

Interest Rate Swaps: Risk Model

2017

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Futures trading is not suitable for all investors, and involves the risk of loss. Futures are a leveraged investment, and because only a percentage of a contract's value is required to trade, it is possible to lose more than the amount of money deposited for a futures position. Therefore, traders should only use funds that they can afford to lose without affecting their lifestyles. And only a portion of those funds should be devoted to any one trade because they cannot expect to profit on every trade. All references to options refer to options on futures.

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Agenda

IRS: Risk Model

- IRS Clearing Offering
- IRS Margin
- IRS Financial Safeguards
- Customer Resources

IRS Clearing Offering

IRS Product Scope

IRS Clearing Offering

Fixed/Float	Tenor						Index			
	Years						Months			
Currency	10	11	15	21	31	51	1	3	6	
USD	●						●	●	●	LIBOR
EUR	●						●	●	●	EURIBOR
GBP	●						●	●	●	LIBOR
CAD	●							●		CDOR
JPY	●						●	●	●	LIBOR
CHF	●								●	LIBOR
AUD	●							●	●	BBR
SEK	●							●		STIBOR
DKK	●								●	CIBOR
NOK	●								●	NIBOR
KRW	●							●		CD-KSDA
MXN	●						28d			TIIE-BANXICO
NZD	●							●		BBR
HKD	●							●		HIBOR
SGD	●								●	SOR-VWAP
HUF	●								●	BUBOR
CZK	●								●	PRIBOR
PLN	●								●	WIBOR
ZAR	●							●		JIBAR

Zero Coupon Swaps

USD | EUR | GBP

51 years

BRL

10 years

Overnight Index Swap (OIS)¹

USD | EUR | GBP | JPY

30 years

INR

10 years

AUD

6 years

CAD

3 years

Basis Swaps

USD | EUR | GBP

51 years

AUD | JPY

31 years

Fed Funds vs. Libor (USD)

30 years

Forward Rate Agreements (FRA)

USD | EUR | GBP | JPY | AUD |

CAD | CHF | CZK | DKK | HKD |

HUF | NOK | NZD | PLN | SEK |

SGD | ZAR |

3 days – 3 years

FIXED/FLOAT SWAPTIONS

USD

Up to 2 years option expiry &
underlying swap tenor of 30 years

Products Available for Portfolio Margining

IRS Clearing Offering

CME Clearing offers portfolio margining between the following exchange-trade interest rate derivatives and IRS:

- Eurodollar Futures
- U.S. Treasury Futures
 - 2-year
 - 5-year
 - 10-year
- U.S. Treasury Bond Future
- Ultra U.S. Treasury Bond Future
- Ultra 10-year U.S. Treasury Note Future
- 30-day Federal Funds Future
- U.S. MAC Swap Futures
 - 2-year
 - 5-year
 - 10-year
 - 30-year

IRS Margin

IRS Margin Model Goals

IRS Margin

- ✓ Scalable to other currencies and asset classes
- ✓ Achieves a 99% coverage standard over a five-day margin period of risk on an ex-post basis
- ✓ Quickly reacts to changes in rate and volatility regimes
- ✓ Stable margins during periods of low to moderate volatility
- ✓ Ease of implementation
- ✓ Transparency to market participants

Overview of IRS Margin Model

IRS Margin: HVaR and Add-ons

The CME Clearing IRS margin model consists of multiple components

Market Risk Component: Historical Value-at-Risk (“HVaR”)

- The IRS margin model generates scenarios for interest rate curves, futures prices, spot FX rates, and Swaption implied volatilities of 5-day returns that are synchronized across multiple currencies, futures, and FX pairs
 - The model utilizes a rolling lookback period that begins on a given day in September 2008
- Historical returns are scaled based on an appropriate forecast of short term volatility: Exponentially Weighted Moving Average (“EWMA”) volatilities
- Once the profit and loss distribution of the portfolio is determined based on the above scenarios, margin is sampled as 99.7 percentile of the loss distribution over a five-day margin period of risk
 - To determine the appropriate margin period of risk CME Clearing considers the liquidity and market characteristics for the given product
- Further, risk mitigation is employed by apportioning the USD margins down to each currency

Swaption Add-on: Additional add-ons are incorporated to capture Swaption specific risks

Liquidity/Concentration Add-on: CME Clearing applies an add-on to portfolios that present significant liquidation risk within the close out period

- Liquidity costs are computed for each currency to reflect the expenses associated with liquidation
 - The liquidity add-on is calculated as a function of portfolio Greeks

IRS Financial Safeguards

IRS Financial Safeguards Overview

IRS Financial Safeguards

- CME Group Exchange Rules define a default by a Clearing Member to be the failure of such Clearing Member to promptly discharge any obligation to the Clearing House or such Clearing Member becomes subject to any bankruptcy or insolvency proceedings

Guaranty Fund Sizing

- The IRS Guaranty Fund covers the potential loss caused by the simultaneous default of the two Clearing Members and their affiliates with the largest stress shortfall
- The IRS Guaranty Fund is re-sized on at least monthly basis or more frequently as market conditions warrant
 - The size of the IRS Guaranty Fund is calculated daily for risk management review
 - CME Clearing is permitted and able to re-size IRS Guaranty Fund intra-cycle, where necessary
- Assessment powers cover losses beyond the pre-funded resources comprising the IRS Guaranty Fund
 - Assessments for the IRS financial safeguards waterfall structure are sized to cover the stress loss arising from the default of the 3rd and 4th largest Clearing Members and their affiliates

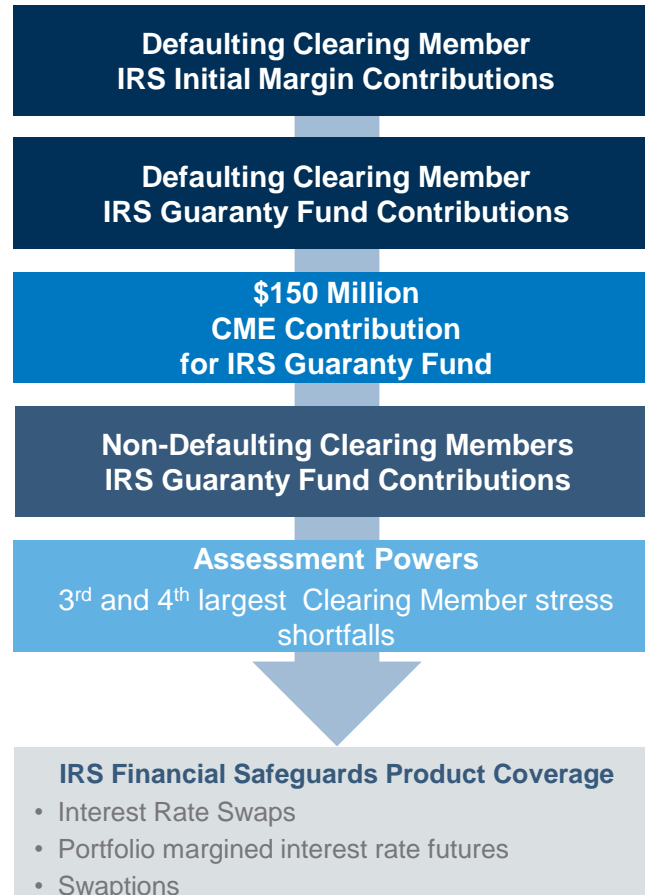
Guaranty Fund Contributions

- Each IRS Clearing Member is required to contribute a minimum amount to the IRS Guaranty Fund defined as the greater of:
 - \$15 million; or
 - Clearing Member's proportional share of the fund based on:
 - a) 30-day trailing average of their Portfolio Residual Loss (90%)
 - b) 30-day trailing average of their Gross Notional (10%)

IRS Financial Safeguards Waterfall

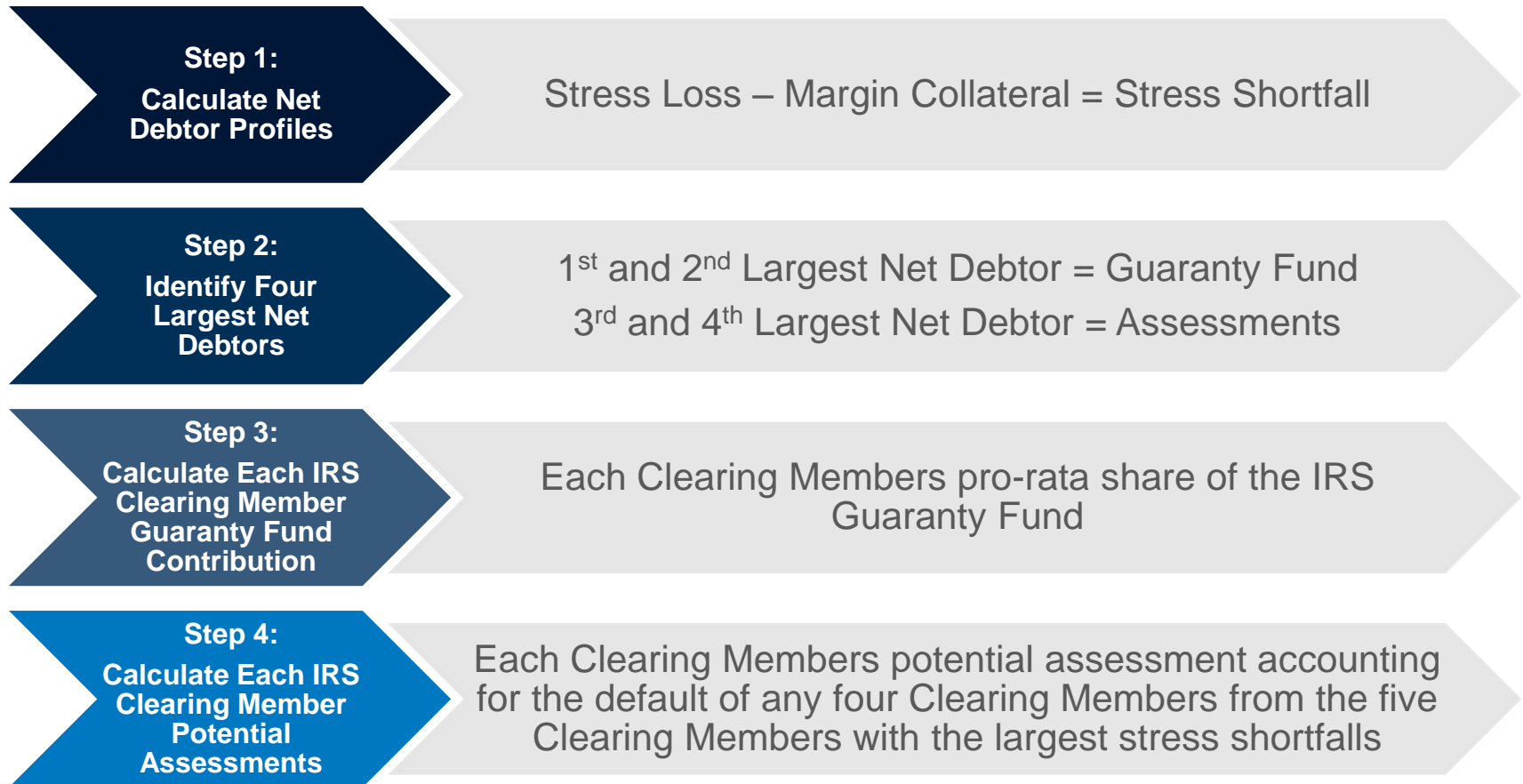
IRS Financial Safeguards

IRS Financial Safeguards



IRS Financial Safeguards Sizing

IRS Financial Safeguards



Stress Testing Overview

IRS Financial Safeguards

- Stress testing is designed to ensure that the Guaranty Fund is sufficiently sized to cover losses during large systemic events that could result in losses that would exceed available margin collateral
- CME Clearing's stress testing is overseen by a comprehensive governance structure designed to ensure thorough review and scrutiny of stress scenarios and procedures

Methodology

Identify Historical Scenarios

- Stress testing scenarios are identified to reflect financial market crises over the past four decades
- The key indicator for these scenarios is the sudden uptick of the realized volatility of the yield curve

Construct Synthetic Scenarios

- Synthetic scenarios are utilized to supplement historical scenarios that represent macro- and micro-shocks

Customer Resources

CME CORE: Clearing Online Risk Engine

Customer Resources

CME CORE is an interactive margin calculator that enables users to calculate and evaluate initial margin requirements for all CME Group Products and efficiently manage risk using powerful OTC analytics

Supported CME Clearing products

- Listed Derivatives
- Interest Rate Swaps and cross-margined interest rate futures
- Credit Default Swaps
- OTC FX
- NEW! CME Europe Products

Accessing CME Core

- Sign-up for free at <https://cmecore.cmegroup.com/core>
- E-mail CORE team at cme.core@cmegroup.com to obtain access to OTC margin calculators

Key Benefits

- Timely margin funding information for trade execution and reconciliation
- Effectively mitigate risk
- Interaction with CME Clearing margin models
- Simple portfolio upload and fast margin results
- Download latest SPAN and CME Optimizer versions of software
- API connectivity available
- Deployable IRS and CDS software available
- NEW! Real-time margin dashboard and positions features

