Credit Analytics Product and Functional Coverage

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Product Coverage

<table>
<tr><th>Base Type</th><th>Variants and Details</th></tr>
<tr><td>Bonds</td><td>

Bullet

Fixed Coupon
Floating Rate
Capped Coupon floor and ceiling

Amortizing Bonds

Bonds with sinking funds
Deterministic coupon and notional schedules
Schedules specified as pay down or outstanding
Accreting and capitalizing bonds
Step up and Step down coupon schedules

Bonds with embedded schedules

European Call or Put Schedules
Bermudan/American Call/Put Schedules
Concurrent and overlapping Calls and Puts
Fix to float on exercise

Differing coupon, redemption, and trade/quote currencies
Custom bonds

Custom coupon and notional schedules (pay down or outstanding)
Custom coupon period generation functionality
Custom quoting/settlement parameters
Custom rates/credit/currency/fixing parameters
Custom embedded option schedules (concurrent put/call, fix to float, American exercise dates etc)

TSY marked bonds – linkable to more than one treasury benchmark

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Credit Default Swap (CDS)	• Varying contract details
	  o Vanilla fixed coupon CDS
	  o Amortizing notional CDS
	  o Fixed recovery CDS
	• Standardized CDS varieties
	  o ISDA style, with variants for NA SNAC, EU standard CDS, EM’s STEM contract
	  o Standard 100 bps/500 bps with upfront quotes
	  o Support for old style pure running CDS
	• Custom CDS
	  o Notional/recovery schedule
	  o Highly flexible period generation and settlement rules

Credit Default Swap Index (CDX)	• Supports all the standard CDX indices traded, including CDX NA variants (on-the run and off the runs varieties), and iTRAXX EUR series, different versions and tenors
	  o CDX NA – IG, HY, HY.B, HY.BB, HVOL, XO, EM
	  o LCDX, SovX, Trac-X, LevX, TRACERS (Check CDX Coverage for the comprehensive list)
	  o ITRAXX EUR – IG, HY, HVOL, XO, NON_FIN, FIN_SNR, FIN_SUB
	• Custom CDS baskets
	  o Customizable components and their weights
	  o Customizable outstanding notional and coupon schedules, as well as component amortization schedules

Bond Basket	• Support for the standard iShares ETF
	• Support for the creation of customizable bond baskets
	  o Customizable components and their weights
	  o Customizable outstanding notional and coupon schedules, as well as component amortization schedules

Interest Rate	• Cash/Monet Market Product

<table>
<tr><td>Products</td><td>Euro-Dollar Future Contracts – explicit, as well by name
IRS Variants
Vanilla fixed coupon IRS
Amortizing notional IRS
Multi-leg IRS – multiple fixed and float legs
Highly flexible period generation and settlement rules</td></tr>
<tr><td>FX</td><td>FXSpot
FXForward
FXSwap</td></tr>
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Curve Construction Coverage

Base Type	Variants and Details

Discount Curve	• Calibration Product – Cash/Deposit/Future/FRA/Fix-Float IRS/Bond
	• Calibration Manifest Measure – Almost all quoted product measures allowed
	• Latent State Quantification Metric
	    o Discount Factor (and univariate transformations thereof)
	    o Zero Rate (and univariate transformations thereof)
	    o Forward Rate (and univariate transformations thereof)
	• Turns List Adjustment in-place and after curve construction
	• Multi-Pass Curve Construction
	    o Shape Preserving Pass – Employing any arbitrary C^k continuity metric and basis function (ordered polynomials, tension spline with all its variants, and several other basis function types)
	    o Smoothing Pass – Employing the lesser C^k metric, using local Hermite continuity specifications (such as Akima, Bessel, Hagan West Monotone Convex, Hagan West Minimal Quadratic, Harmonic, Huynh-Le Floch, Hyman83, Hyman89, Kruger, Preuss, Van Leer schemes)
	• Multi-Stretch Curve Construction/Customization using Transition Splines, and design of the transition zone
	• Custom Extrapolators
	• Perfect Fit + Least Squares Best Fit Manifest Measure Calibration
	• Penalized Curvature + Length Formulation and Penalty

	Estimation • In-place Quote Sensitivity Generator

Forward Curve	• Calibration Product – Fix-Float IRS/ Float- Float IRS/Bond
	• Calibration Manifest Measure – Almost all quoted product measures allowed
	• Latent State Quantification Metric
	    o Tenor Forward Rate
	• Forward Turns List Adjustment in-place and after curve construction
	• Multi-Pass Curve Construction
	    o Shape Preserving Pass – Employing any arbitrary C^k continuity metric and basis function (ordered polynomials, tension spline with all its variants, and several other basis function types)
	    o Smoothing Pass – Employing the lesser C^k metric, using local Hermite continuity specifications (such as Akima, Bessel, Hagan West Monotone Convex, Hagan West Minimal Quadratic, Harmonic, Huynh-Le Floch, Hyman83, Hyman89, Kruger, Preuss, Van Leer schemes)
	• Multi-Stretch Curve Construction/Customization using Transition Splines, and design of the transition zone
	• Custom Extrapolators
	• Perfect Fit + Least Squares Best Fit Manifest Measure Calibration
	• Penalized Curvature + Length Formulation and Penalty Estimation
	• In-place Quote Sensitivity Generator

Fixed Income Analytics Coverage

Category	Details
Holiday	▪ Support for holiday schedules of 126 jurisdictions
Day Count Conventions	▪ Supports 30+ day count conventions – all the main DCC
Date Adjustment and Roll	▪ Supports 15 different date adjustment/date roll conventions
Date generation	▪ Generation of the standard IR product schedules (Cash/EDF/IRS/treasury) and credit products (CDS/CDX/bond) in accordance with typical generation rules (e.g., IMM) ▪ Forward/backward generation with customizable period pay/accrual/reset dates

Calculated Analytical Measures Coverage

As a general note, product generates three versions of every measure – the base (of non-prefixed) version, the "Fair" of theoretical version, and the "market" version. Further, if the market version is available, the base defaults to that version; otherwise, it defaults to the "fair" version.

Exact measure names are given in the columns below – these names are to be used exactly as listed when querying for a given measure for any purpose (including measure based calibration).

Product	Measure
Bond	• ASW, AssetSwapSpread, FairASW, FairAssetSwapSpread, MarketASW, MarketAssetSwapSpread, MarketASW, MarketAssetSwapSpread • Accrued01, FairAccrued01, MarketAccrued01 • BondBasis, FairBondBasis, MarketBondBasis • CleanDV01, FairCleanDV01, MarketCleanDV01 • CleanPV, FairCleanPV, MarketCleanPV • CleanPrice, FairCleanPrice, MarketCleanPrice • Convexity, FairConvexity, MarketConvexity • CreditBasis, FairCreditBasis, MarketCreditBasis • CreditRisklessParPV, FairCreditRisklessParPV, MarketCreditRisklessParPV • CreditRisklessPrincipalPV, FairCreditRisklessPrincipalPV, MarketCreditRisklessPrincipalPV • CreditRiskyParPV, FairCreditRiskyParPV, MarketCreditRiskyParPV • CreditRiskyPrincipalPV, FairCreditRiskyPrincipalPV,

	MarketCreditRiskyPrincipalPV • DV01, FairDV01, MarketDV01 • DefaultExposure, FairDefaultExposure, MarketDefaultExposure • DefaultExposureNoRec, FairDefaultExposureNoRec, MarketDefaultExposureNoRec • DirtyDV01, FairDirtyDV01, MarketDirtyDV01 • DirtyPV, FairDirtyPV, MarketDirtyPV • DirtyPrice, FairDirtyPrice, MarketDirtyPrice • Duration, FairDuration, MarketDuration • ExpectedRecovery, FairExpectedRecovery, MarketExpectedRecovery • FirstCouponDate, FairFirstCouponRate, MarketFirstCouponRate • FirstIndexRate, FairFirstIndexRate, MarketFirstIndexRate • GSpread, FairGSpread, MarketGSpread • ISpread, FairISpread, MarketISpread • LossOnInstantaneousDefault, FairLossOnInstantaneousDefault, MarketLossOnInstantaneousDefault • PV, FairPV, MarketPV • ParPV, FairParPV, MarketParPV • ParSpread, FairParSpread, MarketParSpread • Price, FairPrice, MarketPrice • PrincipalPV, FairPrincipalPV, MarketPrincipalPV • RecoveryPV, FairRecoveryPV, MarketRecoveryPV • RisklessCleanCouponPV, FairRisklessCleanCouponPV, MarketRisklessCleanCouponPV • RisklessCleanDV01, FairRisklessCleanDV01, MarketRisklessCleanDV01 • RisklessCleanPV, FairRisklessCleanPV, MarketRisklessCleanPV • RiskyCleanCouponPV, FairRiskyCleanCouponPV, MarketRiskyCleanCouponPV • RiskyCleanDV01, FairRiskyCleanDV01, MarketRiskyCleanDV01

	• RiskyCleanPV, FairRiskyCleanPV, MarketRiskyCleanPV • RisklessDirtyCouponPV, FairRisklessDirtyCouponPV, MarketRisklessDirtyCouponPV • RisklessDirtyDV01, FairRisklessDirtyDV01, MarketRisklessDirtyDV01 • RisklessDirtyPV, FairRisklessDirtyPV, MarketRisklessDirtyPV • RiskyDirtyCouponPV, FairRiskyDirtyCouponPV, MarketRiskyDirtyCouponPV • RiskyDirtyDV01, FairRiskyDirtyDV01, MarketRiskyDirtyDV01 • RiskyDirtyPV, FairRiskyDirtyPV, MarketRiskyDirtyPV • TSYSpread, FairTSYSpread, MarketTSYSpread • WorkoutDate, FairWorkoutDate, MarketWorkoutDate • WorkoutFactor, FairWorkoutFactor, MarketWorkoutFactor • WorkoutType, FairWorkoutType, MarketWorkoutType • WorkoutYield, FairWorkoutYield, MarketWorkoutYield • Yield, FairYield, MarketYield • ZSpread, FairZSpread, MarketZSpread • MarktInputType=???
Bond Basket	▪ Accrued ▪ Accrued 01 ▪ Calculation Time ▪ Clean DV01 ▪ Clean Price ▪ Clean Price Default Free ▪ Clean PV ▪ Clean PV Default Free ▪ Convexity ▪ Coupon PV ▪ Dirty DV01 ▪ Dirty Price ▪ Dirty Price Default Free

	▪ Dirty PV ▪ Dirty PV Default Free ▪ Duration ▪ DV01 ▪ Expected Recovery ▪ Fair Clean DV01 ▪ Fair Clean Price ▪ Fair Clean Price Default Free ▪ Fair Clean PV ▪ Fair Clean PV Default Free ▪ Fair Credit Yield Basis ▪ Fair Dirty DV01 ▪ Fair Dirty Price ▪ Fair Dirty Price Default Free ▪ Fair Dirty PV ▪ Fair Dirty PV Default Free ▪ Fair G Spread ▪ Fair I Spread ▪ Fair Notional PV ▪ Fair Par Coupon ▪ Fair Price ▪ Fair Price Default Free ▪ Fair PV ▪ Fair Spread over Treasury benchmark ▪ Fair Upfront ▪ Fair Yield To Maturity ▪ Fair Yield To Maturity Default Free ▪ Fair Yield To Maturity Default Free Duration ▪ Fair Yield To Worst ▪ Fair Yield To Worst Date ▪ Fair Yield To Worst Default Free

	▪ Fair Yield To Worst Default Free Convexity ▪ Fair Yield To Worst Default Free Date ▪ Fair Yield To Worst Default Free Duration ▪ Fair Yield To Worst Default Free Factor ▪ Fair Yield To Worst Convexity ▪ Fair Yield To Worst Duration ▪ Fair Yield To Worst Factor ▪ Fair Z Spread ▪ First Coupon Index ▪ First Index Rate ▪ G Spread ▪ I Spread ▪ Market Credit Yield Basis ▪ Market Clean Price ▪ Market Dirty Price ▪ Market Price ▪ Market Price Default Free ▪ Market Yield to Maturity ▪ Market Yield To Maturity Convexity ▪ Market Yield To Maturity Duration ▪ Market Yield To Worst ▪ Market Yield To Worst Convexity ▪ Market Yield To Worst Date ▪ Market Yield To Worst Duration ▪ Market Yield To Worst Factor ▪ Market I Spread ▪ Market G Spread ▪ Market Z Spread ▪ Principal PV ▪ Recovery PV ▪ Spread over Treasury benchmark

	▪ Yield to Maturity ▪ Yield To Maturity Convexity ▪ Yield To Maturity Duration ▪ Yield To Worst ▪ Yield To Worst Convexity ▪ Yield To Worst Date ▪ Yield To Worst Duration ▪ Yield To Worst Factor ▪ Z Spread
CDS	▪ Accrued, Fair Accrued, Market Accrued ▪ Accrued 01, Fair Accrued 01, Market Accrued 01 ▪ Clean DV01, Fair Clean DV01, Market Clean DV01 ▪ Clean Price, Fair Clean Price, Market Clean Price ▪ Clean PV, Fair Clean PV, Market Clean PV ▪ Dirty PV, Fair Dirty PV, Market Dirty PV ▪ DV01, Fair DV01, Market DV01 ▪ Expected Loss, Fair Expected Loss, Market Expected Loss ▪ Expected Loss No Recovery, Fair Expected Loss No Recovery, Market Expected Loss No Recovery ▪ Loss on Instantaneous Default, Fair Loss on Instantaneous Default, Market Loss on Instantaneous Default ▪ Loss PV, Fair Loss PV, Market Loss PV ▪ Par Spread, Fair Par Spread, Market Par Spread ▪ Premium PV, Fair Premium PV, Market Premium PV ▪ Price, Fair Price, Market Price ▪ PV, Fair PV, Market PV ▪ Upfront, Fair Upfront, Market Upfront
CDX	▪ Accrued ▪ Accrued 01 ▪ Calculation Time ▪ Clean DV01

	▪ Clean Price ▪ Clean PV ▪ Dirty PV ▪ DV01 ▪ Expected Loss ▪ Fair Premium ▪ Loss PV ▪ Premium PV ▪ Price ▪ PV ▪ Upfront
Cash/EDF	▪ Clean DV01, Fair Clean DV01, Market Clean DV01 ▪ Clean Price, Fair Clean Price, Market Clean Price ▪ Clean PV, Fair Clean PV, Market Clean PV ▪ Dirty PV, Fair Dirty PV, Market Dirty PV ▪ PV, Fair PV, Market PV ▪ Upfront, Fair Upfront, Market Upfront
IRS	▪ Accrued, Fair Accrued, Market Accrued ▪ Accrued 01, Fair Accrued 01, Market Accrued 01 ▪ Clean DV01, Fair Clean DV01, Market Clean DV01 ▪ Clean Price, Fair Clean Price, Market Clean Price ▪ Clean PV, Fair Clean PV, Market Clean PV ▪ Dirty PV, Fair Dirty PV, Market Dirty PV ▪ DV01, Fair DV01, Market DV01 ▪ Par Spread, Fair Par Spread, Market Par Spread ▪ Premium PV, Fair Premium PV, Market Premium PV ▪ Price, Fair Price, Market Price ▪ PV, Fair PV, Market PV ▪ Upfront, Fair Upfront, Market Upfront
Multi-leg Swap	▪ Accrued ▪ Accrued 01

	▪ Calculation Time ▪ Clean DV01 ▪ Clean Price ▪ Clean PV ▪ Dirty PV ▪ DV01 ▪ Fair Premium ▪ Premium PV ▪ Price ▪ PV ▪ Upfront

Calculated Risk Measures Coverage

<table>
<tr><th>Product</th><th>Measure</th></tr>
<tr><td>Bond</td><td>Bond G Spread PV 01
Bond I Spread PV 01
Bond Price Bumped PV 01
Bond Yield Bumped PV 01
Bond TSY Spread PV 01
Bond Z Spread PV 01
Parallel Bumped Credit PV 01
Parallel Bumped Credit PV Gamma
Parallel Bumped IR PV 01
Parallel Bumped IR PV Gamma
Parallel Bumped Recovery Rate PV 01
Parallel Bumped RR PV Gamma
Parallel 10% Credit Spread Widening PV Change
Tenor Bumped Credit PV 01
Tenor Bumped Credit PV Gamma (Same Node)
Tenor Bumped IR PV 01
Tenor Bumped IR PV Gamma (Same Node)
Tenor Bumped Recovery Rate PV 01
Tenor Bumped RR PV Gamma (Same Node)
FX Spot PV 01 (as applicable)</td></tr>
<tr><td>Bond Basket</td><td>Flat G Spread PV 01
Flat I Spread PV 01
Flat Price Bumped PV 01
Flat Yield Bumped PV 01
Flat TSY Spread PV 01
Flat Z Spread PV 01
Flat Parallel Bumped Credit PV 01</td></tr>
</table>

	▪ Flat Parallel Bumped Credit PV Gamma ▪ Flat Parallel Bumped IR PV 01 ▪ Flat Parallel Bumped IR PV Gamma ▪ Flat Parallel Bumped Recovery Rate PV 01 ▪ Flat Parallel Bumped RR PV Gamma ▪ Flat Parallel 10% Credit Spread Widening PV Change ▪ Component Bond G Spread PV 01 ▪ Component Bond I Spread PV 01 ▪ Component Bond Price Bumped PV 01 ▪ Component Bond Yield Bumped PV 01 ▪ Component Bond TSY Spread PV 01 ▪ Component Bond Z Spread PV 01 ▪ Component Parallel Bumped Credit PV 01 ▪ Component Parallel Bumped Credit PV Gamma ▪ Component Parallel Bumped IR PV 01 ▪ Component Parallel Bumped IR PV Gamma ▪ Component Parallel Bumped Recovery Rate PV 01 ▪ Component Parallel Bumped RR PV Gamma ▪ Component Parallel 10% Credit Spread Widen ▪ Flat Tenor Bumped Credit PV 01 ▪ Flat Tenor Bumped Credit PV Gamma (Same Node) ▪ Flat Tenor Bumped IR PV 01 ▪ Flat Tenor Bumped IR PV Gamma (Same Node) ▪ Flat Tenor Bumped Recovery Rate PV 01 ▪ Flat Tenor Bumped RR PV Gamma (Same Node) ▪ Component Tenor Bumped Credit PV 01 ▪ Component Tenor Bumped Credit PV Gamma (Same Node) ▪ Component Tenor Bumped IR PV 01 ▪ Component Tenor Bumped IR PV Gamma (Same Node) ▪ Component Tenor Bumped Recovery Rate PV 01 ▪ Component Tenor Bumped RR PV Gamma (Same Node)

	▪ FX Spot PV 01 (as applicable)
CDS	▪ Parallel Bumped Credit Fair Premium 01 ▪ Parallel Bumped Credit Fair Premium Gamma ▪ Parallel Bumped Credit PV 01 ▪ Parallel Bumped Credit PV Gamma ▪ Parallel Bumped Credit Upfront 01 ▪ Parallel Bumped Credit Upfront Gamma ▪ Parallel Bumped IR Fair Premium 01 ▪ Parallel Bumped IR Fair Premium Gamma ▪ Parallel Bumped IR PV 01 ▪ Parallel Bumped IR PV Gamma ▪ Parallel Bumped IR Upfront 01 ▪ Parallel Bumped IR Upfront Gamma ▪ Parallel Bumped Recovery Rate Fair Premium 01 ▪ Parallel Bumped Recovery Rate Fair Premium Gamma ▪ Parallel Bumped Recovery Rate PV 01 ▪ Parallel Bumped Recovery Rate PV Gamma ▪ Parallel Bumped Recovery Rate Upfront 01 ▪ Parallel Bumped Recovery Rate Upfront Gamma ▪ Parallel 10% Credit Spread Widening PV Change ▪ Tenor Bumped Credit Fair Premium 01 ▪ Tenor Bumped Credit Fair Premium Gamma (Same Node) ▪ Tenor Bumped Credit PV 01 ▪ Tenor Bumped Credit PV Gamma (Same Node) ▪ Tenor Bumped Credit Upfront 01 ▪ Tenor Bumped Credit Upfront Gamma (Same Node) ▪ Tenor Bumped IR Fair Premium 01 ▪ Tenor Bumped IR Fair Premium Gamma (Same Node) ▪ Tenor Bumped IR PV 01 ▪ Tenor Bumped IR PV Gamma (Same Node) ▪ Tenor Bumped IR Upfront 01

	▪ Tenor Bumped IR Upfront Gamma (Same Node) ▪ Tenor Bumped Recovery Rate Fair Premium 01 ▪ Tenor Bumped Recovery Rate Fair Premium Gamma (Same Node) ▪ Tenor Bumped Recovery Rate PV 01 ▪ Tenor Bumped Recovery Rate PV Gamma (Same Node) ▪ Tenor Bumped Recovery Rate Upfront 01 ▪ Tenor Bumped Recovery Rate Upfront Gamma (Same Node)
CDX	▪ Flat Parallel Bumped Credit Fair Premium 01 ▪ Flat Parallel Bumped Credit Fair Premium Gamma ▪ Flat Parallel Bumped Credit PV 01 ▪ Flat Parallel Bumped Credit PV Gamma ▪ Flat Parallel Bumped Credit Upfront 01 ▪ Flat Parallel Bumped Credit Upfront Gamma ▪ Flat Parallel Bumped IR Fair Premium 01 ▪ Flat Parallel Bumped IR Fair Premium Gamma ▪ Flat Parallel Bumped IR PV 01 ▪ Flat Parallel Bumped IR PV Gamma ▪ Flat Parallel Bumped IR Upfront 01 ▪ Flat Parallel Bumped IR Upfront Gamma ▪ Flat Parallel Bumped Recovery Rate Fair Premium 01 ▪ Flat Parallel Bumped Recovery Rate Fair Premium Gamma ▪ Flat Parallel Bumped Recovery Rate PV 01 ▪ Flat Parallel Bumped Recovery Rate PV Gamma ▪ Flat Parallel Bumped Recovery Rate Upfront 01 ▪ Flat Parallel Bumped Recovery Rate Upfront Gamma ▪ Flat Parallel 10% Credit Spread Widening PV Change ▪ Component Parallel Bumped Credit Fair Premium 01 ▪ Component Parallel Bumped Credit Fair Premium Gamma ▪ Component Parallel Bumped Credit PV 01 ▪ Component Parallel Bumped Credit PV Gamma ▪ Component Parallel Bumped Credit Upfront 01

	▪ Component Parallel Bumped Credit Upfront Gamma ▪ Component Parallel Bumped IR Fair Premium 01 ▪ Component Parallel Bumped IR Fair Premium Gamma ▪ Component Parallel Bumped IR PV 01 ▪ Component Parallel Bumped IR PV Gamma ▪ Component Parallel Bumped IR Upfront 01 ▪ Component Parallel Bumped IR Upfront Gamma ▪ Component Parallel Bumped Recovery Rate Fair Premium 01 ▪ Component Parallel Bumped Recovery Rate Fair Premium Gamma ▪ Component Parallel Bumped Recovery Rate PV 01 ▪ Component Parallel Bumped Recovery Rate PV Gamma ▪ Component Parallel Bumped Recovery Rate Upfront 01 ▪ Component Parallel Bumped Recovery Rate Upfront Gamma ▪ Component Parallel 10% Credit Spread Widening PV Change ▪ Flat Tenor Bumped Credit Fair Premium 01 ▪ Flat Tenor Bumped Credit Fair Premium Gamma (Same Node) ▪ Flat Tenor Bumped Credit PV 01 ▪ Flat Tenor Bumped Credit PV Gamma (Same Node) ▪ Flat Tenor Bumped Credit Upfront 01 ▪ Flat Tenor Bumped Credit Upfront Gamma (Same Node) ▪ Flat Tenor Bumped IR Fair Premium 01 ▪ Flat Tenor Bumped IR Fair Premium Gamma (Same Node) ▪ Flat Tenor Bumped IR PV 01 ▪ Flat Tenor Bumped IR PV Gamma (Same Node) ▪ Flat Tenor Bumped IR Upfront 01 ▪ Flat Tenor Bumped IR Upfront Gamma (Same Node) ▪ Flat Tenor Bumped Recovery Rate Fair Premium 01 ▪ Flat Tenor Bumped Recovery Rate Fair Premium Gamma (Same Node) ▪ Flat Tenor Bumped Recovery Rate PV 01 ▪ Flat Tenor Bumped Recovery Rate PV Gamma (Same Node) ▪ Flat Tenor Bumped Recovery Rate Upfront 01

	▪ Flat Tenor Bumped Recovery Rate Upfront Gamma (Same Node) ▪ Component Tenor Bumped Credit Fair Premium 01 ▪ Component Tenor Bumped Credit Fair Premium Gamma (Same Node) ▪ Component Tenor Bumped Credit PV 01 ▪ Component Tenor Bumped Credit PV Gamma (Same Node) ▪ Component Tenor Bumped Credit Upfront 01 ▪ Component Tenor Bumped Credit Upfront Gamma (Same Node) ▪ Component Tenor Bumped IR Fair Premium 01 ▪ Component Tenor Bumped IR Fair Premium Gamma (Same Node) ▪ Component Tenor Bumped IR PV 01 ▪ Component Tenor Bumped IR PV Gamma (Same Node) ▪ Component Tenor Bumped IR Upfront 01 ▪ Component Tenor Bumped IR Upfront Gamma (Same Node) ▪ Component Tenor Bumped Recovery Rate Fair Premium 01 ▪ Component Tenor Bumped Recovery Rate Fair Premium Gamma (Same Node) ▪ Component Tenor Bumped Recovery Rate PV 01 ▪ Component Tenor Bumped Recovery Rate PV Gamma (Same Node) ▪ Component Tenor Bumped Recovery Rate Upfront 01 ▪ Component Tenor Bumped Recovery Rate Upfront Gamma (Same Node)
Rates Product	▪ Parallel Bumped IR Fair Premium 01 ▪ Parallel Bumped IR Fair Premium Gamma ▪ Parallel Bumped IR PV 01 ▪ Parallel Bumped IR PV Gamma ▪ Parallel Bumped IR Upfront 01 ▪ Parallel Bumped IR Upfront Gamma ▪ Tenor Bumped IR Fair Premium 01 ▪ Tenor Bumped IR Fair Premium Gamma (Same Node) ▪ Tenor Bumped IR PV 01 ▪ Tenor Bumped IR PV Gamma (Same Node)

	▪ Tenor Bumped IR Upfront 01 ▪ Tenor Bumped IR Upfront Gamma (Same Node)
Multi-leg Swap	▪ Flat Parallel Bumped IR Fair Premium 01 ▪ Flat Parallel Bumped IR Fair Premium Gamma ▪ Flat Parallel Bumped IR PV 01 ▪ Flat Parallel Bumped IR PV Gamma ▪ Flat Parallel Bumped IR Upfront 01 ▪ Flat Parallel Bumped IR Upfront Gamma ▪ Component Parallel Bumped IR Fair Premium 01 ▪ Component Parallel Bumped IR Fair Premium Gamma ▪ Component Parallel Bumped IR PV 01 ▪ Component Parallel Bumped IR PV Gamma ▪ Component Parallel Bumped IR Upfront 01 ▪ Component Parallel Bumped IR Upfront Gamma ▪ Flat Tenor Bumped IR Fair Premium 01 ▪ Flat Tenor Bumped IR Fair Premium Gamma (Same Node) ▪ Flat Tenor Bumped IR PV 01 ▪ Flat Tenor Bumped IR PV Gamma (Same Node) ▪ Flat Tenor Bumped IR Upfront 01 ▪ Flat Tenor Bumped IR Upfront Gamma (Same Node) ▪ ▪ Component Tenor Bumped IR Fair Premium 01 ▪ Component Tenor Bumped IR Fair Premium Gamma (Same Node) ▪ Component Tenor Bumped IR PV 01 ▪ Component Tenor Bumped IR PV Gamma (Same Node) ▪ Component Tenor Bumped IR Upfront 01 ▪ Component Tenor Bumped IR Upfront Gamma (Same Node)