For emerging market economies, the range was from 13.78% for Latin America to 27.74% for other EMDE economies (see Figure 66B).

Figure 66: Banks in EMDEs Have Small Interest Rate Derivatives Positions

66A: Gross Positive Market Value of Derivatives (as % of Bank Assets)[106]



66B: Notional Value of Derivatives (as % of Bank Assets)[107]



Sources: BIS

[101] BIS, 2023, *Interest rate risk management by EME banks (bis.org)*

[102] Advanced economies include 20 countries: Austria, Australia, Belgium, Canada, Switzerland, Germany, Denmark, Spain, Finland, France, Ireland, Italy, Japan, Netherlands, Norway, New Zealand, Portugal, Sweden, UK and US

[103] Emerging Asia includes 10 countries: China, Hong Kong, Indonesia, India, South Korea, Malaysia, Philippines, Singapore, Thailand and Taiwan

[104] Latin America includes six countries: Argentina, Brazil, Chile, Colombia, Mexico and Peru

[105] Other emerging market economies consist of seven countries: Czech Republic, Hungary, Israel, Poland, Saudi Arabia, Republic of Türkiye and South Africa

[106] Excludes countries: Austria, Belgium, Japan, Norway and New Zealand for advanced economies (AEs); Hong Kong, Indonesia, Philippines, Singapore and Taiwan for emerging Asia; Czech Republic and Israel for other emerging market economies

[107] Excludes countries: Austria, Belgium, Japan, Norway and New Zealand for AEs; Hong Kong, Philippines, Singapore and Taiwan for emerging Asia; Czech Republic for other emerging market economies

- The use of interest rate derivatives is smaller for banks in EMDEs even though net interest income accounts for a high share of their total income. They manage interest rate risk on their net interest income by holding assets and liabilities that reprice frequently. These banks typically extend loans with floating rates or short maturities to businesses to limit repricing gaps with time deposits, which they use heavily for funding.

- As bank balance sheets become more complex and business models change, hedging the impact of interest rate changes on non-interest sources of income and net worth may become more challenging without a robust, liquid derivatives market. As securities already account for a large share of banks' assets in EMDEs, they are also more exposed to valuation losses.

- The duration of banks' assets is likely to increase as mortgage markets develop and fee income is likely to expand as asset management grows. This would increase the size of interest rate risk exposures that are inherently difficult to hedge by minimizing repricing gaps.

Example:

Banco De Bogotá, a Colombian bank, executed hedging transactions totaling ~$1.5 billion (6,539,684 million Colombian pesos) as of December 31, 2023. These hedges were designed to mitigate the fair value risk of its fixed-rate financial liabilities by using IRS that exchange fixed-rate flows for flows indexed to the reference banking indicator. The notional amounts of time deposits and swaps were perfectly matched[108].

State Bank of India, a public-sector bank in India, indicated in its annual report that IRS contracts are primarily used for hedging assets and liabilities. As of March 31, 2024, it held 155 IRS with a notional value of ₹57,794 crores (approximately $6.9 billion) for the purposes of hedging. These swaps are predominantly structured to receive fixed rates and pay floating rates, using the Secured Overnight Financing Rate[109] (SOFR) benchmark[110].

3.3.4.4. Enabling and Supporting Infrastructure Financing

Infrastructure is a key driver of economic growth in EMDEs, which face an annual infrastructure financing gap of $1.5 trillion. The ability to hedge financial risks resulting from the financing of infrastructure projects is considered crucial by project sponsors and lenders in both AEs and EMDEs. Without the ability to hedge interest rate and foreign exchange risks through derivatives such as IRS and cross-currency swaps, project sponsors and investors may choose to avoid EMDE infrastructure projects given uncertain cashflows due to the longer-term nature of such lending. The infrastructure sector is therefore a regular user of long-dated derivatives instruments[111].

Given less developed local currency bond markets, EMDE infrastructure projects often rely on hard currency financing, typically in US dollars, creating currency mismatches as project revenues are usually in local currency. OTC derivatives, including IRS and cross-currency swaps, are important tools for mitigating these risks.

[108] Banco De Bogotá annual report, 2023, *efs-notas-consolidados-bdb-dic23-ingles.pdf (bancodebogota.com)*

[109] The Secured Overnight Financing Rate (SOFR) is a benchmark interest rate for US-dollar-denominated loans and derivatives, replacing LIBOR (London Interbank Offered Rate) as a preferred reference rate in global financial markets. SOFR is based on transactions in the US Treasury repurchase market, which makes it a transparent and risk-free benchmark

[110] State Bank of India annual report, 2024, *Annual_Report_2024.pdf*

[111] World Bank, 2019, *The Effects of Derivatives Regulation on Infrastructure Finance: Some Evidence From Emerging Markets*

In 2019, the World Bank conducted a study[112] based on a survey of 10 leading infrastructure finance banks, a roundtable with financiers and hedge providers and over 50 interviews with banks, industry associations, regulatory experts and sponsors. The survey highlighted that there has been a decline in banks' appetite for EMDE infrastructure projects, with 78% of respondents reporting reduced appetite due to hedging challenges. This indicates a direct link between derivatives availability and financing viability.

Examples:

The **Asian Development Bank** (ADB) helped to partially fund the $900 million[113] Nam Ngiep 1, a 290 MW hydropower project in the Lao People's Democratic Republic, through a series of US dollar/Thai baht cross-currency swaps between 2015 and 2017, with maturities of 22 years and 23 years. According to the ADB, structuring long-term project bonds for such financing would be difficult, especially with the semiannual amortizing cashflows and multiple disbursements spread over a lengthy availability period, making traditional project bonds an impractical solution. The ADB has also used US dollar/Chinese yuan cross-currency swaps to fund loans in the micro-credit, small business and agrifinance sectors[114].

According to the World Bank, the majority of financing in South Africa and India is in local currency. In **Morocco**, approximately one third of financing is in local currency. In EMDE countries, where underdeveloped local financial systems and capital markets cannot provide local currency long-term financing, infrastructure financing is raised from development agencies, export credit agencies and international banks, predominantly in hard currency variable-rate loans. The limited availability of long-term local currency lending, resulting in currency risk, is one of the greatest challenges to infrastructure development in EMDEs[115].

The development of local derivatives markets would strengthen the resilience of EMDE economies, support economic growth and help increase access to financing.

Key Takeaways:

1. **Strengthening Debt Management and Fiscal Stability:** In EMDEs with volatile currencies, OTC derivatives help manage foreign currency debt exposure, reducing unpredictable servicing costs. By effectively converting foreign-currency-denominated loans into local currency, they enhance debt sustainability and support prudent fiscal strategies.

2. **Enhancing Market Resilience During Global Shocks:** EMDEs with more developed hedging markets experience greater liquidity and stability in times of financial turbulence. They see less pronounced widening of bid-ask spreads, which results in more robust bond markets and underpins long-term economic resilience.

3. **Empowering Banks to Provide Credit and Growth:** Without interest rate derivatives, EMDE banks must tightly match assets and liabilities, limiting their lending capacity. Access to derivatives allows flexible risk management, supporting long-term financing, cost-effective credit provision and stronger economic growth.

[112] World Bank, 2019, *The Effects of Derivatives Regulation on Infrastructure Finance: Some Evidence From Emerging Markets*

[113] Southeast Asia Infrastructure, 2014, *Nam Ngiep 1 Power Company achieves financial closure for the 290 MW hydropower project - Southeast Asia Infrastructure*

[114] Asian Development Bank blog, 2019, *Putting Derivatives to Work in Development Finance | Asian Development Blog*

[115] World Bank, 2019, *The Effects of Derivatives Regulation on Infrastructure Finance: Some Evidence From Emerging Markets*

Key Takeaways:

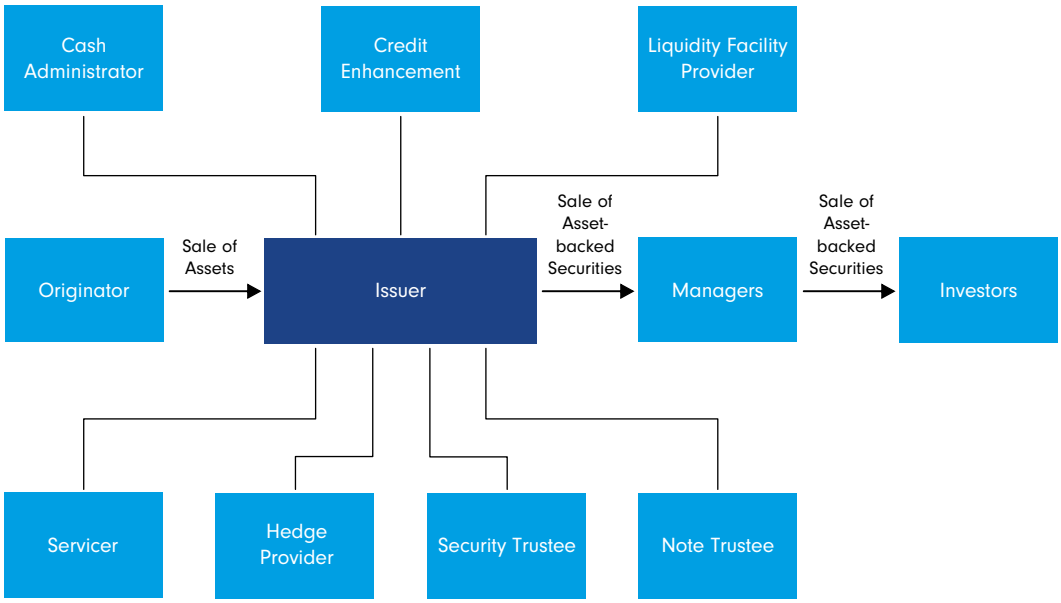
4. Facilitating Sustainable Infrastructure Financing: Long-dated swaps and other derivatives are vital for hedging currency and interest rate risks in EMDE infrastructure projects. By reducing hedging costs, unlocking international capital and improving project feasibility, derivatives play a key role in bridging sizable infrastructure funding gaps.

3.3.5. Creating Capacity for Lending Across the Economy: OTC Derivatives Enable Securitizations

OTC derivatives are instrumental in enabling securitizations, which may broadly be defined as the process whereby loans, receivables and other financial assets are pooled together, with their cashflows or economic values redirected to support payments on related securities. Securitization essentially allows firms to shift assets (or the risk of those assets) from their balance sheets to third-party investors willing to take on that risk, enabling the originating firm to raise funding and free up capacity for additional lending, which contributes to economic growth.

- Traditional asset-backed securities (ABS) are backed by assets like mortgage loans (see Figure 67), while synthetic securitizations use derivatives to transfer the credit risk of the asset pool, not the assets themselves, to third parties like insurance firms[116].

Figure 67: A Schematic Description of a Securitization Structure



Source: World Bank[117]

- IRS and credit derivatives are crucial in managing the risks associated with securitized assets. By employing CDS, issuers can hedge against the credit risk of the underlying asset pool, enhancing the credit quality of the securitized tranches and making them more appealing to investors. IRS help manage interest rate mismatches between the assets and the issued securities, ensuring stable cashflows.

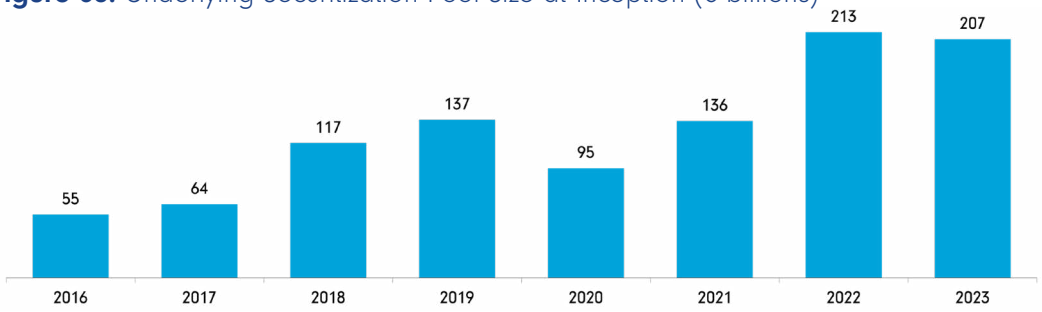
[116] European Parliamentary Research Service, 2015, *Understanding Securitisation*

[117] World Bank, *https://documents1.worldbank.org/curated/ru/747401468092077080/pdf/395540Securitization.pdf*

- Implementation of frameworks like the EU's simple, transparent and standardized (STS) securitization[118] in 2017 emphasizes the use of OTC derivatives for mitigating interest rate and currency risks. According to the European Central Bank (ECB)[119], if banks increase the placement of securitization instruments with external investors, this could help invigorate and deepen Europe's capital markets and benefit its economy.

- Synthetic securitizations are typically structured through OTC derivatives, allowing banks to transfer risk while retaining ownership of the assets, unlocking capital, creating funding capacity and optimizing their portfolios[120]. Between 2016 and 2023, the International Association of Credit Portfolio Managers[121] found that 507 synthetic on-balance-sheet securitizations[122] were issued by 40 banks, covering approximately €1 trillion in assets, with corporate loans making up two-thirds of assets (see Figure 68).

Figure 68: Underlying Securitization Pool Size at Inception (€ billions)



Source: International Association of Credit Portfolio Managers

Securitization allows non-financial firms to reduce their cost of capital without transferring value from existing creditors[123]. The European Securitisation Forum highlights various social and economic benefits of widespread securitization markets, including a reduction in geographical and regional disparities in the availability and cost of credit[124].

Examples:

BMW, a German automobile company, executed €16 billion of ABS in 2023, both new and rolled over, in Australia, China, Germany, Japan, Canada, Switzerland, South Korea, the US and the UK. BMW transferred retail customer and dealership financing receivables, rights and obligations from leasing contracts and collateral interests in financed vehicles to structured entities. These entities securitize the assets and place them on the capital market as collateralized securities. For the purposes of ABS financing, only the senior tranches of the issued securities are sold to external investors. Subordinated tranches are retained by BMW. BMW also retains the exposure to interest rate risk in many transactions for which it executes corresponding interest rate derivatives[125].

[118] EU, 2017, *Regulation - 2017/2402 - EN - securitisation regulation - EUR-Lex (europa.eu)*

[119] ECB, 2024, *EU securitisations: 2023 in figures (europa.eu)*

[120] ECB, 2024, *EU securitisations: 2023 in figures (europa.eu)*

[121] International Association Credit Portfolio Managers, 2024, *https://iacpm.org/wp-content/uploads/2024/06/IACPM-Balance-Sheet-Synthetic-Securitization-Survey-2016-2023-Select-Survey-Results36.pdf*

[122] Synthetic on-balance-sheet securitization is a way for banks to manage risk without selling their loans or other assets. Instead of transferring the actual assets, banks use financial contracts or derivatives to pass on the risk of those assets to other investors

[123] Various authors, 2018, *Securitization and Capital Structure in Nonfinancial Firms: An Empirical Investigation by Michael L. Lemmon, Laura Xiaolei Liu, Mike Qinghao Mao, Greg Nini :: SSRN*

[124] European Securitisation Forum, *https://pages.stern.nyu.edu/~igiddy/ABS/resourceguide.pdf*

[125] BMW annual report, 2023, *BMW-Group-Report-2023-en.pdf (bmwgroup.com)*

As of December 31, 2023, US automobile manufacturer **Ford Motor Company** had $58.0 billion in asset-backed debt. This secured debt, issued by Ford Credit (the financial services arm of Ford Motor Company), included ABS that were used to fund operations and maintain liquidity. Ford Credit's ability to obtain securitized funding under its committed asset-backed liquidity programs depends on having sufficient eligible assets, appropriate credit ratings and derivatives to manage interest rate risk. If there's a significant decline in demand for its securities or an inability to obtain necessary derivatives, Ford Credit may reduce the receivables it purchases or originates. This could significantly reduce its ongoing results and adversely affect its ability to support the sale of Ford vehicles. Third-party investors in the securitization transactions have legal recourse only to the assets securing the debt and do not have recourse to Ford Credit, except (for example) when Ford Credit is a counterparty to certain derivatives of the special purpose entities (SPEs). SPEs that are exposed to interest rate or currency risk may reduce their risks by entering into derivatives[126].

Banco Sabadell, a Spanish lender, implemented a securitization strategy as of December 31, 2023. This process involves pooling certain financial assets (primarily loans) and transferring them to a separate securitization fund. The fund subsequently issues securities (bonds) backed by these assets, which are then sold to investors. Banco Sabadell utilizes fully derecognized securitizations, a category through which it transfers risk to investors, allowing it to remove the assets (totaling €569 million in 2023) from its balance sheet, freeing up capital and enabling additional lending capacity. The fully derecognized assets include securitized mortgages (€111.6 million in 2023), other securitized assets (€228.7 million in 2023) and additional transferred financial assets (€228.7 million in 2023)[127].

3.3.6. Supporting Mortgages

The landscape for housing loan markets varies considerably across countries, reflecting differences in preferences and policy settings. Derivatives help to support institutions that provide mortgages, particularly in societies that encourage home ownership, and contribute to the stability and efficiency of housing finance systems in various markets.

Securitization plays a critical role in supporting housing markets by increasing credit access for otherwise 'marginal' borrowers, freeing up lending capacity and expanding the pool of lenders able to originate mortgages. Although the structure and features of housing markets vary by country, they typically face interest rate, prepayment and other risks. Derivatives are used to mitigate these risks and manage cashflows, enhancing the overall efficiency and resilience of the housing finance system.

A 2024 study[128] that reviewed loan systems in the US, Japan and South Korea noted that the expansion of fixed-rate loans in the US and Japan might be attributed to the development of derivatives for risk management. That is because instruments that mitigate the interest rate risk of lending are indispensable to increasing the proportion of long-term fixed-rate mortgages through the issuance of MBS.

[126] Ford annual report, *2023, 2023-Ford-Annual-Report.pdf (q4cdn.com)*

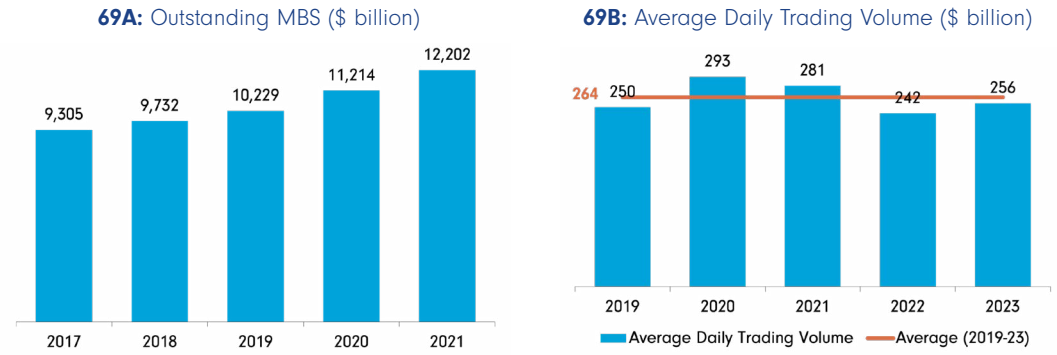
[127] Banco Sabadell annual report, 2023, *Banco Sabadell - Annual Report 2023*

[128] Kim, J., & Stephens, A. R., 2024, *The Effects of Conforming Loan Systems on Housing Finance Stability: A Panel Analysis of US, Japanese, and South Korean Mortgage Loan Systems*

US

The MBS market emerged to decouple mortgage lending from mortgage investing. Until the 1980s, nearly all US mortgages were held on balance sheet by financial intermediaries, limiting the amount of lending these entities could provide. Securitization allows these mortgages to be held and traded by investors all over the world, freeing up the capacity for financial institutions to lend more. The US MBS market is one of the largest and most liquid global fixed-income markets, with more than $12 trillion of securities outstanding and more than $250 billion in average daily trading volume. MBS are bonds with cashflows tied to the principal and interest payments on a pool of underlying mortgages (see Figure 69)[129].

Figure 69: Size of the US MBS Market



Source: Securities Industry and Financial Markets Association (SIFMA)[130]

Investors in MBS face duration and prepayment risks. Duration risk involves the sensitivity of a security's price to changes in interest rates, while prepayment risk arises when borrowers repay their mortgages earlier than expected, especially in a declining interest rate environment. Early repayments reduce the expected cashflows from the MBS, affecting its valuation[131]. To hedge these risks, investors typically utilize interest rate derivatives like IRS, options and futures. These instruments allow investors to manage the impact of interest rate fluctuations on their portfolios by adjusting the duration or offsetting potential losses from prepayments.

Derivatives also help manage the risks associated with MBS, such as mitigating interest rate shocks. In the US, the high proportion of fixed-rate mortgages can be partly attributed to the development of a robust derivatives market that enables effective risk management[132].

Outside US

MBS and covered bonds are used for funding mortgages in many European countries, as well as some other parts of the world.

[129] Federal Reserve Bank of New York, 2022, *Mortgage-backed Securities*

[130] SIFMA, *US Mortgage-backed Securities Statistics*

[131] Federal Reserve Bank of New York, 2022, *Mortgage-backed Securities*

[132] Kim, J., & Stephens, A. R., 2024, *The Effects of Conforming Loan Systems on Housing Finance Stability: A Panel Analysis of US, Japanese, and South Korean Mortgage Loan Systems*

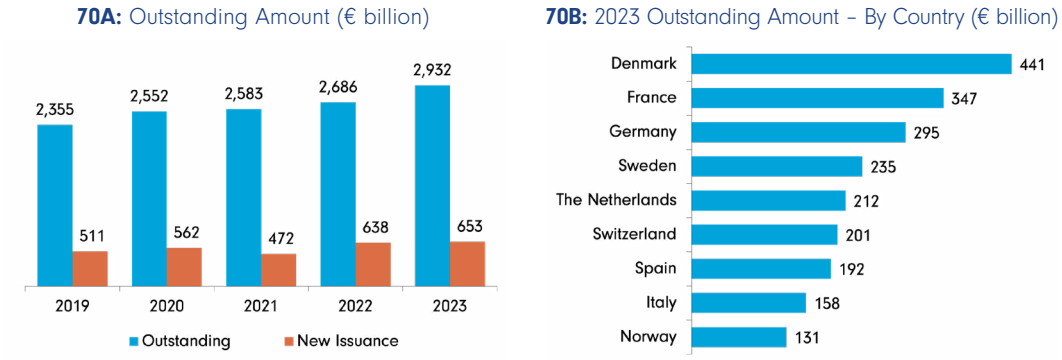
Europe

Mortgage-backed covered bonds (or mortgage bonds) are a distinct but related form of capital market mortgage financing and are popular in many countries. Mortgage bonds are securities embodying a debt relationship with the issuing credit institution and a pool of mortgage loans. The loans are earmarked as collateral for the outstanding mortgage bonds and are kept in separate cover pools. The bond investors have a double claim – on the issuing institution and, in the event of its insolvency, on the cashflows from the mortgage loans serving as collateral. Unlike securitization, the cover pool is pledged as collateral for the bonds but remains on the issuer's balance sheet, and mortgage prepayment and default therefore do not typically affect payments to investors.

Mortgage bonds have gained predominance as a source of stable funding and an asset-liability management tool and play a significant role in the financing of bank lending. They allow less liquid mortgage loans to be (indirectly) transformed into covered bonds, enhancing liquidity. Banks can diversify their funding mix and investor base and extend the maturity profile of the liabilities.

The outstanding amounts of covered bonds in 2022 and 2023 were about €2.7 trillion and €2.9 trillion, respectively, with annual issuance surpassing €600 billion in both years (see Figure 70)[133]. Mortgage bonds are widespread in Europe, especially in northern, western and southern Europe[134]. In 2022, the outstanding amount of these bonds relative to GDP was around 30% in northern Europe, about 13% in western Europe and approximately 12% in southern Europe[135].

Figure 70: Outstanding Amount of Mortgage Bonds



Source: European Covered Bond Council

OTC derivatives are typically used to hedge the misalignment between the interest flows of the loan portfolio and interest flows on the covered bonds issued. Almost all European covered bond legal frameworks allow derivatives in the cover pool, with the purpose of hedging interest rate risks or currency mismatches that may arise from the usual activity of an issuer. These derivatives are mainly plain vanilla cross-currency swaps and IRS[136].

[133] European Covered Bond Council, 2024, *https://hypo.org/app/uploads/sites/2/2024/08/FactBook-2024_web.pdf*

[134] Northern Europe refers to Finland, Iceland, Norway and Sweden. Western Europe refers to Austria, Belgium, Denmark, France, Germany, Ireland, Luxembourg, Netherlands, Switzerland and the UK. Southern Europe refers to Cyprus, Greece, Italy, Portugal and Spain

[135] BIS, 2023, *Covered bonds as instruments for developing capital markets and supporting financial stability: the Hungarian experience*

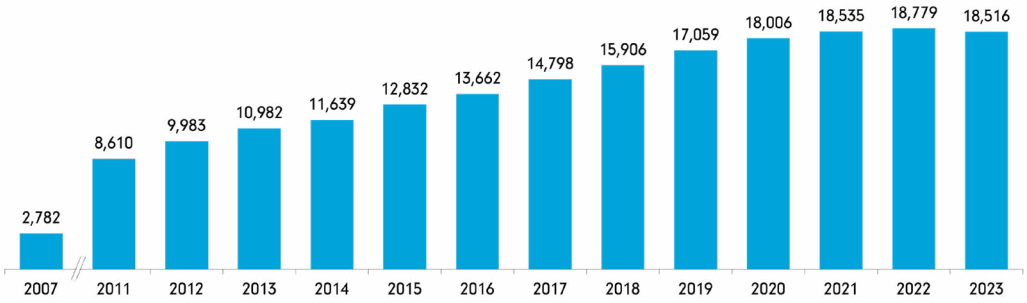
[136] European Covered Bond Council, 2012, *ecbc_response_to_esma_discussion_paper_1.pdf*

Japan

In Japan, Japan Housing Finance (JHF) facilitates the supply of long-term fixed-rate housing loans by private financial institutions through its 'securitization support business' initiative. Housing loans offered with the backing of 'securitization support business' are called Flat 35. Flat 35 helps homeowners create their financial plans on a long-term basis because their interest rates and payments are fixed for the entire life of the loan. JHF issues MBS backed by housing loans to transfer interest rate risk related to its housing loans to investors. This business structure enables private financial institutions to offer long-term fixed-rate housing loans, and the annual supply of Flat 35 mortgages has grown from ¥2.7 trillion in 2007 to over ¥18.5 trillion in 2023 (see Figure 71)[137].

JHF bears pipeline risk that refers to potential fluctuations in periodic income or losses caused by changes in interest rates during the period between finalizing the housing loan interest rate and setting the corresponding funding interest rate. JHF mitigates this risk by utilizing IRS as a hedging tool[138].

Figure 71: Growth of Flat 35 Mortgages in Japan (¥ billions)



Source: Japan Housing Finance, 2024, Integrated report

Overall

Derivatives strengthen the stability and provision of housing finance. With the availability of derivatives to manage interest rate risk, investors are more willing to invest in MBS and covered bonds. Derivatives also enable lenders to manage their interest rate risk on long-term fixed-rate mortgages, which gives house buyers certainty about the rate at which they can borrow.

Examples:

The **Danish** mortgage model is similar in many respects to agency securitization in the US. Mortgages in Denmark are originated by a small number of specialist mortgage banks, which then issue bonds with cashflows matching the borrowers' payments. The mortgage bank retains the loan on its balance sheet and bears the credit risk if the borrower defaults.

The mortgage activities of **Jyske Bank** are conducted through Jyske Realkredit, a wholly owned subsidiary of Jyske Bank. As of December 31, 2023, Jyske Realkredit reported mortgage loans at a fair value of 352.7 billion Danish krone, which are registered as collateral for issued mortgage bonds, including covered bonds. As of the same date, the fair value of issued bonds stood at 351.8 billion Danish krone. Interest on swaps and similar derivatives used in connection with the funding of mortgage loans – where the interest on certain issued bonds is swapped to align with interest on the

[137] Japan Housing Finance Integrated Report, 2024, *400371557.pdf*

[138] Japan Housing Finance, 2018, Disclosure Booklet *400348585.pdf*

mortgage loan – is recorded under other interest expenses. As a result, the total interest expense related to mortgage loan funding is recognized under interest expenses. In 2023, interest expenses paid to the parent company, Jyske Bank, amounted to 632 million Danish krone, which included interest expenses from swaps totaling 436 million Danish krone, recorded under other interest expenses. The nominal value of IRS used by Jyske Realkredit was 58.8 billion Danish krone as of December 31, 2023[139].

Royal Bank of Canada (RBC), a Canadian Bank, periodically securitizes insured Canadian residential mortgage loans through the creation of MBS pools under the National Housing Act MBS (NHA MBS) program. All loans securitized under the NHA MBS program are insured by the Canada Mortgage and Housing Corporation (CMHC) or a third-party insurer. RBC sells the NHA MBS pools primarily to Canada Housing Trust, a government-sponsored structured entity under the Canada mortgage bond (CMB) program. The entity periodically issues CMBs, which are guaranteed by the government and sold to third-party investors. Proceeds from the CMB issuances are used by the entity to purchase the NHA MBS pools from eligible NHA MBS issuers participating in the issuance of a particular CMB series. RBC also acts as a counterparty to IRS agreements, where it pays the entity the interest due to CMB investors and receives the interest on the underlying MBS and reinvested assets.

In addition, RBC uses interest rate contracts in fair value hedges to manage interest rate risk from residential mortgage assets and funding liabilities. Its exposure from this portfolio changes with the origination of new loans, repayments of existing loans and the sale of securitized mortgages. As of October 31, 2023, RBC held interest rate contracts with a notional value of C$93.5 billion for hedging fixed-rate assets, with the carrying amount of fixed-rate assets consisting of securities, retail loans (including residential mortgages) and wholesale loans, amounting to C$86.7 billion[140].

Banco BPM, an Italian bank formed following the merger of Banco Popolare and Banca Popolare di Milano, operated a covered bond program called BPM CB2 as of December 31, 2023, which includes residential and mortgage loans. To manage the interest rate risk associated with this covered bond program, Banco BPM entered into a covered bond swap. This IRS was designed to hedge against mismatches between the interest flows from the loan portfolio and those from the issued covered bonds. As of December 31, 2023, the book value of the residential and mortgage loans within the BPM CB2 program totaled €7.3 billion, while the book value of the associated covered bonds amounted to €4.35 billion[141].

Key Takeaways:

1. **Enhancing Mortgage Market Efficiency:** Derivatives enable financial institutions to manage interest rate and prepayment risks inherent in MBS and covered bonds. This risk management capacity encourages broader investor participation, increases lending capacity and improves mortgage market liquidity.

2. **Facilitate Fixed Rate Mortgages:** By reducing the exposure of lenders and investors to interest rate volatility, derivatives encourage the offering of long-term, fixed-rate mortgage products. This stability makes housing finance more accessible by lowering the risk premiums that lenders would otherwise charge.

3. **Supporting Housing Stability and Growth:** By controlling risk exposures, derivatives underpin stable, efficient mortgage markets that foster homeownership and economic development.

[139] Jyske Bank annual report, 2023, *Jyske+Bank+2023+Q4+UK.pdf*

[140] Royal Bank of Canada annual report, 2023, *https://www.rbc.com/investor-relations/_assets-custom/pdf/ar_2023_e.pdf*

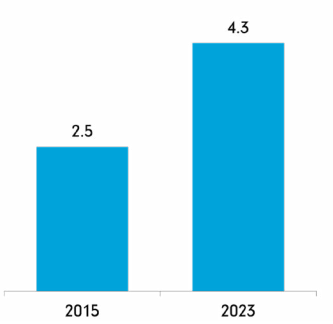
[141] Banco BPM annual report, 2023, *Microsoft Word - 101_001-039_Relazione_Parte_01_EN_verGT01*

3.3.7. Achieving Sustainable Development Goals

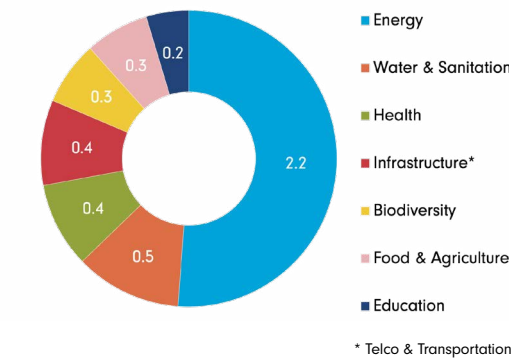
Countries around the world have pledged to reduce the carbon dioxide they release into the atmosphere. Achieving these goals will require trillions of dollars in new infrastructure investment – funds that must be raised through financial markets. According to estimates by UNCTAD[142,143], between $5 trillion and $7 trillion of investment is required annually between 2015 and 2030 to meet sustainable development goals, with a current financing gap of approximately $4.3 trillion in developing countries across multiple sectors (see Figure 72). Mobilizing this massive amount of funding through financial markets is essential, and derivatives will play a critical role by allowing companies to hedge risks associated with sustainable investments and capital raising, thereby facilitating efficient capital allocation toward green initiatives.

Figure 72: Investment Gap to Meet Sustainable Development Goals

72A: SDG Annual Investment Gap – 2015 vs 2023 ($ trillion)



72B: SDG Annual Investment Gap 2023 – By Sector ($ trillion)



Source: United Nations Conference on Trade and Development report[144]

The financial services sector will be pivotal in facilitating long-term funding through capital markets and managing risks associated with capital raising and sustainable investments, including project risk, interest rate risk and currency risk. Derivatives markets enable companies to hedge these exposures, allowing more capital to flow into sustainable investments. By facilitating transparency, price discovery and market efficiency, derivatives help foster long-term investment strategies. Other derivatives have emerged that link payments to specific sustainability measures, further promoting efforts to meet climate targets.

- Research by the Centre for European Policy Studies and the European Capital Markets Institute underscores the significant role derivatives play in the context of the European Green Deal[145]. Derivatives help in capital raising by hedging risks related to sustainable investments and enhancing the transparency and price formation process of underlying securities, thus fostering long-termism[146]. For example, IRS can help renewable energy projects lock in fixed borrowing costs, reducing financial uncertainty over the project's lifespan.

[142] UNCTAD, 2023, *https://unctad.org/sdg-costing/about*

[143] João Pinto, Mário Coutinho dos Santos, 2023, *Asset-Based Structured Finance of Infrastructure Projects by João Pinto, Mário Coutinho dos Santos :: SSRN*

[144] United Nations Conference on Trade and Development, 2024, *https://unctad.org/system/files/official-document/diaemisc2023d6_en.pdf*

[145] The European Green Deal is the EU's roadmap to achieve climate neutrality by 2050, decouple economic growth from resource use and protect biodiversity. It encompasses key initiatives like transitioning to clean energy, fostering a circular economy, promoting sustainable agriculture and achieving zero pollution for air, water and soil. Balancing environmental goals with economic development and social equity, it is intended to ensure a fair and inclusive shift to a sustainable future for all EU regions and citizens

[146] European Capital Markets Institute, 2020, Derivatives in Sustainable Finance *https://www.ecmi.eu/sites/default/files/derivatives_in_sustainable_finance_0.pdf*

- A market for ESG-linked derivatives has emerged in recent years. Instruments such as sustainability-linked derivatives, ESG-related CDS and renewable energy derivatives have been developed to integrate ESG considerations into financial markets[147]. Green derivatives incorporate climate-related considerations – for example, sustainability-linked IRS and cross-currency swaps might link interest rate adjustments to a company's ESG performance. These contracts utilize third-party ESG ratings or auditor reports to determine adjustments. By incentivizing sustainable practices, these instruments could play a role in achieving the UN's 2030 sustainable development goals[148].

- Derivatives help manage financial risks related to climate change, including physical risks (eg, extreme weather events) and transition risks (eg, economic shifts toward lower carbon emissions). For instance, physical risks like droughts or wildfires can disrupt businesses, causing price spikes or credit losses, while transition risks, such as carbon taxes, can undermine industries like oil and gas[149].

- The use of ESG-related instruments in financing continues to grow as part of efforts to finance the net-zero transition. However, some organizations and countries are also using derivatives to obtain protection against extreme weather. For example, a farmer can hedge against extreme rainfall by entering into a contract that pays out if rainfall exceeds a certain threshold, protecting crops without the need for proof of damage[150].

Examples:

In March 2020, **Siemens Gamesa** a Spanish wind power company, partnered with HSBC to execute an ESG-linked IRS on a €250 million tranche of a floating-rate syndicated loan, originally arranged in December 2019, converting it into fixed-rate funding. The fixed rate under the swap remains constant, but any changes in Siemens Gamesa's ESG rating during the swap's term will trigger charitable donations. If Siemens Gamesa's ESG rating improves, HSBC will donate to non-profit projects annually, while a decline will prompt Siemens Gamesa to make donations. Unlike traditional ESG-linked derivatives, the swap's incentive structure is tied to charitable giving, rather than directly affecting the cost of the hedge[151].

In June 2020, **Olam International**, a Singapore-headquartered food and agribusiness company, worked with Deutsche Bank to execute a US dollar/Thai baht one-year FX forward linked to ESG key performance indicators. The transaction hedged Olam's FX risk from exporting agricultural products from Thailand. The sustainability-linked feature provided Olam with a discount for meeting pre-defined ESG targets, contributing to 10 of the 17 UN UNSDGs, including alleviating poverty (UNSDG 1), alleviating hunger (UNSDG 2), improving gender quality (UNSDG 5), improving clean water and sanitation (UNSDG 6), reducing inequalities (UNSGD 10), increasing responsible consumption and production (UNSDG 12), contributing to climate action (UNSDG 13), protecting life below water (UNSGD 14), protecting life on land (UNSGD 15) and increasing partnerships for the goals (UNSDG 17)[152].

[147] ISDA, 2021, *https://www.isda.org/a/qRpTE/Overview-ofESG-related-DerivativesProducts-and-Transactions.pdf*

[148] 2022, *Review-of-ESG-Derivatives-and-its-application-towards-the-sustainability-goals.pdf (researchgate.net)*

[149] George Mason University, 2023 *Climate Risk and Financial Markets: The Case of Green Derivatives by Paolo Saguato :: SSRN*

[150] Climate Adapt, 2024, *Weather derivatives as risk management tool (europa.eu)*

[151] *Siemens Gamesa in ESG-linked interest rate swap, Energy News, ET EnergyWorld (indiatimes.com)*

[152] *Deutsche Bank Executes Asia's First FX ESG Derivative - Markets Media*

In November 2020, **New World Development**, a real estate owner and developer, collaborated with DBS Hong Kong to complete an IRS linked to the UNSDGs. This derivatives transaction was structured to hedge against interest rate risk on New World Development's five-year HK$1 billion sustainability-linked loan from DBS, initiated in November 2019. If New World Development successfully creates at least eight business-to-business integration opportunities that contribute to the UNSDGs outlined in the New World Sustainability Vision 2030, it will qualify for sponsorship from DBS to fund social innovation projects. Among New World Development's social innovation initiatives is Impact Kommons, a UNSDG-focused start-up accelerator and business integration program, in which DBS serves as a social impact partner[153].

[153] New World Development, November 2020, *New World Development Joins Forces with DBS Hong Kong to Pioneer Hong Kong's First Interest Rate Swap Linked to the United Nations Sustainable Development Goals*

4. Conclusion

OTC derivatives play a critical role in enabling different types of entities – from multinational corporations, agricultural companies and governments to asset managers, pension funds and insurance companies – to transfer risk, enhance returns and optimize liquidity. This creates value for users by enhancing predictability, enabling them to lock in financing levels, reduce costs, protect against losses and dampen the impact of volatility on earnings. The stability and certainty achieved by using derivatives gives companies the confidence to borrow, invest and hire, which contributes to economic growth.

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Derivatives are not a new concept. While the instruments and underlying legal and regulatory systems have evolved over time, the basic techniques of risk management have existed since the dawn of civilization. They are used by entities across the globe because they serve an important economic and social need and contribute to market liquidity, competition, economic growth and prosperity.

Based on analysis of major stock indices in seven jurisdictions, **87.1% of 1,187 companies** actively use OTC derivatives for a variety of reasons, including:

- **Risk Transfer:** Corporations, governments and financial institutions use derivatives to hedge against fluctuations in interest rates, FX rates and equity and commodity prices, creating certainty and stability in their operations, reducing volatility and enhancing financial performance and company value.
    - Derivatives help governments, corporations and financial institutions to lock in financing costs, creating stability and mitigating the impact of sudden spikes in interest costs. This helps maintain profit margins, enables longer-term strategic planning and frees capacity for growth-oriented initiatives. Proactive risk management can also lead to higher equity valuations, better access to credit markets and potentially lower borrowing costs.
    - Derivatives can help limit unwanted swings in profitability. By locking in exchange rates, companies can reduce the risk of hits to earnings and protect core operations from currency movements. With currency risks held in check, entities can focus on operational growth rather than being derailed by FX fluctuations.
    - Derivatives help governments, corporations and producers manage commodity price volatility, ensuring greater stability and resilience against market fluctuations. Governments in commodity-dependent economies use hedging to manage price volatility, protect public spending and mitigate economic volatility. Companies hedge against price fluctuations in commodities to stabilize costs, manage budgets and protect profit margins.
    - Credit derivatives allow financial institutions to hedge the risk of potential losses from borrower defaults, maintaining financial stability and supporting the broader economic system by freeing up lending capacity to the real economy.
- **Liquidity Management:** Derivatives are used by a variety of entities to optimize cashflows, manage funding needs and maintain adequate liquidity levels. For example, companies can choose to take advantage of funding opportunities in overseas markets, using a cross-currency swap to mitigate interest rate and currency mismatches.

- Corporates and governments use derivatives to align cash and currency inflows and outflows, access a variety of currencies, secure funding across multiple currencies and safeguard their liquidity positions. By locking in favorable interest rates and managing currency exposures, firms using derivatives can secure lower borrowing costs, invest more aggressively and achieve better access to capital.

- **Investment:** Derivatives enable asset managers, pension funds, insurance companies, hedge funds and others to create and preserve wealth by optimizing, diversifying and enhancing exposures and protecting investment portfolios against asset price volatility.

  - Derivatives allow investors and asset managers to fine-tune risk exposures, hedge unwanted risks and enhance portfolio stability. By focusing on specific market factors – such as price movements, credit spreads or volatility – investors can construct customized portfolios aligned with their objectives, even in markets that may be hard to access directly.

Derivatives also help to address a variety of social and economic challenges. They are used by pension funds to protect the value of pensions for future retirees and avoid shortfalls, by insurance companies to ensure premiums paid by customers are sufficient to meet future insurance claims and by mortgage providers to manage risks and maintain lending capacity for would-be house owners. They can be used to support market development and infrastructure financing in EMDEs and to help mobilize the significant funding needed to meet climate goals. Together, this contributes to financial stability and economic growth.

- **Pensions:** Effective use of derivatives supports stable pension payouts, helping to ensure retirees receive reliable income streams. This stability supports public confidence, mitigates potential economic shocks from underfunded pensions and fosters healthier financial ecosystems.

- **Insurance Companies:** Derivatives play a key role in maintaining the financial stability of insurance companies, helping to ensure they can meet their obligations and protect the long-term financial security of policyholders by aligning asset portfolios with long-term liabilities and mitigating volatility.

- **Mortgages:** By reducing the exposure of lenders and investors to interest rate volatility, derivatives encourage the offering of long-term, fixed-rate mortgage products. This stability makes housing finance more accessible by potentially lowering the risk premiums that lenders would otherwise charge. By controlling risk exposures, derivatives underpin stable, efficient mortgage markets that foster homeownership and economic development.

- **EMDEs:** In EMDEs with volatile currencies, OTC derivatives help manage foreign currency debt exposure, reducing unpredictable servicing costs. By effectively converting foreign-currency-denominated loans into local currency, they enhance debt sustainability and support prudent fiscal strategies.

  - Without interest rate derivatives, EMDE banks must tightly match assets and liabilities, limiting their lending capacity. Access to derivatives allows flexible risk management, supporting long-term financing, cost-effective credit provision and stronger economic growth.

The participants in the derivatives ecosystem – banks, pension funds, insurers, non-financial companies and others – complement each other, balancing risks efficiently. Analysis of Bank of England data[154] of the interest rate derivatives market from 2019 to 2022 showed effective risk sharing: pension funds and insurers receive fixed rates to manage long-term liabilities, while banks and firms exposed to rising rates pay fixed rates. This reduces dealer reliance, enhances stability and lowers hedging costs. Increase in one sector's hedging demand may reduce hedging costs for the other due to opposing needs. For instance, banks' increased hedging could raise long-maturity swap spreads by 60bp, saving pension funds and insurers approximately $2 billion annually. Similarly, an increase in demand from pension funds and insurers lowers costs for banks by around 75bp, saving them $5.9 billion annually.

The Path Ahead

The OTC derivatives market is global, enabling users to access a wide universe of counterparties, which enhances competition, market liquidity and depth. Maintaining deep, liquid markets is critical to enable users to effectively and cost-efficiently use derivatives for risk transfer, liquidity management, capital allocation and investment.

- **An Appropriate Regulatory Framework:** An appropriately calibrated, risk-sensitive regulatory framework is critical to maintaining deep, liquid markets with a vibrant ecosystem that includes dealers and end users. A vast universe of companies all over the world use derivatives for a variety of reasons because they find them useful and derive value from them. It's critical these entities can continue to access derivatives markets seamlessly and with as little friction as possible. Market and prudential regulatory frameworks should therefore achieve a balance between ensuring resilience and maintaining deep, liquid markets.

- **Regulatory Divergence:** Differences in regulatory frameworks across jurisdictions create unnecessary complexities, inefficiencies and costs. Aligning global regulatory standards is critical to prevent market fragmentation and ensure a level playing field.

- **Accessibility and Liquidity:** Entities in some EMDEs face limited access to derivatives due to shallow local capital markets, high hedging costs and regulatory constraints. Expanding the availability of derivatives in these regions could enhance financial stability and economic growth.

- **Market Innovation:** Expanding ESG-linked derivatives and other risk management tools can help address evolving financial and sustainability challenges.

The OTC derivatives market is a cornerstone of the global financial system, enabling risk management, liquidity optimization and economic growth. Its evolution – shaped by academic research and quantitative mathematical techniques, regulatory reforms and technological advancements – has made it an indispensable tool for addressing the complexities of modern finance. By navigating challenges and seizing emerging opportunities, the derivatives market will continue to play a pivotal role in fostering financial stability, supporting sustainable development and driving global economic progress.

[154] Umang Khetan, Jian Li, Ioana Neamțu, Ishita Sen, 2024, *The Market for Sharing Interest Rate Risk: Quantities and Asset Prices by Umang Khetan, Jian Li, Ioana Neamțu, Ishita Sen :: SSRN*

Appendices

1. The Regulatory Environment for OTC Derivatives

The regulatory landscape of the OTC derivatives market changed dramatically after the 2008 financial crisis. Before the crisis, regulations focused mainly on capital adequacy, with Basel I (1988) targeting credit risk and Basel II (2004) expanding to operational and market risks.

The financial crisis exposed some weaknesses in how derivatives are traded and managed. A lack of reporting meant there was uncertainty over who had what exposures, which undermined confidence and the willingness to extend credit. The bilateral nature of the market meant there was a network of interlinking trading relationships, with the big dealers at the center, which led to fears of contagion. While some of those bilateral trades were collateralized, many were not. Even in cases where they were collateralized, there were questions about the frequency of collateral calls and the ability to quickly access that collateral in the event of a default. In addition, banks were found to have insufficient capital or liquidity to withstand a severe market shock.

In response, the Group-of-20 nations (G-20) agreed a series of reforms aimed at mitigating systemic risk, enhancing market transparency and ensuring financial stability. This included mandatory central clearing of standardized derivatives, margin requirements for non-cleared derivatives, higher capital requirements, reporting of all derivatives to trade repositories and the trading of standardized derivatives on exchanges or electronic trading platforms where appropriate. The reforms have been broadly implemented across the globe, albeit at a different pace (see Figure 73).

Figure 73: Status of OTC Derivatives Reforms across 24 FSB Jurisdictions (September 2023)

	Trade Reporting	Central Clearing	Platform Trading	Margin
Argentina				
Australia				
Brazil				
Canada				
China	R, F			
France				
Germany				
Hong Kong				
India				
Indonesia				
Italy				
Japan				
Korea				
Mexico				
Netherlands				
Russia				
Saudi Arabia	R			
Singapore				
South Africa				
Spain				
Switzerland				
Türkiye				
UK				
US				

Source: Financial Stability Board (FSB)

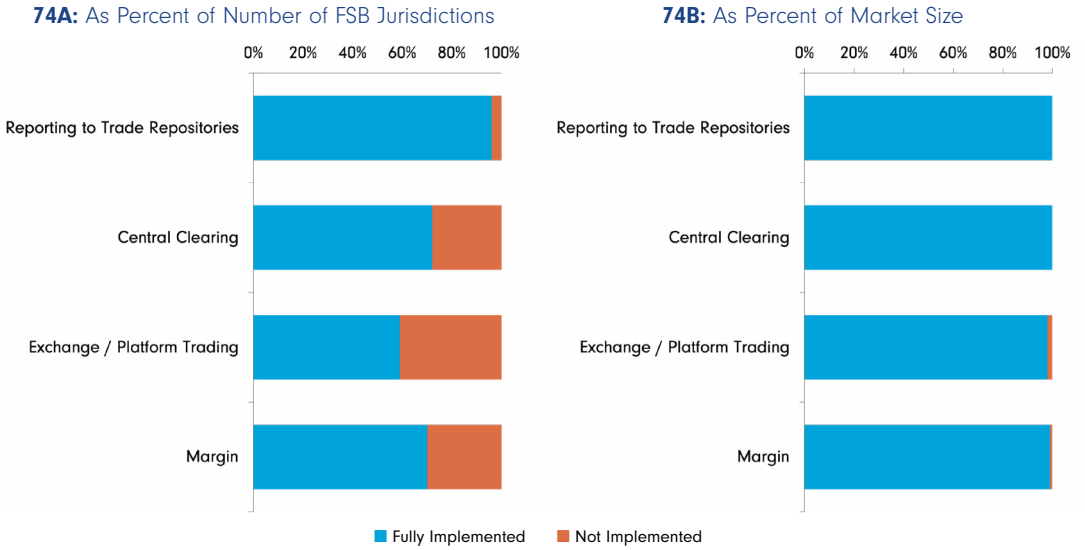
Legislative framework in force and standards/criteria/requirements (as applicable) in force for over 90% of relevant transactions

Regulatory framework being implemented

R/F — Further action required to remove barriers to full trade reporting (R) or to access trade repository data by a foreign authority (F). For example, Mexico issued a regulation in 2020 to allow the direct sharing of Mexican trade repository data with foreign trade repositories

Overall implementation of the OTC derivatives reforms is well-advanced across Financial Stability Board (FSB) jurisdictions (see Figure 74A) and as a percentage of market size[155] (see Figure 74B)[156].

Figure 74: Implementation is Most Advanced in the Largest OTC Derivatives Markets



Source: FSB

Together, the post-crisis regulatory framework has made the banking system more resilient and helped to mitigate counterparty credit risk – an issue that was at the center of the 2008 financial crisis. According to analysis based on 16 jurisdictions by the BIS, the regulatory changes are expected to have positive net economic effect (when fully implemented), estimated to be around +0.12% of GDP per annum[157].

While the reforms were agreed at the global level through the G-20, divergences have emerged in how individual regulators have implemented specific rules. For example, the EU and the US have different reporting formats and data fields, leading to divergences in the derivatives trade data reported to regulators. In addition, the scope of derivatives subject to mandatory clearing varies: the US has broader exemptions for commercial end users, while the EU requires more products to be cleared through CCPs.

Given the global nature of derivatives markets, inconsistency in regulatory frameworks can lead to fragmentation that can split liquidity pools, increase operational complexity and reduce the efficiency of risk management practices. Firms operating internationally also face higher costs due to the need to comply with multiple regulatory regimes. This is partially addressed through equivalence, which involves one jurisdiction recognizing another's regulatory framework as achieving similar outcomes, allowing market participants to operate across borders without having to comply with duplicative and potentially inconsistent regulations. For example, the US CFTC and the European Securities and Markets Authority have mutually recognized their respective CCPs and signed an enhanced memorandum of understanding in 2021 to facilitate supervisory cooperation[158].

The following sections (Appendix 1.1 to 1.5) provide an overview of the objectives behind these regulatory changes and their subsequent impact on the OTC derivatives market.

[155] As per the FSB, market size was determined by single currency interest rate derivatives gross turnover in April 2022, as per the BIS 2022 Triennial Survey

[156] FSB, 2023, *Promoting Global Financial Stability: 2023 FSB Annual Report*

[157] BIS, 2013, *Macroeconomic impact assessment of OTC derivatives regulatory reforms (bis.org).*

[158] European Securities and Markets Authority (ESMA), 2021, *CFTC and ESMA Sign Enhanced MOU Related to Certain Recognized Central Counterparties.*

1.1. MANDATORY CENTRAL CLEARING: REDUCING COUNTERPARTY RISK

Objective

Mandatory central clearing was implemented to reduce the risk of a party in a financial transaction failing to meet its obligations. This requirement applies to certain standardized OTC derivatives, such as IRS and index CDS, which must be cleared through CCPs. They act as middlemen, taking on the counterparty risk by using pooled insurance funds and managing collateral requirements.

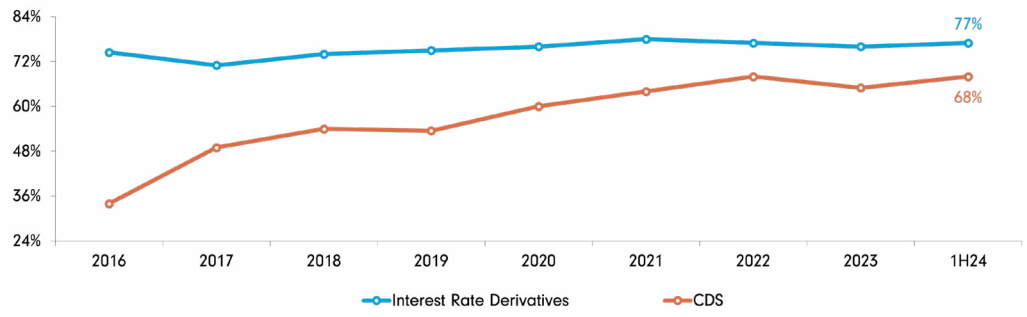
If a clearing member or a client defaults, the CCP has three layers of protection to cover the resulting losses – IM and VM[159] posted by the defaulting counterparty, default fund contributions made by clearing members, and the CCP's own financial resources (capital), which ensures greater financial stability and reduces the likelihood of widespread financial disruptions[160].

Central clearing has significantly improved market resilience, and 18 out of 24 FSB member jurisdictions had implemented clearing regulations by September 2023[161].

Scale

Around 77% of interest rate derivatives and 68% of CDS global outstanding notional were cleared through CCPs in the first half of 2024, according to the BIS (see Figure 75)[162].

Figure 75: Central Clearing of Derivatives (%) Based on Global Outstanding Notional



Source: BIS OTC derivatives statistics

Based on US data reported under CFTC rules, 72.3% of interest rate derivatives traded notional and 75.8% of trade count were cleared during the first nine months of 2024 (see Figure 76).

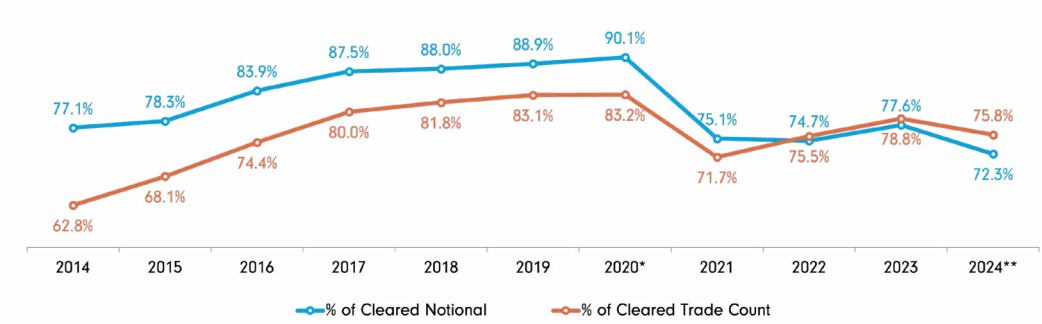
[159] Margin includes initial margin, a fixed, predetermined amount of cash or non-cash collateral posted to the central counterparty (CCP) by each party in a transaction, and variation margin, which comprises payments arising as a result of changes in the value of positions

[160] BIS, 2015, *Central clearing: trends and current issues (bis.org)*

[161] FSB, 2023, *Promoting Global Financial Stability: 2023 FSB Annual Report*

[162] BIS, 2024, *OTC derivatives statistics at end-June 2024*

Figure 76: US Interest Rate Derivatives Cleared Notional and Trade Count (%)



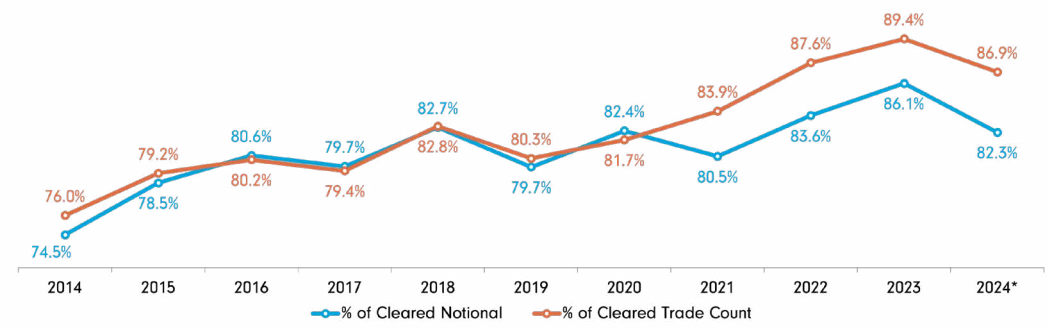
Source: ISDA analysis based on data from the Depository Trust and Clearing Corporation (DTCC) and Bloomberg swap data repositories (SDRs)

*The DTCC SDR completed a planned system upgrade on November 21, 2020, which changed the reporting logic for the status of cleared trades. Following the upgrade, the percentage of interest rate derivatives cleared trades appears to be lower compared to historical averages, as firms switched to the new reporting logic

**2024 covers the period from January 1, 2024, to September 30, 2024

In addition, 82.3% of index CDS traded notional and 86.9% of trade count were cleared in the first nine months of 2024 (see Figure 77)[163].

Figure 77: US Index Credit Derivatives Cleared Notional and Trade Count (%)



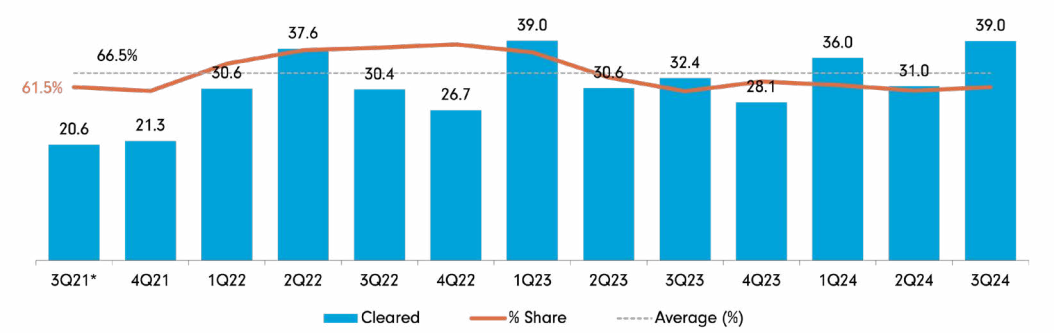
Source: ISDA analysis based on data from the DTCC and Bloomberg SDRs

* 2024 covers the period from January 1, 2024, to September 30, 2024

In Europe, including the UK, data from 30 European approved publication arrangements (APAs) and trading venues (TVs), as reported under local regulatory rules, shows that clearing levels for interest rate derivatives remained steady, averaging 66.5% of total interest rate derivatives traded notional between the third quarter of 2021 and the third quarter of 2024 (see Figure 78).

[163] ISDA, 2024, *SwapsInfo-Third-Quarter-of-2024-and-Year-to-September-30-2024-Review.pdf*

Figure 78: EU/UK Interest Rate Derivatives Cleared Notional ($ trillions) and Percentage Share of Cleared Notional



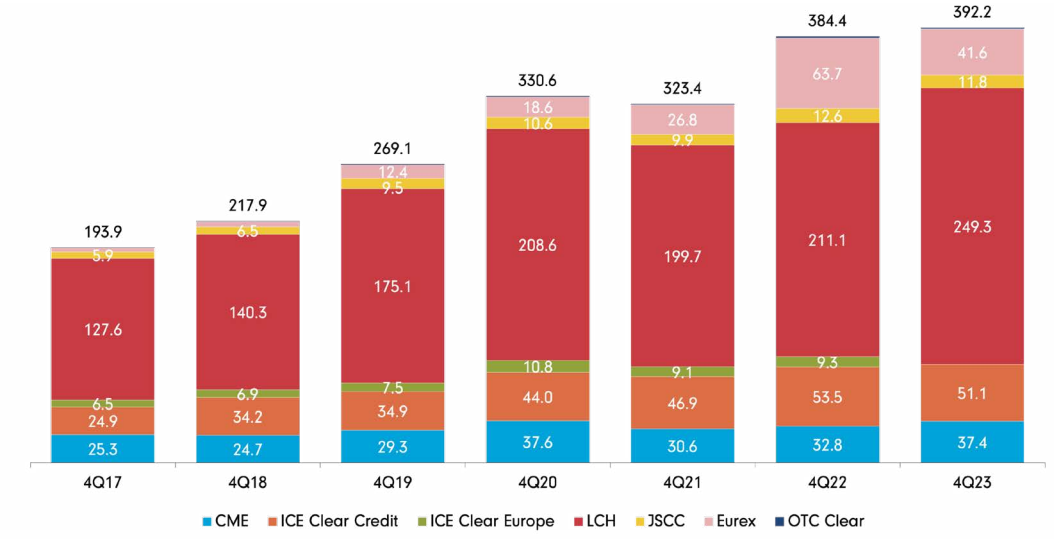
Source: ISDA analysis based on data from European APAs and TVs

* Data is available starting from May 2021

Margin for Cleared Trades

The high levels of clearing has meant the IM posted to major clearing houses by all market participants for their cleared interest rate derivatives and CDS exposures has more than doubled since 2017, reaching $392.2 billion by the end of 2023, compared to $193.9 billion at the end of 2017 (see Figure 79)[164].

Figure 79: IM for Cleared Interest Rate Derivatives and CDS ($ billions)



Source: ISDA Margin Survey

Although the new ecosystem has greatly reduced counterparty risk, some market participants, academics and regulators have argued that the system is more susceptible to liquidity risks during periods of stress. That's because firms could be caught by surprise by sudden increases in margin requirements during periods of high volatility, potentially causing them to sell assets to raise cash. Policymakers led by the FSB are looking at margin practices as a result[165,166].

[164] ISDA, 2024, ISDA Margin Survey Year-end 2023, *ISDA-Margin-Survey-Year-End-2023.pdf*

[165] BIS, 2018, *Clearing risks in OTC derivatives markets: the CCP-bank nexus (bis.org)*

[166] FSB, 2024, Liquidity Preparedness for Margin and Collateral Calls, *WGMP202326REV3*

1.2. MARGIN REQUIREMENTS: NON-CLEARED DERIVATIVES

Objectives

Margin requirements for non-cleared derivatives are in force in 17 out of 24 FSB jurisdictions[167]. The posting of IM[168] and VM[169] protects market participants from counterparty default risk by ensuring that collateral is available to cover current and potential future exposures.

Scale

The 2023 ISDA margin survey[170] reports that 32 key participants in the derivatives market collected $1.4 trillion in IM and VM for non-cleared derivatives at the end of 2023, reflecting a 38% rise from $1.02 trillion in 2018.

- IM: $368.5 billion of the collected IM was mandatory under global margin rules. Additionally, $93.5 billion of IM was collected as independent amount (IA[171]) from counterparties and/or transactions outside the scope of the regulations (see Figure 80).

Figure 80: Regulatory IM and IA ($ billions)

Source: ISDA Margin Survey

- VM: Of the VM collected, $660.7 billion was held to comply with global regulatory requirements and $283.8 billion of VM was discretionary, covering transactions and/or counterparties outside the scope of the margin rules, including legacy trades (see Figure 81).

[167] FSB, 2023, *Promoting Global Financial Stability: 2023 FSB Annual Report*

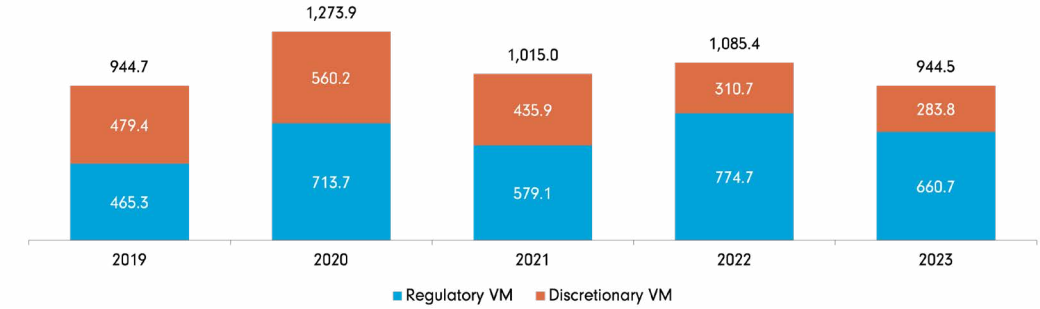
[168] Initial margin (IM) includes regulatory IM collected/posted by in-scope counterparties for non-cleared derivatives subject to regulatory IM agreements. It also covers independent amount (IA), which covers transactions and/or counterparties not currently in scope of the margin rules, including legacy transactions

[169] Variation margin (VM) refers to amount of regulatory VM required under the margin regulations, and may also refer to any other VM as discretionary

[170] ISDA, 2023, *ISDA-Margin-Survey-Year-End-2023.pdf.*

[171] Independent Amount (IA) is the amount of margin collected/posted by counterparties for legacy transactions executed prior to the implementation of margin rules, for transactions or counterparties that are not subject to margin rules for non-cleared derivatives and/or in addition to regulatory IM

Figure 81: Regulatory and Discretionary VM ($ billions)

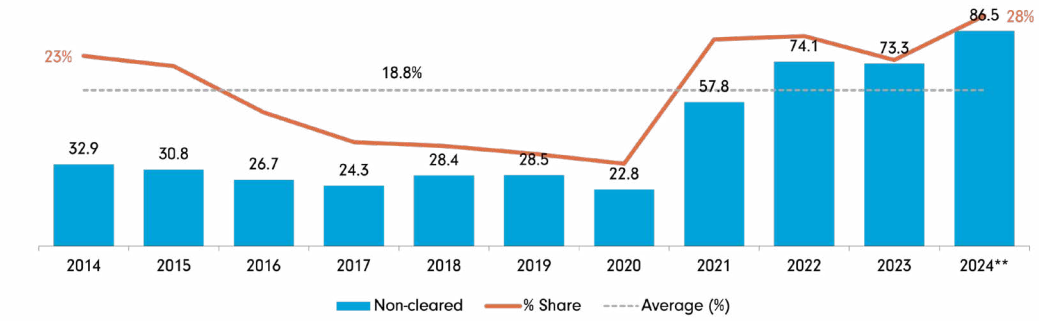


Source: ISDA Margin Survey

While a significant portion of the OTC derivatives market has shifted toward central clearing, certain segments will remain non-cleared due to specific factors such as liquidity constraints, unique economic terms and exemptions for participants like non-financial firms, sovereign entities and central banks. Financial products like interest rate swaptions and cross-currency swaps are examples of instruments likely to stay non-cleared because they do not meet CCP eligibility requirements.

Based on US data reported under CFTC rules, the non-cleared interest rate derivatives market totaled $73.3 trillion in traded notional in 2023 ($86.5 trillion in first nine months of 2024), up from $32.9 trillion in 2014. This reflects growth in the interest rate derivatives market as a whole and non-cleared trades have maintained a steady share of 23%-28% of the total interest rate derivatives market (see Figure 82).

Figure 82: US Interest Rate Derivatives Non-cleared Notional ($ trillions) and Percentage Share of Non-cleared Notional



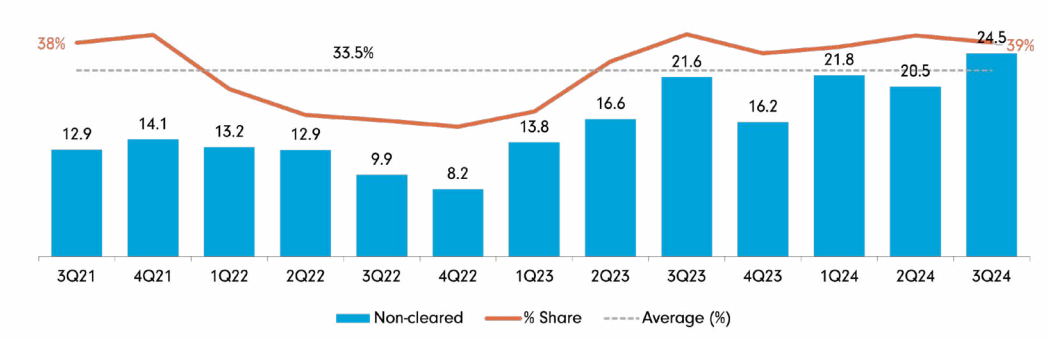
Source: ISDA analysis based on data from the DTCC and Bloomberg SDRs

*The DTCC SDR completed a planned system upgrade on November 21, 2020, which changed the reporting logic for the status of cleared trades. Following the upgrade, the percentage of interest rate derivatives cleared trades appears to be lower compared to historical averages, as firms switched to the new reporting logic

**2024 covers the period from January 1, 2024, to September 30, 2024

Similarly, data from 30 European APAs and TVs indicate that non-cleared interest rate derivatives comprised on average 33.5% of total interest rate derivatives traded notional reported under EU and UK rules between July 1, 2021, and September 30, 2024 (see Figure 83).

Figure 83: EU/UK Interest Rate Derivatives Non-cleared Notional ($ trillions) and Percentage Share of Non-cleared Notional



Source: ISDA analysis based on data from European APAs and TVs

Enduring Role of Non-cleared Derivatives

The non-cleared segment remains vital for managing bespoke risks that clearable instruments cannot adequately hedge. An ISDA report[172] indicated that "non-cleared derivatives enable industrial companies and governments to effectively finance and manage risk in their operations and activities and help pension funds meet their obligations to retirees".

The US Dodd-Frank Act recognizes the essential role of customized, less liquid instruments that enable counterparties to hedge specific risks. It acknowledges the necessity of non-cleared derivatives and mandates regulators to set appropriate capital and margin requirements for them.

In a 2010 speech to the American Bar Association's Committee on Derivatives and Futures Law, Gary Gensler, then chairman of the CFTC, highlighted their importance, stating that "so that corporations can effectively hedge their risk, tailored, or customized, products should be permitted to trade bilaterally, with the dealers being regulated for these transactions"[173].

Non-cleared instruments are not necessarily more complex than their cleared counterparts, nor do they inherently pose greater risks. Often, these contracts have non-standard terms because they are tailored to a client's specific needs. In other cases, a lack of liquidity and the relatively small number of dealers active in trading a particular product result in too few firms participating in a clearing house's default management process, making CCPs hesitant to accept certain instruments.

Nonetheless, these non-cleared derivatives are vital components in the risk management strategies of corporations, insurance companies, pension funds, sovereign entities, smaller financial institutions and others. Without access to them, these entities may experience increased earnings volatility due to an inability to qualify for hedge accounting or may be unable to offset interest rate, inflation and longevity risks associated with long-term pension or insurance liabilities.

[172] ISDA, 2013, *Non-Cleared OTC Derivatives: Their Importance to the Global Economy (isda.org)*

[173] CFTC, 2010, *Remarks of Chairman Gary Gensler, OTC Derivatives Reform*

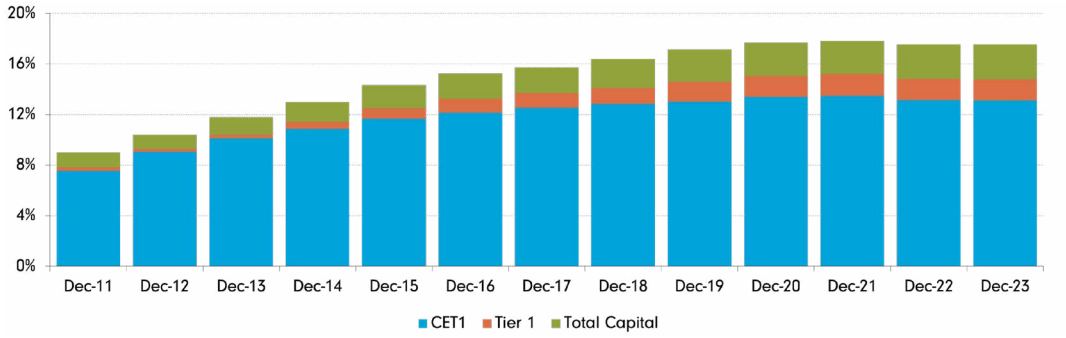
1.3. CAPITAL IMPACT

Capital requirements have undergone significant reforms since the financial crisis, with CET1[174] ratios nearly doubling for Group 1[175] banks – from 7.6% in 2011 to 13.1% in 2023. Overall capital has also increased from 9.0% to 17.5% (see Figure 84)[176].

In value terms, this translates to an increase in total bank capital from €2.1 trillion in 2011 to €5.3 trillion in 2023 (see Figure 85)[177], significantly enhancing bank resilience and systemic stability.

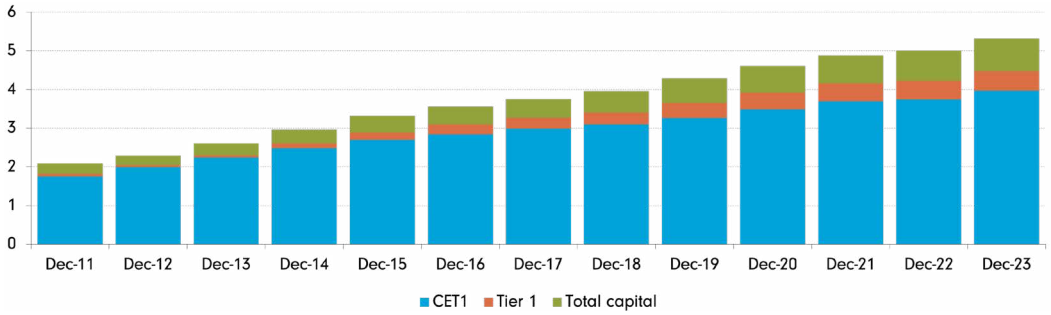
This is primarily driven by reforms to bank capital requirements, which have led to capital growth outpacing the rise in risk-weighted assets.

Figure 84: CET1, Tier 1[178] and Total Capital Ratios (%)



Source: BIS

Figure 85: Level of Capital (€ trillion)



Source: BIS

[174] The CET1 ratio is calculated by dividing CET1 capital (the numerator) – which includes a bank's core equity components like common shares, retained earnings and other reserves – by risk-weighted assets (the denominator), which are adjusted based on the risk level each asset poses. A higher ratio reflects stronger capital adequacy

[175] Group 1 banks are those with Tier 1 capital of more than €3 billion and are internationally active

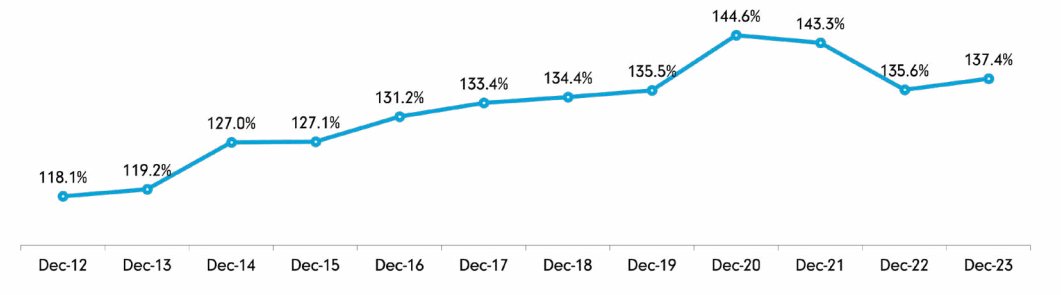
[176] BIS, 2024, *Basel III monitoring report*

[177] BIS, 2024, *Basel III monitoring report*

[178] Tier 1 capital is a measure of a bank's core capital, combining CET1 capital with additional Tier 1 (AT1) capital, such as certain preferred shares and convertible instruments. It assesses a bank's ability to absorb losses, with higher Tier 1 ratios indicating greater financial resilience

In addition, the LCR[179] for Group 1 banks has increased from 118.1% in 2012 to 137.4% in 2023 (see Figure 86)[180].

Figure 86: LCR Ratio (%)



Source: BIS

Next Steps

Regulators are moving forward with the final stages of Basel III implementation, including the Fundamental Review of the Trading Book. The BIS estimates that, under the fully phased-in final Basel III standards, Group 1 banks' CET1 capital ratios would rise by 40bp, from 13.1% to 13.5%. For global systemically important banks, the increase is estimated to be 60bp, from 13.0% to 13.6% (see Figure 87)[181].

Figure 87: CET1 Capital Ratios (%)

	Current Basel III Standards		Final Basel III Standards		
	Number of Banks	Current	Number of Banks	Transitional	Fully Phased-in
Group 1 Banks	**117**	**13.1**	**108**	**13.9**	**13.5**
Europe	41	14.9	41	13.9	13.1
Americas	23	12.7	19	13.2	13.2
Rest of World	53	12.6	48	14.2	13.8
G-SIBs	29	13.0	27	14.0	13.6
Group 2 Banks	**62**	**18.2**	**57**	**17.1**	**16.6**

Source: BIS

[179] The liquidity coverage ratio is a regulatory standard established by the Basel III framework, requiring banks to maintain a sufficient level of high-quality liquid assets (HQLA) to cover their total net cash outflows over a 30-day stress period. It is calculated by dividing a bank's stock of HQLA by its projected net cash outflows during the next 30 calendar days, with a minimum required ratio of 100%

[180] BIS, 2024, *Basel III monitoring report*

[181] BIS, 2024, *Basel III monitoring report*

1.4. COMPREHENSIVE REPORTING: IMPROVING MARKET TRANSPARENCY

Objectives

The comprehensive reporting of OTC derivatives transactions was introduced to enhance market transparency by providing regulators with data on market activity, counterparty exposures and systemic risk. Reporting to trade repositories is intended to allow regulators to monitor the market more effectively and aims to prevent unchecked systemic risks. Reporting requirements have been implemented in all but one FSB member jurisdiction[182].

Scale

Mandatory reporting has improved regulators' ability to oversee market activities, providing critical data like counterparty identities, notional volumes and mark-to-market values via trade repositories. However, maximizing the effectiveness of this reporting framework remains challenging, as differences in how regulatory reporting rules have been implemented across jurisdictions have resulted in inconsistencies in reported data.

Regulators are revising their rules to incorporate globally agreed data standards to improve the cross-border consistency of what is reported and the format in which it is submitted. Industry initiatives, such as ISDA's Digital Regulatory Reporting solution[183], are also underway to improve the accuracy of reporting. However, targeted investments in data curation and advanced analytics by regulators are also required to extract actionable insights[184].

Despite room for improvement, increased availability of regulatory data has helped general market oversight and enhanced the analytical capabilities of supervisory organizations, particularly in analyzing interest rate and inflation-linked derivatives markets. This data allows the ECB, for example, to gauge investor expectations for interest rates and inflation, potentially informing more effective monetary policy decisions[185].

[182] FSB, 2023, *Promoting Global Financial Stability: 2023 FSB Annual Report*

[183] ISDA, *ISDA Digital Regulatory Reporting – International Swaps and Derivatives Association*

[184] ISDA, 2023, *Hidden-in-Plain-Sight-Derivatives-Exposures-Regulatory-Transparency-and-Trade-Repositories.pdf*

[185] ECB, 2019, *Derivatives transactions data and their use in central bank analysis (europa.eu)*

1.5. SHIFT TO STANDARDIZED TRADING PLATFORMS: IMPROVING TRANSPARENCY AND LIQUIDITY

Objectives

The shift to standardized trading platforms is aimed at improving price transparency by ensuring that standardized derivatives are traded on regulated markets or designated electronic platforms where appropriate.

In the US, for example, swap execution facilities (SEFs) provide transparent platforms for OTC derivatives trading. In Europe, multilateral trading facilities (MTFs) and organized trading facilities (OTFs) serve the same function.

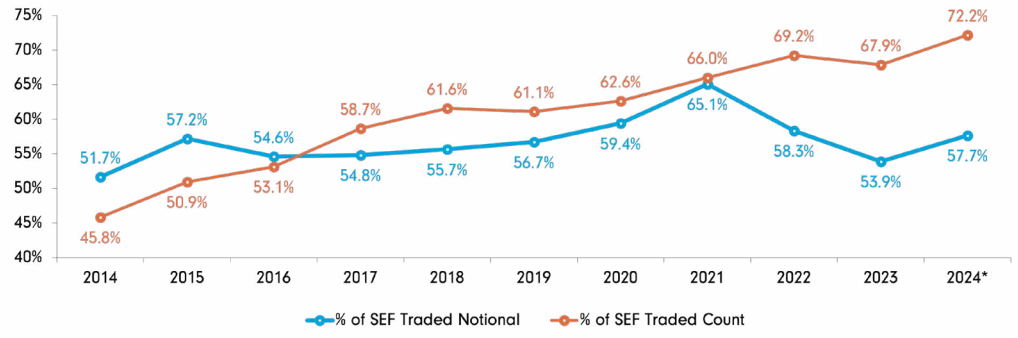
Relevant rules have been implemented in 14 out of 24 FSB member jurisdictions by September 2023[186], including Australia, France, Germany, Hong Kong, Japan, Singapore, the UK and the US.

Scale

Usage of electronic platforms has enhanced price discovery and transparency and increased liquidity, according to a review of electronic trading in fixed markets by the BIS[187].

In the US, SEF usage for interest rate derivatives increased from 51.7% of traded notional in 2014 to 57.7% in the first nine months of 2024, according to trade data reported to swap data repositories (SDRs) under CFTC regulations. Trade count rose from 45.8% to 72.2% over the same period, reflecting greater adoption and trading activity on SEFs (see Figure 88)[188].

Figure 88: Share of US Interest Rate Derivatives SEF Traded Notional and Trade Count (%)



Source: ISDA analysis based on DTCC and Bloomberg SDRs data

*2024 covers the period from January 1, 2024, to September 30, 2024

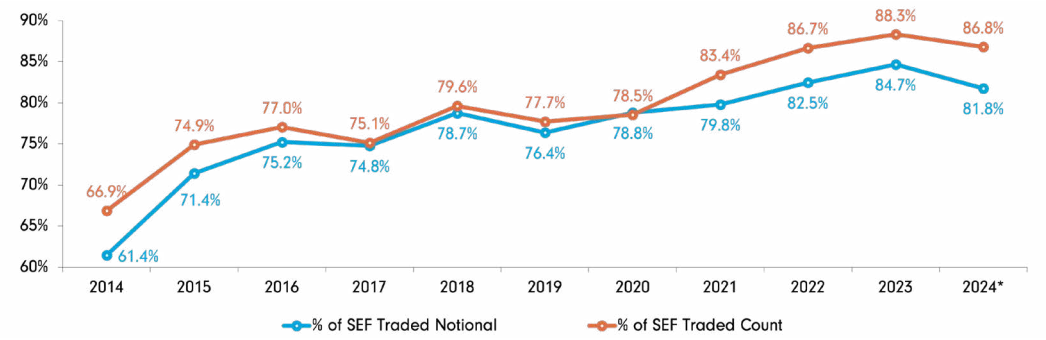
The proportion of index credit derivatives traded on SEFs has also grown. Based on US data reported to SDRs under CFTC regulations, SEF-executed trades increased from 61.4% of total traded notional in 2014 to 81.8% in the first nine months of 2024. Similarly, the proportion of SEF-executed trades has risen from 66.9% to 86.8% over the same period (see Figure 89).

[186] FSB, 2023, *Promoting Global Financial Stability: 2023 FSB Annual Report*

[187] BIS, 2016, Electronic trading in fixed income markets, *https://www.bis.org/publ/mktc07.pdf*

[188] ISDA, 2024, *SwapsInfo-Third-Quarter-of-2024-and-Year-to-September-30-2024-Review.pdf*

Figure 89: Share of US Credit Derivatives SEF Traded Notional and Trade Count (%)

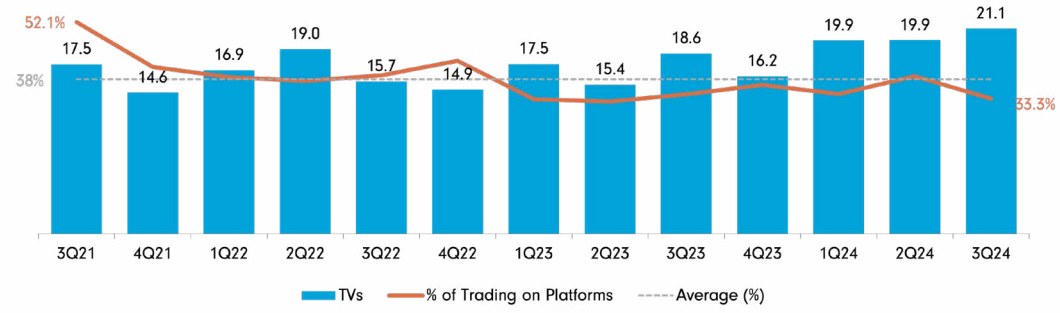


Source: ISDA analysis based on DTCC and Bloomberg SDRs data

*2024 covers the period from January 1, 2024, to September 30, 2024

In Europe, 38% of interest rate derivatives traded notional, totaling about $17.4 trillion, was executed on regulated EU and UK platforms on average between the third quarter of 2021 and third quarter of 2024, based on data from 30 APAs and TVs (see Figure 90)[189].

Figure 90: EU/UK Interest Rate Derivatives Traded Notional on TVs ($ trillions) and Percentage Share of Traded Notional on TVs



Source: ISDA analysis based on data from European APAs and TVs

[189] ISDA, 2022, Demystifying-Derivatives-Trading-in-the-EU *https://www.isda.org/a/zAWgE/Demystifying-Derivatives-Trading-in-the-EU.pdf*

1.6. CONCLUSION

The regulatory reforms of mandatory central clearing, stricter margin requirements, comprehensive reporting, increased capital requirements and the shift to standardized trading platforms have fundamentally transformed the OTC derivatives market. These regulations have significantly reduced counterparty credit risk, enhanced transparency and strengthened the resilience of financial institutions and markets.

2. Market Size and Structure

2.1. SIZE OF DERIVATIVES ACTIVITIES

2.1.1. Evolving Landscape of OTC Derivatives Markets

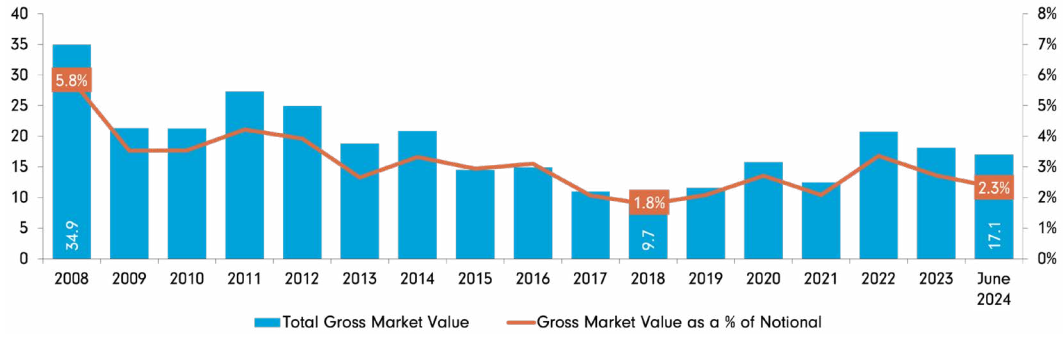
Over the past two decades, the OTC derivatives market has been transformed significantly by periods of rapid growth in the early 2000s and by regulatory-driven changes after the 2008 financial crisis (see Appendix 1).

Risk Exposure of the Market

Discussions about the OTC derivatives market often highlight its large outstanding notional value – $729.8 trillion, with interest rate derivatives accounting for $578.8 trillion as of June 30, 2024. These figures represent the total 'face value' of all outstanding trades, both long and short, and don't reflect actual risk exposure.

Market size and risk are better captured by gross market value[190], which is the cost of replacing all open contracts at current prices. Since 2008, this has ranged from a peak of $34.9 trillion (5.8% of notional) just before the financial crisis to $9.7 trillion in 2018 and was at $17.1 trillion (2.3% of notional) as of June 30, 2024 (see Figure 91). Regulatory changes post-crisis, rising interest rates and market compression – where offsetting trades are essentially torn up and replaced with a smaller number of positions with the same net risk – have all affected the size of the market. Interest rate and FX derivatives remain the largest segments, contributing an average of 91.7% of gross market value between 2013 and June 30, 2024.

Figure 91: Gross Market Value ($ trillions) and as % of Notional Outstanding



Source: BIS OTC derivatives statistics

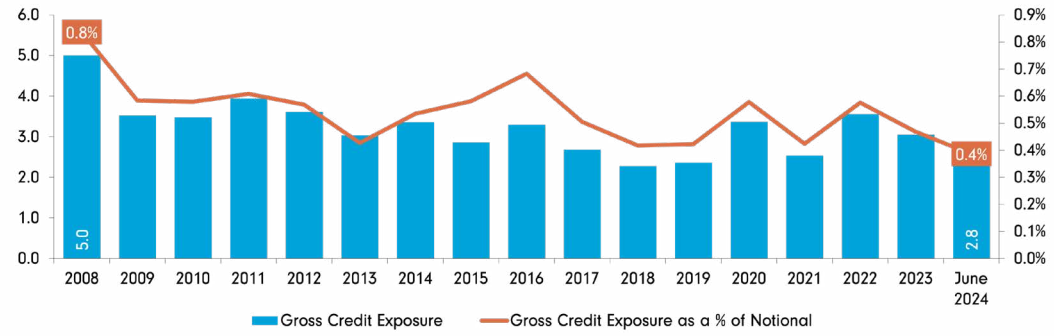
Gross credit exposure[191], which factors in netting but not collateral, has also fallen from $5 trillion in 2008 to $2.8 trillion as of June 30, 2024, and has halved as a percentage of notional from 0.8% in 2008 to 0.4% in mid-2024 (see Figure 92)[192]. This reduction in exposure underscores the critical role of netting, which reduces credit risk by allowing counterparties to offset their various obligations into a single net amount owed by one party to the other. Without close-out netting, firms would need to manage their credit risk on a gross basis, which would result in less credit capacity and reduced liquidity.

[190] Gross market value is the sum of the absolute values of all outstanding derivatives contracts with either positive or negative replacement values evaluated at market prices prevailing on the reporting date

[191] Gross credit exposure is the gross market value minus amounts netted with the same counterparty across all risk categories under legally enforceable netting agreements, and measures counterparty credit risk (before collateral)

[192] BIS, *OTC derivatives statistics - overview | BIS Data Portal*

Figure 92: Gross Credit Exposure ($ trillions) and as % of Notional Outstanding



Source: BIS OTC derivatives statistics

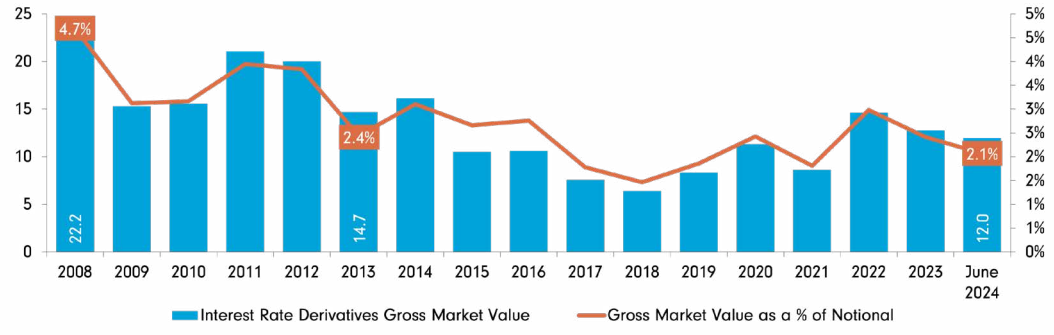
Taking the collateral that parties have posted to each other into account reduces that exposure even further. Regulatory requirements are now in place requiring the posting of collateral on derivatives trades (see Appendix 1.2).

How the Various Asset Classes Have Evolved

Interest Rate Derivatives

Interest rate derivatives are the largest segment of the OTC derivatives market, comprising products like IRS, forward rate agreements, options and other related instruments. The market size for these derivatives can be represented by the gross market value of all outstanding contracts, which shows the total value of these contracts based on current market prices. Since 2013, gross market value has declined from $14.7 trillion (2.4% of notional) to $12 trillion (2.1% of notional) by June 30, 2024 (see Figure 93). Rising interest rates and a shift toward central clearing have contributed to this decline.

Figure 93: Interest Rate Derivatives Gross Market Value ($ trillions) and as % of Notional Outstanding



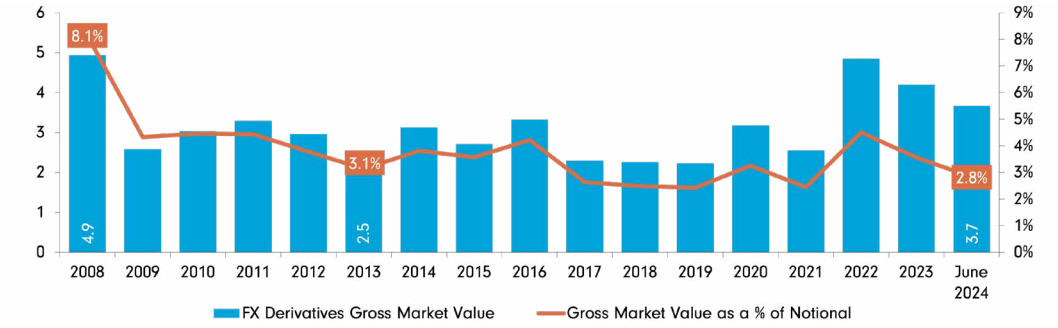
Source: BIS OTC derivatives statistics

FX Derivatives

FX derivatives represent the second-largest segment of the derivatives market and comprise swaps, forwards and options. As of June 30, 2024, the gross market value for FX derivatives stood at $3.7 trillion (see Figure 94).

This has grown from $2.5 trillion in 2013 due to several factors, including an expansion in global trade, which increases demand for currency hedging. Additionally, higher volatility in exchange rates due to economic and geopolitical shifts has fueled the need for FX derivatives as companies and investors seek to manage currency risks. Advances in technology and electronic trading platforms have also made it easier and more efficient for participants to trade FX derivatives across borders.

Figure 94: FX Derivatives Gross Market Value ($ trillions) and as % of Notional Outstanding

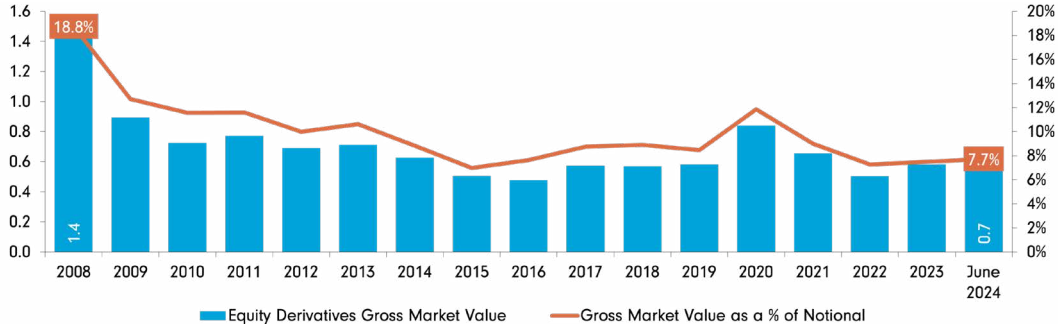


Source: BIS OTC derivatives statistics

Equity Derivatives

The OTC equity derivatives market has remained relatively stable, with a gross market value of $0.67 trillion as of June 30, 2024, in line with the average from 2013 of approximately $0.61 trillion (see Figure 95).

Figure 95: Equity Derivatives Gross Market Value ($ trillions) and as % of Notional Outstanding



Source: BIS OTC derivatives statistics

This market primarily includes equity swaps, options and forwards, which allow investors to hedge or gain exposure to equity assets without holding the underlying stocks directly. The demand for OTC equity derivatives has been steady, as they provide flexible, tailored solutions for managing equity risk and structuring customized investment strategies. Despite fluctuations in global equity markets, OTC derivatives remain valuable for institutional investors seeking specific equity exposures or customized hedging options beyond what's available on traditional exchanges. The US has become the dominant region for OTC equity derivatives, overtaking European countries[193].

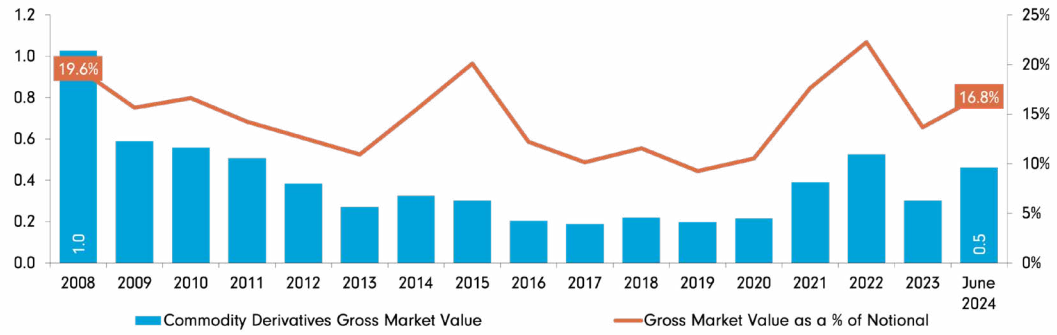
[193] ISDA, 2024, *https://www.isda.org/a/1lhgE/Overview-of-OTC-Equity-Derivatives-Markets-Use-Cases-and-Recent-Developments.pdf.*

Commodity Derivatives

The commodity OTC derivatives market plays a vital role for industries like energy, agriculture and metals, allowing companies to manage risks associated with commodity price fluctuations and lock in purchase or sale prices. These derivatives are essential because they provide stability and predictability in revenues and costs, helping businesses navigate volatile markets.

The market includes products like swaps, options and forwards referenced to a variety of commodities and commodity indices. In terms of scale, the gross market value stood at $0.46 trillion as of June 30, 2024 (see Figure 96).

Figure 96: Commodity Derivatives Gross Market Value ($ trillions) and as % of Notional Outstanding



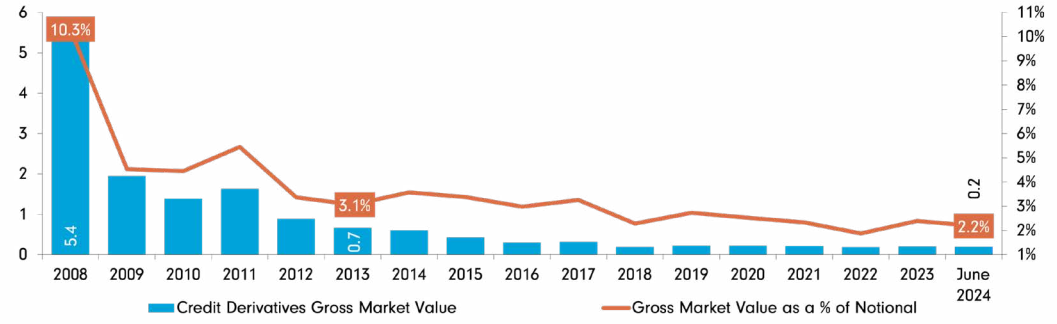
Source: BIS OTC derivatives statistics

Credit Derivatives

The credit derivatives market has contracted, with gross market value declining from $0.66 trillion (3.1% of notional) in 2013 to $0.20 trillion (2.2% of notional) as of June 30, 2024 (see Figure 97).

This reduction has been driven by several key factors, including trade compression efforts, which eliminate redundant or offsetting trades to reduce gross notional exposure, and a decline in trading activity by some banks following changes in regulatory capital treatment.

Figure 97: Credit Derivatives Gross Market Value ($ trillions) and as % of Notional Outstanding



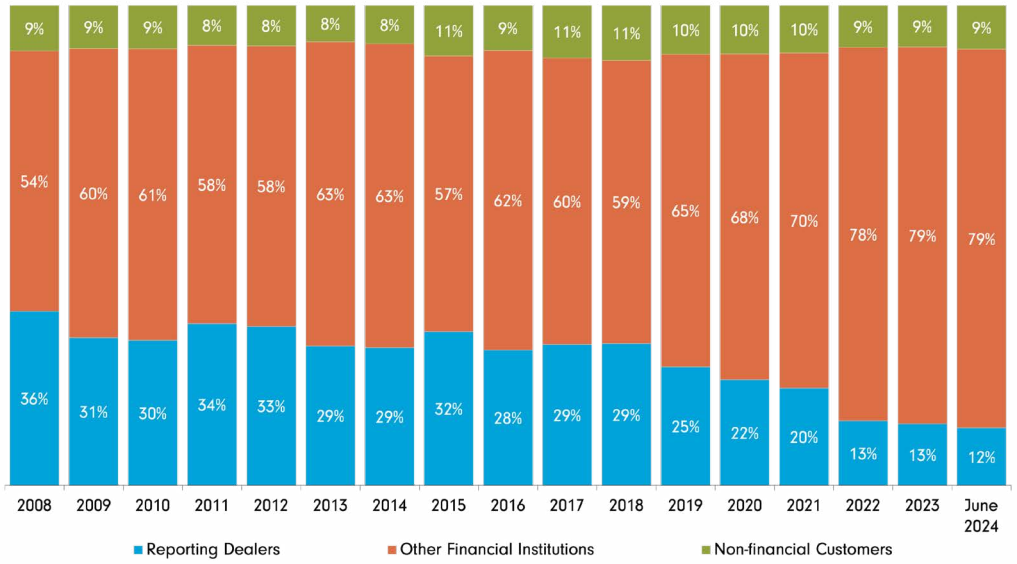
Source: BIS OTC derivatives statistics

2.1.2. Ecosystem of OTC Derivatives

The OTC derivatives market operates within an interconnected ecosystem of financial institutions and participants, including reporting dealers, other financial institutions and non-financial customers (see Figure 98). This network collectively supports trading, clearing, risk management and risk-taking activities, enabling corporations, institutional investors and sovereign entities to effectively manage financial risks.

The significance of each participant type becomes clear when examining the gross market value of OTC interest rate, FX and equity derivatives, which together comprised 95.7% of total gross market value as of June 30, 2024. The remaining 4.3% of gross market value relates to commodity derivatives (2.7%), credit derivatives (1.2%) and other derivatives (0.4%).

Figure 98: Gross Market Value Percentage Share – By Type of Counterparty



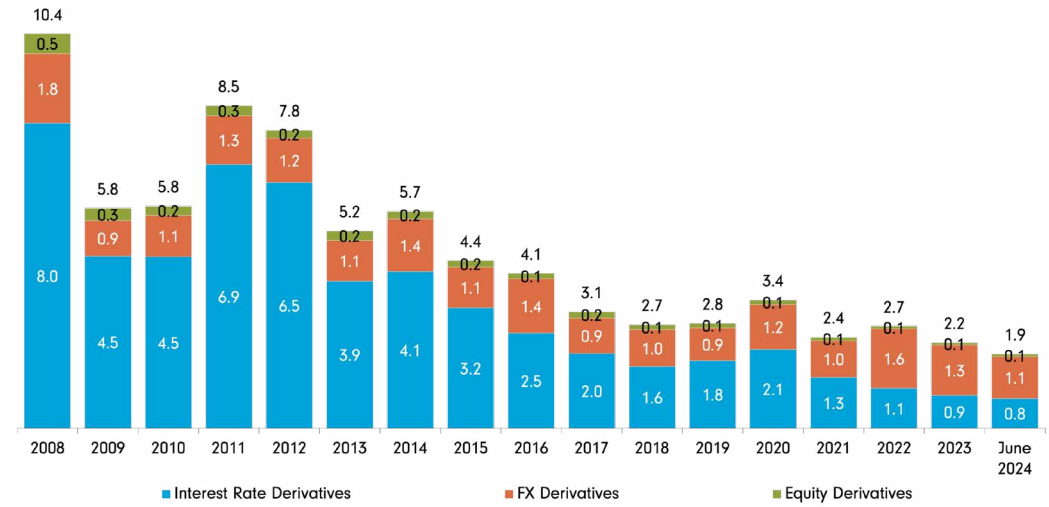
Source: BIS OTC derivatives statistics

Reporting Dealers

These institutions – primarily large commercial and investment banks and securities firms – are key players in the interdealer market and conduct business with their clients, including corporations, governments and non-reporting financial institutions. They engage in OTC derivatives trading for their own portfolios and to fulfill customer needs, providing derivatives solutions for specific risk management and yield enhancement strategies. As central participants, they originate and intermediate transactions, serving as counterparties to other financial institutions and non-financial clients.

The gross market value of interest rate, FX and equity derivatives for reporting dealers has been steadily declining, reaching $1.9 trillion as of June 30, 2024 – roughly 60% of the average gross market value from 2013 to June 2024 (see Figure 99). This reduction is due to the growing role of other financial entities, such as principal trading firms, as well as regulatory capital changes that have affected the ability of dealers to warehouse and retain risk. As intermediaries, dealers tend to be flat from a risk perspective (ie, they typically don't have large directional exposures).

Figure 99: Gross Market Value – Reporting Dealers ($ trillions)



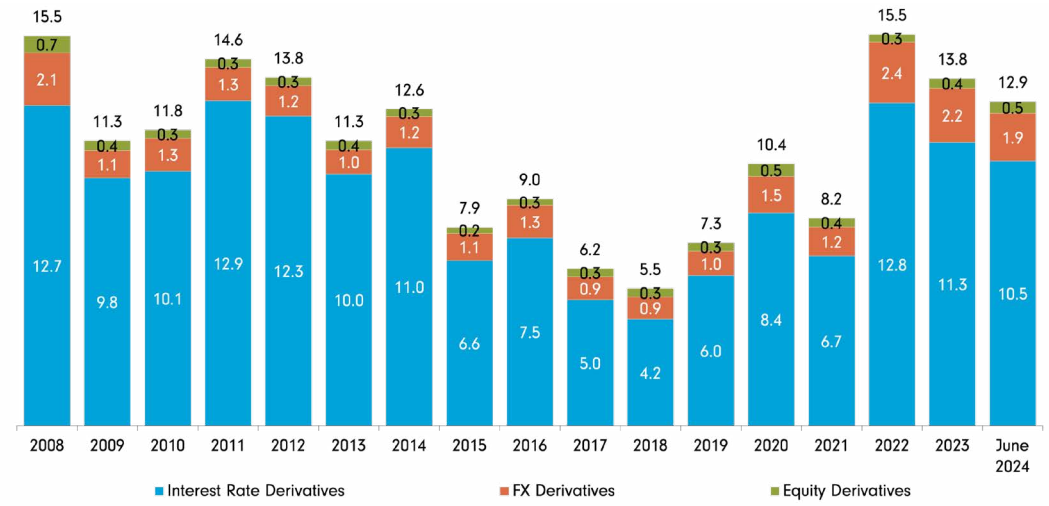
Source: BIS OTC derivatives statistics

Other Financial Institutions

These entities include smaller commercial banks, securities firms, mutual funds, asset managers, pension funds, hedge funds, money market funds, building societies, leasing companies, insurance firms, financial subsidiaries of corporates and central banks, many of which use derivatives for hedging or risk optimization.

By June 30, 2024, the gross market value of FX, interest rate and equity derivatives involving these financial institutions reached $12.9 trillion, roughly 30% more than the average gross market value from 2013 to June 30, 2024 (see Figure 100). Part of this growth is driven by increased activity by principal trading firms, which act as liquidity providers in key markets. Regulatory changes have also increased the use of derivatives for hedging by institutional investors like pension funds and insurance companies to meet evolving capital and risk management requirements.

Figure 100: Gross Market Value – Other Financial Institutions ($ trillions)

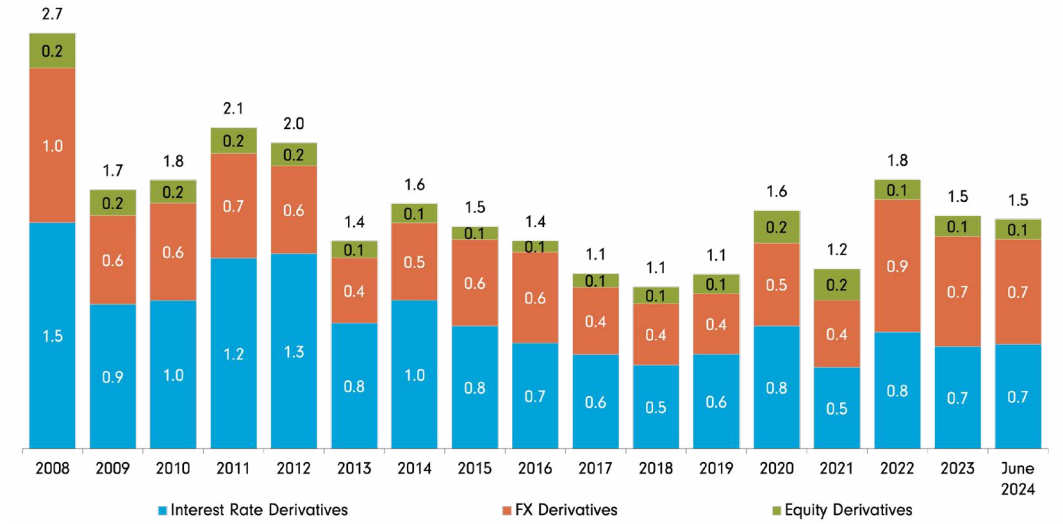


Source: BIS OTC derivatives statistics

Non-financial Firms

This category includes non-financial end users, such as corporations and government entities, as well as private individuals who engage directly with reporting dealers primarily for hedging, yield enhancement and liquidity management purposes. The gross market value of interest rate, FX and equity derivatives involving these entities was $1.5 trillion as of June 30, 2024, a slight increase compared to the average for the period from 2013 to June 30, 2024 (see Figure 101).

Figure 101: Gross Market Value – Non-financial Firms ($ trillions)



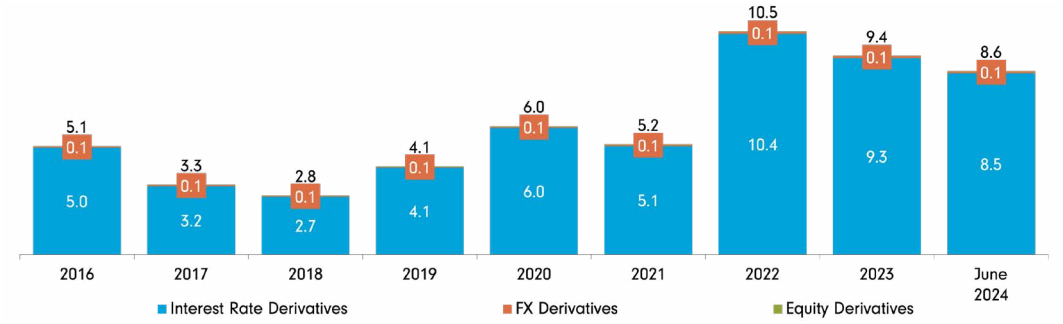
Source: BIS OTC derivatives statistics

CCPs

CCPs have become crucial to the OTC derivatives ecosystem, especially following regulatory reforms introduced after the 2008 financial crisis. Acting as intermediaries between buyers and sellers, they reduce counterparty risk by guaranteeing trade settlements and requiring collateral.

CCPs engage with all key market participants, including reporting dealers and other financial institutions, to uphold market stability and integrity. This essential role is evidenced by the growth in the gross market value of outstanding trades they manage, which rose from $5.1 trillion in 2016 to $8.6 trillion as of June 30, 2024 (see Figure 102).

Figure 102: Gross Market Value – CCPs ($ trillions)



Source: BIS OTC derivatives statistics

This intricate web of relationships ensures that the OTC derivatives markets operate smoothly, with each participant playing a role in maintaining market efficiency, liquidity and stability via their interactions.

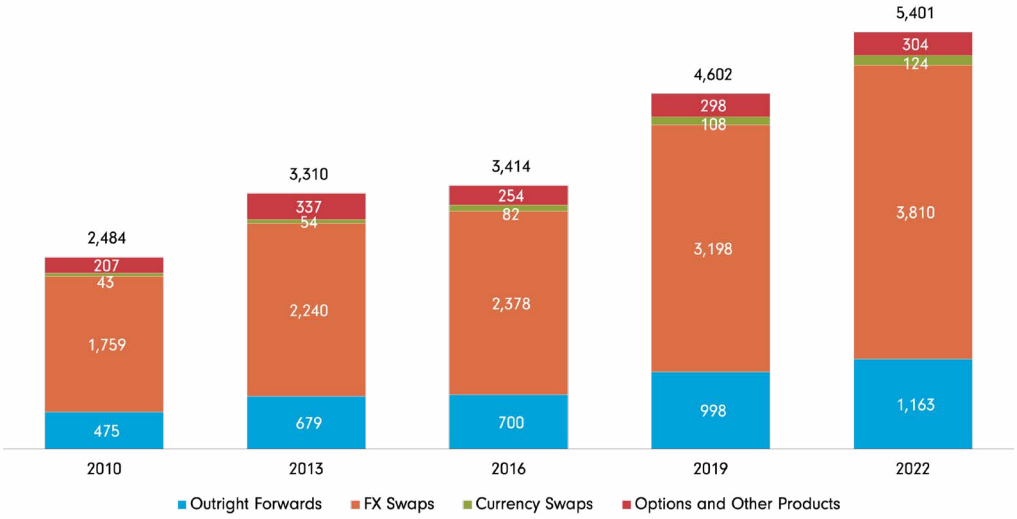
2.1.3. Liquidity and Daily Turnover

While gross market value provides insight into risk exposures, average daily notional turnover[194] can be used to indicate liquidity and the market's pivotal role in global finance. It is published by the BIS every three years for OTC FX and interest rate derivatives markets as part of its triennial central bank survey.

OTC FX Derivatives

Based on those figures, trading in OTC FX derivatives reached $5.4 trillion in average notional turnover per day in April 2022 (net-net basis[195]), up from $2.5 trillion in 2010. FX swaps accounted for 70.5% of global OTC FX derivatives market turnover in 2022, which was similar to the level in 2010 (see Figure 103)[196].

Figure 103: OTC FX Turnover by Instrument ($ billions)



Source: BIS Triennial Survey

FX trading is concentrated in major financial centers. In April 2022, turnover reported by the sales desks of reporting dealers in the UK, the US, Europe and Asia Pacific amounted to 96.2% of all OTC FX derivatives trading (net-gross basis[197]). The UK was the most important FX trading location globally, with 38.8% of global turnover (see Figure 104).

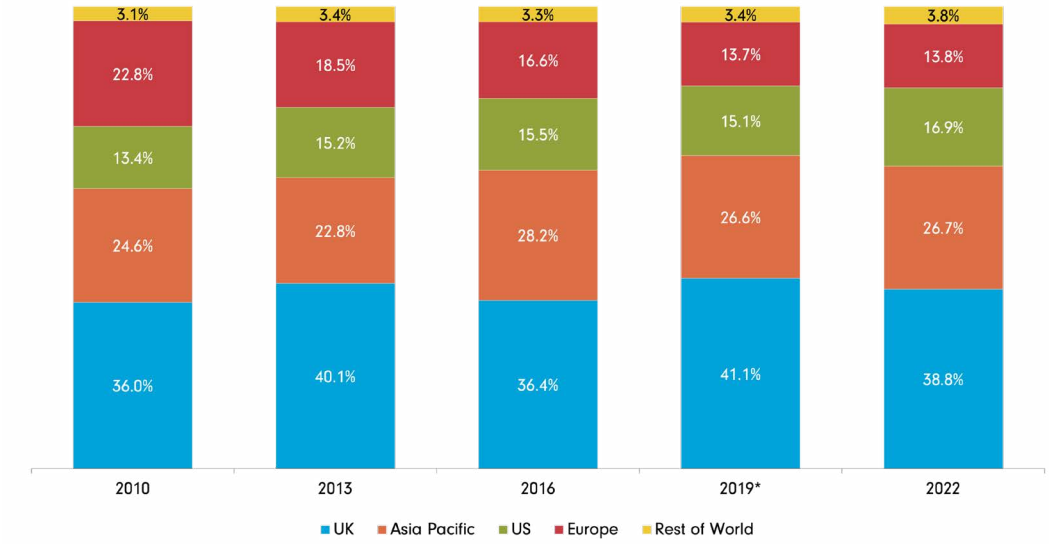
[194] Turnover is defined as the gross value of all new deals entered into during a given period, and is measured in terms of the notional amount of the contracts

[195] Net-net basis refers to turnover figures that are adjusted for local and cross-border interdealer double-counting

[196] BIS, 2022, Triennial Central Bank Survey *OTC foreign exchange turnover in April 2022 (bis.org)*

[197] Net-gross basis refers to turnover figures that are adjusted for local interdealer double-counting

Figure 104: Global Distribution of OTC FX Derivatives Turnover (%)

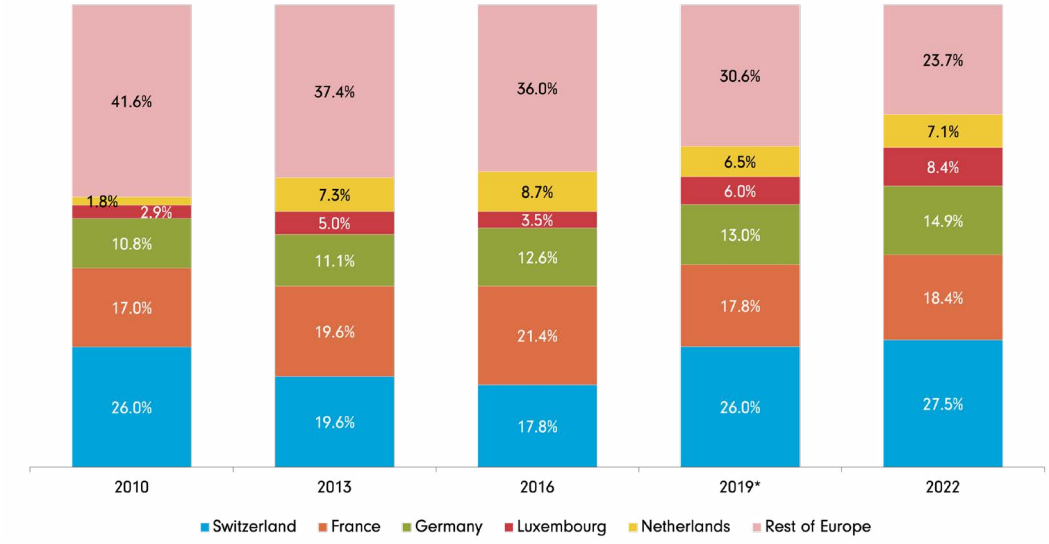


Source: BIS Triennial Survey

Excluding the UK and the US, Asia Pacific and Europe together accounted for 40.5% of global FX derivatives turnover (net-gross basis) in 2022 compared to 47.5% in 2010.

EU and non-EU countries in Europe (excluding the UK) collectively represented 13.8% of global FX derivatives turnover in 2022. Switzerland (a non-EU country) held the largest share at 27.5% ($270 billion), followed by France at 18.4% ($181 billion), Germany at 14.9% ($146 billion), Luxembourg at 8.4% ($82 billion) and the Netherlands at 7.1% ($70 billion) (see Figure 105).

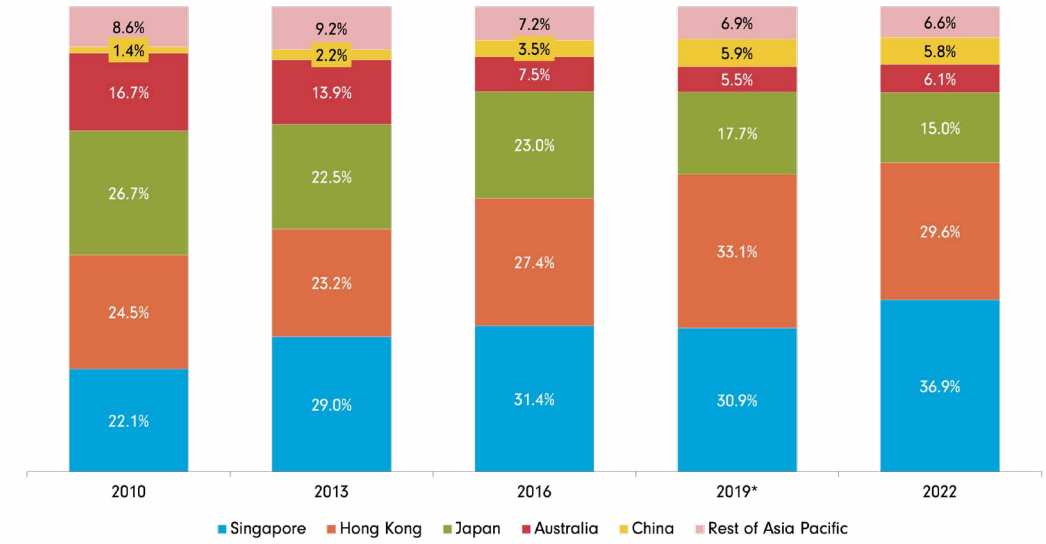
Figure 105: Distribution of OTC FX Turnover in Europe (%)



Source: BIS Triennial Survey

Asia Pacific made up 26.7% of global OTC FX derivatives turnover in 2022, with Singapore taking a 36.9% share ($699 billion), Hong Kong accounting for 29.6% ($560 billion) and Japan representing 15.0% ($284 billion). Other notable contributors included Australia at 6.1% ($116 billion) and China at 5.8% ($109 billion) (see Figure 106).

Figure 106: Distribution of OTC FX Turnover in Asia Pacific (%)

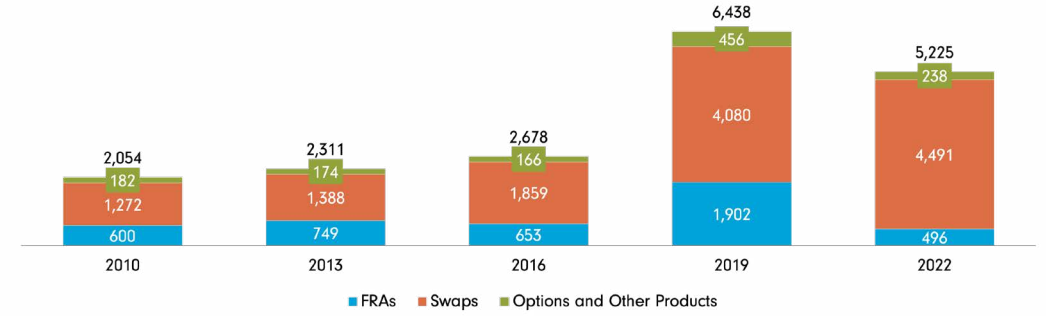


Source: BIS Triennial Survey

OTC Interest Rate Derivatives

Average notional turnover of OTC interest rate derivatives was $5.2 trillion per day (net-net basis) in April 2022[198], more than double the amount in April 2010, with US-dollar-denominated contracts contributing 72.8% of global turnover across all products (see Figure 107).

Figure 107: OTC Interest Rate Derivatives Turnover by Instrument ($ billions)



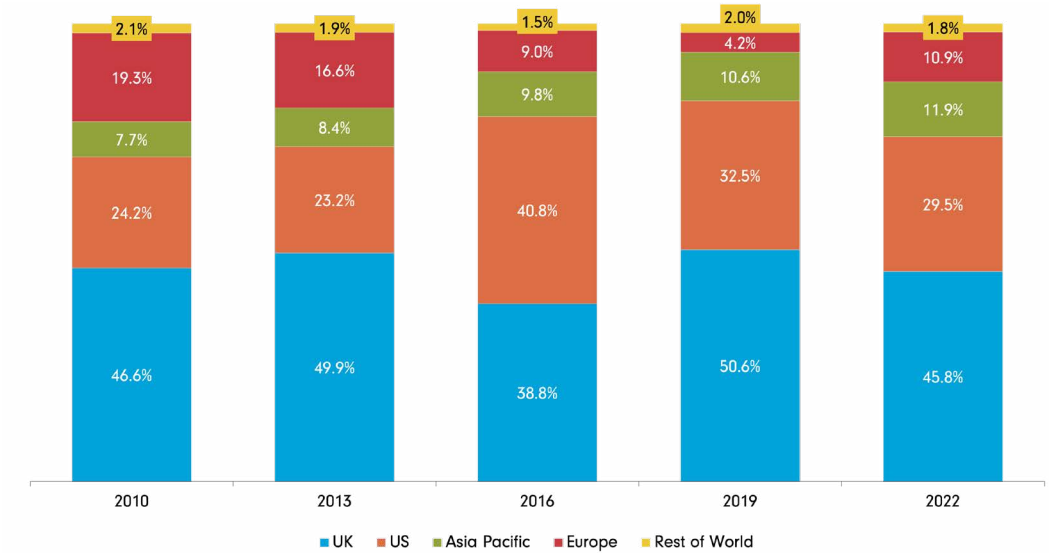
Source: BIS Triennial Survey

Similar to FX, OTC interest rate derivatives trading is concentrated in major financial centers. In April 2022, turnover reported by the sales desks of reporting dealers in the UK, the US, Europe and Asia Pacific amounted to 98.2% of all OTC interest rate derivatives trading (net-gross basis[199]). The UK was the most important interest rate derivatives trading location globally, with turnover of $2.6 trillion, or 45.8% of global turnover (see Figure 108).

[198] BIS, 2022, Triennial Central Bank Survey OTC interest rate derivatives turnover in April 2022 (*bis.org*)

[199] Net-gross basis refers to turnover figures that are adjusted for local interdealer double-counting

Figure 108: Global Distribution of OTC Interest Rate Derivatives Turnover ($ billions)

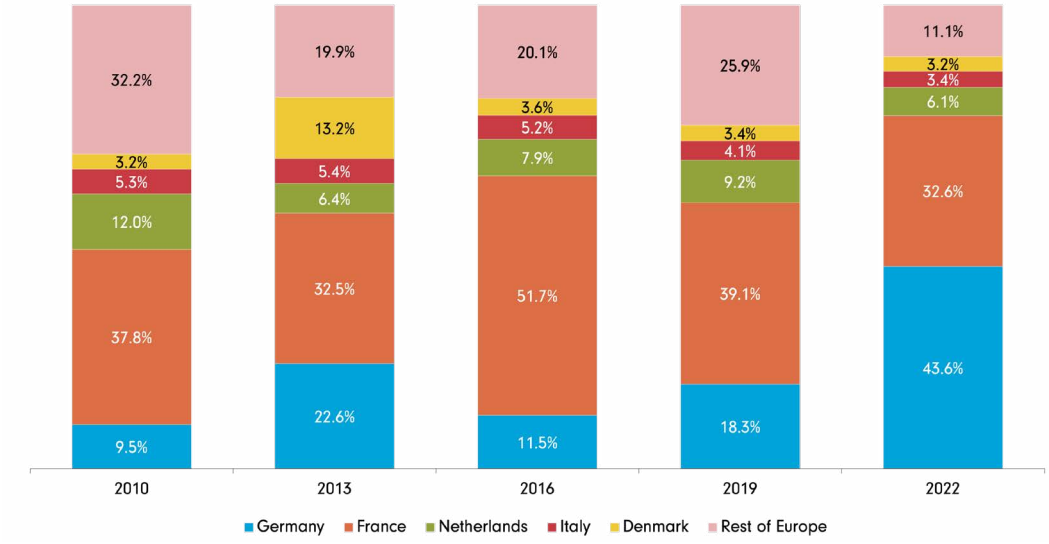


Sources: BIS Triennial survey

Excluding the UK and the US, Asia Pacific and Europe accounted for 22.9% of global interest rate derivatives turnover (net-gross basis), down from 27.0 % in 2010.

Europe (excluding the UK) collectively made up 10.9% of global interest rate derivatives turnover. Germany held the largest share at 43.6% ($273 billion), followed by France at 32.6% ($204 billion), the Netherlands at 6.1% ($38 billion) and Italy at 3.4% ($21 billion) (see Figure 109).

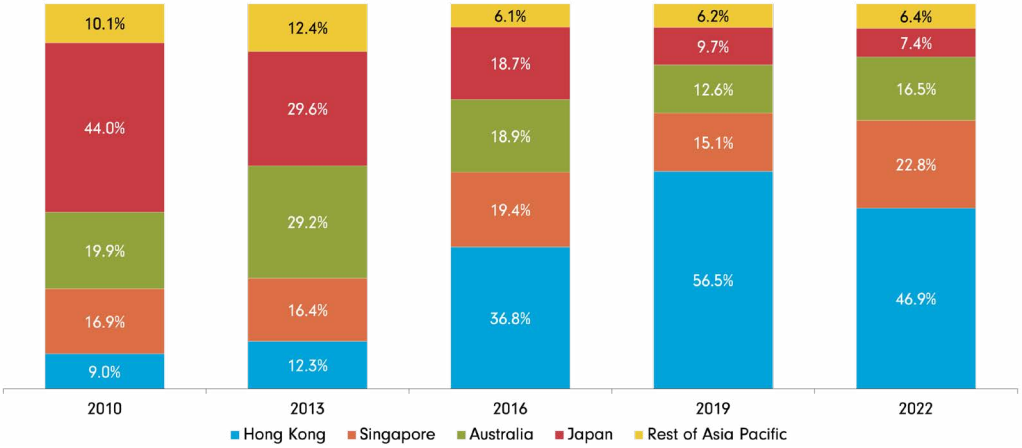
Figure 109: Distribution of OTC Interest Rate Derivatives Turnover in Europe (%)



Source: BIS Triennial Survey

Asia Pacific accounted for 11.9% of global interest rate derivatives turnover, with Hong Kong taking a 46.9% share ($321 billion), Singapore comprising 22.8% ($156 billion), Australia representing 16.5% ($113 billion) and Japan making up 7.4% ($51 billion) (see Figure 110).

Figure 110: Distribution of OTC Interest Rate Derivatives Turnover in Asia Pacific (%)

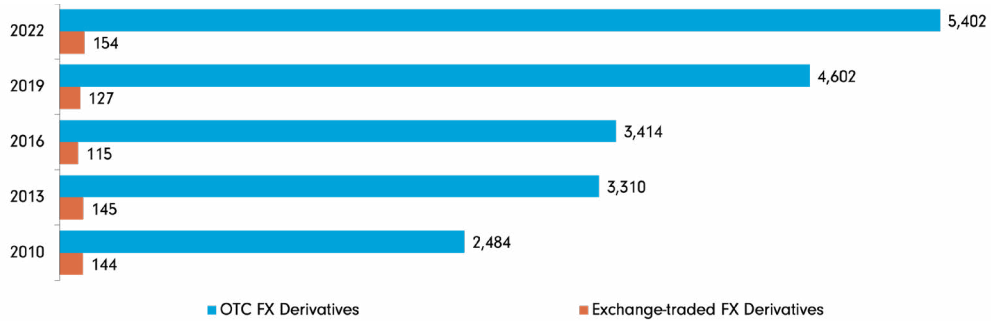


Source: BIS Triennial Survey

Comparison to Other Markets

Comparing OTC derivatives markets to other financial markets offers a perspective on their scale and significance. For instance, daily turnover in FX is considerably higher than that of exchange-traded FX derivatives (see Figure 111).

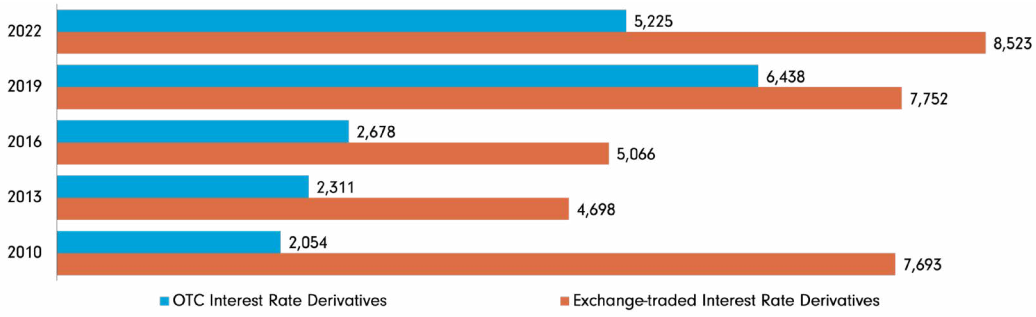
Figure 111: OTC FX Derivatives Daily Turnover ($ billions)



Sources: BIS Triennial Survey and exchange-traded derivatives statistics

Meanwhile, the daily turnover of OTC interest rate derivatives as a percentage of exchange-traded interest rate derivatives has been steadily increasing, rising from around 27% in 2010 to approximately 61% in 2022 (see Figure 112).

Figure 112: OTC Interest Rate Derivatives Daily Turnover ($ billions)



Source: BIS Triennial Survey and exchange-traded derivatives statistics

ABOUT ISDA

Since 1985, ISDA has worked to make the global derivatives markets safer and more efficient. Today, ISDA has over 1,000 member institutions from 76 countries. These members comprise a broad range of derivatives market participants, including corporations, investment managers, government and supranational entities, insurance companies, energy and commodities firms, and international and regional banks. In addition to market participants, members also include key components of the derivatives market infrastructure, such as exchanges, intermediaries, clearing houses and repositories, as well as law firms, accounting firms and other service providers. Information about ISDA and its activities is available on the Association's website: www.isda.org. Follow us on LinkedIn and YouTube.