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The risk-shifting effect and the value of a warrant

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Notes

§Similarly, the non-stationary nature of stock volatility due to the presence of debt or warrants was also studied by Geske (1979) and Bensoussan et al. (1994, 1995).

†By 'leverage effect' the financial literature refers to a negative correlation between stock prices and volatilities caused by the presence of debt financing (Black 1976).

‡For instance, setting arbitrarily the elasticity parameter to 0.5 would lead to a closed formula for the call price (Beckers 1980).

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†To deno   write σ_S .

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⊥Intuitively, the net effect on $\epsilon_{\sigma_s,s}^{*}$ of this substitution is negligible once we recall equation (5). Both of these substitutions (s_t for a_t and σ_s for σ) produce a downward approximation of the variables, which lowers the product σa_t but also increases the expression in brackets. As a matter of fact, the above-mentioned approximation determines a drop in $N(d_1)$ (the warrant's delta) due to the decrease in both moneyness and volatility. Hence, the suggested replacement causes two opposite outcomes, whose net effect tends to be insignificant. The analytical expression of the difference between the two elasticities is provided in appendix A.

†This value is also computable through the numerical algorithm proposed by Ukhov (2004). Nevertheless, in our simulation this method is not necessary since we assume that the asset value and its volatility are both known.

‡We obtain a_t applying the Newton–Raphson algorithm to the process defined in equation (4).

§We consider a log-normal distribution of asset values. The moneyness bounds are computed according to the following probability intervals: DOTM [0.01, 0.20), OTM [0.20, 0.45), ATM [0.45, 0.55), ITM [0.55, 0.80), and DITM [0.80, 0.99]. First and last percentiles are excluded to avoid an infinite support.

†Simulations based on different values of σ do not produce significant changes in terms of pricin

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