



## Equities

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### Demand-Based Option Pricing

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Index and equity options are notoriously difficult to price. A large body of research has been conducted in the field, led by the Black-Scholes-Merton benchmark and its assumptions about the dynamics of the underlying asset. While these efforts have met with undeniable success, nontrivial pricing puzzles remain.

This article takes a different approach. We recognize that, in contrast to the Black-Scholes-Merton structure, in the real world options cannot be hedged perfectly. Consequently, if intermediaries who take the other side of end-user option demand are risk averse, end-user demand for options will affect option prices.

We develop a model of competitive, risk-averse intermediaries who cannot perfectly hedge their option positions. We compute equilibrium prices as a function of net end-user demand and show that demand for an option increases its price by an amount proportional to the variance of the part of the option that cannot be hedged. Further, we find that demand changes the prices of other options on the same underlying asset by an amount proportional to the covariance of their unhedgeable parts.

The empirical part of the article measures the expensiveness of an option as its Black-Scholes implied volatility minus a proxy for the expected volatility over the life of the option. We show that on average index options are quite expensive by this measure, and that they have high positive end-user demand. Equity options, on the other hand, do not appear expensive on average and have a small negative end-user demand.

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