

Solution to chapter 33

Problem 1

| Scenario | Value/share |
|-------------|-------------|
| Worst | \$5.00 |
| Most likely | \$18.00 |
| Best Case | \$30.00 |

If the most likely scenario value is already risk adjusted, I would still buy the stock. There is a chance that I will lose money but rejecting the investment, with a risk adjusted value > price would represent double counting.

Problem 2

| | |
|----------------------------------|--------------------------|
| After-tax cash flows last year = | 40 |
| Expected growth rate = | 2% |
| Cost of capital = | 12% |
| Value of operating assets = | $408 = 40 / (.12 - .02)$ |
| +Cash | 0 |
| - Debt | 50 |
| Value of equity | 358 |
| Number of shares | 25 |
| Value per share | 14.32 |

| | |
|------------------------------------|------|
| After-tax cash flow if contract lc | 20 |
| Value of operating assets = | 204 |
| +Cash | 0 |
| - Debt | 50 |
| Value of equity | 154 |
| Number of shares | 25 |
| Value per share | 6.16 |

Expected value per share = $12.688 = 14.32 (.80) + 6.16 (.20) = 12.688$
 Price per share = 10
 Stock is still under valued. Buy it.

Problem 3

| | | | | | |
|------------------------------|--|--------|-------------|--------------|-----------------|
| Net Income | 100 | | | | |
| Book value of equity | 1000 | | | | |
| Dividends | 70 | | | | |
| Assumed stable growth rate = | 3% ! You can assume any stable growth rate or cost of equity | | | | |
| Assumed cost of equity = | 10% ! Be consistent across the scenarios | | | | |
| | Probability | ROE | Growth rate | Payout ratio | Value of equity |
| Status Quo | 40% | 10.00% | 3% | 70.0% | \$441.43 |
| Regulatory easing | 25% | 12% | 3% | 75.0% | \$367.86 |
| Regulatory tightening | 35% | 9% | 3% | 66.7% | \$490.48 |

Expected value of equity (today) \$440.20 ! $40\% (441.43) + 25\% (367.86) + 35\% (490.48)$

Problem 4

| | | |
|----------------------------------|----------|------------|
| Expected EBIT (1-t) next year | 50 | |
| | Subsidy | No subsidy |
| Oil prices > \$100 | \$833.33 | \$555.56 |
| | 18% | 12% |
| Oil price \$60 - \$100 | \$700.00 | \$500.00 |
| | 30% | 20% |
| Oil price < \$ 60 | \$625.00 | \$468.75 |
| | 12% | 8% |
| Expeded value across scenarios = | \$639.17 | |

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Problem 5

| | |
|------------------------------|-------|
| After-tax operating income = | 120 |
| Return on capital = | 20% |
| Expected growth rate = | 4% |
| Reinvestment rate = | 20.0% |
| Cost of capital = | 12% |

| | |
|----------------------------------|------------|
| Value of firm = | 1200 |
| Book value = | 600 |
| Probability of nationalization = | 30% |
| Value of firm today = | \$1,020.00 |

| |
|----------|
| Success |
| 60% |
| \$244.18 |

Problem 6

| | | | | | | | | |
|---|---|---------|---|---------|---|-----------|-----|-----------|
| | <table border="1"> <tr> <td>Success</td> </tr> <tr> <td>80%</td> </tr> <tr> <td>\$15.60</td> </tr> </table> | Success | 80% | \$15.60 | <table border="1"> <tr> <td>Failure</td> </tr> <tr> <td>40%</td> </tr> <tr> <td>-\$327.27</td> </tr> </table> | Failure | 40% | -\$327.27 |
| Success | | | | | | | | |
| 80% | | | | | | | | |
| \$15.60 | | | | | | | | |
| Failure | | | | | | | | |
| 40% | | | | | | | | |
| -\$327.27 | | | | | | | | |
| <table border="1"> <tr> <td>Today</td> </tr> <tr> <td>-\$7.52</td> </tr> </table> | Today | -\$7.52 | <table border="1"> <tr> <td>Failure</td> </tr> <tr> <td>20%</td> </tr> <tr> <td>-\$100.00</td> </tr> </table> | Failure | 20% | -\$100.00 | | |
| Today | | | | | | | | |
| -\$7.52 | | | | | | | | |
| Failure | | | | | | | | |
| 20% | | | | | | | | |
| -\$100.00 | | | | | | | | |

Problem 7

| | |
|--|----------|
| Value of business once operational = | \$300.00 |
| PV of operational value = | \$213.53 |
| Likelihood of survival = | 60% |
| Survival adjusted value = | \$128.12 |
| VC equity brought in = | \$50.00 |
| Proportion of value you would demand = | 39.03% |

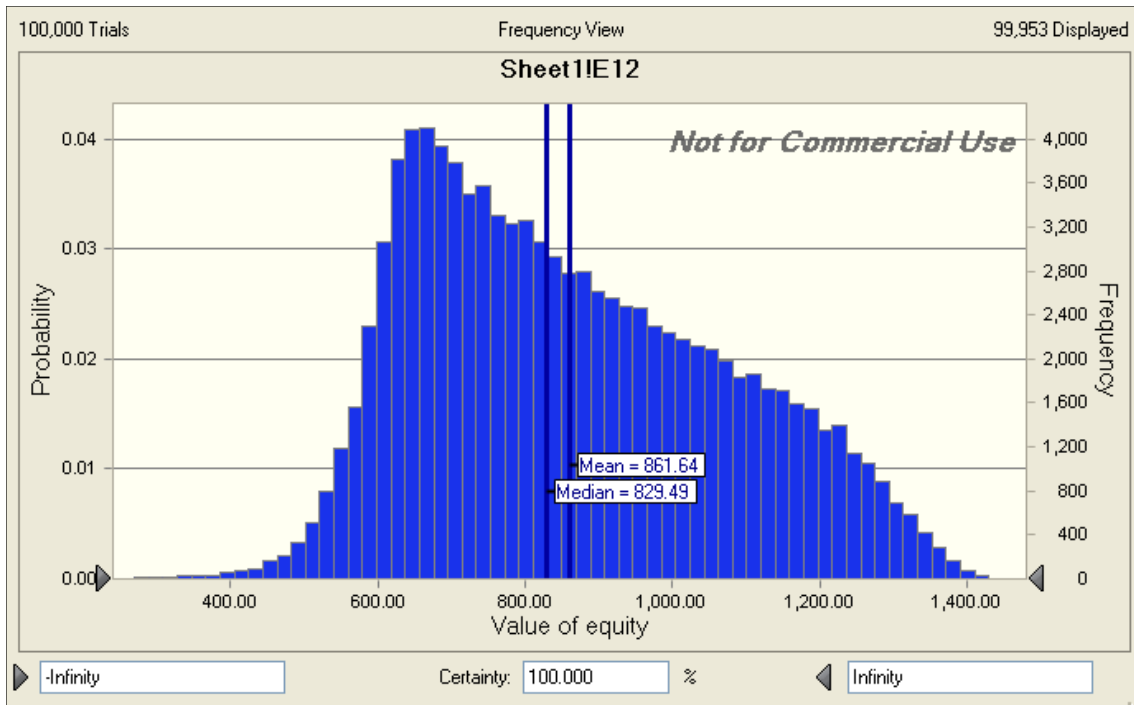
Target rate of return = 32.79% $! (300/128)^{(1/3)} - 1$

Problem 8

| | |
|---------------------------------|-----|
| Expected EBIT (1-t) next year = | 100 |
| Expected growth rate = | 3% |
| Return on capital = | 15% |
| Cost of capital = | 10% |

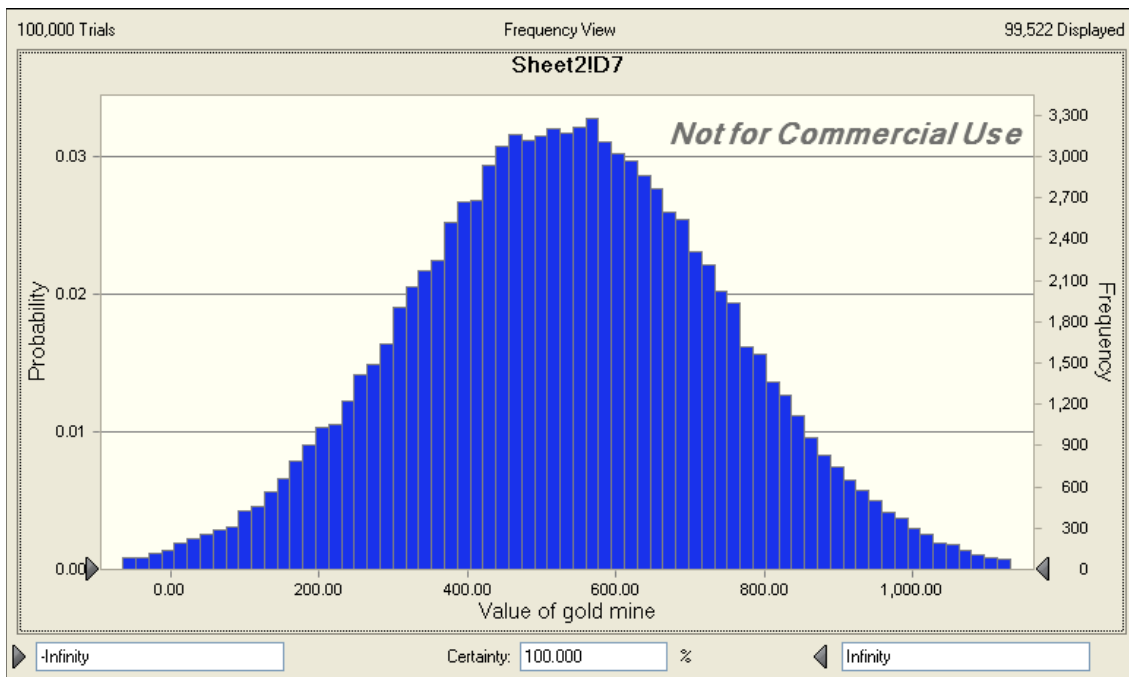
| | |
|-----------------------------|------------|
| Value of operating assets = | \$1,142.86 |
| + Cash | \$200.00 |
| - Debt | \$500.00 |
| Value of equity = | \$842.86 |

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Problem 9

| | |
|-----------------------------------|----------|
| Production per year (in millions) | 0.1 |
| Price/oz = | 1500 |
| Fixed Cost per year = | 100 |
| Annual cash flow = | 50 |
| Number of years = | 25 |
| Cost of capital = | 8% |
| Value of gold mine = | \$533.74 |



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Problem 10

| Company | Price | Expected value | Standard deviation | % chance that t | Lowest value | Highest value |
|---------|----------|----------------|--------------------|-----------------|--------------|---------------|
| A | \$8.00 | \$10.00 | \$1.00 | 80% | \$7.00 | \$13.00 |
| B | \$12.00 | \$13.50 | \$0.50 | 75% | \$10.00 | \$16.00 |
| C | \$15.00 | \$20.00 | \$5 | 50% | \$4.00 | \$50.00 |
| D | \$9.00 | \$10.00 | \$0.20 | 85% | \$8.50 | \$13.00 |
| E | \$50.00 | \$80.00 | \$10 | 80% | \$40.00 | \$150.00 |
| F | \$22.00 | \$25.00 | \$1 | 88% | \$18.00 | \$28.00 |
| G | \$3.00 | \$5.00 | \$0.50 | 70% | \$2.50 | \$6.00 |
| H | \$150.00 | \$200.00 | \$30 | 60% | \$40.00 | \$500.00 |
| I | \$35.00 | \$70.00 | \$20 | 65% | \$0.00 | \$200.00 |
| J | \$80.00 | \$100.00 | \$5 | 90% | \$70.00 | \$115.00 |

a. On Expected value basis

| Company | Price | Expected value | % Under/Over valued |
|---------|----------|----------------|---------------------|
| I | \$35.00 | \$70.00 | -50.00% |
| G | \$3.00 | \$5.00 | -40.00% |
| E | \$50.00 | \$80.00 | -37.50% |
| C | \$15.00 | \$20.00 | -25.00% |
| H | \$150.00 | \$200.00 | -25.00% |
| A | \$8.00 | \$10.00 | -20.00% |
| J | \$80.00 | \$100.00 | -20.00% |
| F | \$22.00 | \$25.00 | -12.00% |
| B | \$12.00 | \$13.50 | -11.11% |
| D | \$9.00 | \$10.00 | -10.00% |

b. With uncertainty incorporated

| Company | Price | Expected value | Standard deviation | T statistics |
|---------|----------|----------------|--------------------|--------------|
| D | \$9.00 | \$10.00 | \$0.20 | -5.00 |
| G | \$3.00 | \$5.00 | \$0.50 | -4.00 |
| J | \$80.00 | \$100.00 | \$5 | -4.00 |
| B | \$12.00 | \$13.50 | \$0.50 | -3.00 |
| E | \$50.00 | \$80.00 | \$10 | -3.00 |
| F | \$22.00 | \$25.00 | \$1 | -3.00 |
| A | \$8.00 | \$10.00 | \$1.00 | -2.00 |
| I | \$35.00 | \$70.00 | \$20 | -1.75 |
| H | \$150.00 | \$200.00 | \$30 | -1.67 |
| C | \$15.00 | \$20.00 | \$5 | -1.00 |

$T = (\text{Price} - \text{Exp value}) / \text{Std deviation}$

c. With downside worries

| Company | Price | Expected value | Lowest value | Worst case % dro | % Under valued |
|---------|----------|----------------|--------------|------------------|----------------|
| D | \$9.00 | \$10.00 | \$8.50 | -5.6% | -10% |
| A | \$8.00 | \$10.00 | \$7.00 | -12.5% | -20% |
| J | \$80.00 | \$100.00 | \$70.00 | -12.5% | -20% |
| B | \$12.00 | \$13.50 | \$10.00 | -16.7% | -11% |
| G | \$3.00 | \$5.00 | \$2.50 | -16.7% | -40% |
| F | \$22.00 | \$25.00 | \$18.00 | -18.2% | -12% |
| E | \$50.00 | \$80.00 | \$40.00 | -20.0% | -38% |
| C | \$15.00 | \$20.00 | \$4.00 | -73.3% | -25% |
| H | \$150.00 | \$200.00 | \$40.00 | -73.3% | -25% |
| I | \$35.00 | \$70.00 | \$0.00 | -100.0% | -50% |

Go with stocks with the least percentage drops in worst case

d. If my compensation was a fixed amount plus a percentage of the excess return that I make for my clients.