Pricing of Payment Deferred Vulnerable Options and its Application to Vulnerable Range Accrual Notes

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Abstract

This paper derives a pricing model for payment deferred vulnerable options and applies the results to the pricing of vulnerable range accrual notes. The valuation model for vulnerable options takes into account the possibility of the option writer defaulting. However, when the payment date is set later than the option maturity date, the valuation model will be incomplete if the default risk between the option maturity and payment dates is not explicitly incorporated. We extend the current available models and our results show that the default risk of the option writer will further reduce the option value if the payment date is after the maturity date. The analysis of vulnerable range accrual note, which contains multiple payment deferred vulnerable options, is also performed. Due to the product design, the pricing model for vulnerable range accrual notes shows that the relationship between volatility and note value is not monotonic but depends on whether the underlying price is within, outside, or on the range boundary.

Keywords: Reduced form model, vulnerable options, vulnerable range accrual notes

JEL Classification: G12, G13

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