Finance 5350: Derivatives Markets

Binomial Model Derivation

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Introduction

What follows is a derivation of the single–period Binomial option pricing formula. This derivation is slightly different than the one found in your textbook. I use different variable names than the text in order to be more consistent with the Black–Scholes model.

One-Period Trees

To fix ideas, recall that our simple assumption of binomial prices leads to two binomial trees: one for the stock price, and one for the option price:

Stock Price Tree

Option Price Tree

The Replicating Portfolio Concept

Solving for B

Solving for Δ

The No-Arbitrage Solution

The Risk-Neutral Representation