ANSWERS TO STUDY QUESTIONS

Chapter 19

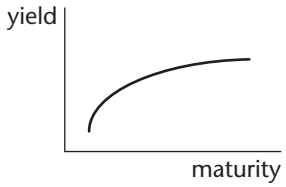
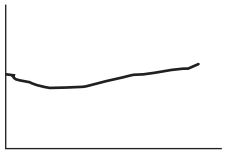
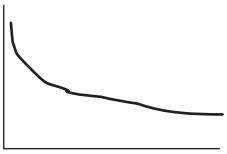
19.1. Finite maturity is a very useful attribute for certain investment purposes, such as covering or servicing a finite-lived obligation the investor may have, as in the case of a pension plan, for example. It is also important because the volatility of bond values and the magnitude of interest-rate risk for bond investors are directly related to the maturity of the bond investment.

19.3. Interest-rate risk is the risk that an investment's value will change due to a change in the level of interest rates prevailing in the bond market.

19.5. In cash flow matching, the investor's fixed future cash outflow obligations are exactly matched by future inflows that are contractually fixed. See the example in section 19.1.2.

19.7. The *yield curve* is a plot or graph of the *term structure of interest rates* that shows how bond yields vary with bond maturity default-free U.S. Treasury obligations (bills, notes, and bonds). The shape of the yield curve is driven by two main considerations: (1) expectations of future short-term interest rates and (2) interest-rate risk (the variability of future short-term rates).

19.9.

Shape of the Yield Curve	Typical Macroeconomic Environment
(a) Steeply upward sloping 	Coming out of an economic downturn or recession, with an expected recovery and economic expansion.
(b) Slightly upward sloping 	Stable economic environment, moderate sustained growth. This is commonly called the "normal" shape.
(c) Shallow-inverted or flat 	Implies expectations of lower short-term interest rates. Near or at the top of an economic upswing. Expectations of slower growth or even a recession.
(d) Steeply Inverted 	A period of unusually high short-term rates generally associated with very high inflation. A likely indicator of a future economic downturn.

19.11. Mortgage securitization allows deposit-taking financial institutions to sell long-term loan assets into the secondary market rather than holding them in the institution's permanent asset portfolio. Ultimately, the bank becomes primarily only a loan originator, at least for some types of loans, rather than a long-term investor. The bank then makes its profits in the form of fees for services, rather than from the yield spread between their assets and liabilities.

19.13. A detailed answer to this question can be found in the Fixed-Income Investment Strategies section on page 466.

19.15. The six components are described in detail in section 19.2.1 and a description of the historical events appears on page 472.

19.17. Interest-rate risk is fundamentally why the yield curve is most commonly slightly upward-sloping. Therefore, by taking out a fixed rate mortgage, the borrower hedges themselves from fluctuations in the future rate of interest rate. However, the cost of getting this insurance is reflected in the spread above the ARM rate.

19.19. For a complete discussion, see subsection Historical Results for Commercial Mortgages on page 474.

19.21. For a complete discussion, see subsection Mortgage versus Property Risk and Return: Is There Positive Leverage? on page 477.

19.23. Macaulay duration = 5.54 years; Modified duration = 5.03 years. Calculated as follows:

Assume a Loan of $100

(1) Month t	(2) Mortgage CF	(3)=(2)*(1) CF*t	(4)=PV[(3) PV[CF*t]	(5)=(4)/LOAN/12 Macaulay Duration (yrs.)	(6)=(5)/(1.10) Modified Duration (yrs.)
0			6,645.07	5.54	5.03
1	0.8333	0.8333			
2	0.8333	1.6667			
3	0.8333	2.5000			
4	0.8333	3.3333			
5	0.8333	4.1667			
6	0.8333	5.0000			
7	0.8333	5.8333			
8	0.8333	6.6667			
9	0.8333	7.5000			
10	0.8333	8.3333			
11	0.8333	9.1667			
12	0.8333	10.0000			
.	.				
.	.				
.	.				
92	0.8333	76.6667			
93	0.8333	77.5000			
94	0.8333	78.3333			
95	0.8333	79.1667			
96	100.8333	9,680.00			

19.25. $dur_E \approx (dur_A - dur_L)(A/E) = (5 - 1.5)\ (1/0.05) = (3.5)\ (20) = 70$ years

*19.27. $1 + r_5 = (1 + YTMZ_5)^5/(1 + YTMZ_4)^4 = 1.065^5/1.0625^4 = 1.370087/1.274429 = 1.075$. Thus, the expected year 5 short-term rate (the year 5 forward rate) is $r_5 = 1.075 - 1 = 0.075 = 7.5\%$.