Learning Outcome Statement

After completing this caselet, students and trainees should be able to explain when convexity matters and which bonds are most likely to show noticeable effects.

Caselet #31

Renowned Darla Moore School of Business graduate and bond analyst Ms. Jane Gotzrox is concerned that her intern may be overlooking an important aspect of bond analysis.

“Sparky, fixed income analysts all know that bonds have convexity and that convexity influences returns. What they do NOT all have is an intuitive sense of how much convexity matters, and when. You are going to be better than that.”

“Here’s what you are going to do. Make a table of yields, durations, and convexities for 2s, 5s, 10s and bonds. You know how to use Historical Data and Price/Yield to find those values, eh? While you’re at it, get as close as you can to a 20-year bond. When I looked, I found that US 5.375 2/15/2031 was closest.

Then, run scenario analysis for an unchanged yield curve overnight, but with beginning Level for each bond equal to its beginning yield and horizon pricing method Yield with Level equal to beginning yield plus 1, for 100bp.”

“Now, what we are really after is seeing how much of the scenario return is attributable to convexity. So let’s see what change we expect from a one percentage point change in yield. That should get your Spider-sense tingling, eh, Sparky? How should you predict the immediate percentage change in a bond’s value for a one percentage point change in yield?”

“Once you have a measure of the duration effect, subtract it from the scenario return. The remainder is due to convexity. Actually, convexity and all higher moments, but they really do round to zero in a hurry. Notice that until you get to 10-years, convexity is hardly noticeable. It certainly matters at 30-years, and would matter even more for zero coupon bonds of, say, 18 or more years to maturity. Can you explain that one, Sparky?”

“Later, we will look at the influence of negative convexity in callable bonds and mortgage-backed securities. For now, it will be enough to show that our rate of return approximator works extremely well for these Treasuries. Include those calculations in an additional column and compare them to the scenario returns. As always, Sparky, your spreadsheet and explanations should be ready for your notebook.”