# The Term Structure and Interest Rate Dynamics

**Test ID: 7441633**

## Question #1 of 101

Question ID: 472553

Use the following spot rate curve to answer this question:

| **Maturity** | 1 | 2 | 3 |
|---|---|---|---|
| **Spot rates** | 5% | 5.5% | 6% |

The 1-year forward rate in one year [$f(1,1)$] and the 1-year forward rate in two years [$f(2,1)$] is *closest* to:

| | | *f(1,1)* | *f(2,1)* |
|---|---|---|---|
| ✗ | **A)** | **4%** | **4.89%** |
| ✓ | **B)** | 6% | 7% |
| ✗ | **C)** | 5.25% | 5.75% |

Explanation

$f(1,1) = (1+S_2)^2/(1+S_1) - 1 = 6\%$
$f(2,1) = (1+S_3)^3/(1+S_2)^2 - 1 = 7\%$

## Question #2 of 101

Question ID: 472594

Volatility in short-term rates is *most likely* related to uncertainty about:

- ✗ **A) inflation.**
- ✗ **B)** the real economy.
- ✓ **C)** monetary policy.

Explanation

Volatility in short-term rates is most likely linked to monetary policy, whereas volatility in long-term rates is most likely linked to uncertainty about the real economy and inflation.

## Question #3 of 101

Question ID: 463732

Assume that the interest rates in the future are not expected to differ from current spot rates. In such a case, the liquidity premium theory of the term structure of interest rates projects that the shape of the yield curve will be:

- ✓ **A) upward sloping.**

✗ **B)** variable.

✗ **C)** downward sloping.

Explanation

The liquidity theory holds that investors demand a premium to compensate them to interest rate exposure and the premium increases with maturity. When the yield curve under pure expectations is flat (i.e., interest rates in future are expected to be same as current rates), addition of liquidity premium (which increases with maturity) would result in an upward sloping yield curve.

---

## Question #4 of 101

Question ID: 463741

Which of the following statements about yield curves is *most* likely accurate?

✗ **A) A twist refers to changes to the degree to which the yield curve is humped.**

✓ **B)** A yield curve gets steeper when spreads widen.

✗ **C)** A negative butterfly means that the yield curve has become less curved.

Explanation

A *twist* refers to yield curve changes when the slope becomes either flatter or steeper. A *negative butterfly* means that the yield curve has become more curved.

---

## Question #5 of 101

Question ID: 463714

Compared to a yield curve based on government bonds, swap rate curves are:

✗ **A) more comparable across countries and have a smaller number of yields at various maturities.**

✗ **B)** less comparable across countries and have a greater number of yields at various maturities.

✓ **C)** more comparable across countries and have a greater number of yields at various maturities.

Explanation

Swap rate curves are typically determined by dollar denominated borrowing based on LIBOR. These rates are determined by market participants and are not regulated by governments. Swap rate curves are not affected by technical market factors that affect the yields on government bonds. Swap rate curves are also not subject to sovereign credit risk (potential government default on debt) that is unique to government debt in each country. Thus swap rate curves are more comparable across countries because they reflect similar levels of credit risk. There is also a wider variety of maturities available for swap rate curves, relative to a yield curve based on US Treasury securities, which has only four on-the-run maturities of two years or more. Swap rate curves typically have 11 quotes for maturities between 2 and 30 years.

---

## Question #6 of 101

Question ID: 472585

Jim Malone, CIO of Sigma bond fund had a successful track record of investing in investment grade bonds. Recently though, Sigma has been lagging its peers because Malone refuses to reduce the duration of the portfolio by purchasing short-term bonds for the fund. Malone's actions are *most consistent* with:

✓ **A) Segmented markets theory.**

✗ **B)** Preferred habitat theory.

✗ **C)** Liquidity preference theory.

Explanation

Under segmented markets theory investors in one maturity segment of the market will not move into any other maturity segments.

---

## Question #7 of 101

Question ID: 463747

Suppose that there is a parallel upward shift in the yield curve. Which of the following *best* explains this phenomenon? The yield:

✗ **A) decrease is the same for all maturities.**

✓ **B)** increase is the same for all maturities.

✗ **C)** increase is proportional to the original level for all maturities.

Explanation

A parallel upward shift indicates an equal yield increase across all maturities.

---

## Question #8 of 101

Question ID: 463761

Which of the following is the *most important* consideration in determining the number of observations to use to estimate the yield volatility?

✗ **A) The liquidity of the underlying instrument.**

✓ **B)** The appropriate time horizon.

✗ **C)** The shape of the yield curve.

Explanation

The appropriate number of days depends on the investment horizon of the user of the volatility measurement, e.g., day traders versus pension fund managers.

---

## Question #9 of 101

Question ID: 472566

Joe McBath makes the following two statements:

Statement 1: The swap rate curve indicates credit spread over government bond yield.
Statement 2: The swap rate curve indicates the premium for time value of money at different maturities.

Joseph is *most likely* correct with regard to:

✗ **A) Both statements.**

✓ **B)** Statement 2 but not statement 1.

✗ **C)** Statement 1 but not statement 2.

Explanation

Swap rates are not spreads and hence the swap rate curve does not indicate credit spread. The swap rate curve can be used instead of government bond yield curve to indicate premium for time value of money.

---

## Question #10 of 101

Question ID: 472567

Prices of zero-coupon, $1 par bonds is shown below:

| Maturity (years) | Price |
|---|---|
| 1 | $0.9615 |
| 2 | $0.9070 |
| 3 | $0.8396 |
| 4 | $0.7629 |

The default risk of these bonds is similar to the default risk of surveyed banks based on which the swap rate is determined. Government spot rate curve is given below:

| Maturity (years) | Rate |
|---|---|
| 1 | 3.05% |
| 2 | 4.10% |
| 3 | 5.25% |
| 4 | 6.45% |

The three-year swap spread is closest to:

✗ **A) 78 bps.**

✗ **B)** 110 bps.

✓ **C)** 67 bps.

Explanation

The 3-year swap fixed rate SFR3 is determined by solving:
$SFR_3 (P_1 + P_2 + P_3) + P_3 = 1$ or $SFR_3 (0.9615 + 0.9070) + 0.8396 + 8396 = 1$
$SFR_3 (2.7081) = 0.1604$
$SFR_3 = 0.1604/2.7081 = 5.92\%$
Swap spread = $SFR_3 - S_3 = 5.92\% - 5.25\% = 0.67\%$ or 67 bps

---

## Question #11 of 101

Question ID: 463718

The use of which of the following benchmarks to generate a spread would not reflect credit risk?

✓ **A) An issuer-specific benchmark.**

✗ **B)** A global industry-yield benchmark.

✗ **C)** A U.S. Treasury benchmark.

Explanation

An issuer-specific benchmark (another bond of the same company) would not reflect credit risk because the benchmark would incorporate the credit risk of the firm. Using a U.S. Treasury benchmark would reflect credit risk because the bond to be evaluated would have higher credit risk than either benchmark. The yield in a global industry is not typically used as a benchmark.

---

## Question #12 of 101

Question ID: 463762

Which of the following is a *major* consideration when the daily yield volatility is annualized?

✓ **A) The appropriate day multiple to use for a year.**

✗ **B)** The appropriate time horizon.

✗ **C)** The shape of the yield curve.

Explanation

Typically, the number of trading days per year is used, i.e., 250 days.

---

## Question #13 of 101

Question ID: 463707

Suppose that there is a nonparallel downward shift in the yield curve. Which of the following *best* explains this phenomenon?

✗ **A) The yield decrease is the same for all maturities.**

✓ **B)** The absolute yield decrease is different for some maturities.

✗ **C)** The absolute yield increase is different for some maturities.

Explanation

A nonparallel downward yield curve shift indicates an unequal yield decrease across all maturities, i.e., some maturity yields declined more than others.

---

## Question #14 of 101

Question ID: 472560

Jon Smithson is a bond trader at Zezen Bank. The spot rate curve is currently flat. Smithson expects that the curve will become upward sloping in the next year. Based on this expectation, the *least appropriate* active strategy for Smithson would be to:

✓ **A) increase the duration of the portfolio.**

✗ **B)** sell all the long-term bonds in the portfolio and reinvest the proceeds in shorter-maturity bonds.

✗ **C)** reduce the duration of the portfolio.

Explanation

The question is asking for least appropriate strategy. Given an expectation of steepening of the yield curve, an active bond manager would reduce the duration of the portfolio.

---

## Question #15 of 101

Question ID: 472568

Prices of zero-coupon, $1 par bonds is shown below:

| Maturity (years) | Price |
|---|---|
| 1 | $0.9615 |
| 2 | $0.9070 |
| 3 | $0.8396 |
| 4 | $0.7629 |

The default risk of these bonds is similar to the default risk of surveyed banks based on which the swap rate is determined. Government spot rate curve is given below:

| Maturity (years) | Rate |
|---|---|
| 1 | 3.05% |
| 2 | 4.10% |
| 3 | 5.25% |
| 4 | 6.45% |

The swap fixed rate for a period of 2 years is *closest* to:

✓ **A) 4.98%**

✗ **B)** 4.00%

✗ **C)** 4.75%

Explanation

Since we are given the discount factors directly, we can use those instead of computing the individual spot rates. The 2-year swap fixed rate $SFR_2$ is determined by solving:

$SFP_2\ (P_1+P_2)+P_2 = 1$ or $SFR_2(09.615+0.9070)+0.9070 = 1$
$SFR_2(1.8685) = 0.093$
$SFR_2 = 0.093/1.8685 = 4.98\%$

---

## Question #16 of 101

Question ID: 472595

Which of the following statements are *most accurate*?

✓ **A) Short-term rates are typically more volatile than long-term rates.**

✗ **B)** Volatility of short-term and long-term rates is typically equal.

✗ **C)** Long-term rates are typically more volatile than short-term rates.

Explanation

Volatility of rates is inversely related to maturity: long-term rates are less volatile than short-term rates.

---

## Question #17 of 101

Question ID: 472582

Under the liquidity preference theory, expected future spot rates will *most likely* be:

✓ **A) Less than the current forward rate.**

✗ **B)** More than the current forward rate.

✗ **C)** Equal to the current forward rate.

Explanation

Existence of a liquidity premium under the liquidity preference theory implies that the current forward rate is an upwardly biased estimate of the future spot rate.

---

## Question #18 of 101

Question ID: 463713

The swap rate curve is typically based on which interest rate?

✗ **A) Treasury bill and bond rates.**

✗ **B)** The Fed Funds rate.

✓ **C)** LIBOR.

Explanation

The interest rate paid on negotiable CDs by banks in London is referred to as LIBOR. LIBOR is determined every day by the British Bankers Association. Swap rate curves are typically determined by dollar denominated borrowing based on LIBOR. The Fed Funds rate is the rate paid on interbank loans within the U.S. Treasury bill and bond rates are used for determining the yield curve, but not for the swap rate curve.

---

## Question #19 of 101

Question ID: 463728

If the liquidity preference hypothesis is true, what shape should the term structure curve have in a period where interest rates are expected to be constant?

✗ **A) Downward sweeping.**

✓ **B)** Upward sweeping.

✗ **C)** Flat.

Explanation

The liquidity theory holds that investors demand a premium to compensate them for interest rate exposure and the premium increases with maturity. Add this premium to a flat curve and the result is an upward sloping yield curve.

---

## Question #20 of 101

Question ID: 463716

Which of the following is NOT a reason why market participants prefer the swap rate curve over a government bond yield curve? The swap market:

✗ **A) it is not affected by technical factors.**

✗ **B)** is free of government regulation.

✓ **C)** reflects sovereign credit risk.

Explanation

Swap rate curves are typically determined by dollar denominated borrowing based on LIBOR. These rates are determined by market participants and are not regulated by governments. Swap rate curves are not affected by technical market factors that affect the yields on government bonds. The swap rate curve is also not subject to sovereign credit risk (potential government default on debt) that is unique to each country.

---

## Question #21 of 101

Question ID: 472551

If the 2-year spot rate is 4% and 1-year spot rate is 7%, the one year forward rate one year from now is *closest* to:

✓ **A) 1%**

✗ **B)** 2%

✗ **C)** 3%

Explanation

$(1+S_2)^2 = (1+s_1)[1+f(1,1)]$

$f(1,1) = (1.04)^2/(1.07) - 1 = 0.0108 = 1.08\%$

---

## Question #22 of 101

Question ID: 463758

Which of the following is *closest to* the annualized yield volatility (250 trading days per year) if the daily yield volatility is equal to 0.45%?

✗ **A) 112.50%.**

✓ **B)** 7.12%.

✗ **C)** 9.73%.

Explanation

Annualized yield volatility = $\sigma \times \sqrt{(\#\text{ of trading days in a year})}$

where:
σ = the daily yield volatility

So, annualized yield volatility = (0.45%) $\sqrt{(250)}$ = 7.12%.

---

## Question #23 of 101

Question ID: 463710

Which of the following is *most likely* to occur if there is a twist in the yield curve?

✗ **A) The curvature of the yield curve increases.**

✓ **B)** The yield curve flattens or steepens.

✗ **C)** The yield curve becomes humped at intermediate maturities.

Explanation

Twists refer to yield curve changes when the slope becomes either flatter or more steep. A flattening (steepening) of the yield curve means that the spread between short- and long-term rates has narrowed (widened).

---

## Question #24 of 101

Question ID: 472590

Currently the term structure of interest rate is downward sloping. Which of the following models *most accurately* describe the current term structure?

✗ **A) Vasicek model.**

✗ **B)** Cox-Ingersoll-Ross model.

✓ **C)** Ho-Lee model.

Explanation

Ho-Lee model is an arbitrage-free term structure that is calibrated to the current actual term structure (regardless of whether it is upward or downward sloping). Vasicek and Cox-Ingersoll-Ross model are examples of equilibrium term structure models and may generate term structures inconsistent with current market observations.

---

## Questions #25-30 of 101

Carol Stephens, CFA, oversees five portfolio managers who all manage fixed income portfolios for one institutional client. Stephens feels that interest rates will change over the next year but is uncertain about the extent and direction of this change. She is confident, however, that the yield curve will change in a nonparallel manner and that modified duration will not accurately measure the overall total portfolio's yield-curve risk exposure. To help her evaluate the risk of her client's total portfolio, she has assembled the table of rate durations shown below.

| Issue | Value ($millions) | 3 mo | 2 yr | 5 yr | 10 yr | 15 yr | 20 yr | 25 yr | 30 yr |
|---|---|---|---|---|---|---|---|---|---|
| Portfolio 1 | 100 | 0.03 | 0.14 | 0.49 | 1.35 | 1.71 | 1.59 | 1.47 | 4.62 |
| Portfolio 2 | 200 | 0.02 | 0.13 | 1.47 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Portfolio 3 | 150 | 0.03 | 0.14 | 0.51 | 1.40 | 1.78 | 1.64 | 2.34 | 2.83 |
| Portfolio 4 | 250 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Portfolio 5 | 300 | 0.00 | 0.88 | 0.00 | 0.00 | 1.83 | 0.00 | 0.00 | 0.00 |

The value of the total portfolio is $1,000,000,000.

## Question #25 of 101

Question ID: 463752

For this question only, imagine that the following three key rates change while the others remain constant:

- The 3-month rate increases by 20 basis points.
- The 5-year rate increases by 90 basis points.
- The 30-year rate decreases by 150 basis points.

The new total value of the portfolio after these rate changes will be *closest* to:

✓ **A) $1,009,469,000.**

✗ **B)** $961,075,000.

✗ **C)** $1,004,735,000.

Explanation

| *Key Rate Durations* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | weight | 3 mo | 2 yr | 5 yr | 10 yr | 15 yr | 20 yr | 25 yr | 30 yr | Effective Duration |
| Portfolio 1 | 0.10 | 0.03 | 0.14 | 0.49 | 1.35 | 1.71 | 1.59 | 1.47 | 4.62 | 11.40 |
| Portfolio 2 | 0.20 | 0.02 | 0.13 | 1.47 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.62 |
| Portfolio 3 | 0.15 | 0.03 | 0.14 | 0.51 | 1.40 | 1.78 | 1.64 | 2.34 | 2.83 | 10.67 |
| Portfolio 4 | 0.25 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 |
| Portfolio 5 | 0.30 | 0.00 | 0.88 | 0.00 | 0.00 | 1.83 | 0.00 | 0.00 | 0.00 | 2.71 |
| Total Portfolio | 1.00 | 0.0265 | 0.3250 | 0.4195 | 0.3450 | 0.9870 | 0.4050 | 0.4980 | 0.8865 | 3.8925 |

Change in Portfolio Value

| | | |
|---|---|---|
| Change from 3-month key rate increase: | (20 bp)(0.0265) | = 0.0053% decrease |
| Change from 5-year key rate increase: | (90 bp)(0.4195) | = 0.3776% decrease |
| Change from 30-year key rate decrease: | (150 bp)(0.8865) | = 1.3298% increase |

Net change 0.9469% increase

This means that the total portfolio value after the yield curve shift is:

1,000,000,000(1 + 0.009469) = $1,009,469,000 (LOS 46.f)

## Question #26 of 101

Question ID: 463753

For this question only, imagine that the original yield curve undergoes a parallel shift such that the rates at all key maturities increase by 50 basis points. The new value of the total portfolio will be *closest* to:

✓ **A) $980,537,500.**

✗ **B)** $961,075,000.

✗ **C)** $1,019,462,500.

Explanation

| *Key Rate Durations* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | weight | 3 mo | 2 yr | 5 yr | 10 yr | 15 yr | 20 yr | 25 yr | 30 yr | Effective Duration |
| Portfolio 1 | 0.10 | 0.03 | 0.14 | 0.49 | 1.35 | 1.71 | 1.59 | 1.47 | 4.62 | 11.40 |
| Portfolio 2 | 0.20 | 0.02 | 0.13 | 1.47 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.62 |
| Portfolio 3 | 0.15 | 0.03 | 0.14 | 0.51 | 1.40 | 1.78 | 1.64 | 2.34 | 2.83 | 10.67 |
| Portfolio 4 | 0.25 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 |
| Portfolio 5 | 0.30 | 0.00 | 0.88 | 0.00 | 0.00 | 1.83 | 0.00 | 0.00 | 0.00 | 2.71 |
| Total Portfolio | 1.00 | 0.0265 | 0.3250 | 0.4195 | 0.3450 | 0.9870 | 0.4050 | 0.4980 | 0.8865 | 3.8925 |

Since the yield curve underwent a parallel shift, the impact on portfolio value can be computed directly using the portfolio's effective duration. There are two methods that can be used to calculate effective duration in this situation. Both methods use the market weight of the individual bonds in the portfolio. As shown in the second column of the table above, the total portfolio weight of each subportfolio equals: Bond value/Portfolio value, where the portfolio value is $1,000,000,000.

Method 1) Effective duration of the portfolio is the sum of the weighted averages of the key rate durations for each issue. The 3-month key rate duration for the total portfolio can be calculated as follows:

(0.10)(0.03) + (0.20)(0.02) + (0.15)(0.03) + (0.25)(0.06) + (0.30)(0) = 0.0265

This method can be used to generate the rest of the key rate duration shown in the bottom row of the table above and summed to yield an effective duration = 3.8925.

Method 2) Effective duration of the portfolio is the weighted average of the effective durations for each issue. The effective duration of each issue is the sum of the individual rate durations for that issue. These values are shown in the right-hand column of the table above. Using this approach, the effective duration of the portfolio can be computed as:

(0.10)(11.4) + (0.20)(1.62) + (0.15)(10.67) + (0.25)(0.06) + (0.30)(2.71) = 3.8925

Using an effective duration of 3.8925, the value of the portfolio following a parallel 50 basis point shift in the yield curve can be computed as follows: Percentage change = (50 basis points)(3.8925) = 1.9463% decrease. $1,000,000,000 × (1-0.0194625) = $980,537.500. (LOS 46.f)

## Question #27 of 101

Question ID: 463754

For this question only, imagine that the original yield curve undergoes a shift such that 3-month rates remain constant and all other rates increase by 135 basis points. The new value of portfolio 4 will be *closest* to:

✗ **A) $243,375,000.**

✗ **B)** $229,750,000.

✓ **C)** $250,000,000.

Explanation

| *Key Rate Durations* |
|---|

| | weight | 3 mo | 2 yr | 5 yr | 10 yr | 15 yr | 20 yr | 25 yr | 30 yr | Effective Duration |
|---|---|---|---|---|---|---|---|---|---|---|
| Portfolio 1 | 0.10 | 0.03 | 0.14 | 0.49 | 1.35 | 1.71 | 1.59 | 1.47 | 4.62 | 11.40 |
| Portfolio 2 | 0.20 | 0.02 | 0.13 | 1.47 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.62 |
| Portfolio 3 | 0.15 | 0.03 | 0.14 | 0.51 | 1.40 | 1.78 | 1.64 | 2.34 | 2.83 | 10.67 |
| Portfolio 4 | 0.25 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 |
| Portfolio 5 | 0.30 | 0.00 | 0.88 | 0.00 | 0.00 | 1.83 | 0.00 | 0.00 | 0.00 | 2.71 |
| Total Portfolio | 1.00 | 0.0265 | 0.3250 | 0.4195 | 0.3450 | 0.9870 | 0.4050 | 0.4980 | 0.8865 | 3.8925 |

Since the 3-month rate did not change, and all other key rate durations for Portfolio 4 are zero, a 135 basis point change will have no effect on the value of Portfolio 4. Hence, Portfolio 4 remains valued at $250,000,000. (LOS 46.f)

## Question #28 of 101

Question ID: 463755

The 10-year key rate duration for the total portfolio is *closest* to:

✓ **A) 0.345.**

✗ **B)** 1.350.

✗ **C)** 1.375.

Explanation

| *Key Rate Durations* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | weight | 3 mo | 2 yr | 5 yr | 10 yr | 15 yr | 20 yr | 25 yr | 30 yr | Effective Duration |
| Portfolio 1 | 0.10 | 0.03 | 0.14 | 0.49 | 1.35 | 1.71 | 1.59 | 1.47 | 4.62 | 11.40 |
| Portfolio 2 | 0.20 | 0.02 | 0.13 | 1.47 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.62 |
| Portfolio 3 | 0.15 | 0.03 | 0.14 | 0.51 | 1.40 | 1.78 | 1.64 | 2.34 | 2.83 | 10.67 |
| Portfolio 4 | 0.25 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 |
| Portfolio 5 | 0.30 | 0.00 | 0.88 | 0.00 | 0.00 | 1.83 | 0.00 | 0.00 | 0.00 | 2.71 |
| Total Portfolio | 1.00 | 0.0265 | 0.3250 | 0.4195 | 0.3450 | 0.9870 | 0.4050 | 0.4980 | 0.8865 | 3.8925 |

The total portfolio key rate duration for a specific maturity is the weighted value of the key rate durations of the individual issues for that maturity. In this case, the 10-year key rate duration for the portfolio is:

(0.10)(1.35) + (0.20)(0.00) + (0.15)(1.40) + (0.25)(0.00) + (0.30)(0.00) = 0.345 (LOS 46.f)

## Question #29 of 101

Question ID: 463756

The effective duration for Portfolio 2 is *closest* to:

✗ **A) 1.47.**

✓ **B)** 1.62.

✗ **C)** 0.023.

Explanation

| *Key Rate Durations* |
|---|

| | weight | 3 mo | 2 yr | 5 yr | 10 yr | 15 yr | 20 yr | 25 yr | 30 yr | Effective Duration |
|---|---|---|---|---|---|---|---|---|---|---|
| Portfolio 1 | 0.10 | 0.03 | 0.14 | 0.49 | 1.35 | 1.71 | 1.59 | 1.47 | 4.62 | 11.40 |
| Portfolio 2 | 0.20 | 0.02 | 0.13 | 1.47 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.62 |
| Portfolio 3 | 0.15 | 0.03 | 0.14 | 0.51 | 1.40 | 1.78 | 1.64 | 2.34 | 2.83 | 10.67 |
| Portfolio 4 | 0.25 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 |
| Portfolio 5 | 0.30 | 0.00 | 0.88 | 0.00 | 0.00 | 1.83 | 0.00 | 0.00 | 0.00 | 2.71 |
| Total Portfolio | 1.00 | 0.0265 | 0.3250 | 0.4195 | 0.3450 | 0.9870 | 0.4050 | 0.4980 | 0.8865 | 3.8925 |

The effective duration for any individual issue is the sum of the individual key rate durations for that issue. For Portfolio 2, the effective duration is:

0.02 + 0.13 + 1.47 = 1.62 (LOS 46.f)

## Question #30 of 101

Question ID: 463757

Which portfolio is *most accurately* described as a laddered portfolio?

✓ **A) Portfolio 3.**

✗ **B)** Portfolio 4.

✗ **C)** Portfolio 5.

Explanation

| *Key Rate Durations* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | weight | 3 mo | 2 yr | 5 yr | 10 yr | 15 yr | 20 yr | 25 yr | 30 yr | Effective Duration |
| Portfolio 3 | 0.15 | 0.03 | 0.14 | 0.51 | 1.40 | 1.78 | 1.64 | 2.34 | 2.83 | 10.67 |
| Portfolio 4 | 0.25 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 |
| Portfolio 5 | 0.30 | 0.00 | 0.88 | 0.00 | 0.00 | 1.83 | 0.00 | 0.00 | 0.00 | 2.71 |

A ladder portfolio's durations are relatively equal across all maturities, and Portfolio 3 exhibits this kind of equal duration across maturities.

Portfolio 4 is best described as a bullet portfolio as its duration is concentrated in one maturity.

Portfolio 5 is best described as a barbell portfolio, as its duration is concentrated in the short and long regions of the maturities. (LOS 46.f)

---

## Question #31 of 101

Question ID: 463729

The liquidity theory of the term structure of interest rates is a variation of the pure expectations theory that explains why:

✓ **A) the yield curve usually slopes upward.**

✗ **B)** the yield curve usually slopes downward.

✗ **C)** duration is an imprecise measure.

Explanation

The pure expectations hypothesis says that the shape of the yield curve only reflects expectations of future short-term rates. Yet, the yield curve generally slopes upward. The liquidity theory says that the yield curve incorporates expectations of short-term rates; however, the tendency for the yield curve to slope upward reflects the demand for a higher return to compensate investors for the extra interest rate risk associated with bonds with longer maturities.

---

## Question #32 of 101

Question ID: 472569

7.5%, 15-year, annual pay option-free Xeleon Corp bond trades at a market price of $95.72 per $100 par. The government spot rate curve is flat at 5%.

The Z-spread on Xeleon Corp bond is *closest* to:

✗ **A) 250 bps**

✓ **B)** 300 bps

✗ **C)** 325 bps

Explanation

Since the spot rate curve is flat, we can simply compute the yield on the bond and subtract the spot rate from it to obtain the Z-spread.

PV = - 95.72; N = 15; PMT = 7.50; FV = 100; I/Y=?=8%.
Z-spread = 8% - 5% = 3% or 300bps

---

## Question #33 of 101

Question ID: 463709

A yield curve is flat, and then it undergoes a non-parallel shift. After the shift, which of the following must be *least* accurate? The new yield curve is:

✗ **A) a straight line.**

✓ **B)** flat.

✗ **C)** curvilinear.

Explanation

If a yield curve begins flat and then experiences a non-parallel shift, this means that some rates changed more than others. After the non-parallel shift the formerly flat yield curve can no longer be flat.

---

## Question #34 of 101

Question ID: 463745

What adjustment must be made to the key rate durations to measure the risk of a steepening of an already upward sloping yield curve?

✓ **A) Decrease the key rates at the short end of the yield curve.**

✗ **B)** Increase all key rates by the same amount.

✗ **C)** Increase the key rates at the short end of the yield curve.

Explanation

Decreasing the key rates at the short end of the yield curve makes an upward sloping yield curve steeper. Performing the corresponding change in portfolio value will determine the risk of a steepening yield curve.

---

## Question #35 of 101

Question ID: 472558

An active bond portfolio manager would *most* appropriately buy bonds when expected spot rates are:

✗ **A) greater than current forward rates.**

✗ **B)** equal to current forward rates.

✓ **C)** less than current forward rates.

Explanation

When expected spot rates are less than the forward rates priced by the market, bonds are undervalued (they are discounted at too high a rate) and hence should be purchased.

---

## Question #36 of 101

Question ID: 472592

Suppose that the short-term and long-term rates decrease by 75bps while the intermediate-term rates decrease by 30bps. The movement in yield curve is *best* described as involving changes in the:

✓ **A) level and curvature.**

✗ **B)** curvature only.

✗ **C)** level only.

Explanation

The decrease in short-term and long-term rates is an indication of change in level of interest rates. Because intermediate-term rates change differently than the short-term and long-term rates, there is also a change in the curvature of the yield curve.

---

## Question #37 of 101

Question ID: 472583

Don McGuire, fixed income specialist at MCB bank makes the following statement: "In the very short-term, the expected rate of return from investing in any bond, including risky bonds, is the risk-free rate of return".
McGuire's statement is *most* consistent with:

✗ **A) unbiased expectations theory.**

✓ **B)** local expectations theory.

✗ **C)** liquidity preference theory.

Explanation

Local expectations theory asserts that in the very short term, the expected return for every bond is the risk-free rate but does

not extend the risk-neutrality assumption to every maturity strategy like the unbiased expectations theory.

---

## Question #38 of 101

Question ID: 472572

Z-spread is *most accurately* described as the constant spread that is:

- ✗ **A) added to the zero volatility binomial tree such that an option-free bond is correctly valued.**
- ✓ **B)** added to the spot rate curve to generate discount rates for each of the bond's cash flows such that the present value of the cash flows is exactly equal to the market price of the bond.
- ✗ **C)** equal to the difference between a bond's yield and the yield on a government bond.

Explanation

Z-spread is the constant spread added to the spot rate curve to generate discount rates which then value the bond at its current market price. The difference between yields of a risky and government bond will be same as the Z-spread only when the yield curve is flat. A Zero-volatility binomial tree does not exist!

---

## Question #39 of 101

Question ID: 472588

Jill Sebelius, editor-in-chief of a monthly interest-rate newsletter uses the following model to forecast short-term interest rates:

$$dr = a(b - r)\,dt + \sigma\sqrt{r}\,dz$$

For the current newsletter, Sebelius has issued the following expectations:

a=0.40, b = 3%, r = 2%.

Based on Sebelius"s estimates, over a sufficiently long period of time, the expected value of the short-term interest rate is *closest* to:

- ✗ **A) 2%**
- ✗ **B)** 2.4%
- ✓ **C)** 3%

Explanation

The long-term expected value of short-term rates is the mean reverting level (b) estimated by Sebelius to be 3%.

---

## Question #40 of 101

Question ID: 472565

Which one of the following is *least likely* a reason to use the swap rate curve?

- ✓ **A) Swap rates are less volatile than government bond yields.**

✗ **B)** Swap rates reflect credit risk of commercial banks and not government.

✗ **C)** The swap market is not regulated by any government.

Explanation

Lower volatility of swap rates relative to government bond yields as a generalization is an incorrect statement.

---

## Question #41 of 101

Question ID: 463734

According to the pure expectations theory, how are forward rates interpreted? Forward rates are:

✗ **A) expected future spot rates if the risk premium is equal to zero.**

✓ **B)** expected future spot rates.

✗ **C)** equal to futures rates.

Explanation

The pure expectations theory, also referred to as the unbiased expectations theory, purports that forward rates are solely a function of expected future spot rates. This implies that long-term interest rates represent the geometric mean of future expected short-term rates, nothing more.

---

## Question #42 of 101

Question ID: 472554

If the spot curve is upward sloping, the forward curve is *most likely* to be:

✓ **A) steeper than the spot curve and above the spot curve.**

✗ **B)** parallel to the spot curve and below the spot curve.

✗ **C)** parallel to the spot curve and above the spot curve.

Explanation

When the spot curve is upward sloping, the forward curve will be lie above the spot curve and will also be upward sloping with a steeper slope.

---

## Question #43 of 101

Question ID: 472550

Given annual spot interest rates for 1 year, 2 years, 3 years, 4 years, and 5 years, the maximum number of forward rates that can be derived is *closest* to:

✗ **A) 8**

✗ **B)** 5

✓ **C)** 10

Explanation

Select all forward rates $f$(j,k) such that j+k ≤ 5. There are 10 forward rates possible: $f$(1,1), $f$(1,2), $f$(1,3), $f$(1,4), $f$(2,1), $f$(2,2), $f$(2,3), $f$(3,1), $f$(3,2), $f$(4,1)

---

## Question #44 of 101

Question ID: 472562

The active bond portfolio management strategy of rolling down the yield curve is *most consistent* with:

✗ **A) segmented markets theory.**

✓ **B)** liquidity preference theory.

✗ **C)** pure expectations theory.

Explanation

Under the liquidity preference theory, investors would earn an extra return for investing in longer-maturity bonds rather than in shorter-maturity bonds. Such extra positive risk-premium linked to maturity of the bonds is absent in the pure expectations and the market segmentation theory.

---

## Question #45 of 101

Question ID: 463717

Which of the following benchmarks would generate the greatest spread when used to examine a bond yield?

✗ **A) Bond sector benchmark.**

✓ **B)** A U.S. Treasury security.

✗ **C)** The issuer of a specific company.

Explanation

The U.S. Treasury security would generate the highest spread because the yield on Treasury securities will be the lowest as they have the lowest credit and liquidity risk. The yields on a bond sector benchmark and for a specific company will be higher.

---

## Questions #46-51 of 101

Bill Woods, CFA, is a portfolio manager for Matrix Securities Fund, a closed-end bond fund that invests in U.S. Treasuries, mortgage-backed securities (MBS), asset-backed securities (ABS), and MBS derivatives. The fund has assets of approximately $400 million, has a current stock price of $14.50 and a net asset value (NAV) of $16.00. Woods is a member of a four person investment team that is responsible for all aspects of managing the portfolio, including interest rate forecasting, performing basic financial analysis and valuation of the portfolio, and selecting appropriate investments for Matrix. His expertise is in the analysis and valuation of MBS and ABS.

The fund pays a $0.12 monthly dividend that is paid from current income. The basic operating strategy of Matrix is to leverage its capital by investing in fixed income securities, and then financing those assets through repurchase agreements. Matrix then earns the spread between the net coupon of the underlying assets and the cost to finance the asset. Therefore, when evaluating a security for investment, it is critical that Matrix can be reasonably assured that it will earn a positive spread.

During the course of his analysis, Woods utilizes several methodologies to evaluate current portfolio holdings and potential investments. Valuation methods he uses include nominal spreads, Z-spreads, and option-adjusted spreads (OAS). There is

ongoing debate among the investment team as to the merits and shortcomings of each of the methods. Woods believes that the OAS method is by far a superior tool in all circumstances, while his fellow portfolio manager, Yuri Ackerman, feels that each of the methods can at times serve a useful purpose. Wood and Ackerman's current discussion involves two similar FNMA adjustable-rate mortgage (ARM) securities Wood is considering purchasing. Both ARM "A" and ARM "B" are indexed off of 6-month LIBOR, are new production, and have similar net coupons.

> **Select Financial Information:**

| *ARM* | *Net Coupon* | *WAM* | *Nominal Spread* | *OAS (bps)* | *Z-spread (bps)* |
|---|---|---|---|---|---|
| A | 6.27% | 360 | 81 | 98 | 135 |
| B | 6.41% | 358 | 95 | 116 | 129 |

Woods recommends that Matrix purchase ARM "A" with the 6.27% net coupon. He has based his conclusion on the calculated OAS of the securities, which he believes indicates that ARM "A" is the cheaper of the two securities. Ackerman disagrees with Woods, arguing that OAS is only one component of any analysis, and that a buy or sell recommendation should not be made based upon the OAS spread alone. Ackerman claims that other measures, such as one of the many duration measures and convexity, need to be incorporated into the analysis. He points out that both ARMs have equal convexities, but ARM "A" has a duration of 7.2 years and ARM "B" has duration of 6.8 years. These characteristics will affect the expected return in any interest rate scenario. Woods admits that he had not considered the differences in the bond's durations, and he acknowledges that others factors should be considered before a recommendation can be made.

## Question #46 of 101

Question ID: 472574

Woods is *most likely* resistant to the zero-volatility spread because the spread:

✗ **A) fails to consider price risk, which is uncertainty regarding terminal cash flows.**

✗ **B)** does not indicate how much of the spread reflects the significant prepayment risk associated with MBS.

✓ **C)** only considers one path of interest rates, the current Treasury spot rate curve.

Explanation

Zero-volatility spread is a commonly used measure of relative value for MBS and ABS. However, it only considers one path of interest rates, while OAS considers every spot rate along every interest rate path. (Study Session 15, LOS 50.a)

## Question #47 of 101

Question ID: 472575

OAS can be used to derive option cost rather than using an option pricing model. The OAS can be interpreted as the MBS spread after the affect of the embedded option on cash flows is considered. Which of the following summaries is *most* accurate?

✓ **A) option cost = zero-volatility spread − option-adjusted spread.**

✗ **B)** option cost = option-adjusted spread − zero-volatility spread.

✗ **C)** option cost = nominal spread − option-adjusted spread.

Explanation

OAS is the MBS spread after the "optionality" of the cash flows is taken into account. OAS can be used to express the dollar difference between price and theoretical value as a spread. (Study Session 15, LOS 50.d)

## Question #48 of 101

Question ID: 472576

Using the pricing data for the two FNMA ARM securities given above, what is the option cost of each security if the effective durations of the two securities are equal?

✗ **A) ARM A = 54 basis points; ARM B = 34 basis points.**

✗ **B)** ARM A = 17 basis points; ARM B = 21 basis points.

✓ **C)** ARM A = 37 basis points; ARM B = 13 basis points.

Explanation

Recall that option cost = zero-volatility spread − option-adjusted spread, therefore:

ARM A option cost = 135 − 98 = 37 basis points.
ARM B option cost = 129 − 116 = 13 basis points.

(Study Session 15, LOS 50.d)

## Question #49 of 101

Question ID: 472577

In general, the investment team at Matrix attempts to buy "cheap" securities because they are undervalued on a relative basis. What is a characteristic of a "cheap" security for a given Z-spread and effective duration?

✓ **A) High OAS relative to the required OAS and low option costs.**

✗ **B)** Low OAS relative to the required OAS and low option costs.

✗ **C)** High OAS relative to the required OAS and high option costs.

Explanation

A higher OAS indicates a larger risk-adjusted spread, which leads to a lower relative price. The implied cost of the embedded option in a security with a call feature is the option cost, so a buyer would prefer a lower cost. (Study Session 15, LOS 50.e)

## Question #50 of 101

Question ID: 472578

Which of the two bonds Woods is considering purchasing has the greater interest rate exposure?

✗ **A) ARM B, because it has a smaller duration.**

✓ **B)** ARM A, because it has a larger duration.

✗ **C)** The interest rate exposure cannot determine without a specific measure of convexity.

Explanation

Effective duration is a measure of interest rate risk. All things equal, the larger the duration of a security the greater the interest rate risk. (Study Session 15, LOS 50.g)

## Question #51 of 101

Question ID: 472579

Matrix also currently has investments in several ABS. Which of the following spread measures is *most* appropriate in the analysis of ABS backed by credit card receivables?

✗ **A) Monte Carlo simulation model, because representative paths can be utilized.**

✓ **B)** Z-spread, because credit card ABS have no prepayment option.

✗ **C)** OAS, because the cash flows are interest rate path dependent.

Explanation

Credit card receivable-backed ABS have no prepayment option, therefore prepayments are not path dependent and the Z-spread is the most appropriate model. (Study Session 15, LOS 50.h, i)

---

## Question #52 of 101

Question ID: 463748

An analyst has a list of key rate durations for a portfolio of bonds. If only one interest rate on the yield curve changes, the effect on the value of the bond portfolio will be the change of that rate multiplied by the:

✗ **A) median of the key rate durations.**

✓ **B)** key rate duration associated with the maturity of the rate that changed.

✗ **C)** weighted average of the key rate durations.

Explanation

This is how an analyst uses key rate durations: For a given change in the yield curve, each rate change is multiplied by the associated key rate duration. The sum of those products gives the change in the value of the portfolio. If only the five-year interest rate changes, for example, then the effect on the portfolio will be the product of that change times the five-year key rate duration.

---

## Question #53 of 101

Question ID: 472581

As compared to the 10-year swap spread, the credit risk in the banking system is more accurately captured by the:

✗ **A) Libor-OIS spread.**

✗ **B)** Z-spread.

✓ **C)** TED spread.

Explanation

The risk of banking system is more accurately captured by the TED spread. 10-year swap spread captures differing demand/supply conditions.

---

## Question #54 of 101

Question ID: 472596

Volatility in long-term rates is *most likely* related to uncertainty about:

✗ **A) fiscal policy.**

✓ **B)** the real economy and inflation.

✗ **C)** central bank actions.

Explanation

Volatility in long-term rates is most likely linked to uncertainty about the real economy and inflation, whereas volatility in short-term rates is most likely linked to monetary policy.

---

## Question #55 of 101

Question ID: 472563

Which one of the following actions is *most consistent* with the strategy of riding an upward sloping the yield curve? Buying bonds with a maturity:

- ✓ **A) longer than than the investor's horizon.**
- ✗ **B)** shorter than the investor's horizon.
- ✗ **C)** equal to the investor's horizon.

Explanation

If the yield curve is upward sloping and is expected to remain the same, higher returns can be obtained by riding the yield curve, i.e., buying bonds with a longer maturity than the investor's horizon.

---

## Question #56 of 101

Question ID: 472561

If an active bond portfolio manager believes future spot rates will be lower than indicated by today's forward rates, then she will *most likely*:

- ✗ **A) be indifferent because her holding period return will be unaffected.**
- ✗ **B)** sell bonds because the market appears to be discounting future cash flows at "too high" of a discount rate.
- ✓ **C)** purchase bonds because the market is discounting future cash flows at "too high" of a discount rate.

Explanation

If an investor believes future spot rates will be lower than indicated by today's forward rates, then she should purchase bonds (at a presumably attractive price) because the market appears to be discounting future cash flows at "too high" of a discount rate.

---

## Question #57 of 101

Question ID: 472552

Suppose the government spot rate curve is flat at 3%. An active manager is planning on purchasing a five-year government bond at par. The realized return on this bond will *most likely* be:

- ✗ **A) more than 3% if the bond is held to maturity while the yield curve remains flat but decreases below 3%.**
- ✓ **B)** 3% if the bond is held to maturity provided that the yield curve remains flat at 3%.
- ✗ **C)** 3% if the bond is held to maturity regardless of the shape of the yield curve.

Explanation

There is no price risk for a default-free bond held to maturity. However, there is reinvestment risk for the coupon payments received during the life of the bond (in this instance, the bond is a par bond and hence has the same coupon rate as its yield). If the yield curve shifts down, the reinvestment rate would be lower and the realized holding period return would be lower than 3%.

---

## Question #58 of 101

Question ID: 472593

A bond portfolio has the following key rate durations:

$D_2 = 0.50$; $D_5 = 2.70$ and $D_{15} = 7.23$.

Suppose that the change in yield curve results in changes in the following spot rates:

$S_1 = +50$bps; $S_2 = +100$bps; $S_5 = +25$ bps; $S_{10} = -75$bps; $S_{15} = -100$bps.

The change in the value of the portfolio will be *closest* to:

- ✗ **A) -2.80%**
- ✓ **B)** +6.30%
- ✗ **C)** +4.75%

Explanation

$\%\triangle P = -(0.50)(0.5)-(2.70)(0.25)-(7.23)(-1) = 6.31\%$

---

## Question #59 of 101

Question ID: 463736

According to the pure expectations theory, which of the following statements is *most* accurate? Forward rates:

- ✗ **A) are biased estimates of market expectations.**
- ✗ **B)** always overestimate future spot rates.
- ✓ **C)** exclusively represent expected future spot rates.

Explanation

The pure expectations theory, also referred to as the *unbiased* expectations theory, purports that forward rates are *solely a function of expected future spot rates*. Under the pure expectations theory, a yield curve that is upward (downward) sloping, means that short-term rates are expected to rise (fall). A flat yield curve implies that the market expects short-term rates to remain constant.

---

## Question #60 of 101

Question ID: 472591

The *least important* factor explaining the changes in the shape of the yield curve is:

- ✗ **A) Level**

✗ **B)** Steepness

✓ **C)** Curvature

Explanation

Changes in the shape of yield curve is explained by (in order of importance): level, steepness and curvature.

---

## Question #61 of 101

Question ID: 463730

Which of the following *most* accurately explains the "break-even-rate" interpretation of forward rates? The forward rate is the rate that will make an investor indifferent between investing:

✗ **A)** **investing at the spot or forward interest rate.**

✓ **B)** for the full investment horizon, or for part of it, and then rolling over the proceeds for the balance of the investment horizon at the forward rate.

✗ **C)** now or at a forward time.

Explanation

The pure expectations theory can be explained using a "break-even rate" line of reasoning. The break even rate is the forward rate that leaves investors indifferent between investing for the full term of their investment horizon or investing in part of the horizon and rolling the investment over at the "break-even" forward rate for the remainder of the term.

---

## Question #62 of 101

Question ID: 472555

The price of a five-year zero coupon bond is $0.7835 for $1 par and the price of a two-year zero-coupon bond is $0.9426 for $1 par. The three-year forward rate two years from now is *closest* to:

✓ **A)** **6.36%**

✗ **B)** 4.87%

✗ **C)** 5.54%

Explanation

$F_{(2,3)} = P_5/P_2 = 0.7835/0.9426 = 0.8312$
$[1+f(2,3)]^3 = 1/ F_{(2,3)} = 1/0.8312 = 1.2031$
$f(2,3) = 6.36\%$

---

## Question #63 of 101

Question ID: 472587

Jill Sebelius, editor-in-chief of a monthly interest-rate newsletter uses the following model to forecast short-term interest rates:

$$dr = a(b - r)\,dt + \sigma\sqrt{r}\,dz$$

For the current newsletter, Sebelius has issued the following expectations:

a=0.40, b = 3%, r = 2%.

Sebelius"s model is most accurately described as the:

✗ **A) Ho-Lee model.**

✗ **B)** Vasicek model.

✓ **C)** Cox-Ingersoll-Ross model.

Explanation

The model given is an example of the Cox-Ingersoll-Ross model which differs from the Vasicek model by including the square root of current level of short-term interest rates in the stochastic part of the equation.

---

## Question #64 of 101

Question ID: 463739

A yield curve undergoes a parallel shift. With respect to the bonds described by the yield curve, the shift has *least likely* changed the:

✗ **A) yield to maturities.**

✓ **B)** yield spreads for bonds of different maturities.

✗ **C)** durations.

Explanation

A yield curve is on a graph with interest rates on the vertical axis and maturities on the horizontal axis. A parallel shift of a yield curve means the spread between the interest rates or the "yield spreads" have not changed. The other possible choices to answer the question would change. By definition, the yields to maturity have changed. Since duration changes with changes in yield, all the durations would change.

---

## Question #65 of 101

Question ID: 463750

Changes in all of the following have been identified as one of the three factors that explain historical Treasury returns EXCEPT the:

✗ **A) level of interest rates.**

✗ **B)** curvature of the yield curve.

✓ **C)** default risk premium.

Explanation

Default risk is not relevant for Treasury securities. Research has identified the curvature of the yield curve, level of interest rates, and the slope of the yield curve as explaining over 95% of the changes in Treasury returns.

---

## Question #66 of 101

Question ID: 472570

7.5%, 15-year, annual pay option-free Xeleon Corp bond trades at a market price of $95.72 per $100 par. The government

spot rate curve is flat at 5%.

Suppose that the Xeleon bond was callable in 10 years at par and an analyst computed the Z-spread on the bond ignoring the embedded option. Relative to the Z-spread on an option-free bond, the calculated Z-spread will *most likely* be:

✗ **A) lower.**

✓ **B)** higher.

✗ **C)** the same.

Explanation

Since a bond with an embedded call option would trade at a lower price than a comparable option-free bond (i.e., its market price would be lower), the additional spread needed to force the model value to the (lower) market price will be higher. Because the Z-spread would inadvertently include compensation for option risk as well as for credit and liquidity risks, it is not appropriate for valuing bonds with embedded options.

---

## Question #67 of 101

Question ID: 472571

A 2-year $1,000 par, 2.5% semi-annual Mexa-corp bond has a Z-spread of 45bps. Using the following spot curve, compute the invoice price of the bond.

| **Maturity** | 0.50 | 1.00 | 1.50 | 2.00 |
|---|---|---|---|---|
| **Spot rates** | 4.50% | 5% | 5.25% | 5.5% |

✓ **A) $982.65**

✗ **B)** $993.45

✗ **C)** $956.32

Explanation

Add the Z-spread to each of the spot rates to discount the bond's cash flows

$$\frac{25}{\left(1+\frac{0.045+0.0045}{2}\right)}+\frac{25}{\left(1+\frac{0.05+0.0045}{2}\right)^2}+\frac{25}{\left(1+\frac{0.0525+0.0045}{2}\right)^3}+\frac{1025}{\left(1+\frac{0.055+0.0045}{2}\right)^4}=\$982.65$$

---

## Question #68 of 101

Question ID: 463731

Which theory explains the shape of the yield curve by considering the relative demands for various maturities?

✓ **A) The segmentation theory.**

✗ **B)** The pure expectations theory.

✗ **C)** The liquidity premium theory.

Explanation

The market segmentation theory contends that lenders and borrowers have preferred maturity ranges, and that supply and demand forces in each maturity range determines yields. This theory relies on the idea that some investors have restrictions (either legal or practical) on

their preferred maturity structure and that they are unwilling or unable to move out of their preferred ranges.

---

## Question #69 of 101

Question ID: 463735

A portfolio manager who believed in the liquidity premium theory would expect:

- ✗ **A) short-term rates to be lower than investors' expectations of short-term rates, because of the liquidity premium.**
- ✗ **B)** long-term securities to offer higher returns than short-term securities.
- ✓ **C)** long-term rates to be higher than investors' expectations of future rates, because of the liquidity premium.

Explanation

The liquidity theory of the term structure proposes that forward rates reflect investors' expectations of future rates plus a liquidity premium to compensate them for exposure to interest rate risk, and this liquidity premium is positively related to maturity. The implication of the liquidity theory is that forward rates, since they include a liquidity premium, are a biased estimate of the market's expectation of future spot rates.

---

## Question #70 of 101

Question ID: 463759

Suppose that the sample mean of 26 daily yield changes is 0.08%, and the sum of the squared deviations from the mean is 0.0100. Which of the following is the *closest* to the daily yield volatility?

- ✗ **A) 1%.**
- ✓ **B)** 2%.
- ✗ **C)** 0.1%.

Explanation

Daily yield volatility is the standard deviation of the daily yield changes. The variance of daily yield change is obtained by dividing the sum of the squared deviations by the number of observations minus one. Therefore, we have:

Variance of daily yield change = 0.0100/(26 - 1) = 0.0004

Yield volatility = Standard deviation of daily yield change = (Variance of daily yield change)$^{½}$ = (0.0004)$^{½}$ = 0.0200 = 2%

---

## Question #71 of 101

Question ID: 463740

Suppose the yield curve becomes steeper. Which of the following is a consequence of the steepening?

- ✗ **A) Long-term bonds become less sensitive to interest rate changes.**
- ✓ **B)** The yield spread between long and short-term securities increases.
- ✗ **C)** Long-term bonds become more sensitive to interest rate changes.

Explanation

This is by definition. A steepening yield curve means that the slope of the yield curve increases. The slope is the difference (i.e. the term spread) between the yields of two maturities. Consequently, as the yield curve steepens this spread increases.

---

## Question #72 of 101

Question ID: 463733

Which of the following *most accurately* explains the "locked-in-rate" interpretation of forward rates? The forward rate allows an investor to lock in:

✗ **A) a coupon rate for some future period.**

✗ **B)** a coupon rate for the current period.

✓ **C)** an interest rate for some future period.

Explanation

The pure expectations theory can be explained using a "locked-in-rate" line of reasoning, whereby forward rates are interpreted as the rate that can be "locked in" for some future period.

---

## Question #73 of 101

Question ID: 463708

Which of the following statements about yield curves is *least* accurate?

✗ **A) A positive butterfly means that the yield curve has become less curved.**

✓ **B)** The slope of the yield curve changes slightly following a parallel shift.

✗ **C)** Twists and butterfly shifts are examples of nonparallel yield curve shifts.

Explanation

The slope of the yield curve never changes following a parallel shift.

---

## Question #74 of 101

Question ID: 472557

Use the following spot rate curve to answer this question:

| **Maturity** | 1 | 2 | 3 |
|---|---|---|---|
| **Spot rates** | 5% | 5.5% | 6% |

The price of a 1-year $1 par, zero-coupon bond to be issued in two years is *closest* to:

✓ **A) $0.9345**

✗ **B)** $0.8396

✗ **C)** $0.9434

Explanation

$f(2,1) = (1+S_3)^3/(1+S_2)^2 - 1 = 7.01\%$

$F_{(2,1)} = 1/[1+ f(2,1)] = 1/(1.0701) = \$0.9345$

## Question #75 of 101

Question ID: 472564

Independence Bank is a small retail bank that specializes in demand deposits and invests in CMO tranches. For the purpose of valuation of Independence Bank's assets and liabilities, the *most appropriate* reference yield curve would be:

✓ **A) government spot curve.**

✗ **B)** Libor-OIS curve.

✗ **C)** swap rate curve.

Explanation

While wholesale banks extensively hedge their assets and/or liabilities using the swap market, retail banks typically have very little exposure to the swap market. Accordingly, the government spot curve is most appropriate for retail banks while the swap rate curve may be most appropriate for wholesale banks.

## Question #76 of 101

Question ID: 463749

Why do differences in the size of the rate shock produce different effective durations?

✓ **A) The price-yield relationship is convex.**

✗ **B)** Different rate shocks result in different yield volatility changes.

✗ **C)** The yield curve is not flat.

Explanation

If the incremental change in interest rates is too large, the effects of convexity contaminate duration measurements.

## Question #77 of 101

Question ID: 463715

There has been an increasing trend to measuring corporate credit spreads relative to which of the following security classes?

✗ **A) Mortgage-backed securities.**

✗ **B)** Treasury securities.

✓ **C)** Swaps.

Explanation

Due to the size and extensive use of the swap market there has been a shift from corporate credit spreads based on Treasuries to credit spreads linked to swaps.

## Question #78 of 101

Question ID: 463727

Assuming the pure expectations theory is correct, an upward sloping yield curve implies:

✓ **A) interest rates are expected to increase in the future.**

✗ **B)** longer-term bonds are riskier than short-term bonds.

✗ **C)** interest rates are expected to decline in the future.

Explanation

The yield curve slopes upward because short-term rates are lower than long-term rates. Since market rates are determined by supply and demand, it follows that investors (demand side) expect rates to be higher in the future than in the near-term.

---

## Question #79 of 101

Question ID: 463712

To construct a theoretical spot-rate curve using Treasury securities, the class of securities that provides the *most* accurate prices but has the disadvantage of large maturity gaps is:

✗ **A) strips.**

✗ **B)** off-the-run securities.

✓ **C)** on-the-run securities.

Explanation

On-the-run securities have the greatest trading volume; therefore, they should be the most accurately priced issues. The Treasury only issues bonds of specified maturities, however, and large gaps exist between the maturities.

---

## Question #80 of 101

Question ID: 472584

During the recent credit crises in the country of Maltovia, several money market funds reported large losses. Subsequently, the Maltovian regulatory body imposed strict restrictions on maturity of securities that money market funds could invest in. The reaction of Maltovian regulatory body was *most likely* based on a belief in:

✗ **A) local expectations theory.**

✗ **B)** market segmentation theory.

✓ **C)** preferred habitat theory

Explanation

Money market funds generally invest in short-term securities. Their inclination to chase higher yields in the longer maturity spectrum is consistent with the preferred habitat theory whereby investors will leave their preferred habitat if they are compensated with higher returns. If Market segmentation theory held, investors would not have left their market segment and therefore no regulatory action would be necessary.

---

## Question #81 of 101

Question ID: 463746

Change in which of the following is NOT a factor that has been observed to drive Treasury returns?

✓ **A) The coupon of Treasury securities.**

✗ **B)** The level of interest rates.

✗ **C)** The curvature of the yield curve.

Explanation

The coupon for Treasury securities is constant.

---

## Question #82 of 101

Question ID: 463744

Which type of yield shift change explains the largest percentage of variation in total realized bond returns?

✗ **A) Curvature changes.**

✓ **B)** Rate changes.

✗ **C)** Slope changes.

Explanation

Changes in the level of rates make the greatest contribution, explaining almost 90% of the observed variation in total returns for all maturity levels.

---

## Question #83 of 101

Question ID: 463738

What are the implications for the shape of the yield curve according to the liquidity theory? The yield curve:

✗ **A) must be upward sloping.**

✗ **B)** is always flat.

✓ **C)** may have any shape.

Explanation

The liquidity theory holds that investors demand a premium to compensate them to interest rate exposure and the premium increases with maturity. Even after adding the premium to a steep downward sloping yield curve the result will still be downward sloping.

---

## Question #84 of 101

Question ID: 463763

Which of the following *best* describes key rate duration? Key rate duration is determined by:

✗ **A) shifting the whole yield curve in a parallel manner.**

✓ **B)** changing the yield of a specific maturity.

✗ **C)** changing the curvature of the entire yield curve.

Explanation

Key rate duration can be defined as the approximate percentage change in the value of a bond or bond portfolio in response to a 100 basis

point change in a key rate, holding all other rates constant, where every security or portfolio has a set of key rate durations, one for each key rate maturity point.

---

## Question #85 of 101

Question ID: 463719

Which of the following spreads will reflect the option risk in a callable bond?

✗ **A) The Z-spread only.**

✗ **B)** The OAS only.

✓ **C)** Both the nominal spread and the Z-spread.

Explanation

The OAS is the option-adjusted spread. It is determined using a binomial tree where a spread (the OAS) is added to the benchmark yield to find the arbitrage-free value for the callable or putable bond. The arbitrage-free value is the imputed value equal to the current bond price. The OAS is referred to as an option-adjusted spread because the cash flows in the tree are adjusted to reflect the option of the bond (e.g. a callable bond's price is capped at the call price when interest rates drop). The nominal spread is simply the bond's yield minus the benchmark yield. The Z-spread is the spread that, when added to the spot rates from a yield curve, results in an imputed value equal to the bond's current price. The nominal spread and the Z-spread do not adjust the cash flows for the bond's option. Thus the calculated yield spread using both these measures will reflect the option risk in the bond, as well as the bond's credit and liquidity risk. Because the OAS calculation adjusts the cash flows for the bond's option-like characteristics, the calculated OAS is just a reflection of the bond's credit and liquidity risk, relative to the benchmark spot rates.

---

## Question #86 of 101

Question ID: 472586

With respect to local expectations theory, which of the following statements is *most consistent* with market evidence?

✓ **A) Short-term holding period return of long-maturity bonds exceeds the short-term holding period returns of short-maturity bonds.**

✗ **B)** Short-term holding period return of long-maturity bonds and the short-term holding period return of short-maturity bonds is the same.

✗ **C)** Short-term holding period return of short-maturity bonds exceeds the short-term holding period returns of long-maturity bonds.

Explanation

Market evidence shows that short-term holding period returns from investing in long-maturity bonds exceed the short-term holding period returns from investing in short-maturity bonds.

---

## Question #87 of 101

Question ID: 472559

It is now January 1, 20x7. The one-year spot rate now is exactly equal to the one-year forward rate for a loan in one year as of January 1, 20x6. The current forward price of $1 par, zero-coupon bond for delivery on January 1, 20x8 will *most likely* be:

✓ **A) the same as it was on January 1, 20x6.**

✗ **B)** higher than it was on January 1, 20x6.

✗ **C)** lower than it was on January 1, 20x6.

Explanation

If the spot rates evolve exactly as indicated by the forward curve, the forward price would remain unchanged.

---

## Question #88 of 101

Question ID: 472589

Jill Sebelius, editor-in-chief of a monthly interest-rate newsletter uses the following model to forecast short-term interest rates:

$dr = a(b - r)\,dt + \sigma\sqrt{r}\,dz$

For the current newsletter, Sebelius has issued the following expectations:

a=0.40, b = 3%, r = 2%.

According to the model used by Sebelius, volatility in the short-term in interest rate is *most likely*:

✓ **A) positively related to the current level of the short-term interest rate.**

✗ **B)** negatively related to the current level of the short-term interest rate.

✗ **C)** independent of the current level of the short-term interest rate.

Explanation

Under the Cox-Ingersoll-Ross model, the random or stochastic component incorporates the square root of current level of interest rate. Hence the higher the current level of interest rates, the higher the volatility of interest rates.

---

## Questions #89-94 of 101

James Wallace, CFA, is a fixed income fund manager at a large investment firm. Each year, the firm recruits a group of new college graduates in the spring to enter in the firm's management training program. The program is a rigorous six-month course that exposes every candidate to each of the different departments within the firm. After successfully completing the six-month training period, candidates then receive offers for employment in one of the departments within the investment firm. Recently, Wallace was selected by his boss to teach the fixed income portion of the firm's training program. He will be able to hold several two-hour sessions with the new hires over a two-week time period, during which he is expected to instruct the trainee's on all aspects of fixed income analysis. These sessions serve as preparation for the trainees to be able to complete a month long rotation on the fixed income trading desk.

His first few sessions will cover the core concepts of fixed income investing. Wallace believes that in order to fully grasp the more complicated concepts of fixed income analysis, the new hires must first begin by having a complete knowledge of the term structure and the volatility of interest rates. The new hires each have different educational backgrounds and varying amounts of work experience, so Wallace decides to begin with the most very basic concepts. He wants to start by teaching the various theories of the term structure of interest rates, and the implications of each theory for the shape of the Treasure yield curve. To evaluate the trainees' understanding of the subjects at hand, he creates a series of questions.

The following interest rate scenario is used to derive examples on the different theories used to explain the shape of the term

structure and for all computational problems in Wallace's lectures.

*Table 1*
*LIBOR Forward Rates and Implied Spot Rates*

| *Period* | *LIBOR Forward Rates* | *Implied Spot Rates* |
|---|---|---|
| 0 × 6 | 5.0000% | 5.0000% |
| 6 × 12 | 5.5000% | 5.2498% |
| 12 × 18 | 6.0000% | 5.4996% |
| 18 × 24 | 6.5000% | 5.7492% |
| 24 × 30 | 6.7500% | 5.9490% |
| 30 × 36 | 7.0000% | 6.1238% |

James uses a rounded day count of 0.5 years for each semi-annual period.

## Question #89 of 101

Question ID: 463721

Following Wallace's first lecture he asks the trainees which of the following explains an upward sloping yield curve according to the (unbiased) pure expectations theory of the term structure of interest rates?

✓ **A) The market expects short-term rates to rise through the relevant future.**

✗ **B)** There is greater demand for short-term securities than for long-term securities.

✗ **C)** There is a risk premium associated with more distant maturities.

Explanation

Under this theory, forward rates exclusively represent expected future spot rates. Thus the entire term structure at a given time reflects the market's expectations of future short term spot rates. (Study Session 14, LOS 46.e)

## Question #90 of 101

Question ID: 463722

Wallace now poses a similar question regarding the liquidity preference theory. Which of the following could explain an upward sloping yield curve according to the liquidity preference theory of the term structure of interest rates?

✗ **A) The market expects short-term rates to rise through the relevant future.**

✗ **B)** There is greater demand for short-term securities than for long-term securities.

✓ **C)** There is a risk premium associated with more distant maturities.

Explanation

According to the liquidity preference theory, the pure expectations theory applies but is modified for a risk or term premium. The longer the maturity, the greater the risk of price fluctuation to the investor.

Short-term rates to rise through the relevant future could explain an upward sloping yield curve according to the pure expectations theory. Greater demand for short-term securities than for long-term securities could explain an upward sloping yield curve according to the market segmentation theory. The market segmentation theory implies that the rate of interest for a particular maturity is determined solely by demand and supply for that maturity, with no reference to conditions for other maturities. (Study Session 14, LOS 46.e)

## Question #91 of 101

Question ID: 463723

Wallace explains to the class that the swap fixed rate is one where the values of the floating-rate and the fixed-rate are the same at the inception of the swap. Using the information in Table 1, he asks the class to compute the swap fixed rate for a one-year plain vanilla interest rate swap with semiannual payments. Which of the following is the *closest* to the correct answer?

✓ **A) 5.18%.**

✗ **B)** 2.56%.

✗ **C)** 3.43%.

Explanation

First calculate the discount factors:

$Z_{180} = 1 / \{1 + [(0.05 \times (180 / 360)]\} = 0.9756$

$Z_{360} = 1 / \{[1 + (0.052498 \times (360 / 360)]\} = 0.9501$

The semi-annual fixed rate on the swap is:

$(1 - 0.9501) / (0.9756 + 0.9501) = 2.59\% \times 2 = 5.18\%$

(Study Session 17, LOS 54.c)

## Question #92 of 101

Question ID: 463724

Wallace finally asks the class about the market segmentation theory of the term structure of interest rates. Specifically, Wallace asks which of the following could explain an upward sloping yield curve according to the market segmentation theory?

✓ **A) There is greater demand for short-term securities than for long-term securities.**

✗ **B)** There is a risk premium associated with more distant maturities.

✗ **C)** There is greater demand for long-term securities than for short-term securities.

Explanation

This could explain an upward sloping yield curve according to the market segmentation theory. The market segmentation theory implies that the rate of interest for a particular maturity is determined solely by demand and supply for that maturity, with no reference to conditions for other maturities.

A risk premium associated with more distant maturities could explain an upward sloping yield curve according to the liquidity preference theory. Greater demand for long-term securities than for short-term securities would drive the yields on long-term securities down and would result in an inverted (downward sloping) yield curve. (Study Session 14, LOS 46.e)

## Question #93 of 101

Question ID: 463725

Wallace presents the relationships between spot and forward rates according to the pure expectations theory. Which of the following is *closest* to the one-year implied forward rate one year from now?

✗ **A) 6.58%.**

✗ **B)** 5.75%.

✓ **C)** 6.25%.

Explanation

The 2 year spot rate is 5.7492 meaning the return that should be earned after 2 years would be 5.7492 + 5.7492 = 11.498%. The 1 year spot rate is 5.2498 therefore the 1 year forward rate 1 year from now must be the difference between the 11.498% earned over the 2 year spot rates and the 1 year spot rate. Thus the 1 year forward rate 1 year from now is 11.498 − 5.2498 = 6.2486 or 6.25%. (Study Session 14, LOS 46.e)

## Question #94 of 101

Question ID: 463726

Wallace completes his first lecture by tying the relationship between Treasury prices and the shape of the term structure. He is particularly interested in the implications of a steepening yield curve. Which of the following is *most* accurate for a steepening yield curve?

✓ **A) The price of short-term Treasury securities increases relative to the price of long-term Treasury securities.**

✗ **B)** The price of long-term Treasury securities increases relative to the price of short-term Treasury securities.

✗ **C)** The price of short-term Treasury securities increases.

Explanation

For a steepening of the yield curve to occur, in every case, the short-term yield has to decrease relative to the long-term yield. Therefore, the price of short-term Treasury securities increases relative to the price of long-term securities. (Study Session 14, LOS 46.e)

---

## Question #95 of 101

Question ID: 463760

Which of the following is *closest to* the annualized yield volatility (250 trading days per year) if the daily yield volatility is equal to 0.6754%?

✗ **A) 168.85%.**

✓ **B)** 10.68%.

✗ **C)** 9.73%.

Explanation

Annualized yield volatility = $\sigma \times \sqrt{(\#\text{ of trading days in a year})}$

where:
σ = the daily yield volatility

So, annualized yield volatility = (0.6754%) $\sqrt{(250)}$ = 10.68%.

---

## Question #96 of 101

Question ID: 472556

Jorgen Welsher, CFA obtains the following quotes for zero coupon government bonds all with a par value of $100.

| Type of Price | Delivery (years) | Maturity (years) | Price |
|---|---|---|---|
| Spot | 0 | 3 | $91.51 |
| | | | |

| | | | |
|---|---|---|---|
| Forward | 2 | 3 | $94.55 |
| Spot | 0 | 2 | $92.45 |

Welsher can earn arbitrage profits by:

- ✓ **A) buying the 2-year bond in the spot market, going long the forward contract and selling the 3-year bond in the spot market.**
- ✗ **B)** selling the 2-year bond in the spot market, going short the forward contract and buying the 3-year bond in the spot market.
- ✗ **C)** buying the 2-year bond in the spot market, going short the forward contract and selling the 3-year bond in the spot market.

Explanation

$F(_{2,1}) = P_3/P_2 = \$98.98$ but is quoted at $94.55 and hence is cheap - buy it. A combination of a long position in the 2-year spot market, rolled over for 1 year at a locked-in forward rate (i.e., a long position in forward), would generate a return higher than the quoted 3-year spot rate.

---

## Question #97 of 101

Question ID: 472580

When the yield curve is downward sloping, the TED spread is *most likely* to be:

- ✗ **A) negative.**
- ✓ **B)** positive.
- ✗ **C)** zero.

Explanation

TED spread is defined as Libor minus T-bill yield and is expected to be positive to reflect the higher credit risk implied in Libor relative to T-bills. This would hold true regardless of the slope of the yield curve.

---

## Question #98 of 101

Question ID: 463737

According to the liquidity theory, how are forward rates interpreted? Forward rates are:

- ✗ **A) equal to futures rates.**
- ✗ **B)** expected future spot rates.
- ✓ **C)** expected future spot rate plus a rate exposure premium.

Explanation

The liquidity theory of the term structure proposes that forward rates reflect investors' expectations of future rates plus a liquidity premium to compensate them for exposure to interest rate risk, and this liquidity premium is positively related to maturity. The implication of the liquidity theory is that forward rates are a biased estimate of the market's expectation of future rates, since they include a liquidity premium.

---

## Question #99 of 101

Question ID: 463711

Which of the following Treasury issues is typically NOT a candidate used to construct the theoretical spot rate curve?

✗ **A) Treasury coupon strips.**

✗ **B)** All Treasury coupon securities and bills.

✓ **C)** Treasury principal strips.

Explanation

The following Treasury securities can be used to construct a default-free theoretical spot rate curve:

1) On-the-Run Treasury - the newest Treasury issues of a given maturity:
   - T-Bills: zero-coupon securities with 3-month, 6-month, and 1-year maturities.
   - Treasury Notes: coupon instruments with 2-year, 5-year, and 10-year maturities.
   - Treasury Bonds: coupon instruments with 30-year maturities.
2) On-the-run Treasury issues and selected off-the-run Treasury issues.
3) All Treasury coupon securities and Bills.
4) Treasury coupon strips.

---

## Question #100 of 101

Question ID: 463742

Changes in which of the following factors has been observed to be the *most* important driving force for Treasury returns?

✓ **A) Level of interest rates.**

✗ **B)** Slope of the yield curve.

✗ **C)** Coupon of Treasury securities.

Explanation

In regressions, changes in the level of the interest rate have been shown to explain about 90% of the Treasury return variance.

---

## Question #101 of 101

Question ID: 463743

Research studies have identified three factors that explain historical Treasury returns. Which of the following is the factor with the *most* explanatory power? Changes in the:

✗ **A) slope of the yield curve.**

✗ **B)** default risk premium.

✓ **C)** level of interest rates.

Explanation

Default risk is not relevant for Treasury securities. Changes in the level of interest rates accounts for almost 90% of the observed variation in total returns.