

Chapter 2, Problem 3

NanoNano: Option to Abandon

(Effect of Decreasing Salvage Value)

Input Data

| | | |
|------------------------------------|-------|---------|
| Present value of future cash flows | \$200 | million |
| Volatility | 45% | annual |
| Risk-free interest rate | 5% | annual |
| Time to expiration | 5 | years |
| Salvage value - Year 1 | \$120 | million |
| Salvage value - Year 2 | \$110 | million |
| Salvage value - Year 3 | \$100 | million |
| Salvage value - Year 4 | \$90 | million |
| Salvage value - Year 5 | \$80 | million |
| Time step | 1 | year(s) |

Results

| | |
|-------------|-------|
| NPV | \$200 |
| ROV | \$210 |
| Value added | \$10 |

Calculated Parameters

| | |
|----------------------------------|-------|
| Up factor (u) | 1.568 |
| Down factor (d) | 0.638 |
| Risk-neutral probability (p) | 0.444 |

Asset Valuation Lattice

| Time period | 0 | 1 | 2 | 3 | 4 | 5 |
|-------------------------------|-------|-------|-------|-------|---------|---------|
| Valuation of underlying asset | \$200 | \$314 | \$492 | \$771 | \$1,210 | \$1,898 |
| | | \$128 | \$200 | \$314 | \$492 | \$771 |
| | | | \$81 | \$128 | \$200 | \$314 |
| | | | | \$52 | \$81 | \$128 |
| | | | | | \$33 | \$52 |
| | | | | | | \$21 |

Option Valuation Lattice*

| Time period | 0 | 1 | 2 | 3 | 4 | 5 |
|---------------------------------|-------|-------|-------|-------|---------|---------|
| Valuation of abandonment option | \$210 | \$316 | \$492 | \$771 | \$1,210 | \$1,898 |
| | | \$144 | \$204 | \$314 | \$492 | \$771 |
| | | | \$110 | \$135 | \$200 | \$314 |
| | | | | \$100 | \$96 | \$128 |
| | | | | | \$90 | \$80 |
| | | | | | | \$80 |

*Continue if green
Abandon if red

