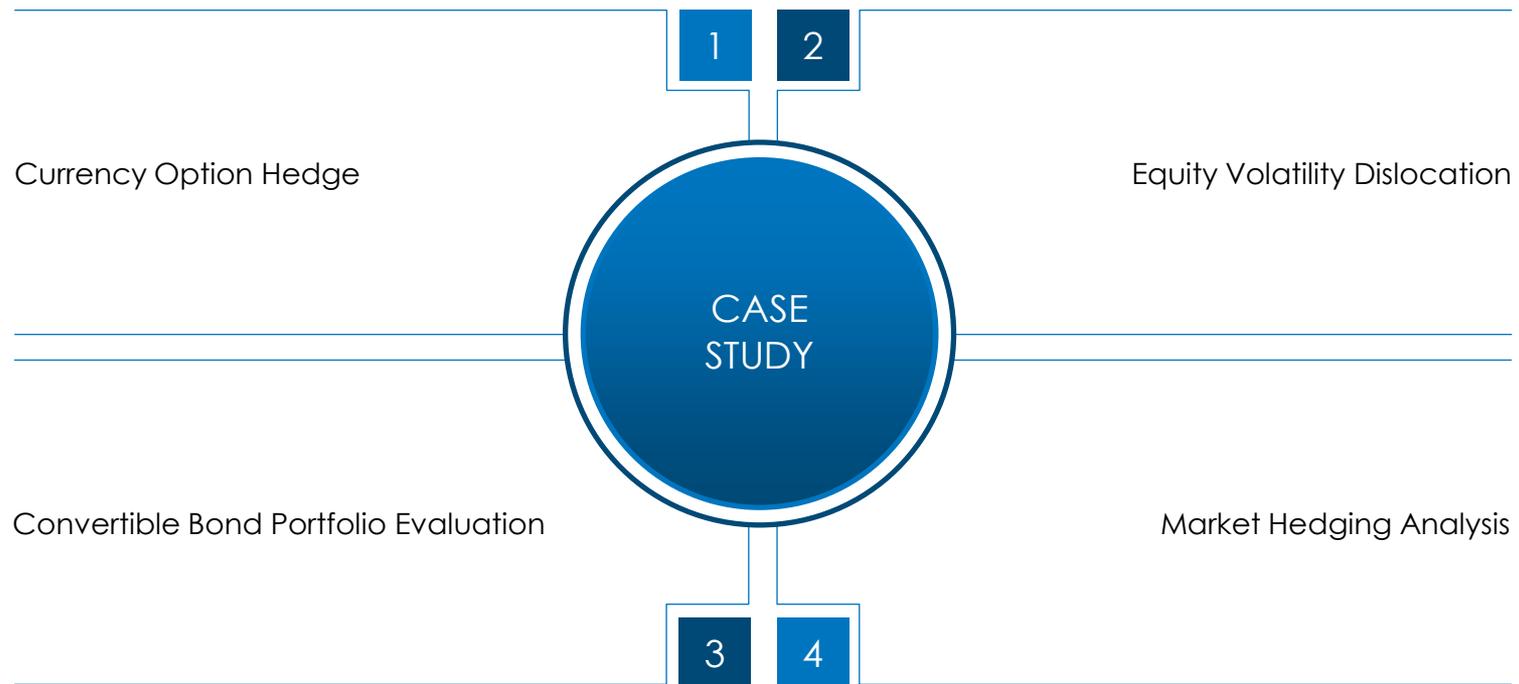


Case Studies



Case Study 1: Currency Option Hedge

Client Type	Private Equity Firm
Asset Class	Currency
Portfolio Scenario	U.S. based investor has made a loan in which principal and interim payments will be made in euros. Investor is concerned about the volatility and downside in the euro and has decided to hedge out the currency risk.
Client Request	After presenting portfolio scenario to a large derivatives dealer, investor has received a proposal in which a put and call hedge are bundled into a short position. The structure is opaque and difficult to analyze for the client, who asks MRA for advice.
MRA Deliverables	<ul style="list-style-type: none">▪ Understand the constraints that the investor has in its hedging process.▪ Advise the investor on the OTC derivatives market and the subtleties in how contracts are executed.▪ Help the investor understand the pricing dynamics for options on the euro and the role that the strike price, expiration and volatility level play in determining the option premium.▪ Provide the investor with an opinion on the relative pricing of options on the euro and their effectiveness as a hedge from a cost perspective.▪ Utilize MRA's extensive client relationships to discuss pricing of euro puts and gain insights on the implied volatility surface.▪ Provide advice on how to negotiate with the dealer to ensure best pricing.▪ Source pricing for the investor from 3 large currency option dealers to create competition▪ Guide investor through the negotiation of both pricing and documentation to ensure optimal execution.▪ Be available for after trade advice and follow-up should a portion of the trade need to be unwound.
Result	Client realized significant cost savings on executed hedge versus the initial pricing.

Case Study 2: Equity Volatility Dislocation

Client Type	Large Credit Focused Hedge Fund
Asset Class	Volatility
Portfolio Scenario	In 2010, the combination of the uncertainty around Greece, the Flash Crash, potential regulation of OTC derivatives and a crowded risk exposure precipitated a short covering event . The result was a substantial pricing dislocation in long dated equity volatility.
Client Request	After reading some of the work that MRA had done to illustrate the event and the opportunities that resulted, the client asked us to perform scenario analysis to help evaluate potential trades.
MRA Deliverables	<ul style="list-style-type: none">▪ Use network of market contacts to explore why the dislocation has occurred and to gain insights on whether it would persist. Speaking with sell-side derivative traders, insurance companies, pension funds and hedge funds, MRA was able to better understand the impact of positioning.▪ Provide the client with historical perspective on the extent of the dislocation through a series of quantitative back-tests.▪ Isolate historical periods of market stress (LTCM, tech bubble, 9/11, Enron, credit crisis) and provide metrics for understanding draw downs of short volatility strategies during these periods.▪ Discuss risk/reward objectives with clients to understand best method for implementing strategy in the context of potential mark to market risks.▪ Build model to illustrate alternative methods for gaining short volatility exposure including variance swaps, short straddles, long puts and put spreads on realized variance all of different expirations.▪ Walk client through the alternatives and help client find a seller of put option on realized variance.
Result	Client implemented recommended trade and has realized substantial profits.

Case Study 3: Convertible Bond Portfolio Evaluation

Client Type	Large Pension Fund
Asset Class	Convertible Bonds
Portfolio Scenario	Client has a passive U.S. convertible bond portfolio in which an index approach has been taken to gaining exposure to the asset class.
Client Request	Client seeks the advice of MRA on the quality of portfolio construction, risk exposure, and recommendations on how to better systematize the approach.
MRA Deliverables	<ul style="list-style-type: none">▪ Take in portfolio positions and build customized spreadsheet to assess risk exposures. Calculate portfolio sensitivities including delta, gamma, rho, credit DV01, and vega.▪ Prepare aggregated portfolio exposures and compute offsetting "index" hedges to neutralize risks.▪ Parse positions based on sectors. Calculate the implicit over or under hedge in each sector relative to the SPX. Do this for delta and vega exposure.▪ Calculate other hidden exposures including dividend and borrow sensitivities.▪ Perform analysis of impact to hedged convert positions to take-overs given short stock hedge. This included case by case analysis of specific take-out language in the indenture of each bond. Find instances in which portfolio was especially vulnerable to a take-out and provide recommendations on how to change delta hedge (in some cases with option overlay).▪ Suggested other screening factors in determining portfolio construction.▪ Provide conclusions to client and make recommendations on trades needed to create greater consistency with index.
Result	Client rebalanced the equity hedge to neutralize sector exposures.

Case Study 4: Market Hedging Analysis

Client Type	Large Asset Manager
Asset Class	Equities
Portfolio Scenario	Client has been employing broad market hedges using combinations of SPY puts, VIX options and volatility ETNs. Carry costs have become increasingly important as market volatility has been compressed.
Client Request	Client seeks MRA's help to understand better the drivers of hedge performance through unique periods of market stress.
MRA Deliverables	<ul style="list-style-type: none">▪ Identify 4 unique periods of market stress including the 2008 crisis, the Flash Crash of 2010, the US debt crisis of 2011 and the sovereign risk flare-up of 2012.▪ Choose hedging instruments to be back-tested including SPY put options, SPY put spreads, VIX calls, VIX call spreads, VIX call "reapers" (sell 1 VIX call to buy 2 further OTM VIX calls)▪ Choose a methodology to use as a basis for evaluating the hedging strategies including sizing, choice of expiration, strike selection and rolling strategy.▪ Perform analysis of the performance of each hedge during the specific market volatility events. How well did each hedge defray losses in an equity portfolio in each period? What was the maximum value of each hedge and was there an optimal time to take profits on the hedges?▪ Assess the carry cost of each instrument with attention to periods when market volatility was low.▪ Study alternative frequencies of rolling each hedge with analysis of relative benefits and costs.▪ Provide conclusions to client and make recommendations on a mix of hedges and a consistent rolling strategy that will perform in different market volatility environments.
Result	Client is utilizing the study to update hedging strategies.