Practice Quiz 11: Risk, Leverage, and Retirement Planning (Solutions)

1. Which of the following statements is **false**? (Only one is false.)

A) For a given change in interest rates, duration provides a better approximation for the change in a bond's price for a long-term bond than for a short-term bond.

B) The duration of a bond may be equal to its maturity.

C) For a given change in interest rates, the new price of a bond estimated using duration will always underestimate the actual new price of the bond (calculated by taking the present value of the cash flows).

D) The price of a longer-term bond is more sensitive to interest rate changes.

Answer: A

A is false. For long-term bonds, duration provides a less accurate estimate for a given change interest rates.

B is true. The duration of a zero-coupon bond is its maturity.

C is true. See slides.

D is true. The duration for is larger for longer-term bonds, and duration measures a bond's sensitivity to interest rate changes. Therefore, long-term bonds are more sensitive to interest rate changes.

2. Discuss life-cycle investing as a retirement strategy.

Ans. Investing in higher-yielding but riskier assets when young and transitioning into more conservative assets as retirement approaches is known as life-cycle investing. Riskier assets, such as stock, have offered and should continue to offer a return premium over long horizons. Young investors with a long investment horizon are better positioned not only to take advantage of this long-term premium, but also to withstand the risks; because they still have a large amount of future earnings, and less accumulated wealth in savings, they can withstand negative shocks. Investors are less able to recover from shocks as they approach and enter retirement and so it's important that they preserve their wealth. This logic suggests investors should invest aggressively when young but transition to more conservative assets as retirement approaches.

3. Discuss the concept of leverage and state the formula for leverage ratio. Explain how leverage relates to risk.

Ans. Leverage is the use of debt to increase returns. An investment is said to be leveraged if it is partially financed by debt, and one effect of leverage is that it magnifies returns. Leverage is sometimes measured by the leverage ratio, which is the total investment divided by the amount the investor contributes (the investor's equity, or capital):

$$L = \frac{A}{E}$$

A general rule of finance is that increased return cannot be had without increased risk, and a levered return is no exception: leverage magnifies profits, but it also magnifies losses. While leveraging an investment increases the expected return, it also increases the dispersion of the returns, and hence, the risk.

4. For her town's annual summer festival, Abbey plans to open a hot dog stand with a $4,000 investment. She contributes $500 of her own money and borrows the remaining $3,500 from her parents (with no interest). If the project returns 6% on the $4,000 investment, what is the return on Abbey's equity?

Ans. Abbey has a leverage ratio of 8:

$$L = \frac{A}{E} = \frac{\$4{,}000}{\$500} = 8$$

Her return on equity is (note that the interest on her debt is zero):

$$R = L * r = 8 * 6\% = 48\%$$