

Chapter 8, Problem 7

Smart Textiles: Variable Volatility

Input Data

Present value of future cash flows	\$200	million
Volatility (first 2 years)	20%	annual
Risk-free rate of return	5%	annual
Time to expiration	4	years
Volatility (last 2 years)	30%	annual
Time step	1	year(s)
Cost of investment	\$250	million

Results

NPV	-\$50
ROV	\$36
Value added	\$86

Calculated Parameters

First Two Years

Up factor (u)	1.221
Down factor (d)	0.819
Risk-neutral probability (p)	0.577

Second Two Years

Up factor (u)	1.350
Down factor (d)	0.741
Risk-neutral probability (p)	0.510

Asset Valuation Lattice

Time period	0	1	2	3	4
				\$403	\$544
					\$298
				\$221	\$298
					\$164
Valuation of underlying asset	\$200	\$244	\$298	\$270	\$364
		\$164	\$200		\$200
			\$134	\$148	\$200
					\$110
				\$181	\$244
					\$134
				\$99	\$134
					\$74



Option Valuation Lattice

Time period	0	1	2	3	4
				\$165	\$294
					\$48
				\$23	\$48
					\$0
Valuation of the option	\$36	\$55	\$80	\$55	\$114
		\$15	\$27		\$0
			\$0	\$0	\$0
					\$0
				\$0	\$0
					\$0
				\$0	\$0
					\$0

*Expand if green

