Accepted Manuscript

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PII: S0377-0427(18)30262-0
DOI: https://doi.org/10.1016/j.cam.2018.04.059
Reference: CAM 11656

To appear in: *Journal of Computational and Applied Mathematics*

Received date : 25 October 2017
Revised date : 24 April 2018

Please cite this article as: W.G. Zhang, X. Yu, Y.J. Liu, Trade and currency options hedging model, *Journal of Computational and Applied Mathematics* (2018), https://doi.org/10.1016/j.cam.2018.04.059

Trade and currency options hedging model

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Abstract

This paper examines the trade and options hedging strategies for an exporting firm. We present a trade and currency options hedging model at the first place aiming to minimize the Conditional Value-at-Risk (CVaR). In the proposed model, a copula function is used to deduce the distribution function of the hedged portfolio. Then, according to the equivalent formulas of CVaR definition, we transform the proposed model into a simple structure by the equivalence transformation method. Finally, an empirical study of a gold exporting firm in China is conducted to illustrate the application of the proposed model. The results show that for an importing firm, to export the gold to a foreign country with currency options hedging is superior to that of selling the gold in the domestic market with or without currency options hedging. In particular, if the firm sells the gold only in the domestic market, it is suggested to be equiped with currency options hedging simultaneously. We analyze the sensitivities of the budget and the risk aversion degree, and find out that the optimal option contract is affected by the budget. In addition, the risk aversion degree of the decision maker has no effects on the optimal strike price. Since currency options hedging is conducive to decrease CVaR, the firm is thus suggested to increase the budget on options.

Key words: Currency options hedging; Exporting strategies; Copula functions; Equivalence transformation method

1. Introduction

Foreign exchange risk, a common risk existed in international trade and finance, refers to the uncertainties stemming from the exchange rate fluctuations. Fluctuations in foreign exchange rates have significant implications on the business decision. For example, owing to exchange rate risk, a multinational firm may alter its exportation plan to reduce the uncertainty of its foreign revenue. Therefore, it is important for multinational firms to hedge the foreign exchange risk.

Currency derivatives, either currency futures or options can be used to hedge the exchange rate risk in international trades. A great deal of literatures focused on hedging exchange rate risk exposure when the currency forward or futures market is unbiased (Let us refer to the references [1-4]). However, the futures contract has a number of standardized features, for instance, the types of goods, quantity, quality, grade, delivery time and place of delivery. These mentioned standardized features increase the funding liquidity risk in futures markets. Conversely, the superiorities of options over forwards and futures are limited downside risk,