

1a.

1. BBB: $\lambda = -\ln(1 - 0.0025) = 0.00250313$
2. BBB-: $\lambda = -\ln(1 - 0.0040) = 0.00400802$
3. BB+: $\lambda = -\ln(1 - 0.0065) = 0.0065212$
4. BB: $\lambda = -\ln(1 - 0.0100) = 0.01005033$
5. BB-: $\lambda = -\ln(1 - 0.0160) = 0.01612938$
6. B+: $\lambda = -\ln(1 - 0.0250) = 0.0253178$
7. B: $\lambda = -\ln(1 - 0.0400) = 0.04082199$

1b.

Interval \$0 - \$5,000,000: 0.9999
Interval \$5,000,000 - \$10,000,000: 0
Interval \$10,000,000 - \$15,000,000: 0
Interval \$15,000,000 - \$20,000,000: 0
Interval \$20,000,000 - \$25,000,000: 0
Interval \$25,000,000 - \$30,000,000: 0
Interval \$30,000,000 - \$35,000,000: 0
Interval \$35,000,000 - \$40,000,000: 0
Interval \$40,000,000 - \$45,000,000: 0
Interval \$45,000,000 - \$50,000,000: 0
Interval \$50,000,000 - \$55,000,000: 0
Interval \$55,000,000 - \$60,000,000: 0
Interval \$60,000,000 - \$65,000,000: 0
Interval \$65,000,000 - \$70,000,000: 0
Interval \$70,000,000 - \$75,000,000: 0
Interval \$75,000,000 - \$80,000,000: 0
Interval \$80,000,000 - \$85,000,000: 0
Interval \$85,000,000 - \$90,000,000: 0
Interval \$90,000,000 - \$95,000,000: 0
Interval \$95,000,000 - \$100,000,000: 0

2a.

Distance to default for BBB: 2.8070

Distance to default for BBB-: 2.6521

Distance to default for BB+: 2.4838

Distance to default for BB: 2.3263

Distance to default for BB-: 2.1444

Distance to default for B+: 1.9600

Distance to default for B: 1.7507

2b.

Interval \$0 - \$5,000,000: 0.0000

Interval \$5,000,000 - \$10,000,000: 0.0000

Interval \$10,000,000 - \$15,000,000: 0.0000

Interval \$15,000,000 - \$20,000,000: 0.0000

Interval \$20,000,000 - \$25,000,000: 0.0000

Interval \$25,000,000 - \$30,000,000: 0.0000

Interval \$30,000,000 - \$35,000,000: 0.00

Interval \$35,000,000 - \$40,000,000: 0.00

Interval \$40,000,000 - \$45,000,000: 0.00

Interval \$45,000,000 - \$50,000,000: 0.00

Interval \$50,000,000 - \$55,000,000: 0.00

Interval \$55,000,000 - \$60,000,000: 0.00

Interval \$60,000,000 - \$65,000,000: 0.00

Interval \$65,000,000 - \$70,000,000: 0.00

Interval \$70,000,000 - \$75,000,000: 0.00

Interval \$75,000,000 - \$80,000,000: 0.00

Interval \$80,000,000 - \$85,000,000: 0.00

Interval \$85,000,000 - \$90,000,000: 0.00

Interval \$90,000,000 - \$95,000,000: 0.00

Interval \$95,000,000 - \$100,000,000: 0.00

3a.

Formula for initial distance to default

$$DD(BBB) = (\ln(V/DF) + (\mu - \sigma^2/2)t) / (\sigma\sqrt{t})$$

Initial distance to default for BBB: -0.0031

Initial distance to default for BBB-: -0.0050

Initial distance to default for BB+: -0.0081

Initial distance to default for BB: -0.0125

Initial distance to default for BB-: -0.0201

Initial distance to default for B+: -0.0313

Initial distance to default for B: -0.0502

3b.

Probability of losses in interval [0, 5000000): 0.0000

Probability of losses in interval [5000000, 10000000): 0.0000

Probability of losses in interval [10000000, 15000000): 0.0000

Probability of losses in interval [15000000, 20000000): 0.0000

Probability of losses in interval [20000000, 25000000): 0.0000

Probability of losses in interval [25000000, 30000000): 0.0000

Probability of losses in interval [30000000, 35000000): 0.0000

Probability of losses in interval [35000000, 40000000): 0.0001

Probability of losses in interval [40000000, 45000000): 0.0002

Probability of losses in interval [45000000, 50000000): 0.0002

Probability of losses in interval [50000000, 55000000): 0.0007

Probability of losses in interval [55000000, 60000000): 0.0012

Probability of losses in interval [60000000, 65000000): 0.0043

Probability of losses in interval [65000000, 70000000): 0.0069

Probability of losses in interval [70000000, 75000000): 0.0163

Probability of losses in interval [75000000, 80000000): 0.0303

Probability of losses in interval [80000000, 85000000): 0.0722

Probability of losses in interval [85000000, 90000000): 0.1429

4. Solution in excel

rho 0.34

5. Solution in excel

\$0	\$50,00,000	5535	0.554
\$50,00,000	\$1,00,00,000	2194	0.219
\$1,00,00,000	\$1,50,00,000	839	0.084
\$1,50,00,000	\$2,00,00,000	304	0.030
\$2,00,00,000	\$2,50,00,000	473	0.047
\$2,50,00,000	\$3,00,00,000	85	0.009
\$3,00,00,000	\$3,50,00,000	191	0.019
\$3,50,00,000	\$4,00,00,000	161	0.016
\$4,00,00,000	\$4,50,00,000	9	0.001
\$4,50,00,000	\$5,00,00,000	81	0.008
\$5,00,00,000	\$5,50,00,000	9	0.001
\$5,50,00,000	\$6,00,00,000	38	0.004
\$6,00,00,000	\$6,50,00,000	29	0.003
\$6,50,00,000	\$7,00,00,000	0	0.000
\$7,00,00,000	\$7,50,00,000	22	0.002
\$7,50,00,000	\$8,00,00,000	7	0.001
\$8,00,00,000	\$8,50,00,000	0	0.000
\$8,50,00,000	\$9,00,00,000	3	0.000
\$9,00,00,000	\$9,50,00,000	0	0.000
\$9,50,00,000	\$10,00,00,000	5	0.001