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*Capital Structure Effects on the Prices of Equity Call Options: First Passage Time Approach*

Capital structure models treat equity as a call option on firm value and hence traded equity options are viewed as compound options (CO) on firm value. Using the CO interpretation, recent work (Geske et al 2016) has shown that prices of traded equity options depend on a firm's capital structure. This work is done in the Merton framework in which default and liquidation of the firm is allowed only at one specific future date. In our work, we extend the CO analysis to the first-passage time (FPT) framework in which default occurs the first time that firm value breaches a barrier. We derive valuation equations and show that the FPT framework provides greater flexibility in fitting option-implied volatility curves as compared to the Merton framework. Case studies using actual equity option prices show the FPT approach significantly outperforms the Merton approach across a range of option moneynesses and maturities. As part of the calibration, we obtain market-implied leverage and firm volatility, which can be used in other corporate finance applications.

This is joint work with Xinghua (Alan) Zhou of Western University.