Warrant

Product

Equity Warrant

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Warrant Introduction

- An equity warrant gives the holder the right to purchase shares at a fixed price from a firm. It is an option on the common stock of a firm issued by the same firm.
- Warrants are in many ways similar to call options, but a few key differences distinguish them.
- Warrants tend to have longer durations than do exchange-traded call options.
- They are traded over the counter more often than on an exchange.
- Investors cannot write warrants like they can options.
- Warrants do not pay dividends or come with voting rights.
- When warrants are exercised, the company typically issues new shares at the exercise price to fill the order, resulting dilutioon of the share value.

Equity Warrant

- Investors are attracted to warrants as a means of leveraging their positions in a security.
- Warrants provide investors a way to hedge risk or speculate. They can also be used to exploiting arbitrage opportunities.
- Warrants are frequently attached to bonds or preferred stock as a sweetener, which can be used to enhance the yield of the bond and make them more attractive to potential buyers.
- Most commonly issued warrants are often detachable, meaning that they can be separated from the bond and sold on the secondary market.
- Wedded warrants are not detachable. The investor must surrender the bond or preferred stock in order to exercise it.
- Naked Warrants are issued on their own.

Warrant Payoff

- If there were n shares outstanding and m warrants exercised, the dilution factor corresponding to the percentage of the firm value that is represented by the warrants is given by

$$\alpha = m/(m+n)$$

- The payoff of the warrant at T is given by

$$payoff = \frac{m}{m+n}\max(A-K,0)$$

where

$A = V/m$ the asset price

V the firm value

Valuation

- Warrants can be valued by the Black-Scholes model, but some modifications must be made to the parameters.
- The price of a warrant under the diluted Black-Scholes model is given by

$$W = \frac{m}{m+n}\left(Ae^{-qT}\Phi(d_1) - Ke^{-rT}\Phi(d_2)\right)$$

where

$$d_{1,2} = \frac{\ln\left(\frac{A}{K}\right)+(r-q\pm 0.5\sigma T)}{\sigma\sqrt{T}}$$

r	the interst rate
q	the dividend yield

Valuation (Con't)

- Strictly speaking, A is the asset price of the firm and σ is the volatility of the firm (not stock). Both of them are not observable.
- For simplicity, people may use stock price and stock volatility to replace the firm value A and the firm volatility σ above, although this simplification generally underestimates the warrant's price.

Equity Warrant

- There are several assumptions in this simplified warrant mode.
- The price process of the stock follows a geometric Brownian motions.
- The stock provides a continuous dividend
- The risk-free interest rate is deterministic.
- The volatility is constant.
- The asset value per share is equal to the stock price.
- The volatility of the firm is equal to the volatility of the stock.

Equity Warrant

Example

Outstanding Shares	**109254024**
Underlying equity	BTX.A
Currency	USD
Strike	4.55
Maturity Date	10/1/2018
CallPut	Call
Exercise Type	European
Settlement Type	Physical
Position	2038

Reference:

https://finpricing.com/lib/EqWarrant.html