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**`90-bstract:**

This paper explores how an option trading strategy known as dispersion trading can be used to give investors exposure to volatility in their portfolios to diversify returns. Using a large dataset of at-the-money options from SPDR ETFs, we identify a systematic way to identify dispersion trading opportunities. We show that the systematic dispersion trading method can be modeled into an ETF to give various investors exposure to volatility as an asset class. The natural alternative hypothesis argues there are already ETF products giving exposure to volatility; however, dispersion provides a hedged alternative to products linked strictly to rises and drops in the VIX which can cause severe volatility for investors during times of distress. Our paper provides new insights on how volatility can be used as an asset class in portfolios without having the risk of extreme movements in the VIX and VIX-linked products.

**Introduction:**

Modern portfolio theory (MPT) as introduced by Markowitz (1952) has shaped the way investors construct portfolios for the better part of a century. By illustrating the benefits of diversification, MPT has helped investors find assets of varying correlations to include in their portfolios to reach a target risk-return profile. While MPT performs well during normal market environments, during periods of uncertainty, correlations trend towards one for most assets. The diversification benefits MPT offers during normal market environments tends to evaporate when uncertainty and volatility increases (Loretan 2000). Assets linked directly to volatility such as the VIX and VIX-linked products can solve some of the shortcomings of MPT; however, many volatility products can suffer extreme movements during and after times of uncertainty. This paper offers an alternative solution to invest in volatility to solve the shortcomings of both MPT and investing in products directly linked to volatility. Ultimately, we will see how dispersion trading can be used to help generate uncorrelated returns and increase diversification for an investor’s portfolio.

Dispersion trading is designed to capitalize on the overpricing/underpricing of index options relative to the constituent options that make up the index. Option pricing theory identifies inputs into the Black-Scholes model (Black and Scholes (1973) and Merton (1973)) as the current spot price, strike price, time to expiration, volatility, and interest rate. All the variables of the Black-Scholes model are observable in the market except for volatility. As a result, option prices imply a volatility for the underlying asset. The volatility value that is derived is known as implied volatility (IV) which is the market’s forecast of an asset’s volatility in the future. Since volatility is the only unknown variable in option pricing, options can be a proxy for pricing volatility. `

\e generalize volatility trading into two main categories. First, there is volatility product trading that involves trading products directly linked to volatility. For example, trading any products that are linked to the VIX or volatility/variance swaps. The VIX is the Chicago Board Option Exchange’s (CBOE) Volatility Index that tracks the stock market’s expectation of volatility based on S&P 500 index options. Volatility and variance swaps are forward contracts with a payoff based on the realized volatility or variance of an u 789+nderlying asset. Second, there is option trading that uses options to indirectly trade volatility because of the pricing of implied volatility. This paper will be focused on the second category of volatility trading by using options to trade volatility.

To implement dispersion trades, we will be using 2-month at-the-money (ATM) straddles. In the option market, ATM means an option with a strike approximately equivalent to the underlying asset’s current spot price. A straddle is when a trader is long both a call option and a put option with the same expiry and strike prices. Since a straddle is long both a call and a put, the trader is making a bet that the underlying asset will make a large move up or down during the life of the trade. Straddles provide a vehicle to bet on an asset’s volatility because trader’s profit on large/volatile moves to the upside or downside. When executing a dispersion trade, a trader will either be short straddles on the index and long straddles on the constituents or long straddles on the index and short straddles on the constituents.

Dispersion strategies are mostly designed to be delta neutral. This means the dispersion portfolio does not have exposure to underlying asset movements to the upside or downside, but rather only exposure to how volatile the movements are. By maintaining delta neutrality throughout the trade, dispersion trading gives investors more pure exposure to volatility.

Despite providing exposure to volatility, dispersion trades differ from the VIX or other volatility linked products because dispersion requires traders to be simultaneously long volatility and short volatility. By making a long volatility and short volatility bet, dispersion trading is much more protected from price blowups like the VIX index experienced in February 2018, December 2018, and March 2020. The protection dispersion trading offers makes the strategy suitable for an ETF.