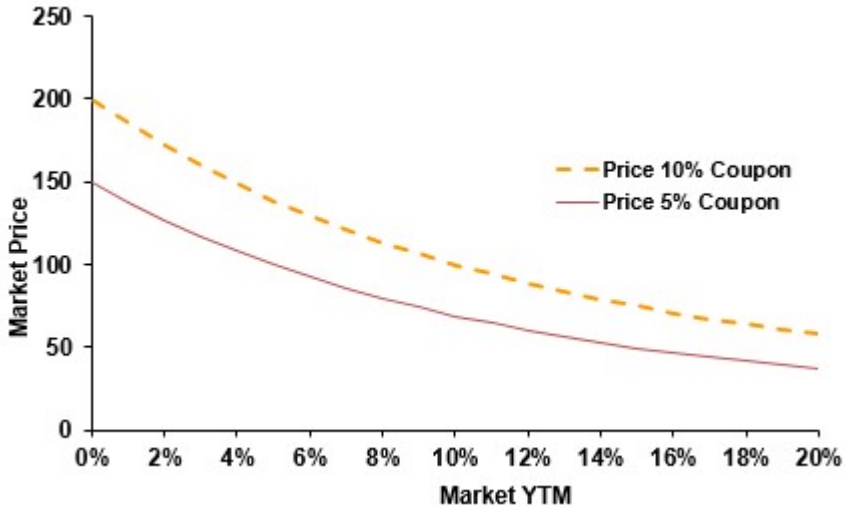
One of your fellow students asked: "In the Slide 21 of Lecture 3 notes, the slope of price-yield curve of price 10% coupon seems to be higher than that of price 5% coupon. Some of us think that higher coupon rate can lead to lower duration and less sensitivity, so the curve of price 10% coupon bond should be flatter than the other one, but appears steeper. Why?"



Answer:

Great job spotting this… you are right, all things being equal, the higher the coupon, the lower the price-yield sensitivity, so the 10% coupon bond should have a shallower slope in that picture, but it appears steeper.

Well first let's just remember that the Modified Duration tells how much as a percentage of a bond's current value it will change for a 1% change in yield. So first we prove this at YTM 10% for both 10yr annual coupon bonds: so the 5% coupon bond price = $69.227 and the 10% coupon bond price = par $100.00 to start. Now if we change the YTM to 9%, the 5% price = $74.329 (up 7.37% in price) and the 10% coupon bond's price = $106.418 (up 6.42%). So we're not crazy thinking the 5% coupon bond price-yield line should be steeper.

So why isn't reflected that way in the picture? Simple answer is that the y-axis there is in absolute $ per $100 of par. The 10% bond gains $6.42 per 100, which is a smaller percentage of its starting value (6.42%) but a bigger $amount. The 5% coupon bond gains $5.10, a smaller amount but a bigger percentage (7.37% of $69.227).