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PART I - QUANTITATIVE ANALYSIS

Chapter 1 - Bunds Fundamentals

Example 1-1: FRM Exam 1999-Question 17/Quantitative Analysis

1-1. Assume a semi-annual compounded rate of 8% per annum. What is the equivalent annually compounded rate?
   a) 9.2%
   b) 8.16%
   c) 7.45%
   d) 8%

Example 1-2: FRM Exam 1998-Question 28/Quantitative Techniques

1-2. Assume a continuously compounded interest rate is 10% per annum. The equivalent semi-annual compounded rate is:
   a) 10.25% per annum
   b) 9.88% per annum
   c) 9.76% per annum
   d) 10.52% per annum

Example 1-3: FRM Exam 1998-Question 12/Quantitative Techniques

1-3. A fixed rate bond, currently priced at 102.9, has one year remaining to maturity and is paying an 8% coupon. Assuming the coupon is paid semi-annually, what is the yield of the bond?
   a) 8%
   b) 7%
   c) 6%
   d) 5%

Example 1-4: FRM Exam 1999-Question 9/Quantitative Analysis

1-4. A number of terms in finance are related to the (calculus!) derivative of the price of a security with respect to some other variable. Which pair of terms is defined using second derivatives?
   a) Modified duration and volatility
   b) Vega and delta
   c) Convexity and gamma
   d) PV01 and yield to maturity
Example 1-5: FRM Exam 1998-Question 17/Quantitative Techniques

1-5. A bond is trading at a price of 100 with a yield of 8%. If the yield
increases by 1 basis point, the price of the bond will decrease to 99.95.
If the yield decreases by 1 basis point, the price of the bond will increase
to 100.04. What is the modified duration of the bond?
   a) 5.0
   b) 5.0
   c) 4.5
   d) −4.5

Example 1-6: FRM Exam 1998-Question 22/Quantitative Techniques

1-6. What is the price impact of a 10 basis point increase in yield on a 10-year
par bond with a modified duration of 7 and convexity of 50?
   a) −0.705
   b) −0.700
   c) −0.698
   d) −0.690

Example 1-7: FRM Exam 2000-Question 19/Capital Markets

1-7. What are the duration and convexity of a two-year bond that pays an
annual coupon of 10 percent and whose current yield to maturity is 14 percent?
Use $1,000 as the face value.
   a) 1.637 years and 3.3491
   b) 1.732 years and 4.0283
   c) 1.892 years and 4.2276
   d) 1.906 years and 4.3278

Example 1-8: FRM Exam 1998-Question 20/Quantitative Techniques

1-8. Coupon curve duration is a useful method to estimate duration from
market prices of an MBS. Assume the coupon curve of prices for Ginnie Maes
in June 2001 is as follows: 6% at 92, 7% at 94, and 8% at 96.5.
What is the estimated duration of the 7s?
   a) 2.45
   b) 2.4
   c) 2.33
   d) 2.25
Example 1-9: FRM Exam 1998-Question 21/Quantitative Techniques

1-9. Coupon curve duration is a useful method to estimate convexity from market prices of an MBS. Assume the coupon curve of prices for Ginnie Maes in June 2001 is as follows: 6% at 92, 7% at 94, and 8% at 96.5. What is the estimated convexity of the 7s?
   a) 53
   b) 26
   c) 13
   d) −53

Example 1-10: FRM Exam 1998-Question 29/Quantitative Techniques

1-10. A and B are two perpetual bonds, i.e., their maturities are infinite. A has a coupon of 4% and B has a coupon of 8%. Assuming that both bonds are trading at the same yield, what can be said about the duration of these bonds?
   a) The duration of A is greater than the duration of B
   b) The duration of A is less than the duration of B
   c) A and B both have the same duration
   d) None of the above

Example 1-11: FRM Exam 1997-Question 24/Market Risk

1-11. Which of the following is NOT a property of bond duration?
   a) For zero coupon bonds Macaulay duration of the bond equals its years to maturity.
   b) Duration is usually inversely related to the coupon of a bond
   c) Duration is usually higher for higher yields to maturity
   d) Duration is higher as the number of years to maturity for a bond selling at par or above increases

Example 1-12: FRM Exam 1999-Question 75/Market Risk

1-12. Suppose that your book has an unusually large short position in two investment grade bonds with similar credit risk. Bond A is priced at par yielding 6.0% with 20 years to maturity. Bond B also matures in 20 years with a coupon of 6.5% and yield of 6%. If risk is defined as a sudden and large drop in interest rate which bond contributes greater market risk to the portfolio?
   a) Bond A
   b) Bond B
   c) Both Bond A and Bond B will have similar market risk
   d) None of the above.
Example 1-13: FRM Exam 2000-Question 106/Quantitative Analysis

1-13. Consider the following bonds:

<table>
<thead>
<tr>
<th>Bond Number</th>
<th>Maturity (yrs)</th>
<th>Coupon Rate</th>
<th>Frequency</th>
<th>Yield (ABB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>6%</td>
<td>1</td>
<td>6%</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>6%</td>
<td>2</td>
<td>6%</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>0%</td>
<td>1</td>
<td>6%</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
<td>6%</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>5</td>
<td>9</td>
<td>6%</td>
<td>1</td>
<td>6%</td>
</tr>
</tbody>
</table>

How would you rank the bonds from the shortest to longest duration?

a) 5-2-1-4-3
b) 1-2-3-4-5
c) 5-4-3-1-2
d) 2-4-5-1-3

Example 1-14: FRM Exam 1998-Question 18/Quantitative Techniques

1-14. A portfolio consists of two positions: One position is long $100M of a two year bond priced at 101 with a duration of 1.7; the other position is short $50M of a five year bond priced at 99 with a duration of 4.1.

What is the duration of the portfolio?

a) 0.68
b) 0.61
c) −0.68
d) −0.61

Example 1-15: FRM Exam 2000-Question 110/Quantitative Analysis

1-15. Which of the following statements are TRUE?

I. The convexity of a 10-year zero coupon bond is higher than the convexity of a 10-year, 6% bond.
II. The convexity of a 10-year zero coupon bond is higher than the convexity of a 6% bond with a duration of 10 years.
III. Convexity grows proportionately with the maturity of the bond.
IV. Convexity is always positive for all types of bonds.
V. Convexity is always positive for “straight” bonds.

a) I only
b) I and II only
c) I and V only
d) II, III, and V only
Chapter 2 - Fundamentals of Probability

Example 2-1: FRM Exam 1999-Question 21/Quantitative Analysis

2-1. The covariance between variable A and variable B is 5. The correlation between A and B is 0.5. If the variance of A is 12, what is the variance of B?
   a) 10.00
   b) 2.89
   c) 8.33
   d) 14.40


2-2. Which one of the following statements about the correlation coefficient is FALSE?
   a) It always ranges from −1 to +1
   b) A correlation coefficient of zero means that two random variables are independent
   c) It is a measure of linear relationship between two random variables
   d) It can be calculated by scaling the covariance between two random variables

Example 2-3: FRM Exam 1999-Question 12/Quantitative Analysis

2-3. For a standard normal distribution, what is the approximate area under the cumulative distribution function between the values −1 and 1?
   a) 50%
   b) 68%
   c) 75%
   d) 95%

Example 2-4: FRM Exam 1999-Question 11/Quantitative Analysis

2-4. You are given that X and Y are random variables each of which follows a standard normal distribution with Covariance(X,Y) = 0.4. What is the variance of (5X + 2Y)?
   a) 11.0
   b) 29.0
   c) 29.4
   d) 37.0
### Example 2-5: FRM Exam 1999-Question 13/Quantitative Analysis

2-5. What is the kurtosis of a normal distribution?

a) 0
b) Cannot be determined, as it depends on the variance of the particular normal distribution considered
c) 2
d) 3

### Example 2-6: FRM Exam 2000-Question 108/Quantitative Analysis

2-6. The distribution of one-year returns for a portfolio of securities is normally distributed with an expected value of $\$45$ million, and a standard deviation of $\$16$ million. What is the probability that the value of the portfolio, one year hence, will be between $\$39$ million and $\$43$ million?

a) 8.6%
b) 9.6%
c) 10.6%
d) 11.6%

### Example 2-7: FRM Exam 1999-Question 16/Quantitative Analysis

2-7. If a distribution with the same variance as a normal distribution has kurtosis greater than 3, which of the following is TRUE?

a) It has fatter tails than normal distribution
b) It has thinner tails than normal distribution
c) It has the same tail fatness as the normal distribution since variances are the same
d) Cannot be determined from the information provided

### Example 2-8: FRM Exam 1999-Question 5/Quantitative Analysis

2-8. Which of the following statements best characterizes the relationship between the normal and lognormal distributions?

a) The lognormal distribution is the logarithm of the normal distribution
b) If the natural log of the random variable $X$ is lognormally distributed, then $X$ is normally distributed
c) If $X$ is lognormally distributed, then the natural log of $X$ is normally distributed
d) The two distributions have nothing to do with one another
Example 2-9: FRM Exam 1998-Question 10/Quantitative Techniques

2-9. For a lognormal variable x, we know that ln(x) has a normal distribution with a mean of zero and a standard deviation of 0.2. What is the expected value of x?

a) 0.98
b) 1.00
c) 1.02
d) 1.20

Example 2-10: FRM Exam 1998-Question 16/Quantitative Techniques

2-10. Which of the following statements are true?
I. The sum of two random normal variables is also a random normal variable.
II. The product of two random normal variables is also a random normal variable.
III. The sum of two random lognormal variables is also a random lognormal variable.
IV. The product of two random lognormal variables is also a random lognormal variable.
a) I and II only
b) II and III only
c) III and IV only
d) I and IV only
Example 2-11: FRM Exam 2000-Question 128/Quantitative Analysis

2-11. For a lognormal variable $X$, we know that $\ln(X)$ has a normal distribution with a mean of 0 and a standard deviation of 0.5. What are the expected value and the variance of $X$?
   a) 1.025 and 0.187
   b) 1.126 and 0.217
   c) 1.133 and 0.365
   d) 1.203 and 0.399

Example 2-12: FRM Exam 1999-Question 22/Quantitative Analysis

2-12. Which of the following exhibit positively skewed distributions?
   I) Normal distribution
   II) Lognormal distribution
   III) The returns of being short a put option
   IV) The returns of being long a call option
   a) II only
   b) III only
   c) II and IV only
   d) I, III, and IV only

Example 2-13: FRM Exam 1999-Question 3/Quantitative Analysis

2-13. It is often said that distributions of returns from financial instruments are leptokurtotic. For such distributions, which of the following comparisons with a normal distribution of the same mean and variance MUST hold?
   a) The skew of the leptokurtotic distribution is greater
   b) The kurtosis of the leptokurtotic distribution is greater
   c) The skew of the leptokurtotic distribution is smaller
   d) The kurtosis of the leptokurtotic distribution is smaller
**Chapter 3 – Fundamentals of Statistics**

**FRM-99, Question 4**
Random walk assumes that returns from one time period are statistically independent from another period. This implies:
A. Returns on 2 time periods can not be equal.
B. Returns on 2 time periods are uncorrelated.
C. Knowledge of the returns from one period does not help in predicting returns from another period
D. Both b and c.

**FRM-99, Question 14**
Suppose returns are uncorrelated over time. You are given that the volatility over 2 days is 1.2%. What is the volatility over 20 days?
A. 0.38%
B. 1.2%
C. 3.79%
D. 12.0%

**FRM-98, Question 7**
Assume an asset price variance increases linearly with time. Suppose the expected asset price volatility for the next 2 months is 15% (annualized), and for the 1 month that follows, the expected volatility is 35% (annualized). What is the average expected volatility over the next 3 months?
A. 22%
B. 24%
C. 25%
D. 35%

**FRM-97, Question 15**
The standard VaR calculation for extension to multiple periods assumes that returns are serially uncorrelated. If prices display trend, the true VaR will be:
A. the same as standard VaR
B. greater than the standard VaR
C. less than the standard VaR
D. unable to be determined

**FRM-99, Question 2**
Under what circumstances could the explanatory power of regression analysis be overstated?
A. The explanatory variables are not correlated with one another.
B. The variance of the error term decreases as the value of the dependent variable increases.
C. The error term is normally distributed.
D. An important explanatory variable is excluded.

**FRM-99, Question 20**
What is the covariance between populations a and b:
<table>
<thead>
<tr>
<th>a</th>
<th>17</th>
<th>14</th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>22</td>
<td>26</td>
<td>31</td>
<td>29</td>
</tr>
</tbody>
</table>
A. -6.25
B. 6.50
C. -3.61
D. 3.61

**FRM-99, Question 6**
Daily returns on spot positions of the Euro against USD are highly correlated with returns on spot holdings of Yen against USD. This implies that:
A. When Euro strengthens against USD, the yen also tends to strengthens, but returns are not necessarily equal.
B. The two sets of returns tend to be almost equal
C. The two sets of returns tend to be almost equal in magnitude but opposite in sign.
D. None of the above.
FRM-99, Question 10
You want to estimate correlation between stocks in Frankfurt and Tokyo. You have prices of selected securities. How will time discrepancy bias the computed volatilities for individual stocks and correlations between these two markets?
A. Increased volatility with correlation unchanged.
B. Lower volatility with lower correlation.
C. Volatility unchanged with lower correlation.
D. Volatility unchanged with correlation unchanged.

FRM-00, Question 125
If the F-test shows that the set of X variables explains a significant amount of variation in the Y variable, then:
A. Another linear regression model should be tried.
B. A t-test should be used to test which of the individual X variables can be discarded.
C. A transformation of Y should be made.
D. Another test could be done using an indicator variable to test significance of the model.

FRM-00, Question 112
Positive autocorrelation of prices can be defined as:
A. An upward movement in price is more likely to be followed by another upward movement in price.
B. A downward movement in price is more likely to be followed by another downward movement.
C. Both A and B.
D. Historic prices have no correlation with future prices.

FRM-00, Question 112
Positive autocorrelation of prices can be defined as:
A. An upward movement in price is more likely to be followed by another upward movement in price.
B. A downward movement in price is more likely to be followed by another downward movement.
C. Both A and B.
D. Historic prices have no correlation with future prices.
Chapter 4 - Monte Carlo Methods

Example 4-1: FRM Exam 1999-Question 18/Quantitative Analysis

4-1. If \( S_1 \) follows a geometric Brownian Motion and \( S_2 \) follows a geometric Brownian motion, which of the following is TRUE?

a) \( \log(S_1 + S_2) \) is normally distributed
b) \( S_1 \times S_2 \) is lognormally distributed
c) \( S_1 \times S_2 \) is normally distributed
d) \( S_1 + S_2 \) is normally distributed

Example 4-2: FRM Exam 1999-Question 19/Quantitative Analysis

4-2. Considering the one-factor Cox, Ingersoll and Ross term structure model and the Vasicek model:
I) Drift coefficients are different.
II) Both include mean reversion.
III) Coefficients of the stochastic term, \( dz \), are different.
IV) CIR is a jump-diffusion model.

a) All of the above are true
b) I and III are true
c) II, III, and IV are true
d) II and III are true

Example 4-3: FRM Exam 1999-Question 25/Quantitative Analysis

4-3. The Vasicek Model defines a risk-neutral process for \( r \) which is:
\[ dr = a(b - r)dt + \sigma dz, \] where \( a, b, \) and \( \sigma \) are constant, and \( r \) represents the rate of interest. From this equation we can conclude that the model is a:

a) Monte Carlo type model
b) Single Factor term structure model
c) Two-Factor term structure model
d) Decision tree model
Example 4-4: FRM Exam 1999-Question 26/Quantitative Analysis

4-4. The term $a(b - r)$ in the equation in Question 25 represents which term?
   a) Gamma
   b) Stochastic
   c) Reversion
   d) Vega

Example 4-5: FRM Exam 1999-Question 30/Quantitative Analysis

4-5. For which of the following currencies would it be most appropriate to choose a lognormal interest rate model over a normal model?
   a) USD
   b) JPY
   c) DEM
   d) GBP

Example 4-6: FRM Exam 1998-Question 23/Quantitative Techniques

4-6. Which of the following interest rate term structure models tends to capture the mean reversion of interest rates?
   a) $dr = a \times (b - r)dt + \sigma \times dz$
   b) $dr = a \times dt + \sigma \times dz$
   c) $dr = a \times r \times dt + \sigma \times r \times dz$
   d) $dr = a \times (r - b) \times dt + \sigma \times dz$

Example 4-7: FRM Exam 1998-Question 24/Quantitative Techniques

4-7. Which of the following is a shortcoming of modeling a bond option by applying Black-Scholes formula to bond prices?
   a) It fails to capture convexity in a bond
   b) It fails to capture the pull-to-par phenomenon
   c) It fails to maintain put/call parity
   d) It works for zero-coupon bond options only
Example 4-8: FRM Exam 2000-Question 118/Quantitative Analysis

4-8. Which group of term structure models do the Ho-Lee, Hull-White and Heath, Jarrow & Morton models belong to?
   a) No-arbitrage models
   b) Two-factor models
   c) Log normal models
   d) Deterministic models

Example 4-9: FRM Exam 2000-Question 119/Quantitative Analysis

4-9. A plausible stochastic process for the short-term rate is often considered to be one where the rate is pulled back to some long-run average level. Which one of the following term structure models does NOT include this characteristic?
   a) The Vasicek model
   b) The Ho-Lee model
   c) The Hull-White model
   d) The Cox-Ingersoll-Ross

Example 4-10: FRM Exam 1999-Question 8/Quantitative Analysis

4-10. Several different estimates of the VaR of an options portfolio were computed using 1,000 independent, log-normally distributed samples of the underlyings. Because each estimate was made using a different set of random numbers, there was some variability in the answers; in fact, the standard deviation of the distribution of answers was about 100,000 USD. It was then decided to re-run the VaR calculation using 10,000 independent samples per run. The standard deviation of the re-runs is most likely to be:
   a) About 10,000 USD
   b) About 30,000 USD
   c) About 100,000 USD (i.e., no change from the previous set of runs)
   d) Cannot be determined from the information provided
**Example 4-11: FRM Exam 1998-Question 34/Quantitative Techniques**

4-11. You have been asked to find the value of an Asian option on the short rate. The Asian option gives the holder an amount equal to the average value of the short rate over the period to expiration less the strike rate. To value this option with a one-factor binomial model of interest rates, what method would you recommend using?
   a) The backward induction method, since it is the fastest
   b) The simulation method, using path averages since the option is path-dependent.
   c) The simulation method, using path averages since the option is path-independent.
   d) Either the backward induction method or the simulation method, since both methods return the same value.

**Example 4-12: FRM Exam 1997-Question 17/Quantitative Techniques**

4-12. The measurement error in VaR, due to sampling variation, should be greater with:
   a) more observations and a high confidence level (e.g. 99%)
   b) fewer observations and a high confidence level
   c) more observations and a low confidence level (e.g. 95%)
   d) fewer observations and a low confidence level.

**Example 4-13: FRM Exam 1999-Question 29/Quantitative Analysis**

4-13. Given the following covariance matrix:

\[
\Sigma = \begin{bmatrix}
0.09% & 0.06% & 0.03% \\
0.06% & 0.05% & 0.04% \\
0.03% & 0.04% & 0.06%
\end{bmatrix}
\]

let \( \Sigma = XX' \), where \( X \) is lower triangular, be a Cholesky decomposition. Then the four elements in the upper left hand corner of \( X, x_{11}, x_{12}, x_{21}, x_{22} \), are respectively:
   a) 3.0%, 0.0%, 4.0%, 2.0%
   b) 3.0%, 4.0%, 0.0%, 2.0%
   c) 3.0%, 0.0%, 2.0%, 1.0%
   d) 2.0%, 0.0%, 3.0%, 1.0%
PART I - CAPITAL MARKETS

Chapter 5 - Introduction to Derivatives


5-1. On Friday, October 4, the spot price of gold was $378.85 per troy ounce. The price of an April gold futures contract was $387.20 per troy ounce. (Note: Each gold futures contract is for 100 troy ounces.) Assume that a Treasury bill maturing in April with an “ask yield” of 5.28 percent provides the relevant financing (borrowing or lending rate). Use 180 days as the term to maturity. Also assume that warehousing and delivery costs are negligible and ignore convenience yields. What is the theoretically correct price for the April futures contract and what is the potential arbitrage profit per contract?
a) $379.85 and $156.59  
b) $318.05 and $615.00  
c) $387.84 and $163.25  
d) $388.84 and $164.00


5-2. Consider an eight-month forward contract on a stock with a price of $98/share. The delivery date is eight months hence. The firm is expected to pay a $1.80/share dividend in four months time. Riskless zero coupon interest rates (continuously compounded) for different maturities are as follows.
Less than/equal to 6 months: 4%; 8 months: 4.5%
The theoretical forward price (to the nearest cent) is:
a) 99.15  
b) 99.18  
c) 100.98  
d) 96.20

Example 5-3: FRM Exam 1999-Question 49/Capital Mkts.

5-3. Assume the spot rate for EUR/USD is 1.05 (i.e. 1 Euro buys 1.05 dollars). A U.S. bank pays 5.5% compounded annually for one year for a dollar deposit and a German bank pays 2.5% compounded annually for one year for a Euro deposit. What is the forward exchange rate for EUR/USD one year from now?
a) 1.0815  
b) 1.0201  
c) 1.0807  
d) 1.05
Example 5-4: FRM Exam 1999-Question 41/Capital Mkts.

5-4. Assume a dollar asset provides no income for the holder and an investor can borrow money at risk-free interest rate \( r \), then the forward price \( F \) at time \( T \) and spot price \( S \) at time \( t \) of the asset is related. If the investor observes that \( F > S e^{r(T-t)} \), then the investor can take a profit by:

a) Borrowing \( S \) dollars for a period of \( (T-t) \) at the rate of \( r \), buy the asset, and short the forward contract.

b) Borrowing \( S \) dollars for a period of \( (T-t) \) at the rate of \( r \), buy the asset, and long the forward contract.

c) Selling short the asset and invest the proceeds of \( S \) dollars for a period of \( (T-t) \) at the rate of \( r \), and short the forward contract.

d) Selling short the asset and invest the proceeds of \( S \) dollars for a period of \( (T-t) \) at the rate of \( r \), and long the forward contract.


5-5. For assets that are strongly positively correlated with interest rates, which one of the following is TRUE?

a) Long-dated forward contracts will have higher prices than long-dated futures contracts

b) Long-dated futures contracts will have higher prices than long-dated forward contracts

c) Long-dated forward and long-dated futures prices are always the same

d) The “convexity effect” can be ignored for long-dated futures contracts on that asset

Chapter 6 - Options

Example 6-1. FRM Exam 1999-Question 35/Capital Mkts.

6-1. According to put-call parity, writing a put is like:

a) Buying a call, buying stock, and lending

b) Writing a call, buying stock, and borrowing

c) Writing a call, buying stock, and lending

d) Writing a call, selling stock, and borrowing
Example 6-2. FRM Exam 2000-Question 15/Capital Mkts.

6-2. A six-month call option sells for $30, with a strike price of $120. If the stock price is $100 per share and the risk-free interest rate is 5 percent, what is the price of a 6-month put option with a strike price of $120?

a) $39.20
b) $44.53
c) $46.28
d) $47.04


6-3. Which of the following statements about options on futures is true?

a) An American call is equal in value to a European call
b) An American put is equal in value to a European put
c) Put/Call parity holds for both American and European options
d) None of the above

Example 6-4. FRM Exam 1999-Question 50/Capital Mkts.

6-4. A covered call writing position is equivalent to:

a) A long position in the stock and a long position in the call option
b) A short put position
c) A short position in the stock and a long position in the call option
d) A short call position
Example 6-5. FRM Exam 1999-Question 33/Capital Mkts.

6-5. Which of the following will create a bull spread?
   a) Buy a put with a strike price of X = 50, and sell a put with K = 55
   b) Buy a put with a strike price of X = 55, and sell a put with K = 50
   c) Buy a call with a premium of 5, and sell a call with a premium of 7
   d) Buy a call with a strike price of X = 50, and sell a put with K = 55


6-6. Consider a bullish spread option strategy of buying one call option with
   a $30 exercise price at a premium of $3 and writing a call option with a $40
   exercise price at a premium of $1.50. If the price of the stock increases
   to $42 at expiration and the option is exercised on the expiration date,
   the net profit per share at expiration (ignoring transaction costs) will be:
   a) $8.50
   b) $9.00
   c) $9.50
   d) $12.50

Example 6-7. FRM Exam 1999-Question 34/Capital Mkts.

6-7. What is the lower pricing bound for a European call option with a
   strike price of 80 and one year until expiration? The price of the
   underlying asset is 90, and the one-year interest rate is 5% per annum.
   Assume continuous compounding of interest.
   a) 14.61
   b) 13.90
   c) 10
   d) 5.90
Example 6-8. FRM Exam 1999-Question 52/Capital Mkts.

6-8. The price of an American call stock option is equal to an otherwise equivalent European call stock option at time t when:
I) The stock pays continuous dividends from t to option expiration T.
II) The interest rates follow a mean-reverting process between t and T.
III) The stock pays no dividends from t to option expiration T.
IV) Interest rates are non-stochastic between t and T.
   a) II and IV
   b) III only
   c) I and III
   d) None of the above; an American option is always worth more than a European option.


6-9. If the Garman-Kohlhagen formula is used for valuing options on a dividend paying stock, then to be consistent with its assumptions, upon receipt of the dividend, the dividend should be:
a) Placed into a non-interest bearing account
b) Placed into an interest bearing account at the risk-free rate assumed in the G-K model.
c) Used to purchase more stock of the same company
d) Placed into an interest bearing account, paying interest equal to the dividend yield of the stock.

Example 6-10. FRM Exam 1998-Question 2/Quantitative Techniques

6-10. In the Black-Scholes expression for a European call option the term used to compute option probability of exercise is:
a) $d_1$
b) $d_2$
c) $N(d_1)$
d) $N(d_2)$

6-11. A knock-in barrier option is harder to hedge when it is:
   a) In the money
   b) Out of the money
   c) At the barrier and near maturity
   d) At the inception of the trade

Example 6-11. FRM Exam 1997-Question 10/Derivatives

6-11. Knockout options are often used instead of regular options because:
   a) knockouts have a lower volatility
   b) knockouts have a lower premium
   c) knockouts have a shorter maturity on average
   d) knockouts have a smaller gamma

Chapter 7 - Fixed Income Securities


7-1. The price of an inverse floater:
   a) Increases as interest rates increase
   b) Decreases as interest rates increase
   c) Remains constant as interest rates change
   d) Behaves like none of the above


7-2. An investment in a callable bond can be analytically decomposed into:
   a) Long position in a non-callable bond and a short position in a put option
   b) Short position in a non-callable bond and a long position in a call option
   c) Long position in a non-callable bond and a long position in a call option
   d) Long position in a non-callable and a short position in a call option

7-3. A US Treasury bill selling for $97,569 with 100 days to maturity and a face value of $100,000 should be quoted on a bank discount basis at:
   a) 8.75%.
   b) 8.87%.
   c) 8.97%.
   d) 9.09%.


7-4. Consider a 9% annual coupon 20-year bond trading at 6% with a price of 134.41. When rates rise 10bps, price reduces to 132.99 and when rates decrease by 10bps, the price goes up to 135.85. What is the modified duration of the bond?
   a) 11.25
   b) 10.61
   c) 10.50
   d) 10.73


7-5. A 10-year zero coupon bond is callable annually at par (its face value) starting at the beginning of year six. Assume a flat yield curve of 10%. What is the bond duration?
   a) 5 years
   b) 7.5 years
   c) 10 years
   d) Cannot be determined based on the data given.

Example 7-6: FRM Exam 1999-Question 91/Market Risk

7-6. (Modified) duration of a fixed rate bond, in the case of flat yield curve, can be interpreted as (where $B$ is the bond price and $y$ is the yield to maturity):
   a) $-\frac{1}{B} \frac{\partial B}{\partial y}$
   b) $\frac{1}{B} \frac{\partial B}{\partial y}$
   c) $\frac{1}{B} \frac{\partial B}{\partial y}$
   d) $\frac{(1-y) \frac{\partial B}{\partial y}}{B}$
Example 7-7: FRM Exam 1997-Question 49/Market Risk

7-7. A money markets desk holds a floating-rate note with an eight-year maturity. The interest rate is floating at three-month LIBOR rate, reset quarterly. The next reset is in one week.
What is the approximate duration of the floating-rate note?
   a) 8 years
   b) 4 years
   c) 3 months
   d) 1 week


7-8. Which of the following statements about yield curve arbitrage is true?
   a) No arbitrage conditions require that the zero coupon yield curve is either upward sloping or downward sloping.
   b) It is a violation of the no-arbitrage condition if the one-year interest rate is 10% or more, higher than the 10-year rate.
   c) As long as all discount factors are less than one but greater than zero, the curve is arbitrage free.
   d) The no-arbitrage condition requires all forward rates be non-negative.

Example 7-9: FRM Exam 1997-Question 1/Quantitative Techniques

7-9. Suppose a risk manager has made the mistake of valuing a zero coupon bond using a swap (par) rate rather than a zero coupon rate. Assume the par curve is upward sloping. The risk manager is therefore:
   a) indifferent to the rate used.
   b) over-estimating the value of the bond.
   c) under-estimating the value of the bond.
   d) does not have enough information.

Example 7-10: FRM Exam 1999-Question 1/Quantitative Analysis

7-10. Suppose that the yield curve is upward sloping. Which of the following statements is TRUE?
   a) The forward rate yield curve is above the zero-coupon yield curve, which is above the coupon-bearing bond yield curve.
   b) The forward rate yield curve is above the coupon-bearing bond yield curve, which is above the zero-coupon yield curve.
   c) The coupon-bearing bond yield curve is above the zero-coupon yield curve, which is above the forward rate yield curve.
   d) The coupon-bearing bond yield curve is above the forward rate yield curve, which is above the zero-coupon yield curve.

7-11. Suppose the annual prepayment rate CPR for a mortgage-backed security is 6%. What is the corresponding single-monthly mortality rate SMM?
   a) 0.514%  
   b) 0.334%  
   c) 0.5%    
   d) 1.355%

Example 7-12: FRM Exam 1999-Question 44/Capital Mkts.

7-12. The following are reasons that a prepayment model will not accurately predict future mortgage prepayments. Which of these will have the greatest effect on the convexity of mortgage pass throughs?
   a) Refinancing incentive  
   b) Seasoning  
   c) Refinancing burnout  
   d) Seasonality


7-13. In analyzing the monthly prepayment risk of Mortgage-backed securities, an annual prepayment rate (CPR) is converted into a monthly prepayment rate (SMM). Which of the following formulas should be used for the conversion?
   a) \( SMM = (1 - CPR)^{1/12} \)
   b) \( SMM = 1 - (1 - CPR)^{1/12} \)
   c) \( SMM = 1 - (CPR)^{1/12} \)
   d) \( SMM = 1 + (1 - CPR)^{1/12} \)

Example 7-14: FRM Exam 1999-Question 87/Market Risk

7-14. A CMO bond class with a duration of 50 means that:
   a) It has a discounted cash flow weighted average life of 50 years
   b) For a 100 bp change in yield, the bond’s price will change by roughly 50%
   c) For a 1 bp change in yield, the bond’s price will change by roughly 5%
   d) None of the above
**Example 7-15: FRM Exam 1998-Question 18/Capital Mkts.**

7-15. Which of the following risks are common to both mortgage-backed securities and emerging market Brady bonds?
- I. interest rate risk
- II. prepayment risk
- III. default risk
- IV. political risk
  a) I only
  b) II and III only
  c) I and III only
  d) III and IV only

**Example 7-16: FRM Exam 1999-Question 40/Capital Mkts.**

7-16. Which attribute of a bond is NOT a reason for using effective duration instead of modified duration?
- a) Its life may be uncertain.
- b) Its cash flow may be uncertain.
- c) Its price volatility tends to decline as maturity approaches.
- d) It may include changes in adjustable rate coupons with caps or floors.

**Example 7-17: FRM Exam 2000-Question 13/Capital Mkts.**

7-17. A CLO is generally:
- a) A set of loans that can individually be traded in the market
- b) A pass-through
- c) A set of bonds backed by a loan portfolio
- d) None of the above

**Example 7-18: FRM Exam 2000-Question 121/Quantitative Analysis**

7-18. Which one of the following long positions is more exposed to an increase in interest rates?
- a) A treasury bill
- b) 10-year fixed coupon bond
- c) 10-year floater
- d) 10-year reverse floater

7-19. A 10-year reverse floater pays a semiannual coupon of 8% minus 6-month LIBOR. Assume the yield curve is 8% flat, the current 10-year note has a duration of 7 years and the interest rate on the note was just reset. What is the duration of the note?
   a) 6 months
   b) Shorter than 7 years
   c) Longer than 7 years
   d) 7 years

Example 7-20: FRM Exam 1999-Question 79/Market Risk

7-20. Suppose that the coupon and the modified duration of a 10-year bond priced to par is 6.0% and 7.5, respectively. What is the approximate modified duration of a 10-year inverse floater priced to par with a coupon of $18\% - 2 \times LIBOR(1\text{ month})$ ?
   a) 7.5
   b) 15.0
   c) 22.5
   d) 0.0


7-21. How would you describe the typical price behavior of a low premium mortgage pass-through security? 
   a) It is similar to a U.S. Treasury bond
   b) It is similar to a plain vanilla corporate bond
   c) When interest rates fall, its price increase would exceed that of a comparable duration U.S. Treasury
   d) When interest rates fall, its price increase would lag that of a comparable duration U.S. Treasury
Chapter 8 - Fixed Income Derivatives


8-2. What are the differences between Forward Rate Agreements (FRAs) and Eurodollar Futures?
I. FRAs are traded on an exchange while Eurodollar Futures are not.
II. FRAs have better liquidity than Eurodollar Futures.
III. FRAs have standard contract sizes while Eurodollar Futures do not.
a) I only
b) I and II only
c) II and III only
d) None of the above


8-3. Roughly, how many 3-month LIBOR Eurodollar Futures contracts are needed to hedge a long 100 M position in 1-year US Treasury bills?
a) Short 100
b) Long 4,000
c) Long 100
d) Short 400


8-4. Suppose that the forward rate implied by spot Treasury Bill rates is 5.7% (expressed as a discount rate). The Treasury Bill futures price is 94.8. In order to arbitrage, you would:
a) Short the futures contract, borrow until the delivery date and invest the money for an additional 90 days beyond the delivery date.
b) Short the futures contract, lend until the delivery date, and borrow the money for an additional 90 days beyond the delivery date.
c) Take a long position in the futures contract, borrow until the delivery date and invest the money for an additional 90 days beyond the delivery date.
d) Take a long position in the futures contract, lend until the delivery date, and borrow the money for an additional 90 days beyond the delivery date.

8-5. The Chicago Board of Trade has reduced the notional coupon of its Treasury futures contracts from 8% to 6%. Which of the following statements are likely to be TRUE as a result of the change?
   a) The cheapest to deliver status will become more unstable if yields hover near the 6% range
   b) When yields fall below 6%, higher duration bonds will become cheapest to deliver, while lower duration bonds will become cheapest to deliver when yields range above 6%
   c) The 6% coupon would decrease the duration of the contract, making it a more effective hedge for the long end of the yield curve
   d) There will be no impact at all by the change
Example 8-6: FRM Exam 1999-Question 59/Capital Mkts.

8-6. If an interest rate swap is priced off the Eurodollar futures strip without correcting the rates for convexity, the resulting arbitrage can be exploited by a:
   a) Receive fixed swap + short Eurodollar futures position
   b) Pay fixed swap + short Eurodollar futures position
   c) Receive fixed swap + long Eurodollar futures position
   d) Pay fixed swap + long Eurodollar futures position


8-7. Which of the following positions has the same exposure to interest rates as the receiver of the floating rate on a standard interest rate swap?
   a) Long a floating-rate note with the same maturity
   b) Long a fixed rate note with the same maturity
   c) Short a floating-rate note with the same maturity
   d) Short a fixed rate note with the same maturity

Example 8-8: FRM Exam 1999-Question 54/Capital Mkts.

8-8. The cap/floor parity can be stated as:
   a) Short cap + Long floor = Fixed rate bond
   b) Long cap + Short floor = Fixed swap
   c) Long cap + Short floor = Floating rate bond
   d) Short cap + Short floor = Interest rate collar

Example 8-9: FRM Exam 1999-Question 60/Capital Mkts.

8-9. For a 5-year ATM cap on the 3-month LIBOR, what can be said about the individual caplets, in a downward sloping term structure environment?
   a) The short maturity caplets are ITM, long maturity caplets are OTM
   b) The short maturity caplets are OTM, long maturity caplets are ITM
   c) All the caplets are ATM
   d) The moneyness of the individual caplets also depends on the volatility term structure
Example 8-10: FRM Exam 1997-Question 18/Derivatives

8-10. The price of an option which gives you the right to receive fixed on a swap will decrease as:
   a) time to expiry of the option increases
   b) time to expiry of the swap increases
   c) the swap rate increases
   d) volatility increases


8-11. Consider a 2 into 3-year Bermudan swaption (i.e., an option to obtain a swap that starts in 2 years and matures in 5 years). Consider the following statements:
I. A lower bound on the Bermudan price is a 2 into 3 year European swaption
II. An upper bound on the Bermudan price is a cap that starts in 2 years and matures in 5 years
III. A lower bound on the Bermudan price is a 2 into 5 year European option
   Which of the following statements is(are) TRUE?
   a) I only
   b) II only
   c) I and II
   d) III only

Chapter 9 - Equity Market


9-1. A hedge fund leverages its 100M of investor capital by a factor of three and invests it into a portfolio of junk bonds yielding 14%.
If its borrowing costs are 8%, what is the yield on investor capital?
   a) 14%
   b) 18%
   c) 26%
   d) 42%

9-2. A 3-year convertible security, which pays 4% coupon per annum, is priced at $1000. The convertible gives the holder the right to convert at any time into 10 shares of XYZ stock whose current market price is $75 per share. At maturity, the security must be converted into 10 XYZ shares. The convexity of the security with respect to the underlying share price prior to maturity is:
   a) Zero
   b) Always positive
   c) Always negative
   d) None of the above

Example 9-3: FRM Exam 1997-Question 52/Market Risk

9-3. A convertible bond trader has purchased a long dated convertible bond with a call provision. Assuming there is a 50% chance that this bond will be converted into stock, which combination of stock price and interest rate level would constitute the WORST case scenario?
   a) Decreasing rates and decreasing stock prices
   b) Decreasing rates and increasing stock prices
   c) Increasing rates and decreasing stock prices
   d) Increasing rates and increasing stock prices


9-4. To prevent arbitrage profits, the theoretical future price of a stock index should be fully determined by which of the following?
I. cash market price
II. financing cost
III. inflation
IV. dividend yield
   a) I and II only
   b) II and III only
   c) I, II and IV only
   d) All of the above

9-5. Suppose the price for a 6-month S&P index futures contract is 552.3. If the risk-free interest rate is 7.5% per year and the dividend yield on the stock index is 4.2% per year, and the market is complete and there is no arbitrage, what is the price of the index today?

a) 543.26  
b) 552.11  
c) 555.78  
d) 560.02

Chapter 10 - Currency and Commodities Markets

Example 10-1: FRM Exam 1999-Question 37/Capital Mkts.

10-1. The table below shows quoted fixed borrowing rates (adjusted for taxes) in two different currencies for two different firms:

<table>
<thead>
<tr>
<th></th>
<th>Yen</th>
<th>Pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company A</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>Company B</td>
<td>3%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Which of the following is TRUE?

a) Company A has a comparative advantage borrowing in both yen and pounds  
b) Company A has a comparative advantage borrowing in pounds  
c) Company A has a comparative advantage borrowing in yen  
d) Company A can arbitrage by borrowing in yen and lending in pounds


10-2. The spot price of corn on April 10th is 207 cents/bu. The futures price of the September contract is 241.5 cents/bu. If hedgers are net short, which of the following statements is MOST accurate concerning the expected spot price of corn in September?

a) The expected spot price of corn is higher than 207  
b) The expected spot price of corn is lower than 207  
c) The expected spot price of corn is higher than 241.5  
d) The expected spot price of corn is lower than 241.5

10-3. In commodity markets, the complex relationships between spot and forward prices are embodied in the commodity price curve. Which of the following statements is true?

a) In a backwardation market, the discount in forward prices relative to the spot price represents a positive yield for the commodity supplier.
b) In a backwardation market, the discount in forward prices relative to the spot price represents a positive yield for the commodity consumer.
c) In a contango market, the discount in forward prices relative to the spot price represents a positive yield for the commodity supplier.
d) In a contango market, the discount in forward prices relative to the spot price represents a positive yield for the commodity consumer.


10-4. If a commodity is more expensive for immediate delivery than for future delivery, the commodity curve is said to be in:

a) Contango
b) Backwardation
c) Reversal
d) None of the above

Example 10-5: FRM Exam 1997-Question 45/Market Risk

10-5. In the commodity markets being long the future and short the cash exposes you to which of the following risks?

a) Increasing backwardation
b) Increasing contango
c) Change in volatility of the commodity
d) Decreasing convexity

10-6. Metallgesellschaft AG’s oil hedging program used a “stack-and-roll” strategy that eventually led to large losses. What can be said about this strategy? The strategy involved:

a) Buying short-dated futures or forward contracts to hedge long term exposure, hence expecting the short-term oil price would not decline
b) Buying short-dated futures or forward contracts to hedge long term exposure, hence expecting the short-term oil price would decline
c) Selling short-dated futures or forward contracts to hedge long term exposure, hence expecting the short-term oil price would not decline
d) Selling short-dated futures or forward contracts to hedge long term exposure, hence expecting the short-term oil price would decline
PART III - MARKET RISK MANAGEMENT

Chapter 11 - Introduction to Risk Measurement

Example 11-1: FRM Exam 1999-Question 89/Market Risk

11-1. What is the correct interpretation of a $3M overnight VaR figure with 99% confidence level? The institution
a) can be expected to lose at most $3M in 1 out of next 100 days
b) can be expected to lose at least $3M in 95 out of next 100 days
c) can be expected to lose at least $3M in 1 out of next 100 days
d) can be expected to lose at most $6M in 2 out of next 100 days


11-2. Considering arbitrary portfolios A and B, and their combined portfolio C, which of the following relationships always holds for VARs of A, B, and C?
a) $VAR_A + VAR_B = VAR_C$
b) $VAR_A + VAR_B \geq VAR_C$
c) $VAR_A + VAR_B \leq VAR_C$
d) None of the above

Example 11-3: FRM Exam 1997-Question 7/Risk Measurement

11-3. To convert VaR from a one day holding period to a ten day holding period the VaR number is generally multiplied by:
a) 2.33
b) 3.16
c) 7.25
d) 10.00

Example 11-4: FRM Exam 1997-Question 16/Regulatory

11-4. Which of the following quantitative standards is NOT required by the Amendment to the Capital Accord to Incorporate Market Risk?
a) Minimum holding period of 10 days
b) 99th percentile, one-tailed confidence interval
c) Minimum historical observation period of two years
d) Update of data sets at least quarterly
Example 11-5: FRM Exam 1997-Question 23/Regulatory

11-5. The standard VaR calculation for extension to multiple periods also assumes that positions are fixed. If risk management enforces loss limits, the true VaR will be:
   a) the same
   b) greater than calculated
   c) less than calculated
   d) unable to be determined

Example 11-6: FRM Exam 1997-Question 9/Regulatory

11-6. A trading desk has limits only in outright foreign exchange and outright interest rate risk. Which of the following products can not be traded within the current limit structure?
   a) Vanilla interest rate swaps, bonds, and interest rate futures
   b) Interest rate futures, vanilla interest rate swaps, and callable interest rate swaps
   c) Repos and bonds
   d) Foreign exchange swaps, and back to back exotic foreign exchange options

Example 11-7: FRM Exam 1997-Question 4/Risk Measurement

11-7. The use of scenario analysis allows one to:
   a) assess the behavior of portfolios under large moves
   b) research market shocks which occurred in the past
   c) analyze the distribution of historical P/L in the portfolio
   d) perform effective back-testing

Example 11-8: FRM Exam 1998-Question 20/Regulatory

11-8. VAR measures should be supplemented by portfolio stress-testing because:
   a) VAR measures indicate that the minimum loss will be the VAR; they don’t indicate how large the losses can be
   b) stress testing provides a precise maximum loss level
   c) VAR measures are correct only 95% of the time
   d) stress testing scenarios incorporate reasonably probable events

11-9. Value-at-Risk (VaR) analysis should be complemented by stress-testing because stress testing:
   a) Provides a maximum loss, expressed in dollars
   b) Summarizes the expected loss over a target horizon within a minimum confidence interval
   c) Assesses the behavior of portfolio at a 99 percent confidence level
   d) Identifies losses that go beyond the normal losses measured by VaR

Chapter 12 - Identification of Risk Factors

Example 12-1: FRM Exam 1997-Question 16/Market Risk

12-1. The risk of a stock or bond which is NOT correlated with the market (and thus can be diversified) is known as:
   a) interest rate risk
   b) FX risk
   c) model risk
   d) specific risk.

Example 12-2: FRM Exam 1998-Question 7/Credit Risk

12-2. Which of the following products has the least liquidity?
   a) U.S. on-the-run Treasuries
   b) U.S. off-the-run Treasuries
   c) Floating Rate Notes
   d) High grade corporate bonds

Example 12-3: FRM Exam 1997-Question 54/Market Risk

12-3. "Illiquid" describes an instrument which:
   a) does not trade in an active market
   b) does not trade on any exchange
   c) can not be easily hedged
   d) is an over-the-counter (OTC) product

12-4. A finance company is interested in managing its balance sheet liquidity risk. The most productive means of accomplishing this is by:
   a) purchasing marketable securities
   b) hedging the exposure with Eurodollar futures
   c) diversifying its sources of funding
   d) setting up a reserve


12-5. In a market crash the following are usually TRUE?
I. Fixed income portfolios hedged with short U.S. Government Bonds and futures lose less than those hedged with interest rate swaps given equivalent durations.
II. Bid offer spreads widen due to less liquidity.
III. The spreads between off the run bonds and benchmark issues widen.
   a) I, II & III
   b) II & III
   c) I & III
   d) None of the above


12-6. Which one of the following statements about liquidity risk in derivatives instruments is NOT TRUE?
   a) Liquidity risk is the risk that an institution may not be able to, or cannot easily, unwind or offset a particular position at or near the previous market price because of inadequate market depth or disruptions in the marketplace
   b) Liquidity risk is the risk that the institution will be unable to meet its payment obligations on settlement dates or in the event of margin calls
   c) Early termination agreements can adversely impact liquidity because an institution may be required to deliver collateral or settle a contract early, possibly at a time when the institution may face other funding and liquidity pressures
   d) An institution that participates in the exchange-traded derivatives markets has potential liquidity risks associated with the early termination of derivatives contracts
Chapter 13 - Sources of Risk

Example 13-1: FRM Exam 1997-Question 10/Market Risk

13-1. Which currency pair would you expect to have the lowest volatility?
   a) USD/DEM
   b) USD/CAD
   c) USD/JPY
   d) USD/ITL

Example 13-2: FRM Exam 1997-Question 14/Market Risk

13-2. What is the implied correlation between JPY/DEM and DEM/USD when given the following volatilities for foreign exchange rates?
   JPY/USD at 8%
   JPY/DEM at 10%
   DEM/USD at 6%.
   a) 60%
   b) 30%
   c) −30%
   d) −60%

Example 13-3: FRM Exam 1999-Question 86/Market Risk

13-3. For purposes of computing the market risk of a U.S. Treasury Bond portfolio, it is easiest to measure:
   a) Yield volatility because yields have positive skewness
   b) Price volatility because bond prices are positively correlated
   c) Yield volatility for bonds sold at a discount and price volatility for bonds sold at a premium to par
   d) Yield volatility because it remains more constant over time than price volatility, which must approach zero as the bond approaches maturity
Example 13-4: FRM Exam 1999-Question 80/Market Risk

13-4. BankEurope has a $20,000,000.00 position in the 6.375% AUG 2027 US Treasury Bond. The details on the bond is given below:

- Market Price: 98 8/32
- Accrued: 1.43%
- Yield: 6.509%
- Duration: 13.133
- Modified duration: 12.719
- Yield volatility: 12%

What is the daily VaR of this position at the 95% confidence level (assume there are 250 business days in a year)?

a) $291,400  
b) $203,080  
c) $206,030  
d) $206,698


13-5. Which one of the following statements about historic U.S. Treasury yield curve changes is TRUE?

a) Changes in long-term yields tend to be larger than in short-term yields
b) Changes in long-term yields tend to be of approximately the same size as changes in short-term yields
c) The same size yield change in both long-term and short-term rates tends to produce a larger price change in short-term instruments when all securities are trading near par
d) The largest part of total return variability of spot rates is due to parallel changes with a smaller portion due to slope changes and the residual due to curvature changes

Example 13-6: FRM Exam 1997-Question 42/Market Risk

13-6. What is the relationship between yield on the current inflation-proof bond issued by the U.S. Treasury and a standard Treasury bond with similar terms?

a) The yields should be about the same
b) The yield of the inflation bond should be approximately the yield on the treasury minus the real interest
c) The yield of the inflation bond should be approximately the yield on the treasury plus the real interest
d) None of the above
Example 13-7: FRM Exam 1999-Question 71/Market Risk

13-7. An investor holds mortgage interest only strips (IO) backed by Fannie Mae 7 percent coupon. She wants to hedge this position by shorting Treasury interest strips off the 10-year on-the-run. The curve steepens as 1 month rate drops, while the 6 month to 10-year rates remain stable. What will be the effect on the value of this portfolio?

a) Both the IO and the hedge will appreciate in value
b) The IO and the hedge value will be almost unchanged (a very small appreciation is possible)
c) The change in value of both the IO and hedge can not be determined without additional details
d) The IO will depreciate, but the hedge will appreciate

Example 13-8: FRM Exam 1999-Question 73/Market Risk

13-8. A fund manager attempting to beat his LIBOR-based funding costs, holds pools of adjustable rate mortgages and is considering various strategies to lower the risk. Which of the following strategies will NOT lower the risk?

a) Enter into a total rate of return swap swapping the ARMs for LIBOR plus a spread
b) Short U.S. government Treasuries
c) Sell caps based on the projected rate of mortgage paydown
d) All of the above

Example 13-10: FRM Exam 1997-Question 44/Market Risk

13-10. A trader runs a cash and future arbitrage book on the S&P 500 index. Which of the following are the MAJOR risk factors?

I. Interest rate
II. Foreign exchange
III. Equity price
IV. Dividend assumption risk

a) I and II only
b) I and III only
c) I, III, and IV only
d) I, II, III, and IV

13-11. In comparing CAPM and APT, which of the following advantages does APT have over CAPM:
I. APT makes less restrictive assumptions about investor preferences toward risk and return.
II. APT makes no assumption about the distribution of security returns.
III. APT does not rely on the identification of the true market portfolio, and so the theory is potentially testable.
a) I only  
b) II and III only  
c) I and III only  
d) I, II, and III

Example 13-12: FRM Exam 1997-Question 12/Market Risk

13-12. Which of the following products should have the highest expected volatility?
   a) Crude oil  
b) Gold  
c) Japanese Treasury Bills  
d) DEM/CHF


13-13. Identify the MAJOR risks of being short 50M USD of gold two weeks forward and being long 50M USD of gold one year forward.
I. Gold liquidity squeeze  
II. Spot risk  
III. Gold lease rate risk  
IV. USD interest rate risk  
a) II only  
b) I, II, and III only  
c) I, III, and IV only  
d) I, II, III, and IV
Chapter 14 - Hedging Linear Risk

Example 14-1: FRM Exam 2000-Question 78/Market Risk Mgt.

14-1. What feature of cash and futures prices tend to make hedging possible?
   a) They always move together in the same direction and by the same amount
   b) They move in opposite directions by the same amount
   c) They tend to move together generally in the same direction and by the same amount
   d) They move in the same direction by different amounts

Example 14-2: FRM Exam 2000-Question 17/Capital Markets

14-2. Which one of the following statements is MOST correct?
   a) When holding a portfolio of stocks, the portfolio's value can be fully hedged by purchasing a stock index futures contract
   b) Speculators play an important role in the futures market by providing the liquidity that makes hedging possible and assuming the risk that hedgers are trying to eliminate
   c) Someone generally using futures contracts for hedging does not bear the basis risk
   d) Cross hedging involves an additional source of basis risk because the asset being hedged is exactly the same as the asset underlying the futures


14-3. Under which scenario is basis risk likely to exist?
   a) A hedge (which was initially matched to the maturity of the underlying) is lifted before expiration
   b) The correlation of the underlying and the hedge vehicle is less than one and their volatilities are unequal
   c) The underlying instrument and the hedge vehicle are dissimilar
   d) All of the above
Example 14-4: FRM Exam 1999-Question 66/Market Risk

14-4. The hedge ratio is the ratio of the size of the position taken in the futures contract to the size of the exposure. Assuming the standard deviation of change of spot price is $\sigma_1$, and the standard deviation of change of future price is $\sigma_2$, the correlation between the changes of spot price and future price is $\rho$. What is the optimal hedge ratio?

a) $1/\rho \times \sigma_1/\sigma_2$
b) $1/\rho \times \sigma_2/\sigma_1$
c) $\rho \times \sigma_1/\sigma_2$
d) $\rho \times \sigma_2/\sigma_1$


14-5. The hedge ratio is the ratio of derivatives to a spot position (or vice versa) that achieves an objective such as minimizing or eliminating risk. Suppose that the standard deviation of quarterly changes in the price of a commodity is 0.57, the standard deviation of quarterly changes in the price of a futures contract on the commodity is 0.85, and the correlation between the two changes is 0.3876. What is the optimal hedge ratio for a three-month contract?

a) 0.1893
b) 0.2135
c) 0.2381
d) 0.2599

Example 14-6: FRM Exam 1999-Question 67/Market Risk

14-6. In the early 1990s, Metallgesellschaft, a German oil company, suffered a loss of $1.33$ billion in their hedging program. They rolled over short dated futures to hedge long term exposure created through their long-term fixed-price contracts to sell heating oil and gasoline to their customers. After a time, they abandoned the hedge because of large negative cashflow. The cashflow pressure was due to the fact that MG had to hedge its exposure by:

a) Short futures and there was a decline in oil price
b) Long futures and there was a decline in oil price
c) Short futures and there was an increase in oil price
d) Long futures and there was an increase in oil price
Example 14-7: FRM Exam 2000-Question 73/Market Risk Mgt.

14-7. What assumptions does a duration-based hedging scheme make about the way in which interest rates move?
   a) All interest rates change by the same amount
   b) A small parallel shift in the yield curve
   c) Any parallel shift in the term structure
   d) Interest rates movements are highly correlated

Example 14-8: FRM Exam 1999-Question 61/Market Risk

14-8. If all spot interest rates are increased by one basis point, a value of a portfolio of swaps will increase by $1100. How many Eurodollar futures contracts are needed to hedge the portfolio?
   a) 44
   b) 22
   c) 11
   d) 1100

Example 14-9: FRM Exam 1999-Question 109/Market Risk

14-9. Roughly how many 3-month LIBOR Eurodollar futures contracts are needed to hedge a position in a $200M, 5 year, receive fixed swap?
   a) Short 250
   b) Short 3,200
   c) Short 40,000
   d) Long 250


14-10. Assume Global Funds manages an equity portfolio worth $50,000,000 with a beta of 1.8. Further, assume that there exists an index call option contract with a delta of 0.623 and a value of $500,000. How many options contracts are needed to hedge the portfolio?
   a) 169
   b) 289
   c) 306
   d) 321
Chapter 15 - Non Linear Risk: Options


14-11. Which one of the following statement is MOST correct?
   a) When holding a portfolio of stocks, the portfolio’s value can be hedged by purchasing a stock index futures contract
   b) Speculators play an important role in the futures market by providing the liquidity that makes hedging possible and assuming the risk that hedgers are trying to eliminate
   c) Someone hedging with a futures contract does not bear the basis risk
   d) Cross hedging involves an additional source of basis risk arising from that fact that the asset being hedged is exactly same as the asset underlying

Example 15-1: FRM Exam 1999-Question 65/Market Risk

15-1. It is often possible to estimate the Value at Risk of a vanilla European options portfolio by using a delta-gamma methodology rather than exact valuation formulas because:
   a) Delta and gamma are the first two terms in the Taylor series expansion of the change in an option price as a function of the change in the underlying and the remaining terms are often insignificant
   b) It is only delta and gamma risk that can be hedged
   c) Unlike the price, delta and gamma for a European option can be computed in closed form
   d) Both a and c, but not b

Example 15-2: FRM Exam 1999-Question 88/Market Risk

15-2. Why is the delta normal approach not suitable for measuring options portfolio risk?
   a) There is a lack of data to compute the variance/covariance matrix
   b) Options are generally short-dated instruments
   c) There are nonlinearities in option payoff
   d) Black-Scholes pricing assumptions are violated in real world
Example 15-3: FRM Exam 1997-Question 28/Market Risk

15-3. Consider the risk of a long call on an asset with a notional amount of $1 million. The VaR of the underlying asset is 7.8%. If the option is a short-term at-the-money option, the VaR of the option position is slightly:

a) less than $39,000 when second-order terms are considered
b) more than $39,000 when second-order terms are considered
c) less than $78,000 when second-order terms are considered
d) more than $78,000 when second-order terms are considered

Example 15-4: FRM Exam 1999-Question 69/Market Risk

15-4. A portfolio is long a call that is delta hedged by trading in the underlying security. Assuming that the call is fairly valued and the market is in equilibrium, which of the following formulas indicates the standard deviation of the expected profit or loss from holding the hedged position until option expiry? In the following, $N$ is the frequency of hedging ($52 = \text{weekly}$), $T$ is the time to expiry and $\sigma$ is the annualised volatility. $K$ is a constant.

a) $K\sigma/\sqrt{N}$
b) $K\sqrt{N}/\sigma^2$
c) $K\sigma^2/N$
d) $KN/\sigma$


15-5. If risk is defined as a potential for unexpected loss, which factors contribute to the risk of a long put option position?

a) Delta, vega, rho
b) Vega, rho
c) Delta, vega, gamma, rho
d) Delta, vega, gamma, theta, rho


15-6. Same as above for a short call position.


15-7. Same as above for a long straddle position.

15-8. Which of the following statements about option time value is TRUE?
   a) Deeply out-of-the-money options have more time value than at-the-money
      options with the same remaining time to expiration
   b) Deeply in-the-money options have more time value than at-the-money
      options with the same amount of time to expiration
   c) At-the-money options have higher time value than either out-of-the money
      or in-the-money options with the same remaining time to expiration
   d) At-the-money options have no time value


15-9. Which type of option experiences accelerating time decay as expiration
        approaches in an unchanged market?
   a) In-the-money
   b) Out-of-the-money
   c) At-the-money
   d) None of the above


15-10. According to the Black-Scholes model for evaluating European options
        on non-dividend paying stock, which option sensitivity (greek) would be
        identical for both a call and a put option, given that the implied volatility,
        time to maturity, strike price, and risk free interest rate were the same?
   I) Gamma
   II) Vega
   III) Theta
   IV) Rho
   a) II only
   b) I and II
   c) All the above
   d) III and IV

15-11. An investor bought a short-term at-the-money swaption straddle from a derivative dealer two days ago. Which of the following risk factors could lead to a loss to the investor?
I. Interest rate delta risk
II. Gamma risk
III. Vega risk
IV. Theta (time decay) risk
V. Counterparty credit risk.
a) I and II only
b) I, II and III only
c) I, III, IV, and V
d) I, II, III, IV, and V


15-12. A trader has an option position in crude oil with a delta of 100,000 barrels and gamma of (50,000) barrels per dollar move in price. Using the delta-gamma methodology, compute the VaR on this position, assuming the extreme move on crude oil is $2.00 per barrel.
a) $100,000
b) $200,000
c) $300,000
d) $400,000


15-13. An investor sold a short-term at-the-money swaption straddle to a derivative dealer two days ago. The option premium was paid up-front. Which of the following risk factors could lead to a loss to the investor?
I. Interest rate delta risk
II. Gamma risk
III. Vega risk
IV. Theta (time decay) risk
V. Counterparty credit risk.
a) I and II only
b) I, II and III only
c) I, III, IV, and V only
d) I, II, III, IV, and V

15-14. How can a trader produce a short vega, long gamma position?
   a) Buy short-maturity options, sell long-maturity options
   b) Buy long-maturity options, sell short-maturity options
   c) Buy and sell options of long maturity
   d) Buy and sell options of short maturity

Example 15-15: FRM Exam 1999-Question 94/Market Risk

15-15. A commodities trading firm has an options portfolio with a two-day VaR of $1.6 million. What would be an appropriate translation of this VaR to a ten-day horizon?
   a) $8.0 million
   b) $3.2 million
   c) $5.6 million
   d) Cannot be determined from the information provided

Example 15-16: FRM Exam 1997-Question 51/Market Risk

15-16. A risk manager would like to measure VaR for a bond. He notices that the bond has a puttable feature. What affect on the VaR will this puttable feature have?
   a) The VaR will increase
   b) The VaR will decrease
   c) The VaR will remain the same
   d) The affect on the VaR will depend on the volatility of the bond

Example 15-17: FRM Exam 2000-Question 97/Market Risk Mgt.

15-17. A trader buys an at-the-money call option with the intention of delta-hedging it to maturity. Which one of the following is likely to be the most profitable over the life of the option?
   a) An increase in implied volatility
   b) The underlying price steadily rising over the life of the option
   c) The underlying price steadily decreasing over the life of the option
   d) The underlying price drifting back and forth around the strike over the life of the option
Chapter 16 - Modelling Risk Factors

Example 16-1: FRM Exam 1999-Question 64/Market Risk

16-1. Under what circumstances is it appropriate to scale up a VaR estimate from a shorter holding period to a longer holding period using the square root of time?
   a) It is never appropriate
   b) It is always appropriate
   c) When either mean reversion or trend are present in the historical data series
   d) When neither mean reversion nor trend are present in the historical data series


16-2. Consider a portfolio with a 1-day VAR of $1M. Assume that the market is trending with an autocorrelation of 0.1. Under this scenario, what would you expect the 2-day VAR to be?
   a) $2M
   b) $1.414M
   c) $1.483M
   d) $1.449M

Example 16-5: FRM Exam 1999-Question 72/Market Risk

16-5. Until January, 1999 the historical volatility for the Brazilian Real versus the U.S. dollar had been very small for several years. On January 13th, Brazil abandoned the defense of the currency peg. Using the data from the close of business on January 13th, which of the following methods for calculating volatility would have shown the greatest jump in measured historical volatility?
   a) 250 day equal weight
   b) Exponentially weighted with a daily decay factor of 0.94
   c) 60 day equal weight
   d) All of the above
Chapter 17 - VaR Methods

Example 17-1: FRM Exam 1997-Question 13/Regulatory

17-1. An institution has a fixed income desk and an exotic options desk. Four risk reports were produced, each with a different methodology. With all four methodologies readily available, which of the following would you use to allocate economic capital?
   a) Simulation applied to both desks
   b) Delta-Normal applied to both desks
   c) Delta-Gamma for the exotic options desk and the delta-normal for the fixed income desk
   d) Delta-Gamma applied to both desks

Example 17-2: FRM Exam 1997-Question 12/Risk Measurement

17-2. Delta-normal, historical-simulation, and Monte-Carlo are various methods available to compute VAR. If underlying returns are normally distributed, then the:
   a) Delta-normal method VAR will be identical to the historical-simulation VaR
   b) Delta-normal method VAR will be identical to the Monte-Carlo VaR
   c) Monte-Carlo VAR will be approach the delta-normal VaR as the number of replications (“draws”) increases
   d) Monte-Carlo VAR will be identical to the historical-simulation VaR

Example 17-3: FRM Exam 1998-Question 6/Regulatory

17-3. Which VAR methodology is least effective for measuring options risks?
   a) Variance/covariance approach
   b) Delta/gamma
   c) Historical simulation
   d) Monte Carlo
Example 17-4: FRM Exam 1999-Question 82/Market Risk

17-4. Bank London with substantial position in 5-year AA grade Eurobonds has recently launched an initiative to calculate 10 day spread VAR. As a risk manager for the Euro bond trading desk you have been asked to provide an estimate for the AA spread VaR. The extreme move used for the GILTS yield is 40bp, and for the Eurobond yield is 50bp. These are based on the standard deviation of absolute (not proportional) changes in yields. The correlation between changes in the two is 89%. What is the extreme move for the spread?
   a) 19.35bp
   b) 14.95bp
   c) 10bp
   d) 23.24bp

Example 17-5: FRM Exam 1999-Questions 15 and 90/Market Risk

17-5. The VaR of one asset is 300 and the VaR of another one is 500. If the correlation between changes in asset prices is 1/15, what is the combined VaR?
   a) 525
   b) 775
   c) 600
   d) 700
PART IV - Credit Risk Management

Chapter 18 - Introduction to Credit Risk

Example 18-1: FRM Exam 2000-Question 36/Credit Risk

18-1. Settlement risk in foreign exchange is generally due to:
   a) Notionals being exchanged
   b) Net value being exchanged
   c) Multiple currencies and countries involved
   d) High volatility of exchange rates


18-2. Which one of the following statements about multilateral netting systems is NOT accurate?
   a) Systemic risks can actually increase because they concentrate risks on the central counterparty, the failure of which exposes all participants to risk
   b) The concentration of risks on the central counterparty eliminates risk because of the high quality of the central counterparty
   c) By altering settlement costs and credit exposures, multilateral netting systems for foreign exchange contracts could alter the structure of credit relations and affect competition in the foreign exchange markets
   d) In payment netting systems participants with net-debit positions will be obligated to make a net settlement payment to the central counterparty that, in turn, is obligated to pay those participants with net credit positions.

Example 18-3: FRM Exam 2000-Question 46/Credit Risk

18-3. An investor holds a portfolio of $50 million. This portfolio consists of A-rated bonds ($20 million) and BBB-rated bonds ($30 million). Assume that the one-year probabilities of default for A-rated and BBB-rated bonds are 2 and 4 percent, respectively, and that they are independent. If the recovery value for A-rated bonds in the event of default is 60 percent and the recovery value for BBB-rated bonds is 40 percent, what is the one-year expected credit loss from this portfolio?
   a) $672,000
   b) $742,000
   c) $880,000
   d) $923,000
Example 18-4: FRM Exam 1998-Question 38/Credit Risk

18-4. Calculate the probability of a subsidiary and parent company both defaulting over the next year. Assume that the subsidiary will default if the parent defaults, but the parent will not necessarily default if the subsidiary defaults. Also assume that the parent has a 1-year probability of default of 0.50% and the subsidiary has a 1-year probability of default of 0.90%.

a) 0.450%
b) 0.500%
c) 0.545%
d) 0.550%

Example 18-5: FRM Exam 1998-Question 16/Credit Risk

18-5. A portfolio manager has been asked to take the risk related to the default of two securities A and B. She has to make a large payment if, and only if, both A and B default. For taking this risk, she will be compensated by receiving a fee. What can be said about this fee?

a) The fee will be larger if the default of A and of B are highly correlated
b) The fee will be smaller if the default of A and of B are highly correlated
c) The fee is independent of the correlation between the default of A and of B
d) None of the above

Example 18-6: FRM Exam 1998-Question 42/Credit Risk

18-6. A German Bank lends 100M DEM to a Russian Bank for one year and receives 120M DEM worth of Russian government securities as collateral. Assuming that the 1-year [99%] VaR on the Russian government securities is 20M DEM and the Russian bank's 1-year probability of default is 5%, what is the German bank's probability of losing money on this trade over the next year?

a) Less than .05%
b) Approximately .05%
c) Between .05% – 5%
d) Greater than 5%
Example 18-7: FRM Exam 1998-Question 51/Credit Risk

18-7. A portfolio consists of two (long) assets £100 million each. The probability of default over the next year is 10% for the first asset, 20% for the second asset, and the joint probability of default is 3%. Estimate the expected loss on this portfolio due to credit defaults over the next year assuming 40% recovery rate for both assets.

a) £19 million  
b) £22 million  
c) £30 million  
d) None of the above

Example 18-8: FRM Exam 1997-Question 11/Credit Risk

18-8. A commercial loan department lends to two different BB-rated obligors for one year. Assume the one-year probability of default for a BB-rated obligor is 10% and there is zero correlation (independence) between the obligor’s probability of defaulting. What is the probability that both obligors will default in the same year?

a) 1%  
b) 2%  
c) 10%  
d) 20%

Example 18-9: FRM Exam 1997-Question 12/Credit Risk

18-9. What is the probability of no defaults over the next year from a portfolio of 10 BBB-rated obligors? (Assume the one-year probability of default for a BBB-rated counterparty is 5% and assumes zero correlation (independence) between the obligor’s probability of default.)

a) 5.0%  
b) 50.0%  
c) 60.0%  
d) 95.0%
Example 18-10: FRM Exam 1998-Question 30/Credit Risk

18-10. A trader purchases two corporate bonds that are each given a B-rating. Assume that the 1-year probability of default for each issuer is 6% and that the default probabilities of each issuer are independent. What is the probability that both issuers avoid default during the first year?

a) 88.0%
b) 88.4%
c) 94.0%
d) 96.4%

Chapter 19 - Measuring Actuarial Default Risk

Example 19-1: FRM Exam 1998-Question 5/Credit Risk

19-1. Which of the following events is not a “credit event”?

a) Bankruptcy
b) Calling back a bond
c) Downgrading
d) Default on payments

Example 19-2: FRM Exam 1999-Question 128/Credit Risk

19-2. Which of the following losses can be considered as resulting from an “event risk”?

I) Losses on a diversified portfolio of stocks during the stock market decline and hedge fund crisis in the Autumn/Fall of 1998.
II) A US investor bought a bond whose payments are in Japanese yen. The investor made a loss as Japanese Yen depreciated relative to the dollar.
III) A holding in RJR Nabisco corporate bonds sustained a loss in 1988 when RJR Nabisco was taken over for $25 billion via a leveraged buyout which resulted in a reduction of its debt rating to non-investment grade.
IV) A municipal bond portfolio suffers a loss when municipal bonds are declared as no longer tax exempt by the tax authority, with no compensation being paid to investors.

a) III only
b) All the above
c) I and IV
d) III and IV
Example 19-3: FRM Exam 1997-Question 8/Credit Risk

19-3. Which of the following is Moody’s lowest credit rating?
   a) Aaa2
   b) Baa1
   c) Baa3
   d) Ba2

Example 19-4: FRM Exam 1998-Question 37/Credit Risk

19-4. A credit risk analyst has calculated two significant financial figures for Company X: a pre-tax interest coverage ratio of 3.75 and long-term debt/equity of 35%. Given this information, what is the most likely rating grade that the analyst will assign to Company X?
   a) Investment grade
   b) Speculative grade
   c) Non-investment grade
   d) Junk grade

Example 19-5: FRM Exam 1997-Question 28/Credit Risk

19-5. Based on historical data from S&P, what is the approximate historical 1-year probability of default for a BB-rated obligor?
   a) 0.05%
   b) 0.20%
   c) 1.0%
   d) 5.0%

Example 19-6: FRM Exam 1998-Question 29/Credit Risk

19-6. Based on historical evidence, a B-rated counterparty is approximately 16 times more likely to default over a 1-year time period than a BBB-rated counterparty. Over a 10-year time period, a B-rated counterparty is how many more times likely to default than a BBB-rated counterparty?
   a) 5
   b) 9
   c) 16
   d) 24
Example 19-7: FRM Exam 1997-Question 2/Credit Risk

19-8. The probability of an AA-rated counterparty defaulting over the next year is 0.06%. Therefore, one would expect that the probability of it defaulting over the next 3 months to be:
   a) between 0% - .015%
   b) exactly .015%
   c) between .015% - .030%
   d) greater than .030%

Example 19-8: FRM Exam 2000-Question 37/Credit Risk

19-7. A company has a constant 30% per year probability of default. What is the probability the company will be in default after three years?
   a) 34%
   b) 48%
   c) 66%
   d) 90%

Example 19-9: FRM Exam 2000-Question 31/Credit Risk

19-10. According to Standard and Poor’s, the 5-year cumulative probability default for AAA-rated debt is 15%. If the marginal probability of default for AAA debt from year 5 to year 6 (conditional on no prior default) is 10%, then what is the 6-year cumulative probability default for AAA-rated debt?
   a) 25%
   b) 16.55%
   c) 15%
   d) 22.65%

Example 19-11: FRM Exam 2000-Question 43/Credit Risk

19-12. The marginal default rates (conditional on no previous default) for a BB-rated firm during the first, second, and third years are 3, 4, and 5 percent, respectively. What is the cumulative probability of defaulting over the next three years?
   a) 10.78 percent
   b) 11.54 percent
   c) 12.00 percent
   d) 12.78 percent
Example 19-12: FRM Exam 2000-Question 34/Credit Risk

19-9. What is the difference between the marginal default probability and the cumulative default probability?
   a) Marginal default probability is the probability that a borrower will default in any given year, while the cumulative default probability is over a specified multi-year period
   b) Marginal default probability is the probability that a borrower will default due to a particular credit event, while the cumulative default probability is for all possible credit events
   c) Marginal default probability is the minimum probability that a borrower will default, while the cumulative default probability is the maximum probability
   d) Both a and c

Example 19-13: FRM Exam 2000-Question 50/Credit Risk

19-13. The transition matrix in credit risk measurement generally represents:
   a) Probabilities of migrating from one rating quality to another over the lifetime of the loan
   b) Correlations among the transitions for the various rating quality assets within one year
   c) Correlations of various market movements that impact rating quality for a 10-day holding period
   d) Probabilities of migrating from one rating quality to another within one year

Example 19-14: FRM Exam 2000-Question 58/Credit Risk

19-14. When measuring credit risk, for the same counterparty:
   a) A loan obligation is generally rated higher than a bond obligation
   b) A bond obligation is generally rated higher than a loan obligation
   c) A bond obligation is generally rated the same as a loan obligation
   d) Loans are never rated so it’s impossible to compare
Example 19-15: FRM Exam 1998-Question 8/Credit Risk

19-15. In a typical collateralized bond obligation (CBO), a pool of high yield bonds are posted as collateral and the cash flows from the collateral are structured as several classes of securities (the offered securities) with different credit ratings and a residual piece (the equity) which absorbs most of the default risk. When comparing the market value weighted average rating of the collateral and that of the offered securities, which of the following is true?

a) The market value weighted average rating of the collateral is about the same as the offered securities
b) The market value weighted average rating of the collateral is higher than the offered securities
c) The market value weighted average rating of the collateral is lower than the offered securities
d) The market value weighted average rating of the collateral may be lower or higher than the offered securities

Example 19-16: FRM Exam 1997-Question 27/Credit Risk

19-16. Which of the following credit events usually takes place first?

a) A bond is downgraded by a rating agency
b) A bond’s credit spread widens

e) The yield curve flattens
f) The credit rating of the country changes

Example 19-17: FRM Exam 1999-Question 121/Credit Risk

19-17. In assessing the sovereign credit, a number of criteria are considered. Which of the following is the more critical one?

a) Fiscal position of the government
b) Prospect for domestic output and demand
c) International asset position
d) Structure of the government’s debt and debt service (external and internal)

Example 19-18: FRM Exam 1998-Question 36/Credit Risk

19-18. What is the most significant difference to consider when assessing the credit worthiness of a country rather than a company?

a) The country’s willingness and its ability to pay must be analyzed
b) Financial data on a country is often available only with long lags
c) It is more costly to do due diligence on a country rather than on a company
d) A country is often unwilling to disclose sensitive financial information
Chapter 20 - Measuring Default Risk from Market Prices

Example 20-1: FRM Exam 1998-Question 3/Credit Risk

20-1. When comparing the zero curve (semiannual compounding) of riskless bonds and risky bonds, one can estimate the implied default probabilities by examining the spread between the two. Assuming the 1-year risk-less zero rate is 5%, the risky zero rate is 5.5%, and the recovery rate is zero, what is the implied 1-year default probability?
   a) 0.24%
   b) 0.48%
   c) 0.97%
   d) 1.92%

Example 20-2: FRM Exam 1997-Question 23/Credit Risk

20-2. Assume the 3 month U.S. Treasury yield is 5.5% and the Eurodollar deposit rate is 6% (both on simple interest basis). What is the approximate probability of the Eurodollar deposit defaulting over its life (assuming a zero recovery rate)?
   a) 0.01%
   b) 0.1%
   c) 0.5%
   d) 1.0%

Example 20-3: FRM Exam 1997-Question 24/Credit Risk

20-3. Assume the 1-year U.S. Treasury yield is 5.5% (on simple interest basis) and a default probability of 1% for 1-year Commercial Paper. What should the yield of 1-year Commercial Paper be (on simple interest basis) assuming 50% recovery rate?
   a) 6.0%
   b) 6.5%
   c) 7.0%
   d) 7.5%
Example 20-4: FRM Exam 1998-Question 11/Credit Risk

20-4. What can be said about the spread (S1) between AAA and A credits, and the spread between BBB and B credits (S2) in general?
   a) S1 is equal to S2
   b) S1 ≥ S2
   c) S1 ≤ S2
   d) S1 may be less or more than S2

Example 20-5: FRM Exam 1999-Question 136/Credit Risk

20-5. Suppose XYZ Corp. has two bonds paying semi-annually according to the following table:

<table>
<thead>
<tr>
<th>Remaining Maturity</th>
<th>Coupon</th>
<th>Price</th>
<th>T-bill rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 months</td>
<td>8.0%</td>
<td>99</td>
<td>5.5%</td>
</tr>
<tr>
<td>1 year</td>
<td>9.0%</td>
<td>100</td>
<td>6.0%</td>
</tr>
</tbody>
</table>

The recovery rate for each in the event of default is 50%. For simplicity, assume that each bond will default only at the end of a coupon period. The market-implied risk-neutral probability of default for XYZ Corp. is:
   a) Greater in the first six-month period than the second.
   b) Equal for both coupon periods.
   c) Greater in the second six-month period than the first.
   d) Cannot be determined from the information provided.
Example 20-6: FRM Exam 1998-Question 22/Credit Risk

20-6. Which of the following is used to estimate the probability of default in the KMV Model?
   a) Vector analysis  
   b) Total return analysis 
   c) Equity price volatility 
   d) None of the above.

Example 20-7: FRM Exam 1999-Question 155/Credit Risk

20-7. Having equity in a firm’s capital structure adds to the creditworthiness of the firm. Which of the following statements support(s) this argument?
   I. Equity does not require payments that could lead to default.
   II. Equity capital does not mature, so it represents a permanent capital base.
   III. Equity provides a cushion for debt holders in case of bankruptcy.
   IV. The cost of equity is lower than the cost of debt.
   a) I, II, and III  
   b) All of the above.  
   c) I, II, and IV  
   d) III only

Chapter 21 - Credit Exposure

Example 21-1: FRM Exam 1999-Question 130/Credit Risk

21-1. By selling a call option on the S&P 500 futures contract, which is cash settled, an organization is subject to:
   a) Market risk, but not credit risk  
   b) Credit risk, but not market risk  
   c) Both market risk and credit risk  
   d) Neither market risk nor credit risk
Example 21-2: FRM Exam 1999-Question 151/Credit Risk

21-2. Trader A purchased an at the money 1-year OTC put option on the DAX index for a cost of EUR 10,000. What does trader A consider his maximum potential credit exposure to the counterparty over the term of the trade?

a) 0
b) Less than EUR 8,000
c) Between EUR 8,000 and EUR 12,000
d) Greater than EUR 12,000


21-3. Which of the following statements regarding a putable bond is true?

a) A putable bond has more market risk than a similar non-putable bond
b) A putable bond has more credit risk than a similar non-putable bond
c) Both a and b
d) Neither a nor b

Example 21-4: FRM Exam 2000-Question 35/Credit Risk Mgt.

21-4. Contracts such as interest-rate swaps that are private arrangements between two parties entail credit risks. Consider a financial institution that has entered into offsetting interest-rate swap contracts with two manufacturing companies, General Equipment and Universal Tools. In which one of the following situations is the financial institution exposed to credit risk from the swap position? The most likely possibility is:

a) A default by General Equipment when the value of the swap to the financial institution is positive
b) A default by Universal Tools when the value of the swap to the financial institution is negative
c) That the interest-rates will move so that the value of the swap to Universal Tools becomes negative
d) That the interest-rates will move so that the value of the swap to General Equipment becomes positive
Example 21-5: FRM Exam 1999-Question 111/Credit Risk

21-5. What is the primary difference between the default implications of loans versus those of [interest rate] swaps?
   a) The principal in a swap is not at risk
   b) The cash flows in the loans are determined by the level of rates, not the difference in rates.
   c) Default on a loan requires only that the firm be in financial distress, a swap also requires that the remaining value be negative [positive to the dealer?].
   d) All of the above.

Example 21-6: FRM Exam 1999-Question 133/Credit Risk

21-6. Which criteria would result in the best measure of loan equivalent exposure for risk management and capital allocation purposes?
   a) Current mark-to-market value of a contract.
   b) Current mark-to-market value of a contract plus an add-on factor for future potential exposure.
   c) A factor of three percent multiplied by the notional amount multiplied by the number of years, or fraction thereof, until maturity, i.e. $3\% \times NT$, where $N$ is notional, and $T$ is time to maturity in years.
   d) Sum of the net notional amount of all transactions with the same counterparty.

Example 21-7: FRM Exam 2000-Question 55/Credit Risk Mgt.

21-7. Bank One enters into a 5-year swap contract with Mervin Co. to pay LIBOR in return for a fixed 8% rate on a nominal principal of $100 million. Two years from now, the market rate on three-year swaps at LIBOR is 7%; at this time Mervin Co. declares bankruptcy and defaults on its swap obligation. Assume that the net payment is made only at the end of each year for the swap contract period. What is the market value of the loss incurred by Bank One as result of the default?
   a) $1.927$ million
   b) $2.245$ million
   c) $2.624$ million
   d) $3.011$ million
Example 21-8: FRM Exam 1999-Question 118/Credit Risk

21-8. Assume that swap rates are identical for all swap tenors. A swap dealer entered into a plain vanilla swap one year ago as the receive-fixed party, when the price of the swap was 7%. Today, this swap dealer will face credit risk exposure from this swap only if the value of the swap for the dealer is:

a) Negative, which will occur if new swaps are being priced at 6%.
b) Negative, which will occur if new swaps are being priced at 8%.
c) Positive, which will occur if new swaps are being priced at 6%.
d) Positive, which will occur if new swaps are being priced at 8%.

Example 21-9: FRM Exam 1999-Question 148/Credit Risk

21-9. Assume that the DV01 of an interest rate swap is proportional to its time to maturity (which at the initiation of the swap is equal to T). Also, assume that the interest rate curve moves are parallel, stochastic with constant volatility, normally distributed and independent. At what time will the maximum potential exposure be reached?

a) T/4  
b) T/3  
c) T/2  
d) 3T/4

Example 21-10: FRM Exam 2000-Question 29/Credit Risk Mgt.

21-10. Determine at what point in the future a derivatives’ portfolio will reach its maximum potential exposure. All the derivatives are on one underlying, which is assumed to move in a stochastic fashion (variance in the underlying’s value increases linearly with time passage). The derivatives’ portfolio sensitivity to the underlying is expected to drop off as \((T - t)^2\) (square of the time left to maturity), where \(T\) is the time from today the last contract in the portfolio rolls off and \(t\) is the time from today.

a) T/5  
b) T/3  
c) T/2  
d) None of the above
Example 21-11: FRM Exam 1999-Question 149/Credit Risk

21-11. Assume that the DV01 of an interest rate swap is equal to 4,000 times its time left to maturity in years. At initiation, the swap tenor is three years and the swap is at par. Assume that the interest rate curve moves are parallel, stochastic with constant volatility and normally distributed and independent with 1 day standard deviation of 5bp. Assume 250 business days per year. The swap’s maximum potential exposure at the 99% confidence level is approximately:

a) 700,000  
b) 1,000,000  
c) 1,500,000  
d) 2,000,000

Example 21-12: FRM Exam 1999-Question 127/Credit Risk

21-12. Which of the following swap positions has the highest potential future credit exposure at the time specified? A 5-year $500M:

a) Interest rate (USD, fixed v floating) swap 4-years after inception.  
b) Currency swap (USD floating v GBP floating) 1-year after inception.  
c) Currency swap (USD floating v GBP floating) 4-years after inception.  
d) Interest rate swap (USD, fixed v floating) 4-years after inception.


21-13. Which one of the following deals would have the largest credit exposure for a $1,000,000 deal size (assume the counterparty in each deal is a AAA-rated bank and has no settlement risk)?

a) Pay fixed in an AUD interest rate swap for 1 year  
b) Sell USD against AUD in a 1-year forward foreign exchange contract  
c) Sell a 1-year AUD Cap  
d) Purchase a 1-year Certificate of Deposit
Example 21-14: FRM Exam 1999-Question 153/Credit Risk

21-14. The amount of potential exposure arising from being long an OTC USD/EUR forward contract will be a function of the:
I) Credit quality of the counterparty
II) Tenor of the contract
III) Volatility of the spot USD/EUR exchange rate
IV) Volatility of the USD interest rate
V) Volatility of the EUR interest rate
VI) Nominal amount of the contract
a) All of the above.
b) All EXCEPT I
c) I, II, III, and VI
d) III, IV, and V

Example 21-15: FRM Exam 1998-Question 33/Credit Risk

21-15. The amount of potential exposure arising from being long an over-the-counter USD/DEM forward contract will be a function of the:
a) Credit quality of the counterparty.
b) Credit quality of the counterparty and the tenor of the contract.
c) Volatility of the USD/DEM exchange rate and the tenor of the contract.
d) Volatility of the USD/DEM exchange rate and the credit quality of the counterparty.

Example 21-16: FRM Exam 1998-Question 34/Credit Risk

21-16. A diversified portfolio of OTC derivatives with a single counterparty currently has a net mark-to-market of 20M USD. Assuming that there are no netting agreements in place with the counterparty, determine the current credit exposure to the counterparty.
a) Less than 20M USD.
b) Exactly 20M USD.
c) Greater than 20M USD.
d) Unable to be determined.

Example 21-17: FRM Exam 1999-Question 131/Credit Risk

21-17. To reduce credit risk, a company can:
a) Expose themselves to many different counterparties.
b) Take on a variety of positions.
c) Set up netting agreements with all of their approved trading partners.
d) All of the above.
Example 21-18: FRM Exam 1999-Question 154/Credit Risk

21-18. A diversified portfolio of OTC derivatives with a single counterparty currently has a net mark-to-market of USD 20,000,000 and a gross [absolute] mark-to-market (the sum of the value of all positive value positions minus the value of all negative value positions) of USD 80,000,000. Assuming there are no netting agreements in place with the counterparty, determine the current credit exposure to the counterparty.

a) Less than or equal to USD 19,000,000.
b) Greater than USD 19,000,000 but less than or equal to USD 40,000,000.
c) Greater than USD 40,000,000 but less than USD 60,000,000.
d) Greater than USD 60,000,000.

Example 21-19: FRM Exam 1999-Question 123/Credit Risk

21-19. An equity repo is a repo in which common stock is used as collateral in place of the more usual fixed income instrument. The mechanics of equity repos are effectively the same as fixed income repos, except that the haircut:

a) Is smaller because equities are more liquid than fixed income instruments.
b) Is larger because equity prices are more volatile than those of fixed income instruments.
c) About the same for both equity and fixed income deals because the counterparty credit risk is the same.
d) Cannot be determined in advance because equity prices, in contrast to fixed income instrument prices, are not martingales.

Chapter 22 - Credit Derivatives

Example 22-1: FRM Exam 2000-Question 33/Credit Risk Mgt.

22-1. Which one of the following statement is MOST correct?

a) Payment in a total return swap is contingent upon a future credit event
b) Investing in a risky (credit-sensitive) bond is similar to investing in a risk-free bond plus selling a credit default swap
c) In the first-to-default swap, the default event is a default on two or more assets in the basket
d) Payment in a credit swap is contingent only upon the bankruptcy of the counterparty
Example 22-2: FRM Exam 1999-Question 113/Credit Risk

22-2. Which of the following statements is/are ALWAYS true?
   a) Payment in a credit swap is contingent upon a future credit event
   b) Payment in a total rate of return swap is not contingent upon a future credit event
   c) Both a and b
   d) None of the above

Example 22-3: FRM Exam 1999-Question 114/Credit Risk

22-3. In the first-to-default swap, the default event is a default on:
   a) Any one of the assets in the basket
   b) All of the assets in the basket
   c) Two or more assets in the basket
   d) None of the above

Example 22-4: FRM Exam 1999-Question 122/Credit Risk

22-4. A portfolio manager holds a default swap to hedge an AA corporate bond position. If the counterparty of the default swap is acquired by the bond issuer, then the default swap:
   a) Increases in value
   b) Decreases in value
   c) Decreases in value only if the corporate bond is downgraded
   d) Is unchanged in value


22-5. A portfolio consists of one (long) $100 million asset and a default protection contract on this asset. The probability of default over the next year is 10% for the asset, 20% for the counterparty that wrote the default protection. The joint probability of default for the asset and the contract counterparty is 3%. Estimate the expected loss on this portfolio due to credit defaults over the next year assuming 40% recovery rate on the asset and 0% recovery rate for the contract counterparty.
   a) $3.0 million
   b) $2.2 million
   c) $1.8 million
   d) None of the above
Example 22-6: FRM Exam 1999-Question 144/Credit Risk

22-6. Which of the following is a type of credit derivative?
I) A put option on a corporate bond
II) A total return swap on a loan portfolio
III) A note that pays an enhanced yield in the case of a bond downgrade
IV) A put option on an off-the-run treasury bond
a) I, II, and III
b) II and III only
c) II only
d) All of the above

Example 22-7: FRM Exam 1998-Question 26/Credit Risk

22-7. The BIS considers all of the following products to be credit derivatives EXCEPT:
a) Credit-linked notes
b) Total-return swaps
c) Credit spread options
d) Callable floating-rate notes

Example 22-8: FRM Exam 1998-Question 44/Credit Risk

22-8. All of the following can be accomplished with the use of a credit derivative EXCEPT:
a) Reducing credit concentration risk
b) Allowing a fund to invest in corporate loans
c) Preventing the bankruptcy of loan counterparty
d) Leveraging credit risk

Example 22-9: FRM Exam 1998-Question 46/Credit Risk

22-9. Company A and Company B enter into a trade agreement in which Company A will periodically pay all cash flows and capital gains arising from Bond X to Company B. On the same dates Company A will pay Company B LIBOR +50bp plus any decrease in the market value of Bond X. What type of trade is this?
a) A total return swap
b) A fixed income linked swap
c) An inverse floater
d) An interest rate swap

22-10. A credit-spread option has a notional amount of $50 million with a maturity of one year. The underlying security is a 10-year, semi-annual bond with a 7% coupon and a $1,000 face value. The current spread is 120 basis points against 10-year Treasuries. The option is a European option with a strike of 130 basis points. If at expiration, Treasury yields have moved from 6% to 6.3% and the credit-spread has widened to 150 basis points, what will be the payout to the buyer of this credit-spread option?

a) $587,352
b) $611,893
c) $622,426
d) $639,023


22-11. Bank One has made a $200 million loan to a software company at a fixed rate of 12 percent. The bank wants to hedge its exposure by entering into a Total Return Swap with a counterparty, Interloan Co., in which Bank One promises to pay the interest on the loan plus the change in the market value of the loan in exchange for LIBOR plus 40 basis points. If after one year, the market value of the loan has decreased by 3 percent and LIBOR is 11 percent, what will be the net obligation of Bank One?

a) Net receipt of $4.8 million
b) Net payment of $4.8 million
c) Net receipt of $5.2 million
d) Net payment of $5.2 million

Example 22-12: FRM Exam 1999-Question 147/Credit Risk

22-12. Which of the following are needed to value a credit swap?

I) Correlation structure for the default and recovery rates of the swap counterparty and reference credit.
II) The swap or treasury yield curve.
III) Reference credit spread curve over swap or treasury rates.
IV) Swap counterparty credit spread curve over swap or treasury rates.

a) II, III, and IV
b) I, III, and IV
c) II and III
d) All of the above
Example 22-13: FRM Exam 1999-Question 135/Credit Risk

22-13. The Widget Company has outstanding debt of three different maturities as outlined in the following table:

<table>
<thead>
<tr>
<th>Maturity</th>
<th>Widget Company Bonds</th>
<th>Corresponding U.S. Treasury Bonds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Price</td>
<td>Coupon (sa 30/360)</td>
</tr>
<tr>
<td>1 year</td>
<td>100</td>
<td>7.60%</td>
</tr>
<tr>
<td>5 years</td>
<td>100</td>
<td>8.50%</td>
</tr>
<tr>
<td>10 years</td>
<td>100</td>
<td>9.50%</td>
</tr>
</tbody>
</table>

All Widget Co. debt ranks pari passu, all its debt contains cross default provisions, and the recovery value for each bond is 20. The correct price for a one-year credit default swap (sa 30/360) with the Widget Co. 9.5% 10-year bond as a reference asset is: a) 1.0% per annum
b) 2.0% per annum
c) 2.5% per annum
d) 3.5% per annum

Example 22-14: FRM Exam 2000-Question 30/Credit Risk Mgt.

22-14. Which one of the following statements is NOT an application of credit derivatives for banks?
   a) Reduction in economic and regulatory capital usage
   b) Reduction in counterparty concentrations
   c) Management of the risk profile of the loan portfolio
d) Credit protection of private banking deposits

Chapter 23 - Managing Credit Risk

Example 23-1: FRM Exam 1998-Question 41/Credit Risk

23-1. Credit provisions should be taken to cover all of the following EXCEPT:
   a) Non-performing loans
   b) The expected loss of a loan portfolio
   c) An amount equal to the VaR of the credit portfolio
d) Excess credit profits earned during below average loss years
Example 23-2: FRM Exam 1998-Question 39/Credit Risk

23-2. Calculate the 1-year expected loss of a $100M portfolio comprising 10 B-rated issuers. Assume that the 1-year probability of default for each issuer is 6% and the average recovery value for each issuer in the event of default is 40%.
   a) $2.4M
   b) $3.6M
   c) $24M
   d) $36M

Example 23-3: FRM Exam 1999-Question 120/Credit Risk

23-3. Which loan is more risky? Assume that the obligors are rated the same, are from the same industry, and have more or less same sized idiosyncratic risk.
   A loan of:
   a) $1,000,000 with 50% recovery rate
   b) $1,000,000 with no collateral
   c) $4,000,000 with 40% recovery rate
   d) $4,000,000 with 60% recovery rate

Example 23-4: FRM Exam 1999-Question 112/Credit Risk

23-4. Which of the following conditions result in a higher probability of default?
   a) The maturity of the transaction is longer
   b) The counterparty is more creditworthy
   c) The price of the bond, or underlying price in the case of a derivative is less volatile
   d) Both a and c

Example 23-5: FRM Exam 1998-Question 13/Credit Risk

23-5. A risk analyst is trying to estimate the Credit VaR for a risky bond. The Credit VaR is defined as the maximum unexpected loss at a confidence level of 99.9% over a one-month horizon. Assume that the bond is valued at $1,000,000 one month forward, and the one-year cumulative default probability is 2% for this bond, what is your best estimate of the Credit VaR for this bond assuming no recovery?
   a) 20,000
   b) 1,682
   c) 998.318
   d) 0
**Example 23-6: FRM Exam 1998-Question 10/Credit Risk**

23-6. A risk analyst is trying to estimate the Credit VaR for a portfolio of two risky bonds. The Credit VaR is defined as the maximum unexpected loss at a confidence level of 99.9% over a one-month horizon. Assume that both bonds are valued at $500,000 one month forward, and the one-year cumulative default probability is 2% for each of these bonds. What is your best estimate of the Credit VaR for this portfolio assuming no default correlation and no recovery?

a) 841  
b) 1,682  
c) 10,0008  
d) 499,159

**Example 23-7: FRM Exam 1999-Question 146/Credit Risk**

23-7. Which of the following is used to estimate the probability of default for a firm in the KMV model?

I) Historical probability of default based on the credit rating of the firm (KMV have a method to assign a rating to the firm if unrated).  
II) Stock price volatility.  
III) The book value of the firm’s equity.  
IV) The market value of the firm’s equity.  
V) The book value of the firm’s debt.  
VI) The market value of the firm’s debt.

a) I only  
b) II, IV, and V  
c) II, III, VI  
d) VI only

**Example 23-8: FRM Exam 1999-Question 145/Credit Risk**

23-8. J.P. Morgan’s CreditMetrics uses which of the following to estimate default correlations?

a) CreditMetrics does not estimate default correlations; it assumes zero correlations between defaults  
b) Correlations of equity returns  
c) Correlations between changes in corporate bond spreads to treasury  
d) Historical correlation of corporate bond defaults
Example 23-9: FRM Exam 1998-Question 21/Credit Risk

23-9. J.P. Morgan's CreditMetrics uses which of the following to estimate default correlations?
a) Bond spreads to treasury
b) History of loan defaults
c) Assumes zero correlations and simulates defaults
d) None of the above.

Example 23-10: FRM Exam 2000-Question 60/Credit Risk

23-10. The KMV credit risk model generates an estimated default frequency (EDF) based on the distance between the current value of assets and the book value of liabilities. Suppose that the current value of a firm's assets and the book value of its liabilities are $500 million and $300 million, respectively. Assume that the standard deviation of returns on the assets is $100 million, and that the returns on the assets are normally distributed. Assuming a standard Merton Model, what is the approximate default frequency (EDF) for this firm?
a) 0.010
b) 0.015
c) 0.020
d) 0.030

Example 23-11: FRM Exam 2000-Question 44/Credit Risk

23-11. Which one of the following statements regarding credit risk models is MOST correct?
a) The CreditRisk+ model decomposes all the instruments by their exposure and assesses the effect of movements in risk factors on the distribution of potential exposure
b) The CreditMetrics model provides a quick analytical solution to the distribution of credit losses with minimal data input
c) The KMV model requires the historical probability of default based on the credit rating of the firm
d) The Credit Portfolio View (McKinsey) model conditions the default rate on the state of the economy
PART V - OPERATIONAL AND INTEGRATED RISK MANAGEMENT

Chapter 24 - Operational Risk

Example 24-1: FRM Exam 1998-Question 3/Oper.&Integr.Risk

24-1. Which of the following risks are not related to operational risk?
a) Errors in trade entry
b) Fluctuation in market prices
c) Errors in preparing Master Agreement
d) Late confirmation

Example 24-2: FRM Exam 1999-Question 173/Oper.&Integr.Risk

24-2. A definition of OPERATIONAL RISK is:
I) All the risks that are not currently captured under Market and Credit Risk.
II) The potential for losses due to a failure in the operational processes or in the systems that support them.
III) The risk of losses due to a failure in people, process, technology or due to external events.
a) I only
b) II only
c) II and III only
d) I, II, and III

Example 24-3: FRM Exam 1997-Question 32/Regulatory

24-3. Which of the following is NOT an example of "model risk" in the context of value at risk measurement models?
a) Model assumptions are adjusted on an annual basis regardless of market and political conditions.
b) The model is developed by a small group of quantitative professionals who are the only personnel who understand its strengths and limitations.
c) Models are validated by an independent risk professional employed by the institution, but who works in another division.
d) Risk managers who use the models are not familiar with underlying model assumptions.

24-4. Which one of the following cases or events can be considered as resulting from an operational risk?
   a) A bank reports losses on a diversified portfolio of stocks during the stock market decline
   b) The bank becomes embroiled in a high-profile lawsuit with a customer that accuses it of improper selling practices
   c) The bank reports the loss of $1.5 billion due to rises in interest rates
   d) A US investor makes a loss as Japanese Yen depreciates relative to the dollar

Example 24-5: FRM Exam 1998-Question 5/Oper.&Integr.Risk

24-5. Which of the following may result in an operational risk?
   a) Changing a spreadsheet’s calculation mode from manual to automatic (Autocalc).
   b) Automatic filtering of outliers in historical data.
   c) Increasing the memory of computers.
   d) Increasing the CPU speed of computers.

Example 24-6: FRM Exam 1998-Question 6/Oper.&Integr.Risk

24-6. Which of the following steps should be done first during risk management processes?
   a) Risk measurement
   b) Risk control
   c) Risk identification
   d) Limit setting

Example 24-8: FRM Exam 1999-Question 166/Oper.&Integr.Risk

24-8. When measuring operational risk, the complete distribution of potential losses for each risk type is formed using:
   a) An insurance based volatility distribution.
   b) Back office distributions of transaction size and number of transactions per day.
   c) An operational and catastrophic distribution.
   d) A frequency and severity distribution.
Example 24-9: FRM Exam 1999-Question 167/Oper.&Integr.Risk

24-9. A particular operational risk event is estimated to occur once in 200 years for an institution. The loss for this type of event is expected to be between HKD 25 Million and HKD 100 Million with equal probability of loss in that range (and zero probability outside that range). Based on this information, determine the fair price of insurance to protect the institution against a loss of over HKD 80 Million for this particular operational risk.

a) HKD 133,333
b) HKD 90,000
c) HKD 120,000
d) HKD 106,667

Example 24-10: FRM Exam 1999-Question 169/Oper.&Integr.Risk

24-10. The measurement of exposure to operational risk should be based on the assessment of:
I) The probability of an operational failure
II) The extent of insurance coverage
III) The probability distribution of losses in case of failure.

a) I only
b) II only
c) I and III only
d) I, II, and III
Example 24-11: FRM Exam 1999-Question 170/Oper.&Integr.Risk

24-11. Operational Risk Capital should provide a cushion against:
   I) Expected losses
   II) Unexpected losses
   III) Catastrophic losses
   a) I only
   b) II only
   c) I and II only
   d) I, II, and III

Example 24-12: FRM Exam 1998-Question 4/Oper.&Integr.Risk

24-12. What can be said about the impact of operational risk on both market risk and credit risk?
   a) Operational risk has no impact on market risk and credit risk.
   b) Operational risk has no impact on market risk but has impact on credit risk.
   c) Operational risk has impact on market risk but no impact on credit risk.
   d) Operational risk has impact on market risk and credit risk.

Chapter 25 - Risk Capital and RAROC

Example 25-1: FRM Exam 1999-Question 159/Oper.&Integr.Risk

25-1. To calculate risk-adjusted return on capital (RAROC), the following information is required:
   a) 1-year holding period, 99% confidence interval loss for the portfolio
   b) Tax rate
   c) Both a and b
   d) None of the above

25-2. A bond trader deals in $100 million in a market with very high volatility of 20 percent per annum. He yields $10 million profit. The Risk Capital (RC) is computed as a Value-at-Risk (VaR) measure at the 99 percent level over a year. Assuming normal distribution of return, calculate the Risk-Adjusted Performance (RAPM).

a) 15.35%
b) 19.13%
c) 21.46%
d) 25.02%
Chapter 26 - Best Practices Reports

Example 26-1: FRM Exam 1997-Question 4/Regulatory

26-1. What did the Group of 30 develop?
   a) A set of risk management principles
   b) A regulatory framework for the Federal Reserve and the BLS
   c) A manual for derivatives users
   d) A set of recommendations for international futures exchanges

Chapter 27 - Firmwide Risk Management

Example 27-1: FRM Exam 1999-Question 160/Oper. & Integr. Risk

27-1. The risk that one of the parties will fail to meet its obligation to make payments in a swap agreement is called:
   a) Counterparty risk
   b) Operational risk
   c) Market risk
   d) Notional risk


27-2. What are the driving forces of integrated risk management?
   I. The increasing complexity of products.
   II. Linkages between markets.
   III. The potential benefits offered by portfolio effects.
   a) I only
   b) II only
   c) II and III only
   d) I, II, and III

27-3. The “best practice” risk management approach is a three-pillar framework. The three pillars are “best-practice policy,” “best-practice infrastructure,” and “best-practice methodologies.” Which of the following aspects of a financial institution are highly dependent upon the “best-practice” policies?
I. Business strategies
II. Risk tolerance
III. Disclosure
   a) I only
   b) I and II only
   c) II and III only
   d) I, II, and III

Example 27-4: FRM Exam 1999-Question 171/Oper.&Integr.Risk

27-4. The Operational Risk Manager should report to:
I) The Chief Executive Officer
II) The Chief Operating Officer
III) The Chief Risk Officer
   a) I only
   b) II only
   c) III only
   d) I and III only

Example 27-5: FRM Exam 1999-Question 164/Oper.&Integr.Risk

27-5. It would be prudent for a trader to direct accounting entries in the following situation:
a) Never
b) When senior management of the firm and the Board of Directors are aware and have approved such on an exception basis
c) When audit controls are such that the entries are reviewed on a regular basis to ensure detection of irregularities
d) Solely during such times as staffing turnover requires the trader to back-fill until additional personnel can be hired and trained
Example 27-6: FRM Exam 1998-Question 7/Oper.&Integr.Risk

27-6. Independent credit risk management should be responsible for:
I. Approving credit exposure measurement standards.
II. Setting credit limits and monitoring adherence to such limits.
III. Reviewing counterparty creditworthiness and concentration of credit risk.
   a) I only
   b) II only
   c) I and II only
   d) I, II, and III

Example 27-7: FRM Exam 1998-Question 9/Oper.&Integr.Risk

27-7. The members of the board of directors should have which of the following responsibilities related to risk management:
I. The board must approve the firm’s risk management policies and procedures.
II. The board must be able to evaluate the performance of risk management activities.
III. The board must maintain oversight of risk management activities.
   a) I and II only
   b) II and III only
   c) I and III only
   d) I, II, and III


27-8. Which one of the following statements about operations risk is NOT correct?
a) The operations unit for derivatives activities, consistent with other trading and investment activities should report to an independent unit and should be managed independently of the business unit.
b) It is essential that operational units be able to capture all relevant details of transactions, identify errors and process payments or move assets quickly and accurately.
c) Because the business unit is responsible for the profitability of a derivatives function, it should be responsible for ensuring proper reconciliation of front and back office databases on a regular basis.
d) Institutions should establish a process through which documentation exceptions are monitored, resolved and appropriately reviewed by senior management and legal counsel.
Example 27-9: FRM Exam 1997-Question 3/Regulatory

27-9. To develop an effective risk management function within a large financial institution, the head of risk management should report to whom?
   a) The head of trading
   b) The head of IT
   c) The board of directors
   d) Depends on the institution

Example 27-10: FRM Exam 1999-Question 165/Oper.&Integr.Risk

27-10. All of the following would strengthen the internal controls for sales personnel EXCEPT:
   a) Tape recording of incoming and outgoing calls
   b) Prompt confirmation of trades and acquisition of completed legal agreements
   c) Compensation schemes directly linked to calendar year revenues
   d) Independent credit department personnel reviewing and approving, as deemed appropriate, all over-line requests

Example 27-11: FRM Exam 1999-Question 163/Oper.&Integr.Risk

27-11. Appropriate internal controls include a balanced compensation program for front office personnel. All of the following would be appropriate components of such a program EXCEPT:
   a) Compensation in part is determined by team play with other units in the firm
   b) Compensation is significantly based on customer service
   c) Compensation is only dependent on the returns generated by customer or proprietary portfolios under management
   d) Bankers' compensation in part depends on compliance with internal policies and procedures
Example 27-12: FRM Exam 1999-Question 162/Oper.&Integr.Risk

27-12. The best example of an effective risk control function would be a unit that:
   a) Uncovers numerous control exceptions, violations of law, and procedural errors, while maintaining a non-controversial relationship with risk taking personnel
   b) Is staffed by competent personnel who report to the head of the trading department while maintaining independence from front office personnel
   c) Conveys issues regarding control mechanisms, risk levels, and the quality of managerial governance; achieves timely and constructive action by responsible personnel; and thereby has few repeat criticisms
   d) Efficiently skews review coverage towards areas experiencing high losses or mediocre performance, thereby reducing resource requirements


27-13. Which of the following roles should not reside within an independent global risk management function?
   a) Establish risk management policies and procedures
   b) Review and approve risk management methodologies and models, in particular those used for pricing and valuation
   c) Execute trading strategies to hedge out global market risk
   d) Communicate risk management results to executive management and the board of directors, as well as investors, rating agencies, stock analysts, and regulators

Example 27-14: FRM Exam 1997-Question 33/Regulatory

27-14. An institution is developing a compensation policy for trading personnel that incorporates sound risk management principles and deters trading abuses. Which of the following should NOT be considered when developing this policy?
   a) Deferring compensation to force traders' long term interests more in line with the institution
   b) Share price growth over the previous year
   c) The consistency of trading practices with corporate energy
   d) Risk-adjusted return of trading activities

27-15. Which of the following strategies can contribute to minimizing operational risk?
I. Individual responsible for committing to transaction should perform clearance and accounting functions
II. To value current positions, price information should be obtained from external sources
III. Compensation scheme for trader should be directly linked to calendar revenues
IV. Trade tickets need to be confirmed with the counterparty
a) I and II
b) II and IV
c) III and IV
d) I, II, and III

Chapter 31 - The Basle Accord

Example 31-2: FRM Exam 1999-Question 189/Regulation

31-2. Banks are required to maintain [a percentage of] of their assets as “Tier 1 Capital”. Which of the following count towards this capital requirement?
I) Shareholders equity
II) Sovereign debt held in the trading book
III) Common stock of other banks
IV) Subordinated debt issued by the bank in question (subject to certain qualifying rules)
a) I, II, and IV
b) II and III
c) I and IV
d) I only

Example 31-3: FRM Exam 2000-Question 139/Regulation

31-3. Tier 1 capital includes all of the following EXCEPT:
a) Asset revaluation reserves
b) Common stock
c) Noncumulative preferred shares
d) Disclosed reserves.
Example 31-4: FRM Exam 2000-Question 134/Regulation

31-4. BIS capital requirement for an unfunded, short-term (under one year) credit commitment is:
   a) 0%
   b) 4%
   c) 8%
   d) 100%

Example 31-5: FRM Exam 2000-Question 137/Regulation

31-5. The BIS requirement for capital charge of an unfunded commitment of original maturity of greater than one year, as compared to an equivalent funded commitment (or loan) is:
   a) The same
   b) Half
   c) A quarter
   d) Zero

Example 31-6: FRM Exam 1999-Question 134/Credit Risk

31-6. A risk analyst is asked to prepare a BIS credit risk report based on accounting data. He receives a report that shows the mark to market value of the following instruments by client: Interest Rate Caps Bought, Interest Rate Caps Sold, Interest Rate Swaps. The analyst's system contains the following additional information:
   I) The time to maturity of the instruments
   II) The presence or absence of a netting agreement
   III) The amount of “add-on” [for each instrument]
   IV) The credit rating of the client

Which items does the analyst need in order to create the report?
   a) I and IV only
   b) II and III only
   c) II and III and IV
   d) All the above.
Example 31-7: FRM Exam 2000-Question 135/Regulation

31-7. As of November 2000, which one of the following will generally receive 8% BIS capital charge (100% asset weight)?
   a) Investment in a publicly traded stock for trading purposes
   b) Investment in a U.S. government bond
   c) Investment in a Venture Capital fund for speculation purposes
   d) None of the above

Example 31-8: FRM Exam 2000-Question 131/Regulation

31-8. The June 1999 Basle Committee on Banking Supervision issued proposals for reform of its 1988 Capital Accord (the Basel II Proposals). An implication of these proposed reforms is the possibility of:
   a) Using internal models or external ratings in the computation of minimum capital requirements
   b) Allocating capital based on an internal VaR model
   c) Including credit risk the overall internal model framework to compute BIS capital requirement
   d) All of the above

Example 31-9: FRM Exam 1998-Question 21/Regulatory

31-9. Which of the following risks is most difficult to measure and manage?
   a) Credit risk, because returns are not normally distributed.
   b) Market risk, because of the optionality of many positions.
   c) Interest rate risk, because no one can consistently predict directional changes.
   d) Operational risk, because sufficient data does not exist.

Chapter 32 - The Basle Risk Charge

Example 32-1: FRM Exam 1999-Question 184/Regulation

32-1. You are given that the RiskMetrics VaR for a portfolio is $1,000,000. What is the approximate Basle Committee VaR?
   a) $4,450,000
   b) $225,000
   c) $1,000,000
   d) $1,412,121
Example 32-2: FRM Exam 1999-Question 196/Regulation

32-2. Under the Amendment to the Capital Accord to Incorporate Market Risks, value at risk:
   a) Must be calculated using a 99th percentile one tailed confidence interval and a 10-day holding period
   b) Must be calculated using a 99th percentile one tailed confidence interval, but may use a shorter holding period and a square root of time scaling
   c) May use any percentile (e.g., 95th as used in RiskMetrics) scale to the 99th percentile using normal distribution assumptions, may use a shorter or longer holding period than 10-days, and scale using the square root of time
   d) May use any percentile or holding period as long as backtesting results are satisfactory

Example 32-3: FRM Exam 1999-Question 190/Regulation

32-3. The Amendment to the Capital Accord requires that internal models:
   a) Utilize at least six months of historical data
   b) Utilize at least one year of equally weighted historical data
   c) Utilize enough historical data so that the weighted average age of the data is at least six months
   d) Utilize two years of historical data, unequally weighted

Example 32-4: FRM Exam 1999-Question 197/Regulation

32-4. The capital requirement specified in the Amendment to the Capital Accord to Incorporate Market Risks is:
   a) The previous day’s value at risk number multiplied by a multiplication factor
   b) The greatest of:
      1) The previous day’s value at risk number multiplied by a multiplication factor
      2) The average of the daily value at risk over the last 60 business days multiplied by a multiplication factor
   c) The greatest of:
      1) The previous day’s value at risk number.
      2) The average of the daily value at risk over the last 60 business days multiplied by a multiplication factor.
   d) The greatest of:
      1) The previous day’s value at risk number multiplied by a factor
      2) The maximum of the daily value at risk over the last 60 business days

32-5. A bank which funds itself at LIBOR-5 bp., purchases an A+ rated corporate floating coupon loan paying LIBOR+15 bp. Based on the current BIS minimum capital requirements, what is the annualized return on regulatory capital for this loan?

a) 2.5%
b) 5.0%
c) 11%
d) None of the above

Example 32-6: FRM Exam 1998-Question 4/Regulatory

32-6. A trading book has interest rate VaR of 200M, equity VaR of 15M, and F/X VaR of 50M. The VaR has been computed based on a 99% confidence level and a 10-day holding period. Assuming there is no correlation among the three asset classes, determine the required regulatory capital based on the current BIS minimum capital requirements for the market risk in this book.

a) 150 M
b) 207 M
c) 620 M
d) 795 M

Example 32-7: FRM Exam 1998-Question 18/Regulatory

32-7. What would be the market risk capital requirement for a bank with a one day VaR of $100 and a specific risk surcharge of $30, based on the current BIS minimum capital requirements?

a) $300
b) $316
c) $949
d) $979
Example 32-8: FRM Exam 1999-Question 194/Regulation

32-8. According to the current version of the Amendment to the Capital Accord to Incorporate Market Risks, a specific risk method must meet certain criteria if a bank is to be allowed to use it for calculating capital requirements. Which of the following statements are TRUE?
I) If the method does not meet the criteria, the capital figure produced for specific risk is subject to a lower limit of 50% of the capital figure under the standardized methodology
II) If the method does not meet the criteria, the bank must use the figure produced by the standardized methodology instead
III) If the method does meet the criteria, but the bank has no methodologies in place that adequately capture event and default risk for its traded debt and equity positions, the specific risk capital charge is subject to a prudential surcharge
IV) The specific risk charge is not affected by any methodologies the bank may have for measuring default or event risk, as these risks are currently covered by credit risk capital charges
a) I and IV
b) I and III
c) II and IV
d) II and III

Example 32-9: FRM Exam 1998-Question 19/Regulatory

32-9. Which one of the following statements is false regarding the calculation of the specific risk charge for the market risk capital rule?

a) If the bank can demonstrate that its specific risk modeling captures all aspects of specific risk, a surcharge will not be required
b) If a bank's model captures the idiosyncratic variation in its debt and equity portfolios, but does not measure default and event risk, a model calculated surcharge should be added to the capital charge
c) Specific risk includes default and event risk but not idiosyncratic variation
d) If a bank's model does not measure specific risk, the surcharge for specific risk should be 100% of the standardized specific risk charge
Example 32-10: FRM Exam 1999-Question 195/Regulation

32-10. According to the current version of the Amendment to the Capital Accord to Incorporate Market Risks in relation to stress testing, which of the following statements is TRUE?
   I) Stress testing results should be communicated to traders
   II) Stress testing results should be communicated to senior management
   III) Stress testing results should be communicated to the bank’s board of directors
   IV) Limits should be set on the loss indicated by stress tests
   V) The levels of limits (e.g., VaR limits) should reflect the results of stress testing
   a) I, II, III, and IV
   b) I, II, and V
   c) II, III, and V
   d) II, III, and IV

Example 32-11: FRM Exam 1998-Question 20/Regulatory

32-11. Value at risk (VaR) measures should be supplemented by portfolio stress testing because:
   a) VaR does not indicate how large the losses will be beyond the specified confidence level.
   b) Stress testing provides a precise maximum loss level
   c) VaR measures are correct only 95% of the time
   d) Stress testing scenarios incorporate reasonably probable events

Example 32-12: FRM Exam 1997-Question 15/Regulatory

32-12. Which one of the following is NOT an explicitly permitted VaR modelling technique of the Amendment to the Capital Accord to Incorporate Market Risk?
   a) Historical simulation
   b) Variance/covariance matrices
   c) Monte Carlo simulation
   d) Scenario analysis
Example 32-13: FRM Exam 1999-Question 192/Regulation

32-13. The Amendment to the Capital Accord recommends that backtesting compares VaR to:
   a) Actual P&L
   b) Hypothetical P&L, i.e. P&L based on end-of-day positions
   c) Both actual and hypothetical P&L
   d) Does not specify a choice

Example 32-14: FRM Exam 1999-Question 193/Regulation

32-14. The Amendment to the Capital Accord defines the “yellow zone” as the following range of exceptions out of 250 observations:
   a) 3 to 7
   b) 5 to 9
   c) 6 to 9
   d) 6 to 10

Example 32-15: FRM Exam 1999-Question 191/Regulation

32-15. For purposes of back-testing, a VaR internal model, the Amendment to the Capital Accord requires:
   a) Comparing one year of daily P&L to a 99% one-tail confidence one-day VaR with an exception produced whenever \( P&L < -VAR \)
   b) Comparing one year of daily P&L to a 98% two-tail confidence one-day VaR with an exception produced whenever \( P&L \) is outside the interval \( (-VAR, +VAR) \)
   c) Comparing one year of rolling ten-day P&L to a 99% one-tail confidence ten-day VaR with an exception produced whenever \( P&L < -VAR \)
   d) Comparing one year of rolling ten-day P&L to a 99% one-tail confidence ten-day VaR with an exception produced whenever \( P&L < -3VAR \)

Example 32-16: FRM Exam 1998-Question 1/Regulatory

32-16. According to the Basle backtesting framework guidelines, penalties start to apply if there are five or more exceptions during the previous year. The Type 1 error rate of this test is 11%. If the true coverage is 97% of exceptions instead of the required 99%, the power of the test is 87%.
   a) 89% probability regulators will reject the correct model
   b) 11% probability regulators will reject the incorrect model
   c) 87% probability regulators will not reject the correct model
   d) 13% probability regulators will not reject the incorrect model