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Question 1

Question Type: MultipleChoice

Which of the following is not a parameter to be determined by the risk manager that affects the level of economic credit capital:

Options:

A- Risk horizon

B- Confidence level

C- Probability of default

D- Definition of credit losses

Answer:

C

Explanation:

Three parameters define economic credit capital: the risk horizon, ie the time horizon over which the risk is being assessed; the confidence level, ie the quintile of the loss distribution; and the definition of credit losses, ie whether mark-to-market losses are considered in addition to default-only losses. The probability of default is not a parameter within the control of the risk manager, but an

input into the capital calculation process that he has to estimate. Therefore Choice 'c' is the correct answer.

Question 2

Question Type: MultipleChoice

For a loan portfolio, unexpected losses are charged against:

Options:

A- Credit reserves

B- Economic credit capital

C- Economic capital

D- Regulatory capital

Answer:

B

Explanation:

Credit reserves are created in respect of expected losses, which are considered the cost of doing business. Unexpected losses are borne by economic credit capital, which is a part of economic capital. This question is a bit nuanced - and 'economic capital' would generally be a good answer as well. However, taking a rather beady eyed view of the terminology and distinguishing between 'economic credit capital' which is a subset of 'economic capital', we can say that 'economic credit capital' is a more appropriate Choice 'a's the question relates to credit losses.

Question 3

Question Type: MultipleChoice

Which of the following statements is true:

Options:

A- Both total expected losses and total unexpected losses are less than the sum of expected and unexpected losses on underlying exposures respectively

B- Total expected losses are equal to the sum of individual underlying exposures while total unexpected losses are greater than the sum of unexpected losses on underlying exposures

C- Total expected losses are equal to the sum of expected losses in the individual underlying exposures while total unexpected losses are less than the sum of unexpected losses on underlying exposures

D- Total expected losses are greater than the sum of individual underlying exposures while total unexpected losses are less than the sum of unexpected losses on underlying exposures

Answer:

C

Explanation:

Total expected losses which are average and anticipated are equal to the sum of expected losses in the underlying exposures. Total unexpected losses, which are the excess of worst case losses at a certain confidence level over the expected losses, benefit from the diversification effect and are lower than the sum of unexpected losses of the underlying exposures. Therefore Choice 'c' is the correct answer. The other choices are incorrect.

Question 4

Question Type: MultipleChoice

For a loan portfolio, expected losses are charged against:

Options:

A- Economic capital

B- Regulatory capital

C- Credit reserves

D- Economic credit capital

Answer:

C

Explanation:

Credit reserves are created in respect of expected losses, which are considered the cost of doing business. Unexpected losses are borne by economic credit capital, which is a part of economic capital. Therefore Choice 'c' is the correct answer.

Question 5

Question Type: MultipleChoice

In estimating credit exposure for a line of credit, it is usual to consider:

Options:

A- a fixed fraction of the line of credit to be the exposure at default even though the currently drawn amount is quite different from such a fraction.

B- the full value of the credit line to be the exposure at default as the borrower has an informational advantage that will lead them to borrow fully against the credit line at the time of default.

C- only the value of credit exposure currently existing against the credit line as the exposure at default.

D- the present value of the line of credit at the agreed rate of lending.

Answer:

A

Explanation:

Choice 'a' is the correct answer. Exposures such as those to a line of credit of which only a part (or none) may be drawn at the time of assessment present a difficulty when attempting to quantify credit risk. It is not correct to take the entire amount of the line as the exposure at default, and likewise the current exposure is likely to be too aggressively low a number to consider.

While the borrower has an information advantage in that he would be aware of the deterioration in credit standing before the bank and would probably draw cash prior to default, it is unlikely that the entire amount of the line of credit would be drawn in all cases. In some cases, none may be drawn. In other cases, the bank would become aware of the situation and curtail or cancel access to the credit line in a timely fashion.

Therefore a fixed proportion of existing credit lines is considered a reasonable approximation of the exposure at default against credit lines.

Question 6

Question Type: **MultipleChoice**

There are two bonds in a portfolio, each with a market value of $50m. The probability of default of the two bonds are 0.03 and 0.08 respectively, over a one year horizon. If the probability of the two bonds defaulting simultaneously is 1.4%, what is the default correlation between the two?

Options:

A- 0%

B- 100%

C- 40%

D- 25%

Answer:

D

Explanation:

Probability of the joint default of both A and B =

Probability of the joint default of both A and B =

$$P(A\ defaults \cap B\ defaults) =$$

$$(Default\ Correlation\ of\ A\&B) * \sqrt{\Big(P(A)\big(1-P(A)\big)\Big)\Big(P(B)\big(1-P(B)\big)\Big)} + P(A)P(B)$$

We know all the numbers except default correlation, and we can solve for it.

Default Correlation*SQRT(0.03*(1 - 0.03)*0.08*(1 - 0.08)) + 0.03*0.08 = 0.014.

Solving, we get default correlation = 25%

Question 7

Question Type: MultipleChoice

There are two bonds in a portfolio, each with a market value of $50m. The probability of default of the two bonds are 0.03 and 0.08 respectively, over a one year horizon. If the default correlation is 25%, what is the one year expected loss on this portfolio?

Options:

A- $1.38m

B- $11m

C- $5.26m

D- $5.5mc

Answer:

D

Explanation:

We will need to calculate the joint probability distribution of the portfolio as follows. Probability of the joint default of both A and B =

$$P(A\ defaults \cap B\ defaults) =$$
$$(Default\ Correlation\ of\ A\&B) * \sqrt{\Big(P(A)\big(1-P(A)\big)\Big)\Big(P(B)\big(1-P(B)\big)\Big)} + P(A)P(B)$$

=25%*SQRT(0.03*(1 - 0.03)*0.08*(1 - 0.08)) + 0.03*0.08 = 0.0140.

The marginal probabilities (ie the standalone probabilities of default of the two bonds) are known, and if we can calculate the probability of joint defaults of the two bonds, we can calculate the rest of the entries. We then multiply the probabilities with the expected loss under each scenario and add them up to get the total expected loss.

The calculations are shown below. The expected loss is $5.5m, and therefore the correct answer is Choice 'd'.

Probabilities

	A defaults	A survives	Total
B defaults	**0.01397**	0.06603	**0.08**
B survives	0.01603	0.90397	0.92
Total	**0.03**	0.97	1

Loss in $m

	A defaults	A survives
B defaults	100.0000	50.0000
B survives	50.0000	0.0000

Expected loss in each scenario ($m)
(multiply the probability with the loss)

	A defaults	A survives
B defaults	1.3970	3.3015
B survives	0.8015	0.0000

Total expected loss = $ 5.5000 m

Question 8

Question Type: MultipleChoice

A bank extends a loan of $1m to a home buyer to buy a house currently worth $1.5m, with the house serving as the collateral. The volatility of returns (assumed normally distributed) on house prices in that neighborhood is assessed at 10% annually. The expected probability of default of the home buyer is 5%.

What is the probability that the bank will recover less than the principal advanced on this loan; assuming the probability of the home buyer's default is independent of the value of the house?

Options:

A- More than 1%

B- Less than 1%

C- More than 5%

D- 0

Answer:

B

Explanation:

The bank will not be able to recover the principal advanced on this loan if both the home buyer defaults, and the house value falls to less than $1m, ie the price moves adversely by more than $500k, which is $-500k/$150k = -3.33. (Note that 150k is the 1 year volatility in dollars, ie $1.5m * 10%).

The probability of both these things happening together is just the product of the two probabilities, one of which we know to be 5%. The other is also certainly a small number, and intuitively it is clear that the probability of both the things happening together will be less than 1%.

For a more precise answer, we can calculate the probability of the house price falling by 3.33 standard deviations by calculating the area under the standard normal curve to the left of -3.33. This indeed is a very small number (actually equal to NORMSINV(-3.33)=0.00043), which when multiplied by the probability of default of the home buyer at 5% is certainly going to be less than 1%. Therefore Choice 'b' is the correct answer.

Question 9

Question Type: MultipleChoice

If A and B be two debt securities, which of the following is true?

Options:

A- The probability of simultaneous default of A and B is greatest when their default correlation is +1

B- The probability of simultaneous default of A and B is not dependent upon their default correlations, but on their marginal probabilities of default

C- The probability of simultaneous default of A and B is greatest when their default correlation is negative

D- The probability of simultaneous default of A and B is greatest when their default correlation is 0

Answer:

A

Explanation:

If the marginal probability of default of two securities A and B is P(A) and P(B), then the probability of both of them defaulting together is affected by the default correlation between them. Marginal probability of default means the probability of default of each security on a standalone basis, ie, the probability of default of one security without considering the other security.

The relationship that expresses the probability of joint default of the two is given by the following expression:

$$P(A\ defaults \cap B\ defaults) = (Default\ Correlation\ of\ A\&B) * \sqrt{\Big(P(A)\big(1-P(A)\big)\Big)\Big(P(B)\big(1-P(B)\big)\Big)} + P(A)P(B)$$

It is easy to see that in a situation where the Default Correlation of A & B = 0, ie, the defaults are independent, the combined probability of default is P(A)*P(B), exactly what we would intuitively expect. Also in the other extreme case where the default correlation is equal to 1 and P(A) = P(B) = p, ie the securities behave in an identical way, the expression resolves to just p, which is what we would expect.

From the above relationship, it is clear that the probability of joint default of A and B is the greatest when default correlation between the two is equal to 1, ie the securities behave in an identical way. Therefore Choice 'a' is the correct answer.

Question 10

Question Type: **MultipleChoice**

A Bank Holding Company (BHC) is invested in an investment bank and a retail bank. The BHC defaults for certain if either the investment bank or the retail bank defaults. However, the BHC can also default on its own without either the investment bank or the retail bank defaulting. The investment bank and the retail bank's defaults are independent of each other, with a probability of default of 0.05 each. The BHC's probability of default is 0.11.

What is the probability of default of both the BHC and the investment bank? What is the probability of the BHC's default provided both the investment bank and the retail bank survive?

Options:

A- 0.0475 and 0.10

B- 0.11 and 0

C- 0.08 and 0.0475

D- 0.05 and 0.0125

Answer:

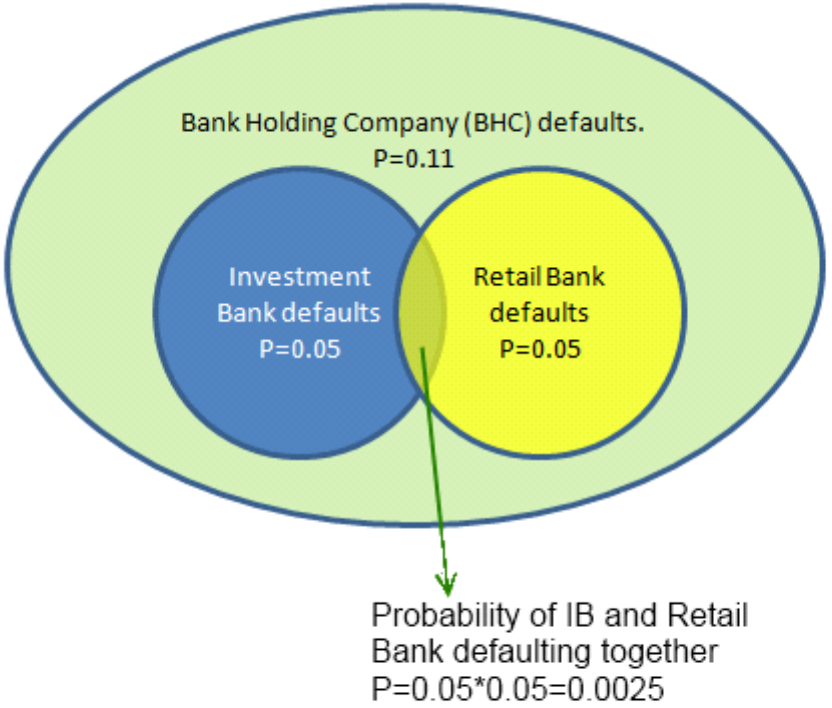
D

Explanation:

Since the BHC always fails when the investment bank fails, the joint probability of default of the two is merely the probability of the investment bank failing, ie 0.05.

The probability of just the BHC failing, given that both the investment bank and the retail bank have survived will be equal to 0.11 - (0.05+0.05-0.05*0.05) = 0.0125. (The easiest way to understand this would be to consider a venn diagram, where the area under the largest circle is 0.11, and there are two intersecting circles inside this larger circle, each with an area of 0.05 and their intersection accounting for 0.05*0.05. We need to calculate the area outside of the two smaller circles, but within the larger circle representing the BHC).

Refer diagram below, please excuse the awful colors.



The green shaded area (ie outside the smaller inner circles but inside the largest circle) represents the probability that the BHC alone defaults. This is equal to 0.11 - (0.05+0.05-0.0025) =0.0125.

Question 11

Question Type: MultipleChoice

There are two bonds in a portfolio, each with a market value of $50m. The probability of default of the two bonds over a one year horizon are 0.03 and 0.08 respectively. If the default correlation is zero, what is the one year expected loss on this portfolio?

Options:

A- $11m

B- $5.26m

C- $5.5m

D- $1.38m

Answer:

C

Explanation:

The probabilities of default of the two bonds are independent (as indicated by a zero default correlation). The various possible states of the portfolio are as follows:

First bond defaults, and the second does not: Probability * Loss = 0.03*0.92 * $50m = $1.38m

Second bond defaults, and the first does not: Probability * Loss = 0.97*0.08 * $50m = $3.88m

Both bonds default: Probability * Loss = 0.03*0.08 * $100m = $0.24m

Thus total expected loss on this portfolio = $5.5m. Since recovery rates are not provided, those should be assumed to be zero.

There is an easier way to solve this as well: default correlation does not affect expected losses, but their volatility. You can calculate the expected losses of the two bonds and add them up, ie, $50m*0.03 + $50m *0.08 = $5.5m