Question: Find: (1) the probability of default; (2) the probability of survival; and (3) the expected time to default for Company A over the next two periods and the default intensity (λ) for Company B.

Company A has an actual default intensity of 0.10, and Company B has a 17% probability of defaulting in the next three periods.

Answer: The expected time to default of any company is simply ($1/\lambda$), which in the case of Company A is 10 periods. Both remaining problems for Company A are solved using Equation 1. For Company A, the probability of survival is $e^{-0.10\times 2}$, which equals 0.819. The probability of default is simply 1.0 minus the probability of survival: 1.0 − 0.819, or 0.181. Company B has a probability of survival of 83%, or 0.83 (since its default probability is 17%). Therefore, the default intensity can be found by inserting 0.83 into the left side of Equation 1 and taking the natural logarithm of both sides. This generates the value that is equal to $-\lambda t$, specifically, ln(0.83), or –0.18633. Dividing that quantity by –3 (i.e., –t) generates a default intensity (λ) of 6.21%.

Question: What is the current price of a 1-year zero-coupon bond issued by a start-up firm with a default intensity of 5%?Assume the riskless rate is 2%.

Answer: The face value of the bond is $50 million. The value ($46.62 million) can be found using Equation 3:

$D_0 = e^{-(0.02+0.05)\times 1} \times 50 = \$46.62$ million

Note that Equation 3 can be solved for any of its variables given the others.

Question: Find the risk-neutral default intensity.

Suppose the credit spread on a 1-year zero-coupon bond is 2%, and the recovery rate is estimated to be 80%.

Answer: Using Equation 5, the approximated implied risk-neutral default intensity is 0.10:

$0.02 \approx \lambda \times (1 - 0.8)$ $\lambda \approx 10\%$

Note that Equation 5 contains three variables, any one of which can be solved using the other two.