

# EDM Webinar

## ENABLING INNOVATION

Approaches for Managing and Transforming  
Market and Reference Data

*A conversation with*



**Charlie Browne**  
Head of Market Data,  
Valuations & Risk Solutions  
**GoldenSource**



**Dr. Wolfgang Kugler**  
Team Leader for Financial  
Market Data  
**RSU GmbH & Co**



# Today's panel

Moderator



**Mike Meriton**

Co-Founder  
EDM Council



**Charlie Browne**

Head of Market Data,  
Valuations & Risk Solutions  
GoldenSource



**Dr. Wolfgang Kugler**

Team Leader for Financial  
Market Data  
RSU



# Agenda

## Approaches for Managing and Transforming Market & Ref Data

**1** Background & Context

**2** Industry Challenges

**3** Approaches for Addressing

Centralized Reference Data for Curves & Surfaces

Validation Approaches for Market Data

Market Data Transformations

Statistical Validation Approaches

**4** Conclusions

**5** Q&A

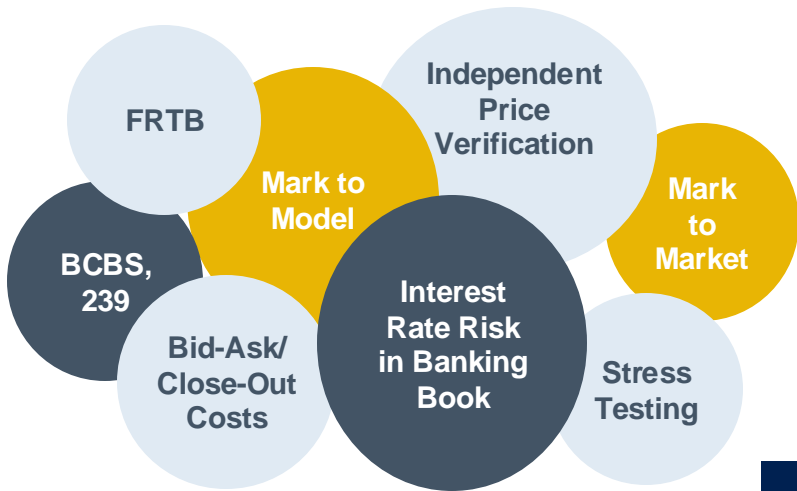


# Background & Context

# Recent Regulatory Emphasis on Data Quality

- 2008 **Financial Crisis**
- 2009 **Financial Stability Board**
- 2010 **Global Regulatory Framework** for More Resilient Banks and Banking Systems (BIS, 2010)

## Banking Regulation – Basel III

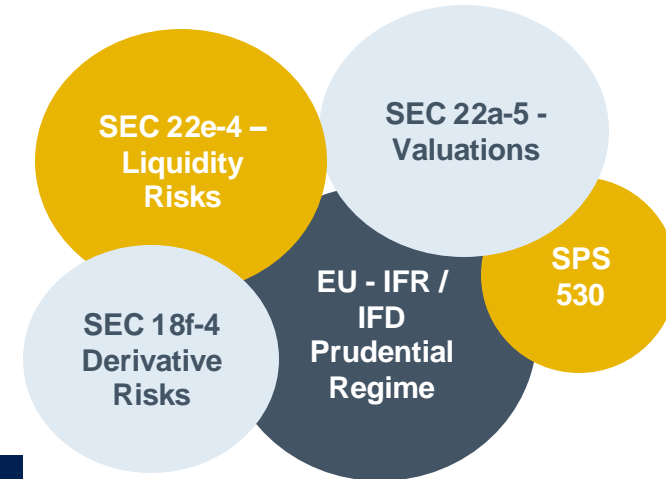


### Market Data Refs

- BCBS (2016a) (EBA, 2018a, Section 4.6)
- BCBS (2013), Principle 8
- EBA (2015)
- BCBS (2016a)
- BCBS (2016a, Section D), Rebonato (2002)
- BCBS (2016a, Section D), Derman (2001)
- BCBS (2016a, Section D), Nash (2017)

### Data Quality Emphasis

## Buy Side Regulation



Valuation & Risk Reg

Centrality of Prices

Data Management Reg

2018

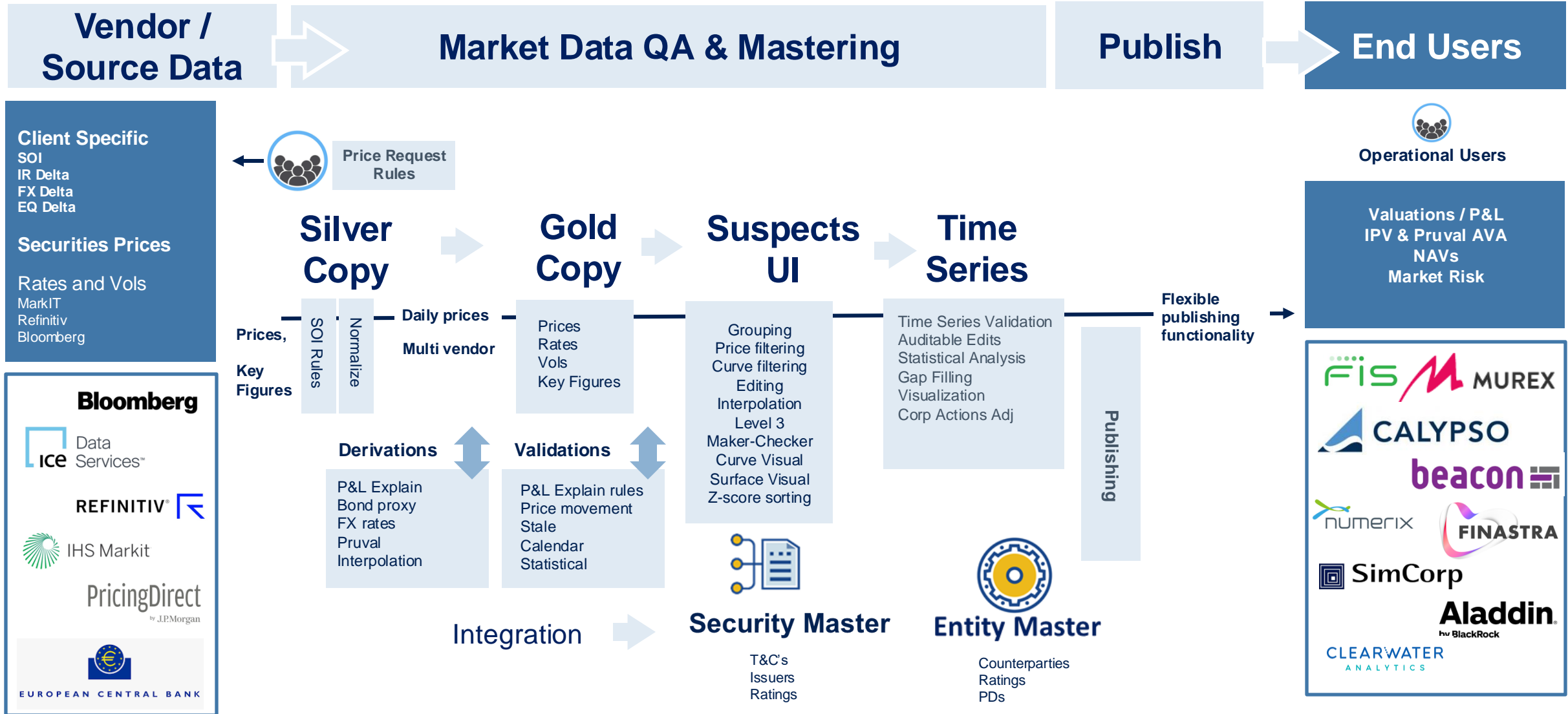
**FRTB reloaded:** The need for a fundamental revamp of trading-risk infrastructure

(McKinsey report 2018)

**RRDAR:** “Data lineage” + “Data governance” + “Golden source of data” + “data validation”

(ECB Stakeholder, 2023)

# Market Data and Reference Data End-to-End

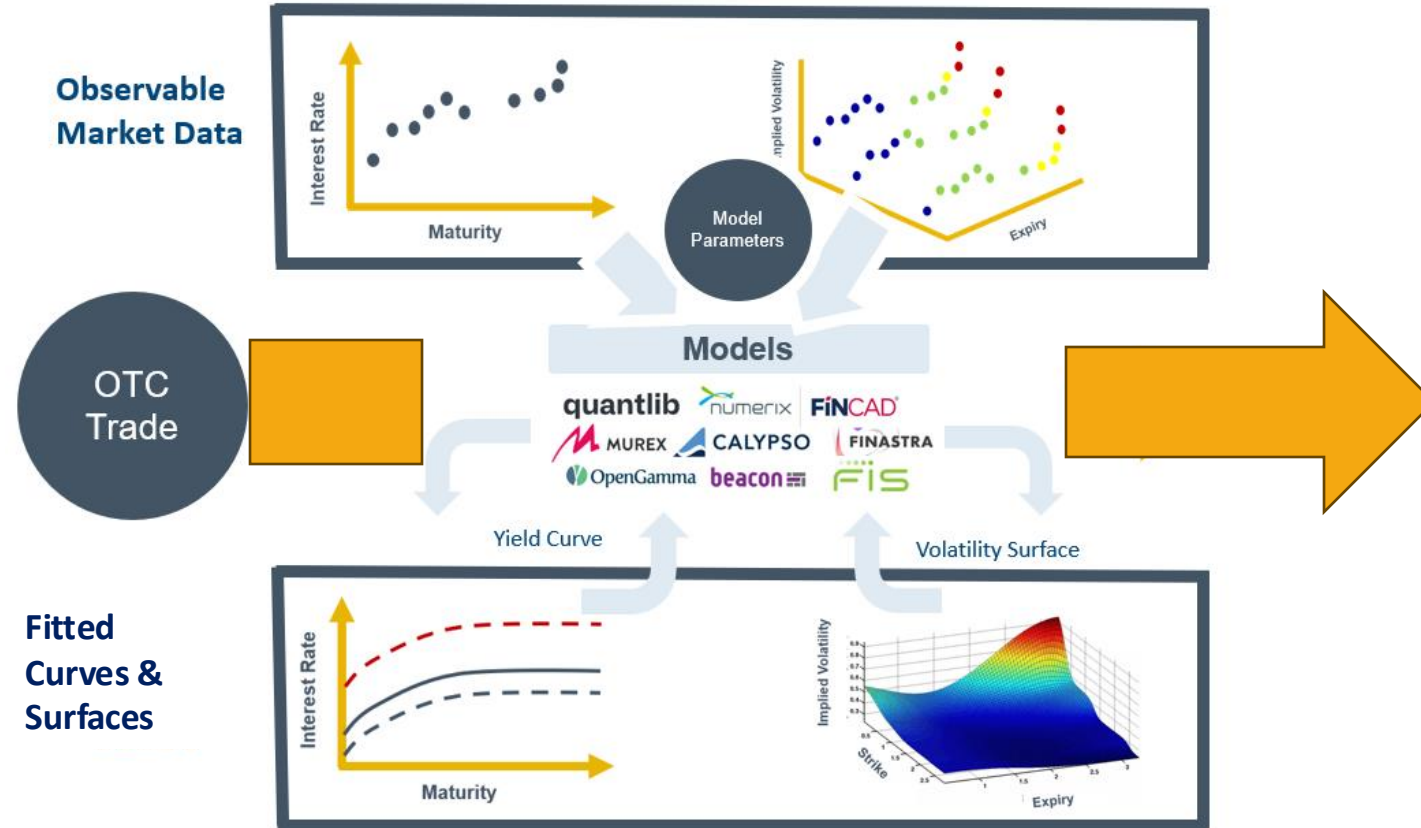


# What are Curves and Surface used for?

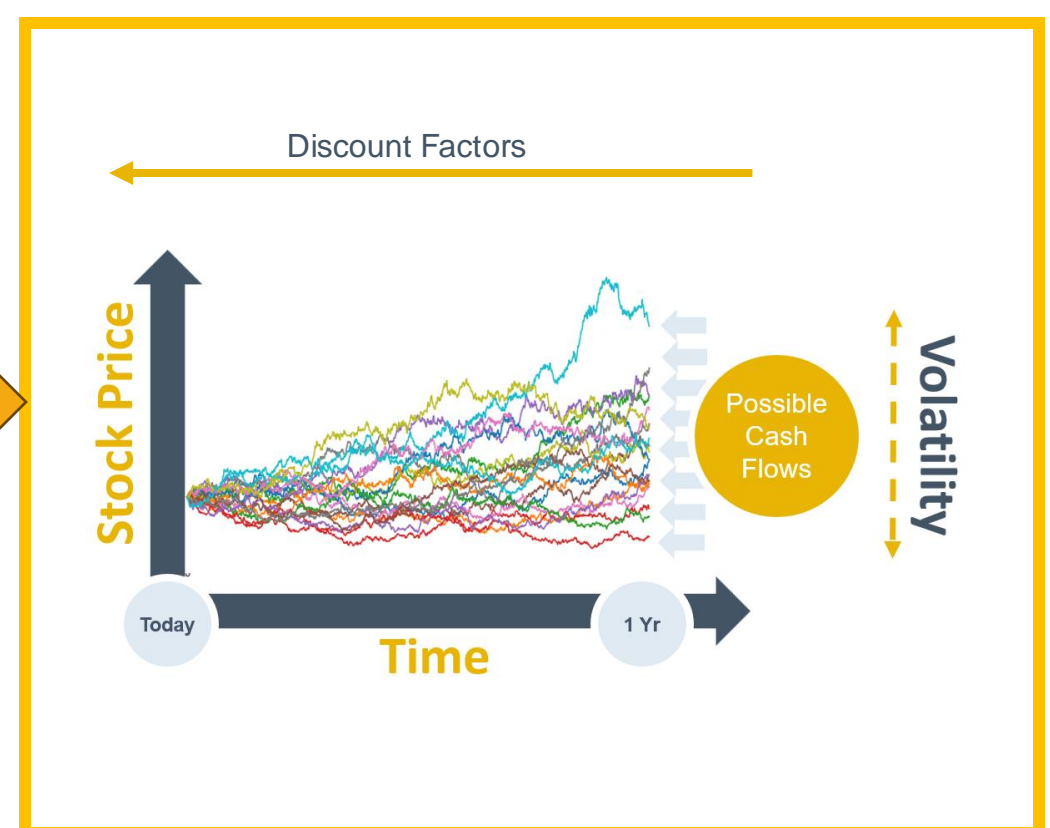
## Business Rational

The market data associated with curves & surfaces are the primary input into derivatives valuations routines

## Curves & Surfaces



## Valuation





# Industry Challenges



# Problems that require market data solutions

## 1 **Fragmented Reference Data Infrastructure**

Disparate sources and repositories for the curves + surfaces reference data

## 2 **Inconsistent Validation Approaches**

Inconsistent and un-auditable approaches for validating market data

## 3 **Time Consuming Validation**

Market data validation not optimized for the time-sensitive nature of daily valuations

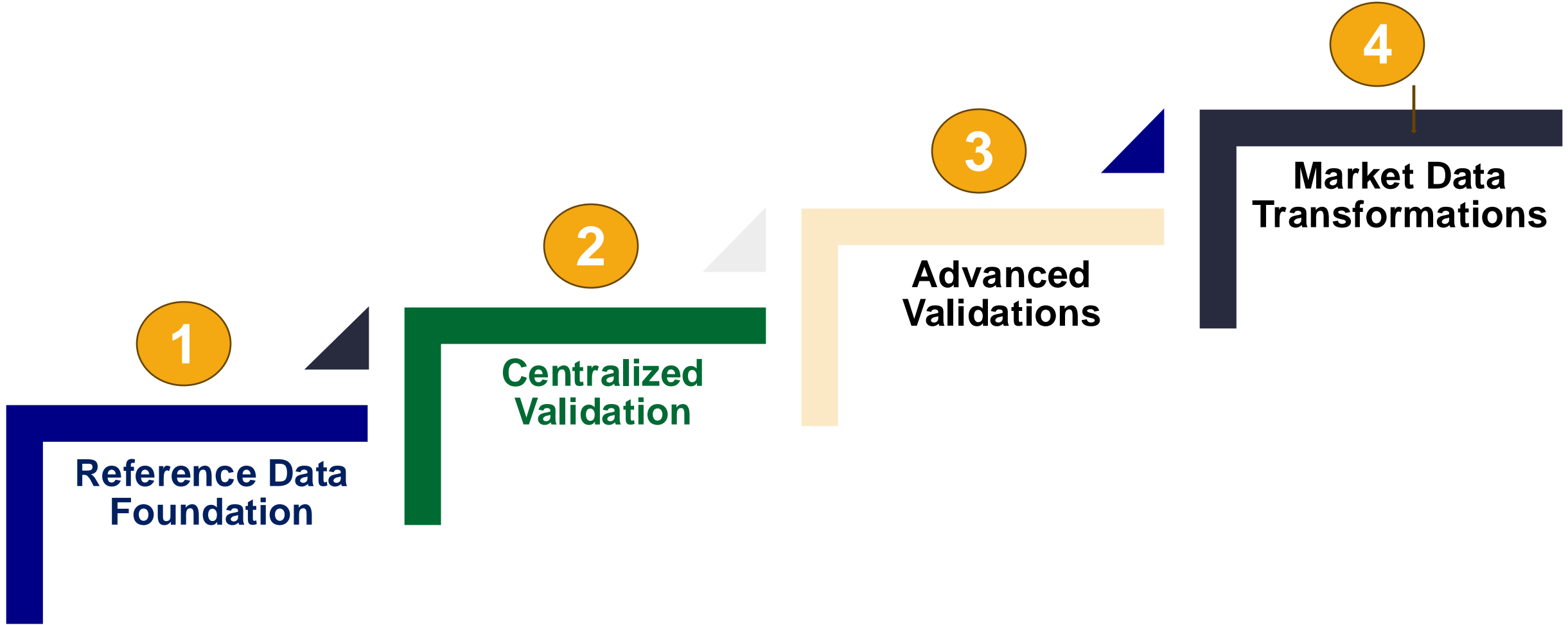
## 4 **Illiquid Market Data**

Market data is often illiquid, with missing data, unusable for valuation and risk processes



# Approaches for Addressing the Challenges

# Building Block Approach



# Approach 1 Reference Data Foundation

## Curves & Surfaces

- IBOR, OIS, Xccy, Tenor, CDS
- FX Forward, Swap
- Cap/Floor vols, Swaption Vols
- FX Vols

## Conventions

- Spot Lag, Day Count Basis
- Index references,
- CDS conventions
- FX Vol conventions

## Price Mappings

- Refinitiv DSS
- Bloomberg DL
- MarkIT CDS
- ICE SuperD, Apex

## Broker Specific

- ICAP IR Vols
- Tullett's FX Vol



- 200+ Currency pairs
- 100+ IR Currencies
- 100+ Conventions Screens
- 30+ Price mappings
- 100+ CSV templates

| Asset classes         | Issue types | Description      | Nb of instruments | Nb of currency pairs | Nb of validation and derivation rules | Nb of screens | Nb of vendor identifiers | Nb of CSV templates |
|-----------------------|-------------|------------------|-------------------|----------------------|---------------------------------------|---------------|--------------------------|---------------------|
| 1<br>FX Spot & Curves | FXSPOT      | FX Spot          | 277               | 277                  | 2                                     | 6             | 111                      | 6                   |
|                       | FXFIXING    | FX Fixing        | 455               |                      |                                       |               |                          |                     |
|                       | FXSWRTE     | FX Swap Rate     | 836               |                      |                                       |               |                          |                     |
|                       | FXFWRTE     | FX Forward Rate  | 1397              | 71                   |                                       |               |                          |                     |
|                       | FXNDSWRT    | FX NDF Swap Rate | 74                |                      |                                       |               |                          |                     |
|                       | FXNDFWRT    | FX NDF rate      | 57                |                      |                                       |               |                          |                     |
|                       | FXVOL       | FX Volatility    |                   |                      |                                       |               |                          |                     |
| <b>Total</b>          |             |                  | <b>3096</b>       | <b>348</b>           |                                       |               |                          |                     |

| Asset classes  | Issue types | Description                        | Nb of instruments | Nb of indices | Nb of rules | Nb of screens | Nb of vendor identifiers | Nb of CSV templates |
|----------------|-------------|------------------------------------|-------------------|---------------|-------------|---------------|--------------------------|---------------------|
| 2<br>IR Curves | IRFRART     | IR Forward rate agreement          | 471               | 231           |             | 6             |                          | 6                   |
|                | IRFIX       | IR Fixing                          | 185               | 81            |             | 6             | 65                       | 6                   |
|                | IRSWRAT     | IR Swap Rate                       | 1086              | 38            |             | 6             | 466                      | 6                   |
|                | IRBSSWRT    | IR Basis Swap Rate                 | 571               | 23            | 2           | 6             | 292                      | 6                   |
|                | IRCMSWRT    | IR CMS rate                        | 23                |               |             | 6             |                          | 6                   |
|                | IRDEPRT     | IR Depo rate                       | 287               |               | 2           | 6             |                          | 6                   |
|                | IRBMCOIX    | IR Corp Bond Benchmark Index Level | 33                |               |             |               |                          |                     |
|                | IRBMGVIX    | IR Gov Bond Benchmark Index Level  | 253               |               |             | 2             |                          | 4                   |
|                | IRBMINIX    | IR Inflation Bond Index Level      | 11                |               |             |               |                          |                     |
|                | IRBMISIX    | IR Issuer Bond Benchmark Level     |                   |               |             | 2             |                          | 4                   |
|                | IRBMSCIX    | IR Sector Bond Benchmark Level     |                   |               |             | 2             |                          | 4                   |
|                | IRBMSPIX    | IR Bond Benchmark Spread Level     |                   |               |             | 2             |                          | 4                   |

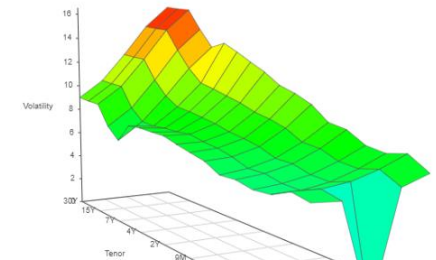
# Approach 2 Centralized Validation

## Validation Approaches

Daily Movement, Curve Consistency, Vendor comparisons, Curve Level Validations, Instrument Level Validations

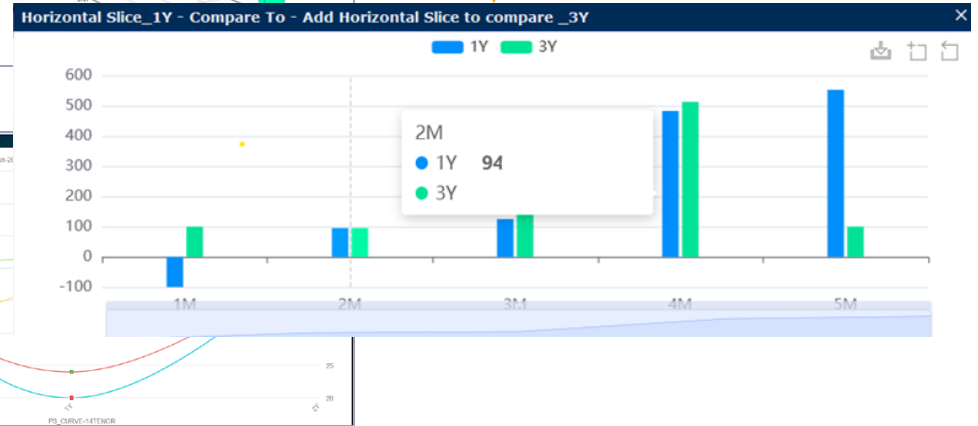
### Surface Visualization

- Curve & Surface Visualization
- Rapidly sense checking



### Vol Surface

“Slices”  
Spreads, Movements  
Vendor Comparisons



| Curve/Surface Name        | Seq No. | Points | ... |
|---------------------------|---------|--------|-----|
| CVRDEPART_PLN             | 9       | 0      | 0   |
| CVRDEPART_SEK             | 9       | 0      | 0   |
| CVRFXRT_CNY_CNY7D         | 1       | 0      | 0   |
| CVRFXRT_CNY_CNY7D_1W      | 1       | 0      | 0   |
| CVRFXRT_CNY_Shibor_3M     | 1       | 0      | 0   |
| CVRFXRT_KRW_CD_91D        | 1       | 0      | 0   |
| CVRSSWRT_CNY_CNY7D_1W     | 10      | 0      | 6   |
| CVRSSWRT_CNY_CNY7D_1W_NDS | 12      | 0      | 7   |
| CVRSSWRT_CNY_Shibor_3M    | 16      | 0      | 11  |
| CVRSSWRT_KRW_CD_91D       | 11      | 10     | 0   |
| CVRSSWRT_PLN_Wibor_6M     | 13      | 13     | 0   |

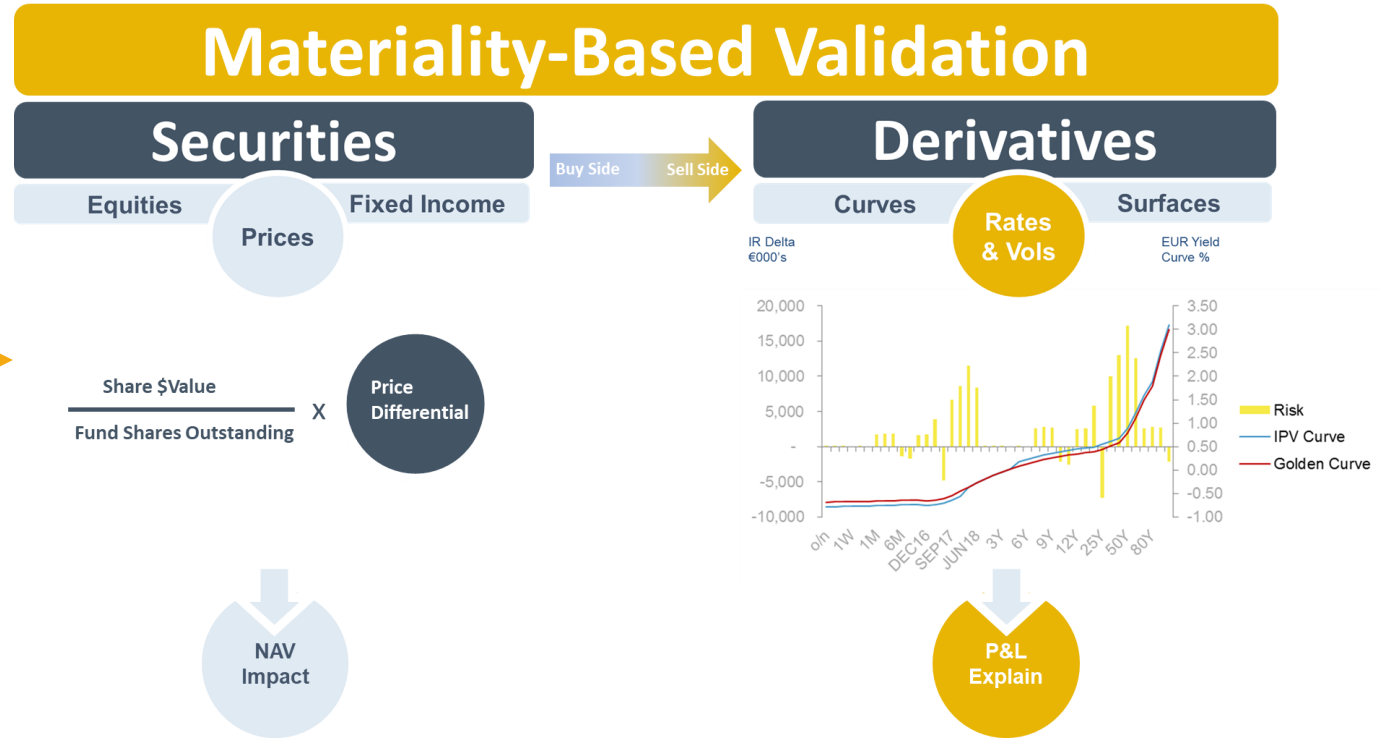
  

| Instrument Name          | Currency | Golden Pr... | Golden Price | Last Gold... | Golden Pric... | StdevDOD      | Stale For |
|--------------------------|----------|--------------|--------------|--------------|----------------|---------------|-----------|
| IRSWRAT_PLN_WIBOR_6M_2Y  | PLN      | Mid          | 4.58         | 4.97         | 31-Aug-2023    | 0.08254796585 |           |
| IRSWRAT_PLN_WIBOR_6M_3Y  | PLN      | Mid          | 4.58         | 4.645        | 31-Aug-2023    | 0.08836005885 |           |
| IRSWRAT_PLN_WIBOR_6M_4Y  | PLN      | Mid          | 4.555        | 4.515        | 31-Aug-2023    | 0.09316651759 |           |
| IRSWRAT_PLN_WIBOR_6M_5Y  | PLN      | Mid          | 4.52         | 4.48         | 31-Aug-2023    | 0.09850972879 |           |
| IRSWRAT_PLN_WIBOR_6M_7Y  | PLN      | Mid          | 4.33         | 4.495        | 31-Aug-2023    | 0.09550301249 |           |
| IRSWRAT_PLN_WIBOR_6M_7Y  | PLN      | Mid          | 4.58         | 4.54         | 31-Aug-2023    | 0.09194314366 |           |
| IRSWRAT_PLN_WIBOR_6M_8Y  | PLN      | Mid          | 4.635        | 4.6          | 31-Aug-2023    | 0.08585477079 |           |
| IRSWRAT_PLN_WIBOR_6M_8Y  | PLN      | Mid          | 4.62         | 4.66         | 31-Aug-2023    | 0.08552777326 |           |
| IRSWRAT_PLN_WIBOR_6M_10Y | PLN      | Mid          | 4.74         | 4.71         | 31-Aug-2023    | 0.08344159634 |           |
| IRSWRAT_PLN_WIBOR_6M_12Y | PLN      | Mid          | 4.85         | 4.82         | 31-Aug-2023    | 0.08344159634 |           |
| IRSWRAT_PLN_WIBOR_6M_15Y | PLN      | Mid          | 4.92         | 4.94         | 31-Aug-2023    | 0.08344159634 |           |

# Approach 3 Advanced Validations

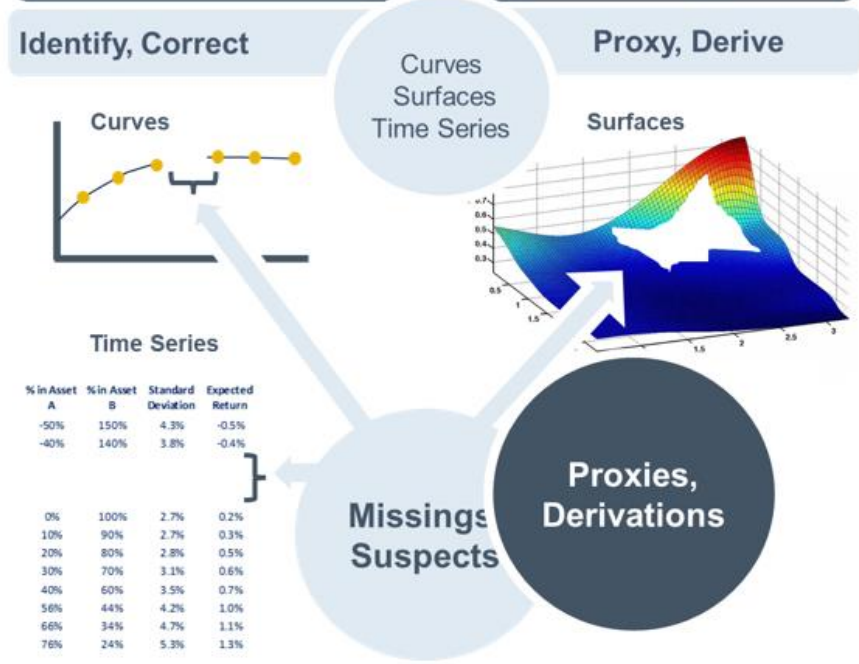
## Statistical and Quantitative Approaches

- Tolerances based on standard deviations
- Sorting market data exceptions by z-score outliers
- Using PCA for tolerance checking
- Time series curve-based validations
- Materiality Based Approaches

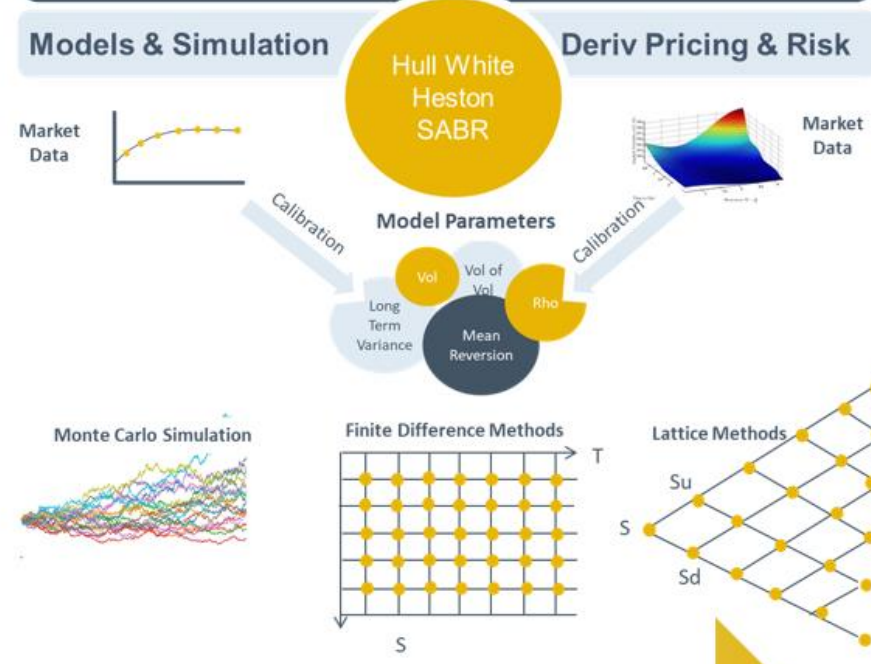


# Approach 4 Market Data Transformations

## Market Data Ops



## Quant Finance



Spline Interpolation    Curve Correlation Analysis    Parameter calibration    Lattice    Stochastic Vol

ASW Z-Spread Proxies    Pruvall MPU    PCA    Option Prems -> IVs    Monte Carlo    Sensitivity Generation

EWMA TimeSeries Check    Curve Consistency / Monotonicity    XVAs    Finite Difference    Exotics    Term Structure

# Approach 4 Market Data Transformations

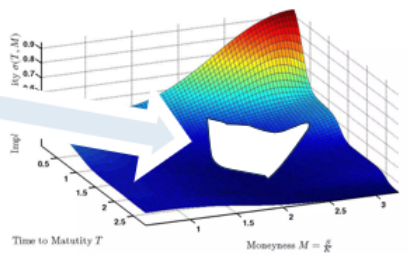
## Proxy Pricing

### 1 Adjacent Proxies

#### Rate Curves



#### Volatility Surfaces



Missing Prices

#### Time Series

| % in Asset A | % in Asset B | Standard Deviation | ed   |
|--------------|--------------|--------------------|------|
| -50%         | 150%         | 4.3%               | }    |
| -40%         | 140%         | 3.8%               |      |
| 0%           | 100%         | 2.7%               | 0.2% |
| 10%          | 90%          | 2.7%               | 0.3% |
| 20%          | 80%          | 2.8%               | 0.5% |
| 30%          | 70%          | 3.1%               | 0.6% |
| 40%          | 60%          | 3.5%               | 0.7% |
| 56%          | 44%          | 4.2%               | 1.0% |
| 66%          | 34%          | 4.7%               | 1.1% |
| 76%          | 24%          | 5.3%               | 1.3% |

### 2 Fixed Income Proxies



| Maturity | Geography | CCY | Rating | Proxy Bonds | Z-Spread   | ASW Spread   |
|----------|-----------|-----|--------|-------------|------------|--------------|
| 2 Years  | Holland   | EUR | AA+    | Bond 1      | Z-Spread 1 | ASW Spread 1 |
|          |           |     |        | Bond 2      | Z-Spread 2 | ASW Spread 2 |
|          |           |     |        | Bond 3      | Z-Spread 3 | ASW Spread 3 |
|          |           |     |        | Bond 4      | Z-Spread 4 | ASW Spread 4 |
|          |           |     |        | Bond 5      | Z-Spread 5 | ASW Spread 5 |

Average: ASW Spread Z Spread

Where:

Z Spread

$$PV = \frac{PMT}{(1+z_1+Z)^1} + \frac{PMT}{(1+z_2+Z)^2} + \frac{PMT}{(1+z_2+Z)^3}$$

ASW Spread

$$100-P + C \sum_{i=1}^{N(FIXED)} z(t_i) - \sum_{i=1}^{N(FLOAT)} \Delta I (RFR_i + ASW) z(t_i) = 0$$





# Key Takeaways

# Essential Insights

1

Strong Reference Data Foundations

2

Centralized Approach to Validation & Lineage

3

Enhanced Validation Techniques for optimized delivery to valuations & risk

4

Advanced transformations for missing an illiquid data

# Questions?



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# GoldenSource at a Glance

The **largest independent** provider of Enterprise & Master Data Management (E-/MDM) software and cloud data management services

Data vendor **neutral**—over 100 data partners

**Founding** and active member of the **EDM Council**

**PaaS** oriented, fit-for-purpose solutions'

Rich domain IP built over 40 years of **exclusive focus on financial services** data management

**Cloud enabled** (AWS / Azure / private)

Headquartered in **NYC** with 400+ employees globally (London, Milan, Singapore Mumbai)

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**6**  
Offices in  
6 countries

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**50**  
Over 50  
Customers

---

**400**  
More than 400 Team  
Members

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**\$1.5bn AUM**  
Owned by  
Gemspring Capital

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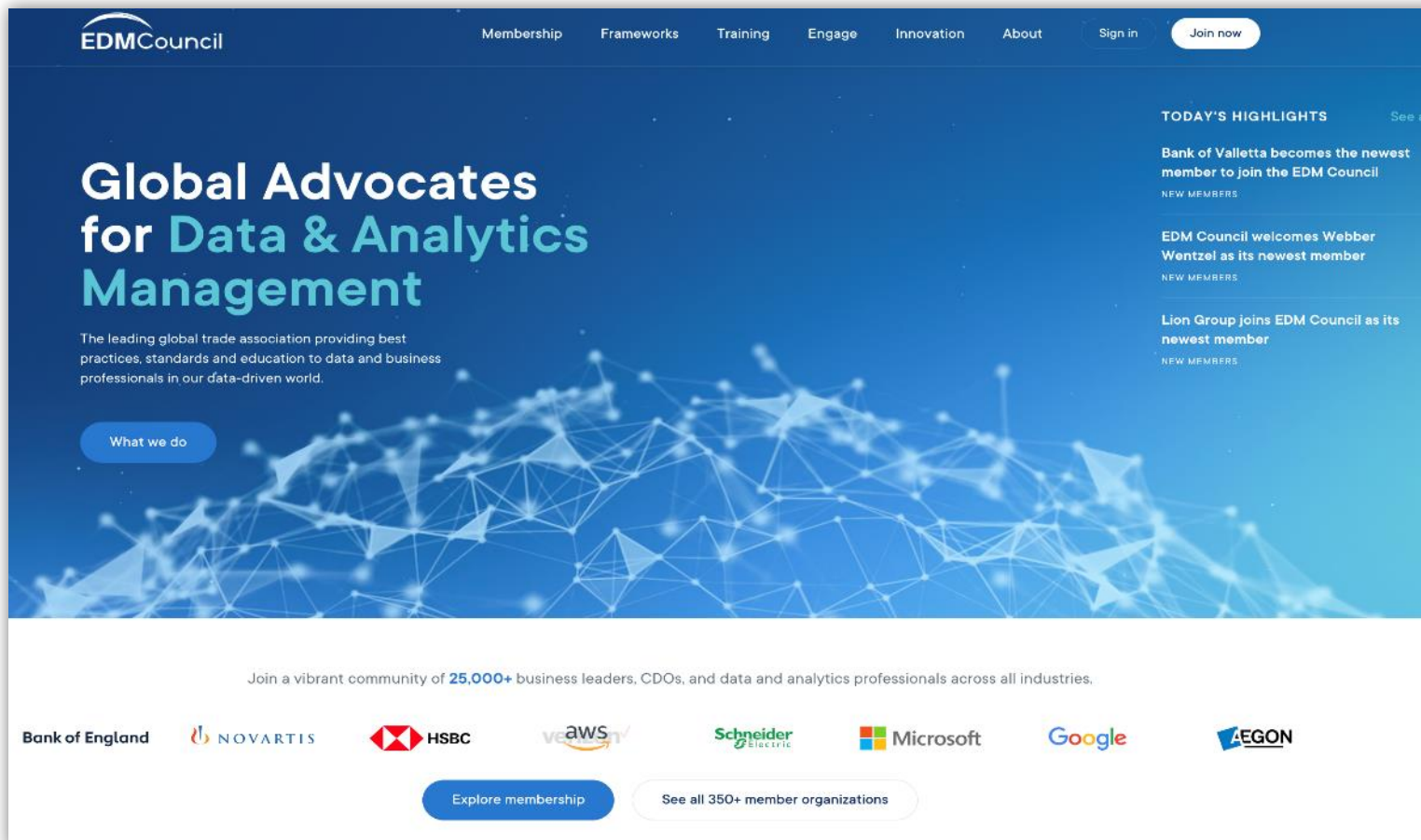
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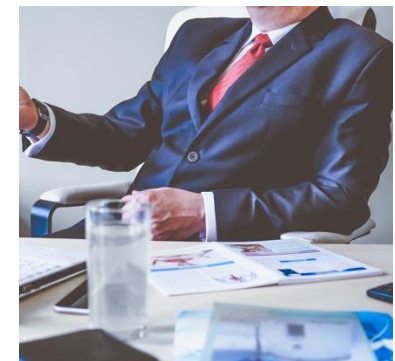


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Thank you!

**FOR MORE INFORMATION,  
PLEASE CONTACT:**

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# Thank You

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