

Enhancing pairs trading performance through spread delta hedging

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Abstract-

This study explores a collaborative investment strategy involving a risk-averse investor and a manager who is informed. The investor applies a mispricing model to detect and exploit cointegrated stock pairs that exhibit recurring relative mispricing. Optimal portfolio weights for long positions in undervalued assets and short positions in overvalued ones are derived by maximizing expected utility, using an error correction mechanism to guide allocation. These weights are communicated to the manager, who implements the trades and hedges the delta risk using a spread option constructed to replicate the investor's strategy. By aligning the option's deltas with the investor's initial weights, the manager achieves risk neutrality with respect to directional spot movements while remaining long the spread option to harvest convexity gains. Using DJIA components (1997–2023), the delta-hedged strategy achieves a Sharpe ratio of 1.38 versus 0.65 for the benchmark. Out-of-sample validation using EURO STOXX 50 constituents (2002–2023) confirms robustness with a Sharpe ratio of 1.67 versus 1.37, demonstrating the convexity harvesting mechanism operates effectively across market structures.

Index Terms- Interacting agents; Pairs trading; Portfolio theory; Spread options

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