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Variance Risk Dynamics, Variance Risk Premia, and Optimal Variance Swap Investments

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Abstract:

With increasing appreciation of the fact that stock return variance is stochastic and variance risk is heavily priced, the industry has created a series of variance derivative products to span variance risk. The variance swap contract is the most actively traded of these products. It pays at expiry the difference between the realized return variance and a fixed rate, called the variance swap rate, determined at the inception of the contract. We obtain a decade worth of variance swap rate quotes at five maturities. With the data, we first exploit the information in both the time series and the term structure of the variance swap rates to analyze the return variance rate dynamics and market pricing of variance risk. We then study both theoretically and empirically how investors can use variance swap contracts across different maturities to span the variance risk and to revise their dynamic asset allocation decisions. We find that with the swap contract to span the variance risk, an investor increases her investment in the underlying stock.

In addition, the investor's indirect utility increases significantly when allowed to span the volatility risk using variance swap contracts. Finally, an out-of-sample study confirms that the gains from including variance swaps into the portfolio mix are large.

Keywords: Return variance swap, equity index options, term structure

JEL Classifications: G12, G13, C52

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