

Swaption Volatility Surface

An implied volatility is the volatility implied by the market price of an option based on the Black-Scholes option pricing model. An interest rate swaption volatility surface is a four-dimensional plot of the implied volatility of a swaption as a function of strike and expiry and tenor.

The term structures of implied volatilities which provide indications of the market's near- and long-term uncertainty about future short- and long-term swap rates. A crucial property of the implied volatility surface is the absence of arbitrage.

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To construct a reliable volatility surface, it is necessarily to apply robust interpolation methods to a set of discrete volatility data. Arbitrage free conditions may be implicitly or explicitly embedded in the procedure. Typical approaches are

Any volatility models must meet arbitrage free conditions. Static arbitrage free condition makes it impossible to invest nothing today and receive positive return tomorrow.

You can find more details at

<https://finpricing.com/lib/IrCurve.html>