HEC Paris Fall 2014

LAST NAME

FIRST NAME

For all questions, assume you can buy or short-sell fractions of bonds, and that default risk free zero-coupon bonds have a face value of $\in 100$.

Bond A is default risk free, pays annual coupons with a coupon rate of 10%, has a face value of \notin 1 000, and has a maturity of 2 years. Default risk free zero-coupon bonds with matury of one, two, and three years have respectively yields-to-maturity of 3%, 7%, and 10% per year.

1) What is the duration of Bond A?

2%	2 .17 years
1.91 years	7 %
2 years	

2) The market price of bond A is $\in 1$ 000. If there is an arbitrage opportunity, it involves:

buying bond A		
□ short-selling the 3-year zero		
□ buying some 1-year and 2-y	ear	
zeros		
short-selling bond A		
\square there is no arbitrage opportu	nity	

3) What is the two-year forward rate starting in one year, $f_{t=1\rightarrow t=3}$, in percentage per year?

4) Bond B has a shorter duration than Bond A. When the yield curve makes a parallel shift upward, then:



Bond B's price increases and it increases more than Bond's A price
Bond B's price increases and it increases less than Bond's A price
Bond B's price decreases and it decreases more than Bond's A price
Bond B's price decreases and it decreases more than Bond's A price

decreases less than Bond's A price

- □ true
- □ false

□ cannot tell

5) Bond C is a fixed-rate coupon bond that currently trades at a price larger than its face value. Then Bond C's yield-to-maturity is larger than its coupon rate. HEC Paris Fall 2014

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For all questions, assume you can buy or short-sell fractions of bonds, and that default risk-free zero-coupon bonds have a face value of €100.

Bond A is default risk-free, pays annual coupons with a coupon rate of 10%, has a face value of €1 000, and has a maturity of 2 years. Default risk-free zero-coupon bonds with maturity of one, two, and three years have respectively yields-to-maturity of 3%, 7%, and 10% per year.

What is the duration of Bond A?
 Not a zero, so cannot be the maturity of 2 years, only one

answer below 2 years

 The market price of bond A is €1 000. Is there an arbitrage opportunity? If yes, it involves:

 $P = 100 / 1.03 + 1100 / 1.07^{\circ}2 = 1057.87$ Bond is cheap, so buy it, short-sell replicating portfolio

3) What is the two-year forward rate starting in one year, $f_{t=1\rightarrow t=3}$, in percentage per year?

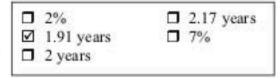
 $f_{t=1 \rightarrow t=3} = \left(\frac{1.10^3}{1.03}\right)^{1/2} - 1 = 13.67\%$

4) Bond B has a shorter (lower) duration than Bond A. When the yield curve makes a parallel shift upward, then:

r goes up, price goes down, B is less sensitive than A so its price goes down by less than A

 Bond C is a fixed-rate coupon bond that currently trades at a price larger than its face value. Then Bond C's yield-to-maturity is larger than its coupon rate.

Bond is more attractive because its coupon rate is higher than yield-to-maturity -> price is higher than face value



buying bond A
 short-selling the 3-year zero
 buying some 1-year and 2-year zeros
 short-selling bond A

there is no arbitrage opportunity

- there is no arbitrage opportunity
- □ 6.79%
 ☑ 13.67%
 □ 29.22%
 □ 3.34%

Bond B's price increases and it increases more than Bond's A price

□ Bond B's price increases and it increases less than Bond's A price

□ Bond B's price decreases and it decreases more than Bond's A price

Bond B's price decreases and it decreases less than Bond's A price

□ true

☑ false

□ cannot tell