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New EDHEC-Risk Institute research examines dynamic hedging of an option when the underlying asset is not available for trading

A new research paper, "Option Pricing and Hedging in the Presence of Cross-Hedge Risk," drawn from the "Structured Products and Derivative Instruments" research chair at EDHEC-Risk Institute supported by the French Banking Federation (FBF), addresses dynamic hedging of an option when the underlying asset is not available for trading, and some other asset, or portfolio, is used as a substitute.

The underlying asset may be unavailable because of liquidity constraints, legal constraints, high market friction, or for other reasons. If the substitute asset were perfectly correlated with the actual underlying asset, no further risk would be introduced, since one could offset any gain or loss in the option position by dynamically trading the substitute asset. In general, however, correlation is not perfect, and the unavailability of the underlying asset induces some form of dynamic incompleteness in that perfect replication is no longer possible with a self-financing strategy. A typical example of what is known as cross-hedge risk can be found in index option markets, in which S&P100 options are systematically hedged using dynamic trading in S&P500 futures contracts, because investors cannot trade in the actual underlying asset.

The authors of the research, Lionel Martellini, Scientific Director, and Vincent Milhau, Senior Research Engineer with EDHEC-Risk Institute, find that the use of the optimal strategy induces a much smaller replication error compared to the replication error induced by a naive Black-Scholes strategy, especially for low levels of the correlation between the underlying asset and the substitute. In the absence of transaction costs, the paper also find that cross hedge risk is more substantial than the risk induced by discrete trading for reasonable parameter values.

While this result implies that trading in the substitute can only be rationalised for exceedingly high correlations, the presence of higher levels of transaction costs is likely to make trading in the actual underlying asset a prohibitively costly alternative.

A copy of the study can be downloaded via the following link:

EDHEC-Risk Working Paper Pricing and Hedging in the Presence of Cross-Hedge Risk

This research was produced as part of the Structured Products and Derivative Instruments" research chair at EDHEC-Risk Institute supported by the French Banking Federation (FBF).

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About EDHEC-Risk Institute

EDHEC-Risk Institute is part of EDHEC Business School, one of Europe's leading business schools and a member of the select group of academic institutions worldwide to have earned the triple crown of international accreditations (AACSB, EQUIS, Association of MBAs). Established in 2001, EDHEC-Risk Institute has become the premier European centre for financial research and its applications to the industry. In partnership with large financial institutions, its team of 90 professors, research engineers, research associates and support staff implements six research programmes and eleven research chairs focusing on asset allocation and risk management in the traditional and alternative investment universes. The results of the research programmes and chairs are disseminated through the three EDHEC-Risk Institute locations in London, Nice and Singapore.

EDHEC-Risk Institute validates the academic quality of its output through publications in leading scholarly journals, implements a multifaceted communications policy to inform investors and asset managers on state-of-the-art concepts and techniques, and forms business partnerships to launch innovative products. Its executive education arm helps professionals to upgrade their skills with advanced risk and investment management seminars and degree courses, including the EDHEC-Risk Institute PhD in Finance.

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