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PRICING CARBON CREDITS BASED ON MODIFIED BLACK-SCHOLES

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Abstract

In order to develop the carbon emission market in a positive and healthy direction, how to price carbon emission rights effectively is an issue worth studying. This paper compares the advantages, disadvantages and applicability of several commonly used pricing methods, and finally chooses the Black-Scholes model (hereinafter referred to as ‘B-S’ model) as the base model to carry out the study. Since the volatility of carbon emission rights is subject to fluctuations, the historical volatility in the BS model cannot fully reflect the real market situation. In order to solve this problem, the GARCH model is introduced to fit the volatility of returns to improve the accuracy of the BS model. However, as the amount of data increases, the modeling ability of the GARCH model cannot fully simulate volatility. The GARCH model is the most commonly used model for modeling the volatility of financial time series data, while the LSTM model requires high initial values. The combination of the two models improves the accuracy of the model and is tested by empirical evidence. The results of this paper enrich the theoretical system of carbon emission rights assessment.

Key words: carbon credits, carbon pricing, LSTM model, Modified Black-Scholes model

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