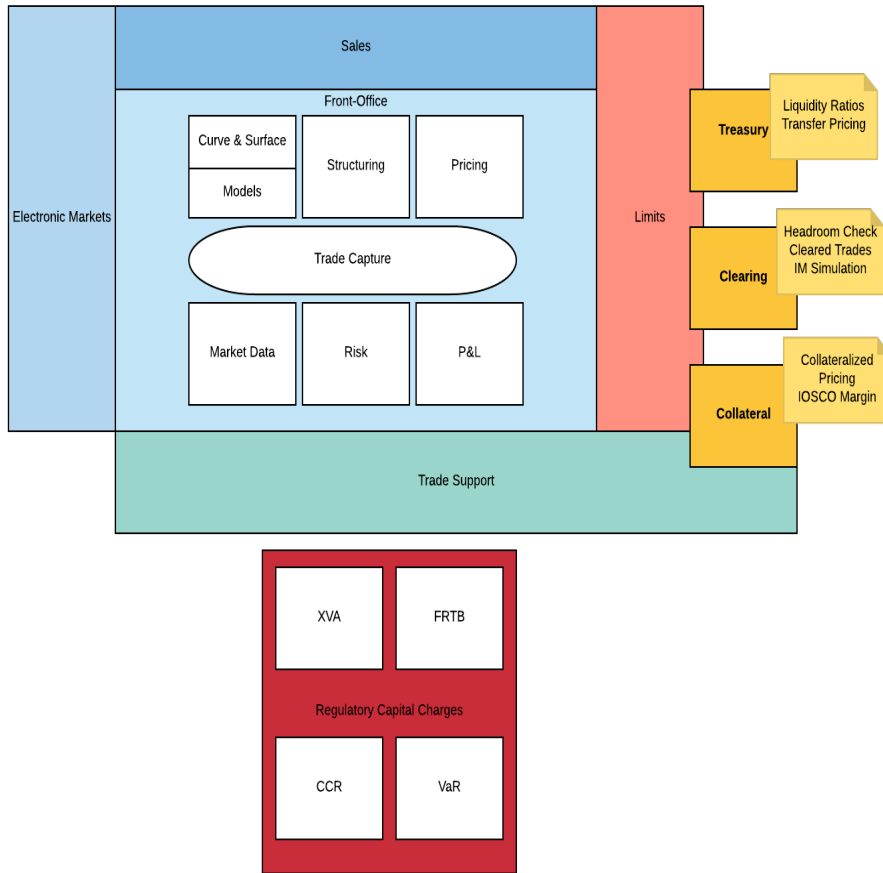


# Derivatives Functions Topography

## V1.0

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Special thanks to Joshua Giersch and Paola Brahimcha



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# Derivatives Functions Topography

## V1.0

I will segment the document into:

### Products:

#### Interest Rates Derivatives

- Swaps Vanilla
- Swaps Structured
- Cross-Currency Swaps
- Constant Maturity Swaps
- Overnight Indexed Swaps
- Future on Interest Rate Swap
- Forward Rate Agreements
- Interest Rate Futures
- **Options:**
  - Cap/Floor
  - Cancelable
  - Swaptions
  - Callable
  - Range Accrual
  - Target Redemption
  - Spread Cap/Floor

#### Foreign Exchange Derivatives:

- Spot and Forward (deliverable or non-deliverable)
- FX swaps (deliverable and non-deliverable)
- Window forward (including early take-up)
- Averaging forwards (average-rate, average-strike, double-average)
- **Options:**
  - Vanilla Options (OTC & listed; cash-and physical-settled)
  - Barrier Options (Single/Double)
  - Digital Options
  - Binary Options
  - Lookback Options
  - Asian Options (average-rate, average-strike, double-average)
  - Forward-start Options
  - Compound Options
  - Basket Options
  - Quanto payoffs (self and third-currency)
  - Scripted payoffs:
    - Target Redemption Forwards (TARF)

# Derivatives Functions Topography

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### Credit Derivatives:

- CDS
- CDS Indices
- CDS Forward
- Asset Swaps
- Credit Index Futures
- Syndicated Loans

### Front-Office Tools:

#### Pricing (Real-Time)

- Single Trade
- Strategies
- Bundles
- Cash Flow Structuring (amortization, annuities,...)
- Packages (linked trades)
- Strips
- Solving

#### Structuring (Real-Time)

- Scripted payoffs
- Linked Notes (Funded and unfunded [swaps/options] payoffs)
- Solving
- Converting a cash structure into a packaged note

In addition to the standard valuation, pricing and structuring tools should provide the following: XVA charges; **Margin comparison** (Cleared and Bilateral); Headroom check (**Collateralized or not**); liquidity ratio checks; and real-time pre-trade checks for compliance, market-risk limits, and credit-risk limits.

#### Trade Capture

- Purpose: Sales, Prop, What-if, Internal, ...
- KYC
- Product Check
- Classifications
- Rules
- Enrichments

#### Market Data:

- Publishing
- Consuming

# Derivatives Functions Topography

## V1.0

- Management (cleaning, blending, rule based,...)

### Analytcs:

- **Curve and Surface Building Framework:**
  - Pricing
  - Calibration
  - Collateralization (same currency, different currency)
- **Pricing Libraries:**
  - OIS Discounting
  - SABR
  - Shifted SABR
  - Black-Scholes
  - LGM
  - LMM
  - BGM
  - Vanna-Volga
  - LSV (local-stochastic vol)
  - Monte-Carlo when appropriate

### Risk:

- Sensitivity analysis
- "What-if" analysis
- Behavior analysis
- Position analysis
- Greek analysis
- Cash analysis
- Expiries analysis
- Barriers analysis
- Reset risk analysis
- JTD analysis
- Pin risk analysis
- Horizon analysis
- Hedge recommendations

### P&L:

- **Type of P&L:**
  - Economic P&L
  - Flash P&L
  - P&L attribution
  - P&L explained

# Derivatives Functions Topography

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- Detailed End of Day P&L [Realized, Unrealized, Accrual, MTM, Capital Gain/Loss, Transfer Pricing, Fees, Cost of Opportunity, Discounting Effects, Cost of Operations]
- **P&L Management:**
  - P&L Sign-Off
  - P&L Sweep
  - P&L Adjustment
  - P&L Lockdown

### Trade Support:

- Trade enrichment
- Trade booking
- Trade validation
- Market Data validation
- **Trade Life Cycle Management:**
  - Standard Market Life Cycles
  - OTC Life Cycles
  - Corporate Actions

### Limits:

- **Type of Limits (pre or post trades):**
  - Credit Limits
  - Settlement Limits
  - PFE Limits
  - VaR Limits
  - Traders mandate Limits
  - Risk limits (Greeks)
  - Collateral Limits (Headroom check)
  - Liquidity Ratio Limits
  - Compliance Limits
  - Market Price Check Limit
- **Limit Management:**
  - Violations management
  - Exception management
  - Freezing of Limits
  - Reservations
  - Hard and Soft Limits definition
  - Enquiries

### Regulatory Capital Tools:

# Derivatives Functions Topography

## V1.0

- **VaR:**
  - Historical
  - Parametric
  - Monte-Carlo
  - VaR Attribution
  - Back-Testing
  - Stress-Testing
  
- **FRTB:**
  - Standard SA-MR
  - Advanced (Internal Models) MR
  
- **XVA:**
  - Basic CVA
  - SA-CVA
  - DVA
  - FVA
  - KVA
  - LVA
  - MVA
  
- **CCR:**
  - Standard SA-CCR
  - Advanced CCR
  - PFE Exposures

### Sales:

- Executable pricing
  - Trader control over executable V/S RFQ pricing: size, tenor, customer
- Structuring
- Sales-Trader communications & negotiation
- 360-degree view of client positions and risk
- Automated termsheet generation
- Corporate Help Desk