

Chapter 7, Problem 12

DermaDrug: Option to Wait

(Effect of Leakage)

Input Data

Present value of future cash flows	\$100	million
Volatility	25%	annual
Risk-free rate of return	5%	annual
Time to expiration	5	years
Time step	1	year(s)
Leakage yield	5%	annual
Strike price (Investment cost)	\$100	million

Results

NPV	\$0
ROV	\$19
Value added	\$19

Calculated Parameters

Up factor (u)	1.284
Down factor (d)	0.779
Risk-neutral probability (p)	0.438

Asset Valuation Lattice

Time period	0	1	2	3	4	5
Valuation of underlying asset	\$100	\$128	\$165	\$212	\$272	\$349
		\$78	\$100	\$128	\$165	\$212
			\$61	\$78	\$100	\$128
				\$47	\$61	\$78
					\$37	\$47
						\$29

Option Valuation Lattice

Time period	0	1	2	3	4	5
Valuation of wait option	\$19	\$36	\$65	\$112	\$172	\$249
		\$8	\$17	\$33	\$65	\$112
			\$2	\$5	\$12	\$28
				\$0	\$0	\$0
					\$0	\$0
						\$0



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Present value of future cash flows	\$100	million
Volatility	25%	annual
Risk-free rate of return	5%	annual
Time to expiration	5	years
Time step	1	year(s)
Leakage yield	15%	annual
Strike Price (Investment Cost)	\$100	million

Results

NPV	\$0
ROV	\$8
Value added	\$8

Calculated Parameters

Up factor (u)	1.284
Down factor (d)	0.779
Risk-neutral probability (p)	0.249

Asset Valuation Lattice

Time period	0	1	2	3	4	5
Valuation of underlying asset	\$100	\$128	\$165	\$212	\$272	\$349
		\$78	\$100	\$128	\$165	\$212
			\$61	\$78	\$100	\$128
				\$47	\$61	\$78
					\$37	\$47
						\$29

Option Valuation Lattice

Time period	0	1	2	3	4	5
Valuation of wait option	\$8	\$28	\$65	\$112	\$172	\$249
		\$2	\$8	\$28	\$65	\$112
			\$0	\$2	\$7	\$28
				\$0	\$0	\$0
					\$0	\$0
						\$0



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Present value of future cash flows	\$100	million
Volatility	25%	annual
Risk-free rate of return	5%	annual
Time to expiration	5	years
Time step	1	year(s)
Leakage yield	20%	annual
Strike price (Investment cost)	\$100	million

Results

NPV	\$0
ROV	\$5
Value added	\$5

Calculated Parameters

Up factor (u)	1.284
Down factor (d)	0.779
Risk-neutral probability (p)	0.162

Asset Valuation Lattice

Time period	0	1	2	3	4	5
Valuation of underlying asset	\$100	\$128	\$165	\$212	\$272	\$349
		\$78	\$100	\$128	\$165	\$212
			\$61	\$78	\$100	\$128
				\$47	\$61	\$78
					\$37	\$47
						\$29

Option Valuation Lattice

Time period	0	1	2	3	4	5
Valuation of wait option	\$5	\$28	\$65	\$112	\$172	\$249
		\$1	\$5	\$28	\$65	\$112
			\$0	\$1	\$4	\$28
				\$0	\$0	\$0
					\$0	\$0
						\$0

