

The Value of a Homogenized and High-quality Historical Dataset of OTC Derivatives across Institutional Functions.

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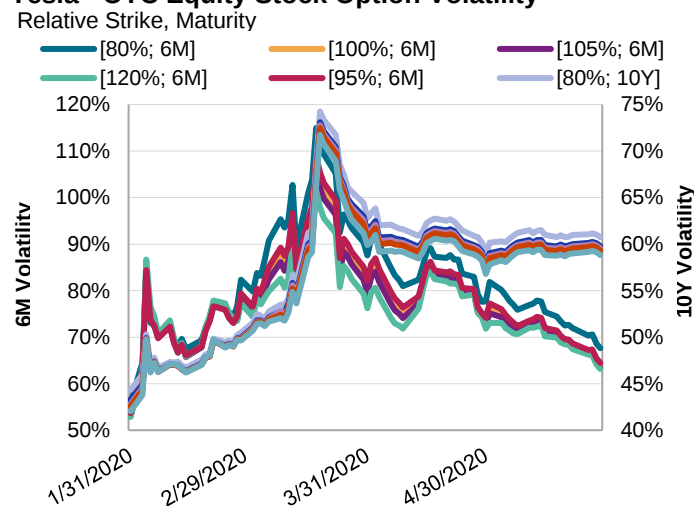
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In the dynamic landscape of financial markets, over-the-counter (OTC) derivatives play a pivotal role in various financial institutions, such as banks, hedge funds, insurance companies, and asset managers. These institutions engage in a multitude of functions ranging from front-office to back-office operations, each dependent on an accurate and comprehensive historical dataset for new structuring ideas, effective trading decision-making, hedging, valuation, risk management, accounting and reporting.

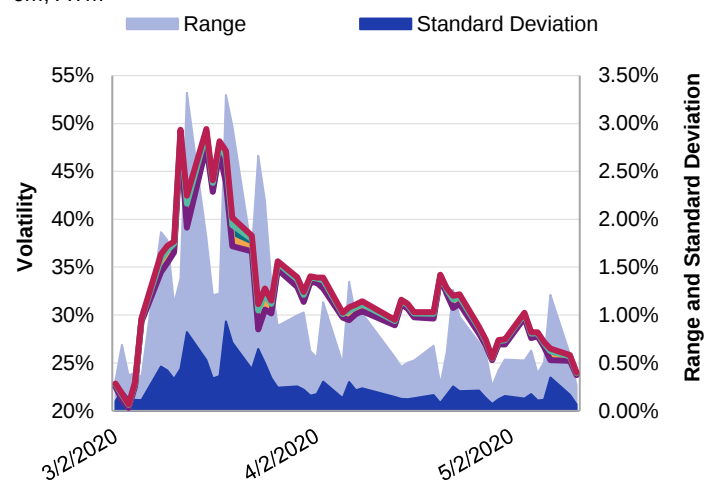
Globally, institutions face a shortage of high-quality historical data of OTC derivatives, especially during stress periods, and a homogenized dataset across internal functions.

At S&P Global Market Intelligence, we have a precise and comprehensive solution that addresses the need for high-quality historical data of OTC derivatives in a wide variety of market conditions.

Tesla - OTC Equity Stock Option Volatility



Quality of Eurostoxx 50 OTC Index Option Volatility



OTC derivatives data challenges

The lack of historical, high-quality and centralized data on OTC derivatives presents significant challenges for market participants and regulators, especially due to:

- **Limited transparency:** OTC derivatives markets are characterized by a lack of transparency compared to exchange-traded markets. Trades often occur bilaterally between parties without being reported to centralized exchanges. This lack of transparency makes it difficult to obtain comprehensive historical data on OTC derivatives transactions and positions.
- **Complexity of Instruments:** OTC derivatives encompass a wide range of complex financial instruments with varying terms, structures, and underlying assets. Collecting accurate and comprehensive data on these instruments requires detailed and deep information.
- **Data quality:** Ensuring the quality and consistency of OTC derivatives data is challenging due to limited access to information and transactions.
- **Limited historical data:** Historical data on OTC derivatives is limited in scope and duration, particularly for less liquid or bespoke instruments.

“Financial institutions suffer lack of high quality and homogenized OTC derivatives data.”

On top of previous issues, a common challenge in many institutions, especially large ones, is the lack of homogenized data and the presence of silos within different functions. This situation can indeed lead to significant difficulties, particularly when it comes to explaining profit and loss (P&L) or reporting data for financial statements.

- **Data Silos:** Different departments or functions within an organization often maintain separate databases. This can result in inconsistencies, redundancies, and difficulties in accessing and integrating data across the organization.
- **Data Quality:** Inconsistent data quality across different datasets and departments can lead to discrepancies and errors when consolidating financial data for reporting purposes.
- **Reconciliation:** Reconciling data from various sources becomes a complex and time-consuming process due to discrepancies and inconsistencies, leading to delays in financial reporting and decision-making.

Benefits of a homogenized and high-quality historical database

Various business areas and functions across institutions, including banks, hedge funds, insurance companies, and asset managers, require a precise historical dataset of OTC derivatives for their operations – from front office to middle and back office. Some example use cases are, but not limited to:

- **Trading and portfolio management:** These functions rely on historical OTC derivatives data to identify market trends, develop trading strategies, and assess potential risks associated with various products. In the Quantitative Investment Strategies (QIS) space¹, historical data of OTC derivatives is crucial to:
 - Identify valuable insights into past market trends, volatility, and correlations between assets; develop, calibrate, and backtest the strategies based on quantitative rules; help to identify profitable opportunities and generate alpha performant returns.
 - Analyze the risk-return profile of different trading strategies, identify potential sources of risk, and implement risk management measures to mitigate downside risk.
 - Achieve optimal risk-adjusted returns, optimize portfolio allocation, identify diversification opportunities, and rebalance based on the identified optimal rule.
- **Risk management:**
 - Develop, calibrate, and backtest risk models², and compute their figures for capital and economic purposes. E.g., calibrating parameters of stochastic simulations in a Monte Carlo framework or setting historical shocks for VaR.
 - Stress tests based on historical scenarios enable financial institutions to assess their resilience to adverse market conditions and evaluate the impact of various scenarios on the portfolio, thereby enhancing risk mitigation strategies.
 - Compute risk metrics, such as Greeks and sensitivities, and consequently monitor hedging performance.
 - Monitor exposure limits over time, identify overshoots and put in place mitigation actions.
 - Robust validation of pricing models, ensuring consistency between theoretical pricing and market observations.
 - For the purpose of the P&L attribution test (PLA³) of FRTB, align Risk-theoretical P&L (RTPL) input data for its risk factors with the data used in Hypothetical P&L (HPL).
 - Identify verifiable prices in the Risk Factor Eligibility test (RFET⁴) of FRTB.
- **Valuation control and independent price verification (IPV):**
 - Validate pricing methodologies, reconcile valuations, and identify discrepancies, thereby enhancing checks and reducing operational risks.
 - Monitor the quality of trader marks and submissions over time.
 - Check the quality of historical data and observability rules in the fair value leveling (hierarchy) against the modellability coming from RFET.
- **Accounting:**
 - Calculate the fair value of derivatives in balance sheets and reconcile figures between different business areas for financial reporting purposes.
- **Audit:**
 - Demonstrate compliance with regulatory requirements, including reporting obligations and adherence to risk management standards.

“A homogenized and high-quality OTC derivatives historical database brings multiple benefits, making front, middle and back-office work smoother and efficient.”

¹ QIS: momentum, carry, volatility, trend, smart beta, alternative risk premia, tail hedging, etc.

² Such as VaR, SVaR, FRTB, counterparty credit risk, CVA, margining.

³ EBA FINAL Draft RTS - Backtesting and PLA requirements.

⁴ EBA FINAL Draft RTS - On criteria for assessing the modellability of risk factors under the Internal Model Approach (IMA).

With the application of a homogenized historical database of OTC derivatives to an institution's whole business chain, i.e., front, middle, and back office, the added value and benefits are multiplied:

1. It contributes to a comprehensive and robust risk management system for financial institution to effectively navigate the complexities of the market while maintaining stability and profitability. Traders can make market decision based on risk metrics, risk managers can compute sensitivities, stress tests and limits used by front office and senior management can handle the risk appetite of the company, with consistent risk numbers.
2. It reinforces the research and development environment across the company to build models for trading, portfolio management, pricing, risk and artificial intelligence.
3. It enhances the control framework from valuation and independent price verification to risk management and accounting, particularly when it comes to explaining profit and loss (P&L) and reporting data for financial statements coming from the same dataset. It reduces complex and time-consuming reconciliations due to inconsistency, operational and numerical errors.
4. It improves the data quality management framework, especially from an audit and regulatory perspective, homogenizing datasets to cover the whole data life cycle from data entry to reporting. This is achieved through effective and robust data quality checks and controls, which encompasses data extraction, data collection, data storage and data transformation.

In April 2018, CPMI-IOSCO published technical guidance on the harmonization of critical data elements for OTC derivatives⁵, which provides guidance on the definition, format and allowable values of critical data elements that are to be provided to authorities. The goal being the implementation of derivative reporting requirements in a global consistent way. The homogenization and quality of historical data for OTC derivatives follow this direction.

⁵ [CPMI-IOSCO Harmonisation of critical OTC derivatives data elements](#).

OTC Derivatives Historical Data

S&P Global Market Intelligence (SPGMI) offers a high quality, accurate, transparent and independent cross-asset historical OTC derivatives dataset with extensive coverage, unique in the market.

We provide firms the ability to access data going back to 1997, including full daily services from when the data went live.

On both a daily and monthly basis, our service utilizes data acquired independently from market makers, interdealer brokers, and exchanges, ranging from vanilla to structured products, with extensive tenors and maturities. Additionally, the data covers various underliers and moneyness related to equity, interest rates, foreign exchange (FX), credit, commodities, repos, and XVA.

“Access to consistent OTC derivatives historical prices, forward curves, volatilities and correlations is a key topic in the financial industry, especially during stress periods.”

Equity	Earliest Start Date ⁶ (dd/mm/yyyy)	IR Curves and Volatilities	Earliest Start Date(dd/mm/yyyy)
Index Options	31/10/1997	Cap/Floor	31/01/2000
Stock Options	26/02/1999	Yield Curve	31/03/2000
Variance Swap	30/04/2013	Swaption	31/01/2001
Volatility Swap	17/02/2016	Basis Swap	29/02/2008
Dividend Swap	28/04/2017	Inflation	01/01/2007
Total Return	31/08/2020	Repos	30/11/2017
Forward	30/10/2020	Bermudan	26/02/2021
Correlation	15/11/2022	Accreters	22/03/2021
		CMS Spread	22/03/2021
FX forwards and volatilities	29/02/2008	Correlation Swap	30/04/2021
Commodities forwards and volatilities	16/03/2018	CMS Quanto Spread	30/07/2021

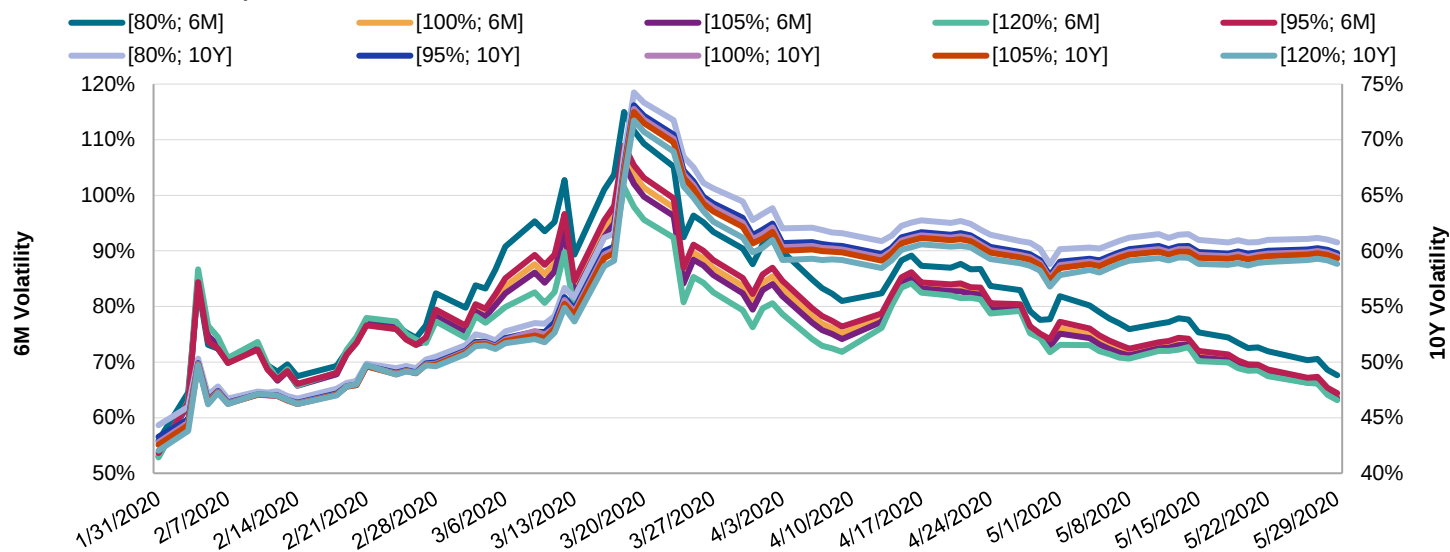
Access to consistent OTC derivatives historical prices, forward curves, volatilities and correlations is a vital tool in the financial industry; especially during stress periods, such as the 2007-2008 Lehman crisis and 2020 COVID-19 pandemic, where capital markets experienced shocks that had not been seen for decades. During such periods, markets can experience extreme volatility, liquidity crises, and rapid changes in correlations between assets. This makes it essential for financial institutions to have reliable historical data to analyze past events, understand market dynamics, and develop strategies to manage risk effectively.

The following chart provides an example of high quality and accurate SPGMI volatilities data for OTC equity stock options on Tesla during the COVID-19 crisis. The chart represents options with 6 months and 10 years tenor and different kinds of moneyness: ATM (100%), not far away from the money (95% and 105%) and deep away from the money (80% and 120%). During such a turbulent period, with noticeable shocks without any flat data points over time or along curves our data remains thorough and precise. The fact that Tesla was not part of the S&P 500 Index at that time adds another layer of complexity, as it implies that Tesla was less liquid compared to its current status.

⁶ The list is for illustrative purposes. The services and depth of the data are continuously evolving.

Tesla - OTC Equity Stock Option Volatility

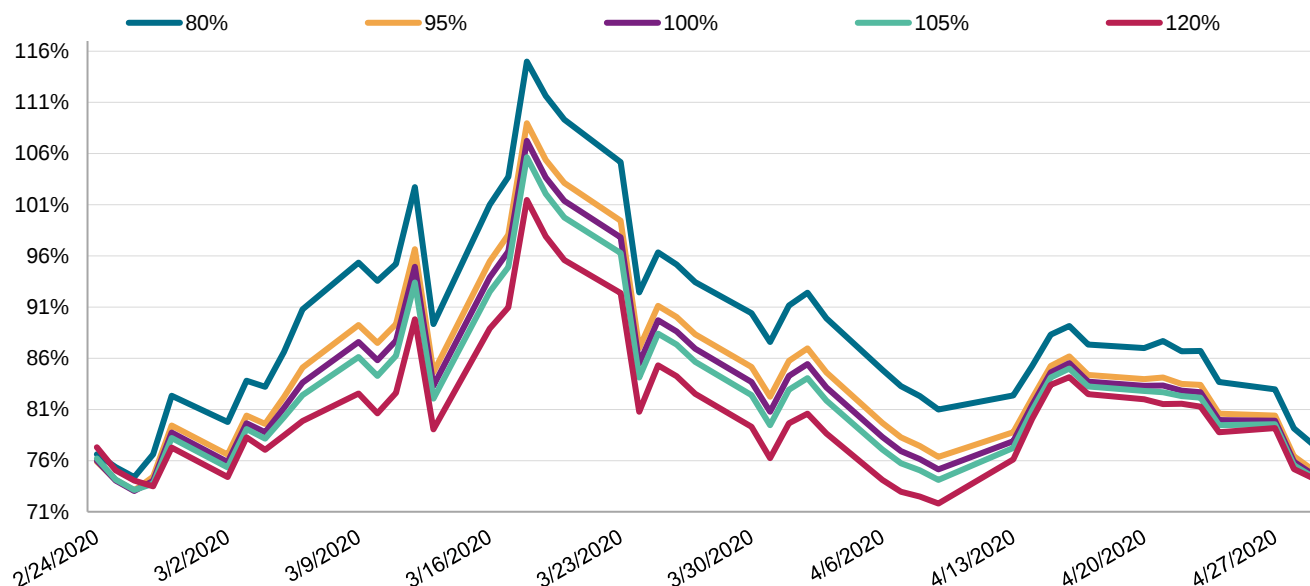
Relative Strike, Maturity



Zooming into the period of maximum shocks, the next graph highlights the precision of volatility levels during the most turbulent times, of the COVID pandemic. The accuracy of the data offers a closer look at the sharp fluctuations experienced without any inconsistency nor stale data.

Tesla - OTC Equity Stock Option Volatility

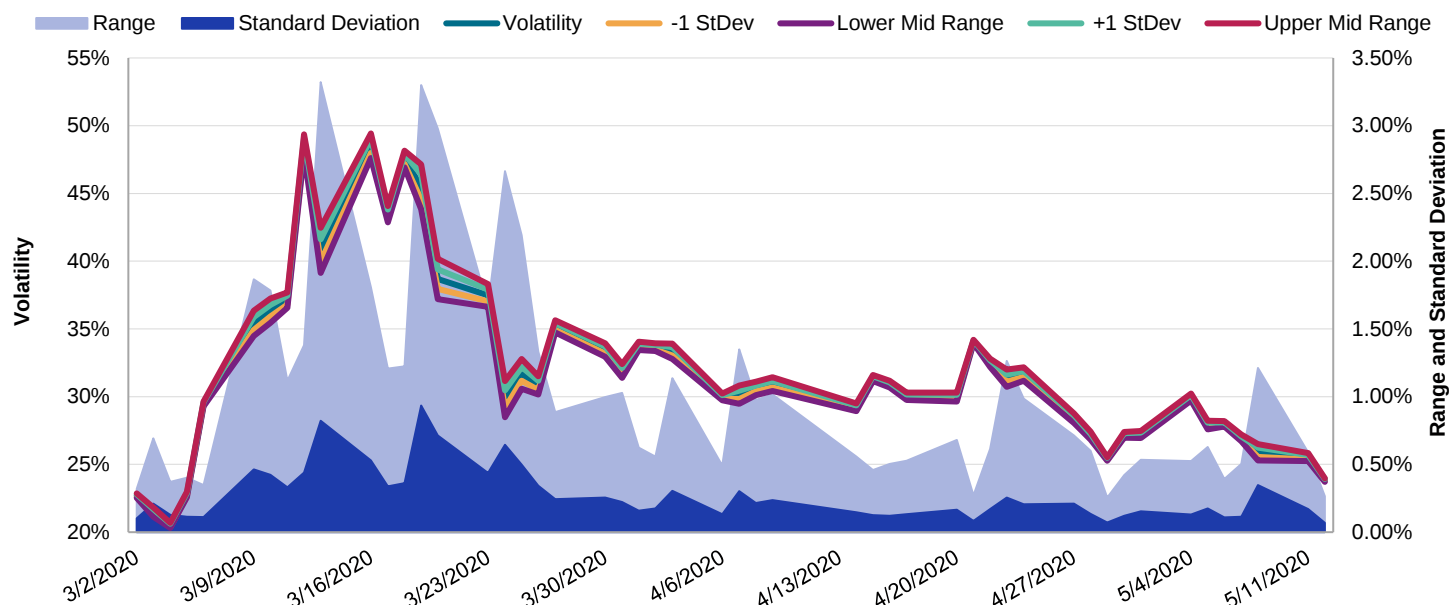
Relative Strike, 6M Maturity



In the following chart, we observe the quality of Euro Stoxx 50 volatility during a high-stress period. The widening of the volatility range or the increasing standard deviation in the distribution is evident. This phenomenon reflects the uncertainty and divergence of opinions among market participants during crisis periods (but always with high level of precision in the volatility levels), underscoring the challenges and complexities of navigating volatile markets.

Quality of Eurostoxx 50 OTC Index Option Volatility

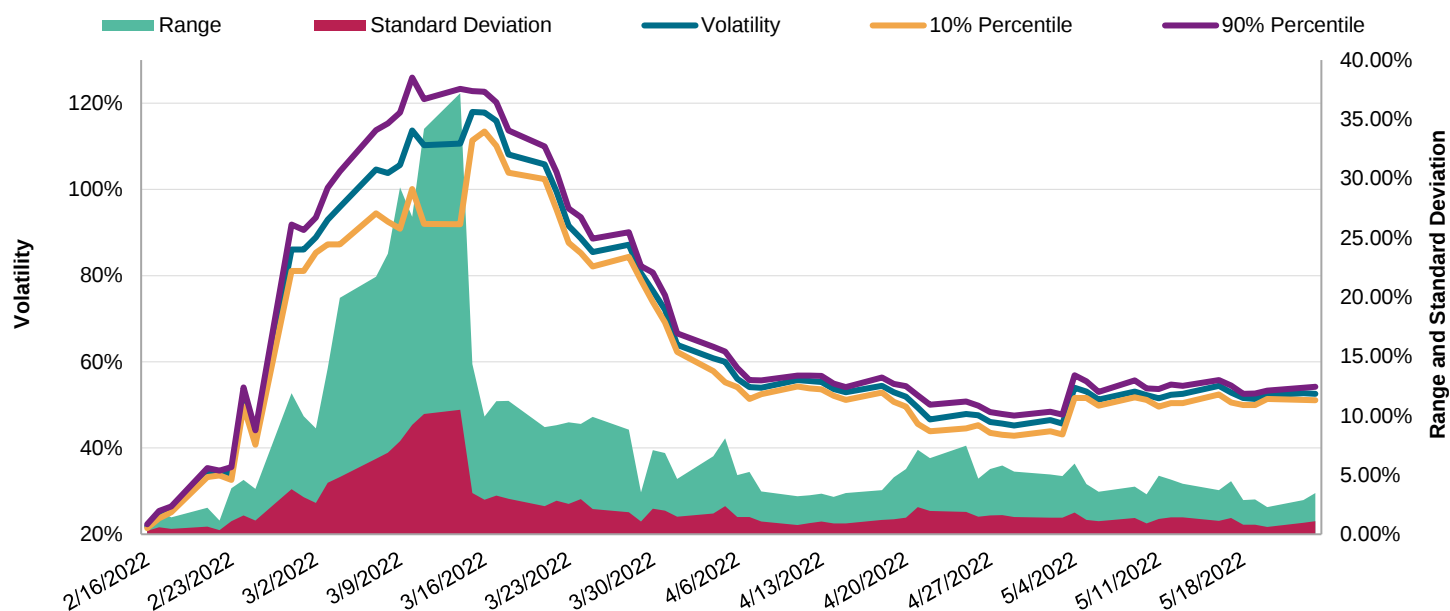
6M, ATM



Switching to FX asset classes, the reader may notice the very high quality of USD/RUB and USD/TRY volatilities during their highly stressed periods, respectively starting in the immediate aftermath of Russia's full-scale invasion of Ukraine in February 2022 and the rate cuts by the Central Bank of the Republic of Turkey beginning in mid-November 2021. This is a great example demonstrating the high quality of SPGMI's data for two emerging market currency pairs, which often exhibit higher volatility and tend to be less liquid compared to currencies from more developed economies.

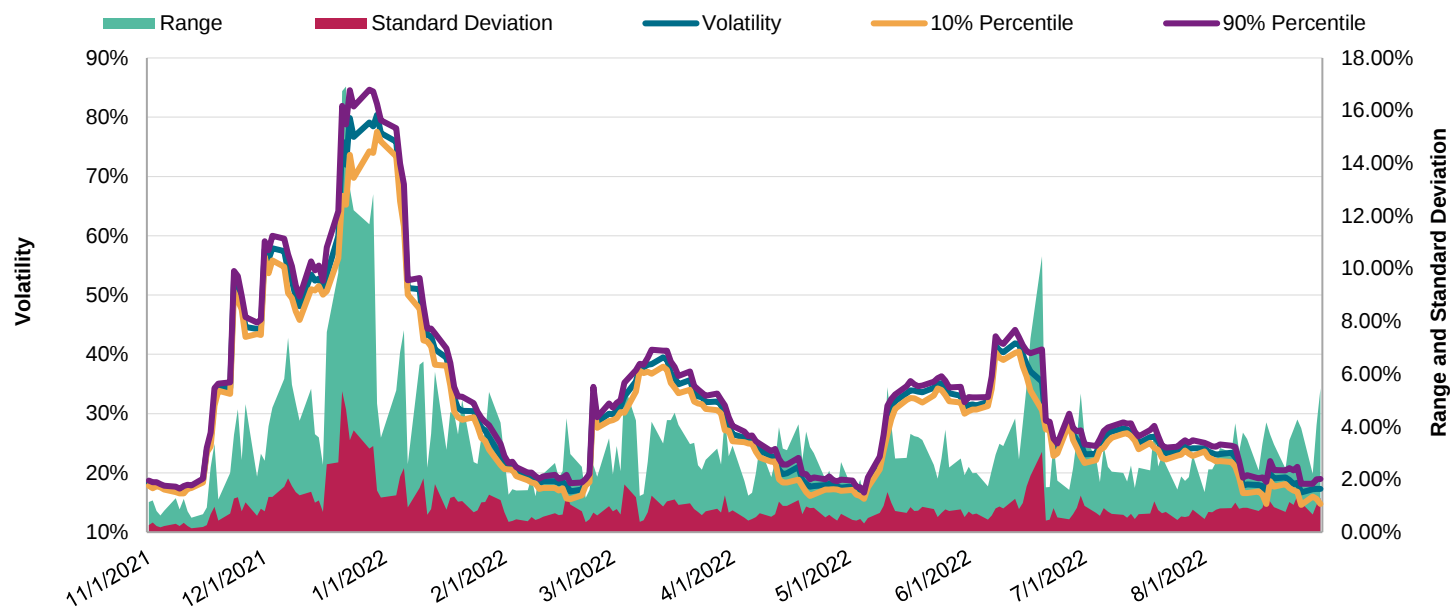
Quality of USD/RUB OTC Option Volatility Straddle

1M, ATM



Quality of USD/TRY OTC Option Volatility Straddle

1M, ATM



OTC derivatives historical data use cases

Firms that harness the power of our historical OTC derivatives datasets, represent a wide array of sectors within the industry. This include investment banks, hedge funds, asset managers, insurers and more firms from diverse backgrounds. They are situated across the entirety of the business chain, covering the front, middle, and back offices. Below, we delve into different use cases:

- **Tier 1 Investment Banks:**
 - QIS Desk:
 - Variance and Volatility Swaps: Developing and backtesting dispersion strategies based on quantitative rules, leveraging high-quality historical volatilities on European and American indexes and single stocks.
 - Inflation and Seasonality: Developing and backtesting quantitative strategies based on quantitative rules to navigate inflation spillovers.
 - Market Risk:
 - Equity Index, ETF, and Stock Options - historical data for VaR and SVaR model quality improvements.
 - Interest rate swaptions and cap/floors – historical and ongoing data for VaR, SVaR.
 - IPV:
 - Total Return Futures: Using historical TR Eurostoxx50 and S&P 500 futures to challenge shock levels on repos/SFT and the shocks applied in the SVaR model.
 - FX Volatilities: Analyzing historical volatilities of USD vs. Asian currencies to better understand the quality of marking "through the cycles" and across times. "Having daily volatilities is a great achievement to assess the trend of the quality of the marking."
- **Fund administrator:**
 - IBOR (investment book of record) and ABOR (accounting book of record) use for end users across all asset classes
- **Top tier and most sophisticated hedge funds and asset managers** are great examples in applying the value of a homogenized historical database of OTC derivatives to their whole business chain, i.e., front, middle, and back office, for historical equity index and stock volatilities, variance and volatility swaps, swaptions and caps/floors, with the following use cases:
 - Front Office - Research & Strategy: Use in pre-trade strategy and investment decision making, price discovery, as an input into algorithms, models, and/or artificial intelligence for trade execution and portfolio construction.
 - Risk, Performance Measurement, Performance Attribution: Use as an input to market and credit risk calculations (e.g., VaR) and risk analytics and any other services for monitoring risk exposure, profit & loss (P&L), and attribution of such, PRBOR (performance and risk books of record). Use in associated regulatory reporting and monitoring investment compliance.
 - Middle Office: Collateral management, performance monitoring, trade settlement, reconciliation, IBOR (Investment book of record).
 - Net Asset Valuation (NAV): Use as part of a process to create and/or validate a net asset valuation (fund net and gross asset value calculations and calculating ABOR (Accounting Book of Record).
- **Other Hedge Funds and Asset Managers:**
 - Interest Rates: Historical convexity adjustments between FRA and futures for EUR EURIBOR and USD LIBOR.
 - Equity Correlations: Providing historical correlations between indexes and stocks for front office and risk use cases for the Equity Correlation Trading desk. Custom-built methodology for bespoke index-to-index correlations, delivered in only 3 weeks.
- **Regional Banks: Risk Management - Cross-Asset Volatility:** Historical volatilities for equity options (indexes and single names), FX, swaptions, commodities, and yield curves to calibrate and compute shocks for SVaR and stress testing calculations.
- **Insurers: Risk Management and Actuarial Function - Equity and IR volatilities:** calibrating stochastic simulation for internal model purpose on historical equity options and swaption volatilities.

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