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Operational Risk Manager (ORM) Exam

PRMIA 8010

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QUESTION NO: 1

Which of the following is closest to the description of a 'risk functional'?

A. A risk functional is the distribution that models the severity of a risk

B. A risk functional is a model distribution that is an approximation of the true loss distribution of a risk

C. Risk functional refers to the Kolmogorov-Smirnov distance

D. A risk functional assigns a penalty value for the difference between a model distribution and a risk's severity distribution

ANSWER: D

Explanation:

For operational risk modeling, both frequency and severity distributions need to be modeled. Modeling severity involves finding an analytical distribution, such as log-normal or other that approximates the distribution best represented by known data - whether from the internal loss database, the external loss database or scenario data. A 'risk functional' is a measure of the deviation of the model distribution from the risk's actual severity distribution. It assigns a penalty value for the deviation, using a statistical measure, such as the KS distance (Kolmogorov-Smirnov distance).

The problem of finding the right distribution then becomes the problem of optimizing the risk functional. For example, if F is the model distribution, and G is the actual, or empirical severity distribution, and we are using the KS test, then the Risk Functional R is defined as follows:

F is the model distribution

G is the severity distribution

$$R_{KS}(F, G) = sup_x|F(x) - G(x)|$$

Absolute of the KS distance

For our purposes, sup means the max value

Note that supx stands for 'supremum', which is a more technical way of saying 'maximum'. In other words, we are calculating the maximum absolute KS distance between the two distributions. (Note that the KS distance is the max of the distance between identical percentiles of the two distributions using the CDFs of the two.)

Once the risk functional is identified, we can minimize it to determine the best fitting distribution for severity.

QUESTION NO: 2

Which of the following is NOT true in respect of bilateral close out netting:

A. The net amount due is immediately receivable or payable

B. All transactions are immediately closed out upon the occurrence of a credit event for either of the counterparties

C. All transactions are netted against each other

D. Transactions are separated by transaction type and immediately settled separately at each's replacement value

ANSWER: D

Explanation:

Choice 'b', Choice 'c' and Choice 'a' correctly describe a bilateral close out netting as recommended by the ISDA. However Choice 'd' is not correct as it suggests individual settlement of transactions without netting which is the whole point of bilateral close out netting.

QUESTION NO: 3

When compared to a low severity high frequency risk, the operational risk capital requirement for a medium severity medium frequency risk is likely to be:

A. Zero

B. Lower

C. Higher

D. Unaffected by differences in frequency or severity

ANSWER: C

Explanation:

High frequency and low severity risks, for example the risks of fraud losses for a credit card issuer, may have high expected losses, but low unexpected losses. In other words, we can generally expect these losses to stay within a small expected and known range. The capital requirement will be the worst case losses at a given confidence level less expected losses, and in such cases this can be expected to be low.

On the other hand, medium severity medium frequency risks, such as the risks of unexpected legal claims, 'fat-finger' trading errors, will have low expected losses but a high level of unexpected losses. Thus the capital requirement for such risks will be high.

It is also worthwhile mentioning high severity and low frequency risks - for example a rogue trader circumventing all controls and bringing the bank down, or a terrorist strike or natural disaster creating other losses - will probably have zero expected losses & high unexpected losses but only at very high levels of confidence. In other words, operational risk capital is unlikely to provide for such events and these would lie in the part of the tail that is not covered by most levels of confidence when calculating operational risk capital.

Note that risk capital is required for only unexpected losses as expected losses are to be borne by P&L reserves. Therefore the operational risk capital requirements for a low severity high frequency risk is likely to be low when compared to other risks that are lower frequency but higher severity.

Thus Choice 'c' is the correct answer.

QUESTION NO: 4

Under the CreditPortfolio View approach to credit risk modeling, which of the following best describes the conditional transition matrix:

A. The conditional transition matrix is the unconditional transition matrix adjusted for the state of the economy and other macro economic factors being modeled

B. The conditional transition matrix is the transition matrix adjusted for the risk horizon being different from that of the transition matrix

C. The conditional transition matrix is the unconditional transition matrix adjusted for probabilities of defaults

D. The conditional transition matrix is the transition matrix adjusted for the distribution of the firms' asset returns

ANSWER: A

Explanation:

Under the CreditPortfolio View approach, the credit rating transition matrix is adjusted for the state of the economy in a way as to increase the probability of defaults when the economy is not doing well, and vice versa. Therefore Choice 'a' is the correct answer. The other choices represent nonsensical options.

QUESTION NO: 5

Which of the following is not a risk faced by a bank from holding a portfolio of residential mortgages?

A. The risk that mortgage interest rates will rise in the future

B. The risk that the homeowners will pay the mortgage off before they are due

C. The risk that the homeowners will not be able to pay their mortgage when they are due

D. The risk that CDS spreads on the bank's debt will rise making funding more expensive

ANSWER: D

Explanation:

Choice 'd' represents a risk that does not arise from its holdings of mortgages. Therefore Choice 'd' is the correct answer.

All the other risks identified are correct - the bank faces interest rate, default and prepayment risks on its mortgages.

QUESTION NO: 6

According to the Basel framework, reserves resulting from the upward revaluation of assets are considered a part of:

A. Tier 3 capital

B. Tier 2 capital

C. Tier 1 capital

D. All of the above

ANSWER: B

Explanation:

According to the Basel II framework, Tier 1 capital, also called core capital or basic equity, includes equity capital and disclosed reserves.

Tier 2 capital, also called supplementary capital, includes undisclosed reserves, revaluation reserves, general provisions/general loan-loss reserves, hybrid debt capital instruments and subordinated term debt.

Tier 3 capital, or short term subordinated debt, is intended only to cover market risk but only at the discretion of their national authority.

QUESTION NO: 7

An error by a third party service provider results in a loss to a client that the bank has to make up. Such as loss would be categorized per Basel II operational risk categories as:

A. Execution delivery and process management

B. Outsourcing loss

C. Business disruption and process failure

D. Abnormal loss

ANSWER: A

Explanation:

Choice 'a' is the correct answer. Refer to the detailed loss event type classification under Basel II (see Annex 9 of the accord). You should know the exact names of all loss event types, and examples of each.

QUESTION NO: 8

Under the internal ratings based approach for risk weighted assets, for which of the following parameters must each institution make internal estimates (as opposed to relying upon values determined by a national supervisor):

A. Probability of default

B. Effective maturity

C. Loss given default

D. Exposure at default

ANSWER: A

Explanation:

Regardless of the approach being followed by a bank (ie, whether foundation IRB or advanced IRB), it must make its own estimates for the probability of default. Banks following the foundation IRB approach may use values set by the supervisor for the other three parameters, though those following the advanced IRB approach may use their own estimates for all four inputs. (This is also the difference between advanced IRB and the foundation IRB approaches.) Therefore Choice 'a' is the correct answer.

Also note the four difference elements that go as inputs to the internal ratings based approach in the choices provided.

QUESTION NO: 9

Under the standardized approach to calculating operational risk capital under Basel II, negative regulatory capital charges for any of the business units:

A. Should be ignored completely

B. Should be offset against positive capital charges from other business units

C. Should be included after ignoring the negative sign

D. Should be excluded from capital calculations

ANSWER: B

Explanation:

According to Basel II, in any given year, negative capital charges (resulting from negative gross income) in any business line may offset positive capital charges in other business lines without limit. Therefore Choice 'b' is the correct answer.

QUESTION NO: 10

If the loss given default is denoted by L, and the recovery rate by R, then which of the following represents the relationship between loss given default and the recovery rate?

A. $L = 1 + R$

B. $R = 1 + L$

C. $R = 1 / L$

D. $R = 1 - L$

ANSWER: D

Explanation:

When a default occurs, the proportion of the exposure represented by the recovery rate is recovered. For example, if the recovery rate is 40% for a loan, the actual loss in the event of a default would be $60 for a $100 loan. In other words, the loss given default = 1 - recovery rate. Hence Choice 'd' is the correct answer. All other choices are incorrect.

QUESTION NO: 11

Under the KMV Moody's approach to calculating expecting default frequencies (EDF), firms' default on obligations is likely when:

A. expected asset values one year hence are below total liabilities

B. asset values reach a level below short term debt

C. asset values reach a level below total liabilities

D. asset values reach a level between short term debt and total liabilities

ANSWER: D

Explanation:

An observed fact that the KMV approach relies upon is that firms do not default when their liabilities exceed assets, but when asset values are somewhere between short term liabilities and the total liabilities. In fact, the 'default point' in the KMV methodology is defined as the short term debt plus half of the long term debt. The difference between expected value of the assets in one year and this 'default point', when expressed in terms of standard deviation of the asset values, is called the 'distance-to-default'.

Therefore Choice 'd' is the correct answer. The other choices are incorrect.

QUESTION NO: 12

Which of the following situations are not suitable for applying parametric VaR:

I. Where the portfolio's valuation is linearly dependent upon risk factors

II. Where the portfolio consists of non-linear products such as options and large moves are involved

III. Where the returns of risk factors are known to be not normally distributed

A. I and II

B. II and III

C. I and III

D. All of the above

E. Where the portfolio's valuation is linearly dependent upon risk factors
II. Where the portfolio consists of non-linear products such as options and large moves are involved
III. Where the returns of risk factors are known to be not normally distributed

ANSWER: B

Explanation:

Parametric VaR relies upon reducing a portfolio's positions to risk factors, and estimating the first order changes in portfolio values from each of the risk factors. This is called the delta approximation approach. Risk factors include stock index values, or the PV01 for interest rate products, or volatility for options. This approach can be quite accurate and computationally efficient if the portfolio comprises products whose value behaves linearly to changes in risk factors. This includes long and short positions in equities, commodities and the like.

However, where non-linear products such as options are involved and large moves in the risk factors are anticipated, a delta approximation based valuation may not give accurate results, and the VaR may be misstated. Therefore in such situations parametric VaR is not advised (unless it is extended to include second and third level sensitivities which can bring its own share of problems).

Parametric VaR also assumes that the returns of risk factors are normally distributed - an assumption that is violated in times of market stress. So if it is known that the risk factor returns are not normally distributed, it is not advisable to use parametric VaR.

QUESTION NO: 13

What percentage of average annual gross income is to be held as capital for operational risk under the basic indicator approach specified under Basel II?

A. 0.125

B. 0.08

C. 0.12

D. 0.15

ANSWER: D

Explanation:

Banks using the basic indicator approach must hold 15% of the average annual gross income for the past three years, excluding any year that had a negative gross income. Therefore Choice 'd' is the correct answer.

QUESTION NO: 14

A zero coupon corporate bond maturing in an year has a probability of default of 5% and yields 12%. The recovery rate is zero. What is the risk free rate?

A. 5.26%

B. 7.00%

C. 5.00%

D. 6.40%

ANSWER: D

Explanation:

The probability of default would make the expected value of the future cash flows from both the corporate bond and the risk free bond identical. If p be the probability of default, the cash flows from the risky corporate bond would be

= (cash flows in the event of default x probability of default) + (cash flows without default x (1 - probability of default))

=> 5%*0 + (1 - 5%)*(1 + 12%) = (1 + Rf).

therefore Rf = 6.4%

(In reality investors would demand a 'credit risk premium' over and above the expected default loss rate. They are unlikely to be happy with just being compensated with exactly the expected default loss rate plus the risk-fre rate because the expected default loss rate itself is uncertain. They would demand some premium over and above what the default rate alone might mathematically imply above the risk free rate. In this question, this credit risk premium is ignored.)

QUESTION NO: 15

When pricing credit risk for an exposure, which of the following is a better measure than the others:

A. Expected Exposure (EE)

B. Notional amount

C. Potential Future Exposure (PFE)

D. Mark-to-market

ANSWER: A

Explanation:

Exposure for derivative instruments can vary significantly over the lifetime of the instrument, depending upon how the market moves. The potential future exposure represents the extremes, not the most likely outcome. The expected exposure is the most suitable measure for pricing the credit risk. Over time, as multiple transactions are entered into, the expectation (or the mean) will be realized - though individual transactions may have more or less by way of exposure.

The notional amount may not be relevant, though for loans it may be the most important contributor to the expected exposure. Mark-to-market will represent the exposure at a given point in time, but cannot be predicted nor be used to price the credit risk.