

Are we using the wrong letters? An analysis of executive stock option Greeks

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Abstract:

Greek letters, in particular delta and vega, based on the Black-Scholes model (BS), have been widely used to estimate the sensitivity of CEO wealth to changes in stock price (delta) and stock return volatility

(vega) and to evaluate the employee stock options (ESOs) granted on the basis of performance and risk. However, the BS model does not take into account the main features of ESOs and therefore the delta and vega values it produces are not valid. The Cvitanic-Wiener-Zapatero model

(CWZ) is an alternative valuation model to Black-Scholes for valuing ESOs. It has a closed formula and takes into consideration the main features of ESOs.

We carry out a sensitivity analysis to show that the results of previous studies regarding option-based compensation and its risk-taking effects are not robust in ESO pricing models. The sensitivity analysis consists of comparing the impact of the common parameters of the BS and CWZ models on the sensitivities of CEO wealth to stock price and stock volatility. We also analyze the effects of the specific parameters of CWZ model on delta and vega.

Additionally, we develop an empirical analysis to illustrate the effects of stock return volatility and different corporate policies on the sensitivities of CEO wealth to stock price and volatility.