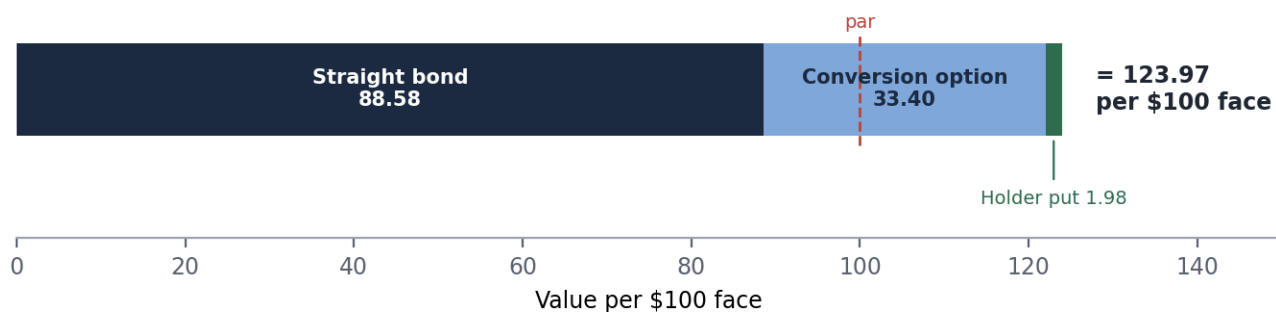


MicroStrategy 2028 Convertible Bond Model

A binomial valuation of Strategy's (MicroStrategy's) 0.625% convertible notes due September 2028. The issuer's main asset is bitcoin, so I modeled bitcoin as the state variable, let default occur when the value of the holdings falls below a debt boundary, and priced the note as a straight bond plus the conversion option plus the holder's 2027 put.

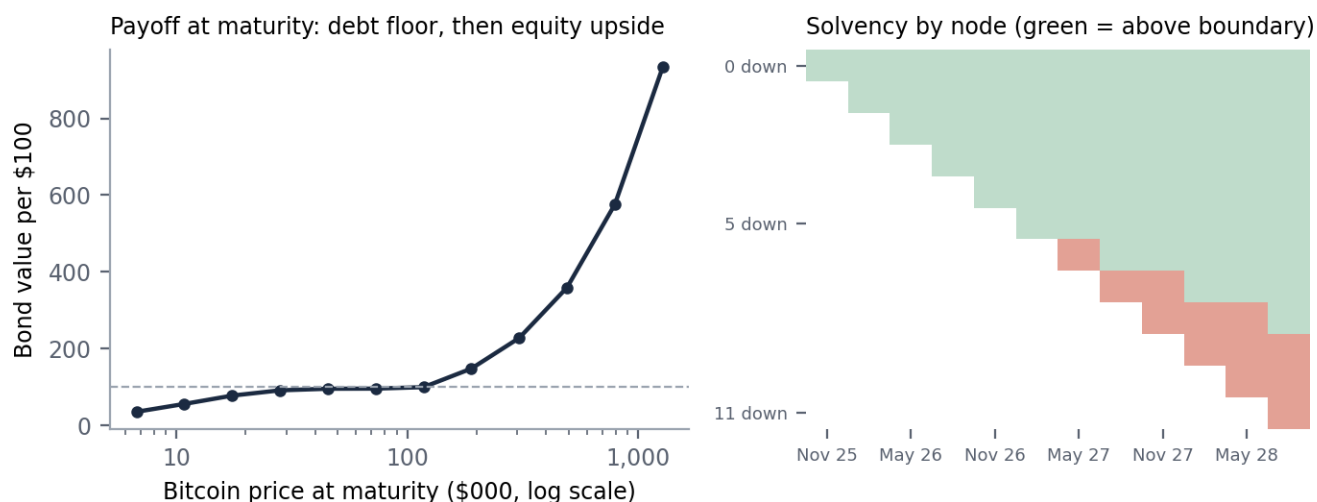
123.97 model value per \$100 face	88.58 straight-bond value (rates + default)	47.7% bitcoin volatility input	12 quarterly steps in the tree
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How the model works

Step	What it does
1 · Bitcoin tree	Quarterly binomial tree from \$92.67K on Nov 23, 2025: $u = e^{(\sigma\sqrt{dt})}$, $d = 1/u$, risk-neutral $p = (e^{(r \cdot dt)} - d)/(u - d)$ with $\sigma = 47.7\%$, $r = 4.5\%$.
2 · Asset value and default	Firm assets = bitcoin price $\times$ 0.65M BTC. A node below the \$16B default boundary is treated as default: bondholders recover par in proportion to the remaining value instead of receiving coupons.
3 · Straight bond	0.625% coupon and par discounted back through the tree, with default checked at each node: 88.58. Most of the gap to par is the low coupon discounted at 4.5%; the rest is expected default loss.
4 · Conversion option	Equity = assets – debt at par; stock price = equity $\div$ shares. The conversion right is a call on 100/183.19 shares, valued at 33.40.
5 · Holder put and total	The September 2027 put at par adds 1.98. Total: $88.58 + 33.40 + 1.98 = 123.97$.

What the tree shows



At maturity the note behaves like debt when bitcoin is low: value falls below par once the holdings no longer cover the debt. It behaves like equity when bitcoin is high: above the conversion price, each \$100 of face tracks the stock. The solvency map shows the default region. It appears only after a long run of losses (about six more down quarters than up quarters), so default is a tail that is unlikely but severe. Most of the value above the straight bond comes from the conversion option, which is why the note is worth more than par despite its 0.625% coupon.

Why a convertible from this issuer is unusual

Most convertibles combine a fairly stable credit with an equity option. Here the same variable, bitcoin, drives both the default risk and the conversion value. A bitcoin rally raises the option and lowers credit risk together; a sell-off hits both at once. A single-factor tree captures that link directly.

Sensitivities worth testing

Input	Direction	Effect on value
Bitcoin volatility	Higher	Raises the conversion option and the put, and lowers the straight bond (more default paths)
Default boundary	Higher	Lowers the straight bond; default arrives on fewer down-moves
Bitcoin price	Higher	Raises conversion value and moves nodes out of the default region
Risk-free rate	Higher	Lowers the discounted bond floor and raises the call value

Model limits: a single state variable (no separate equity or rate risk), quarterly steps, and a fixed boundary rather than the company's full capital structure. Note terms are from Strategy's public debt disclosure (Dec 2, 2025). Coursework, built on the FIN 330 binomial credit-model framework; not investment advice.