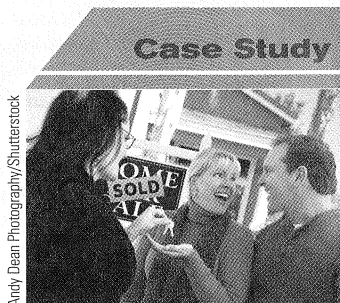


48. When he retires, how much of Percy Egan's retirement fund will have resulted from the company contribution? (See Exercise 46. The company began contributing \$800 per month to his retirement fund when he was hired 5 years ago. Assume the rate of return from Sleepy Hollow has been unchanged.)
49. (See Exercise 45.) Jane Callahan actually wants to retire with \$500,000. How much should she contribute each month to the annuity?
50. (See Exercise 46.) Percy Egan actually wants to retire with \$600,000. How much should he contribute each month to the annuity?
51. (See Exercise 45.) On second thought, Callahan wants to be in a position to draw at least \$5,000 per month for 30 years after her retirement. She feels she can invest the proceeds of her retirement annuity at 8.7% per year in perpetuity. Given the information in Exercise 45, how much will she need to contribute to the plan starting now?
52. (See Exercise 46.) On second thought, Egan wants to be in a position to draw at least \$6,000 per month for 25 years after

his retirement. He feels he can invest the proceeds of his retirement annuity at 7.8% per year in perpetuity. Given the information in Exercise 46, how much will he need to contribute to the plan starting now?

Actually, Jane Callahan is quite pleased with herself; 1 year ago she purchased a \$50,000 government bond paying 7.2% per year (with interest paid every 6 months) and maturing in 10 years, and interest rates have come down since then.

53. The current interest rate on 10-year government bonds is 6.3%. If she were to auction the bond at the current interest rate, how much would she get?
54. If she holds on to the bond for 6 more months and the interest rate drops to 6%, how much will the bond be worth then?
55. □ Jane suspects that interest rates will come down further during the next 6 months. If she hopes to auction the bond for \$54,000 in 6 months' time, what will the interest rate need to be at that time?
56. □ If, in 6 months' time, the bond is auctioned for only \$52,000, what will the interest rate be at that time?



Case Study

Adjustable Rate and Subprime Mortgages

The term **subprime mortgage** refers to mortgages given to home buyers with a heightened perceived risk of default, as when, for instance, the price of the home being purchased is higher than the borrower can reasonably afford. Such loans are typically **adjustable rate** loans, meaning that the lending rate varies through the duration of the loan.* Subprime adjustable rate loans typically start at artificially low "teaser rates" that the borrower can afford, but then increase significantly over the life of the mortgage. The U.S. real estate bubble of 2000–2005 led to a frenzy of subprime lending, the rationale being that a borrower having trouble meeting mortgage payments could either sell the property at a profit or re-finance the loan, or the lending institution could earn a hefty profit by repossessing the property in the event of foreclosure.

Mr. and Mrs. Wong have an appointment tomorrow with you, their investment counselor, to discuss their plan to purchase a \$400,000 house in Orlando, Florida. They have saved \$20,000 for a down payment, so want to take out a \$380,000 mortgage. Their combined annual income is \$80,000 per year, which they estimate will increase by 4% annually over the foreseeable future, and they are considering three different specialty 30-year mortgages:

Hybrid: The interest is fixed at a low introductory rate of 4% for 5 years, and then adjusts annually to 5% over the U.S. federal funds rate.†

Interest-Only: During the first 5 years, the rate is set at 4.2% and no principal is paid. After that time, the mortgage adjusts annually to 5% over the U.S. federal funds rate.

Negative Amortization: During the first 5 years, the rate is set at 4.7% based on a principal of 60% of the purchase price of the home, with the result that the balance on the principal actually grows during this period. After that time, the mortgage adjusts annually to 5% over the U.S. federal funds rate.

* In an adjustable rate mortgage, the payments are recalculated each time the interest rate changes, based on the assumption that the new interest rate will be unchanged for the remaining life of the loan. We say that the loan is **re-amortized** at the new rate.

† The U.S. federal funds rate is the rate banks charge each other for loans and is often used to set rates for other loans. Manipulating this rate is one way the U.S. Federal Reserve regulates the money supply.

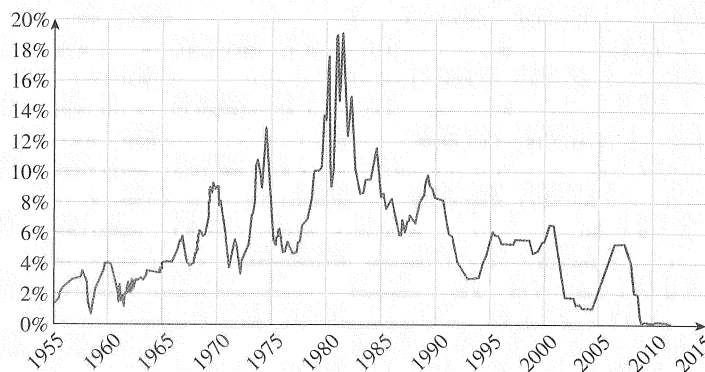
Federal Funds Rate History
(Effective Rate 1955–2011)Source: Board of Governors of the Federal Reserve System (www.federalreserve.gov)

Figure 3

You decide that you should create an Excel worksheet that will compute the monthly payments for the three types of loan. Of course, you have no way of predicting what the U.S. federal funds rate will be in over the next 30 years (see Figure 3 for historical values), so you decide to include three scenarios for the federal funds rate in each case:

Scenario 1: Federal funds rate is 4.25% in year 6 and then increases by 0.25% per year.

Scenario 2: Federal funds rate is steady at 4% during the term of the loan.

Scenario 3: Federal funds rate is 15% in year 6 and then decreases by 0.25% per year.

Each worksheet will show month-by-month payments for the specific type of loan. Typically, to be affordable, payments should not exceed 28% of gross monthly income, so you will tabulate that quantity as well.

Hybrid Loan: You begin to create your worksheet by estimating 28% of the Wongs' monthly income, assuming a 4% increase each year (the income is computed using the compound interest formula for annual compounding):

	A	B	C	D	E	F	G	H
		28% of Monthly Income	Interest Rate				Monthly Payment	
1	Year		Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
2								
3		$1 = 0.28 * 80000 * (1.04)^{(A3-1)/12}$						
4		2						
5		3						
		4						
30		28						
31		29						
32		30						