

**Economics 70, Personal Finance:
Making Better Decisions and Building a Better Financial System**

Assignment 3, due on Canvas by 11:59pm on Wednesday September 27

1. Research credit cards.

Go to <https://www.bankrate.com/finance/credit-cards/todays-best-credit-cards/>. Scroll down to find the section “Types of credit cards”. Under what circumstances should you choose each of the following types of credit cards? Explain the rationale in each case.

- a) Cash back card.
- b) Travel rewards card.
- c) Balance transfer card.
- d) Card with an introductory 0% APR for purchases.
- e) Student card.

2. Morduch and Schneider, *The Financial Diaries*.

- a) In *The Financial Diaries*, Jonathan Morduch and Rachel Schneider describe the volatile incomes that many Americans have. Based on the accounts in the book, what are the reasons why each of the following experience volatile income?
 - i. Janice Evans.
 - ii. Jeremy Moore.
 - iii. Workers supervised by Elaine Sullivan.
- b) The same book describes volatile spending needs. Based on the account in the book, list at least four types of unexpected spending needs that cause financial problems for Sam and Sarah Johnson during the period of the study.

3. APR on an installment loan.

You buy a washing machine for \$1,500 using an installment loan that charges you \$140 per month for 12 months.

- a) How much interest do you pay in total over the 12 months? What is the ratio of that interest to the principal of the loan (the cost of the washing machine)?
- b) Use the approximate formula for installment loans to calculate the APR on the loan. Why is this different from the ratio you calculated in part a)? Explain in words.
- c) Read the slides on the approximate APR formula for installment loans. The following Excel spreadsheet exercise will help you understand this formula better. In the spreadsheet `Econ70_Assignment3_Question3.xlsx`,
 - Enter the total interest you pay in cell D1.
 - Suppose that for each monthly payment, the same amount of the payment goes to the principal. Calculate the principal paydown for different numbers of payments (N) in cells B4 – I4.
 - Cells B7 - B8 and C7 – C9 show the histories of remaining principal for a one-payment installment loan and a two-payments installment loan. Fill in the histories for $N = 4, 6, 12, 24, 36, 48$.
 - Cells B5 – I5 automatically calculate the average principals for you. The simplified APR formula just divides the total interest paid by the average principal balance over the year. In Cells N4 – N11, calculate the approximate APR.
 - The figure plots the trend of the average principal balance and the approximate APR for you. Comment on what you see.
- d) The exact APR for any loan should be calculated using the annuity formula. Explain in words how that approach differs from the approximate formula used in part c). Clue: The difference is small for a short-term loan (as in this example of a 12-month installment loan), but becomes substantial for a long-term loan (such as a 30-year mortgage). Hence, the approximate formula should only be used for installment loans and other short-term loans.

4. Retirement savings.

- a) You are talking to your uncle about his plan to retire this year. He says “I plan to consume \$100,000 in each year of my retirement, which I expect to last 30 years. I have \$1.5m in my retirement account and I expect to earn an average return of 4% per year on that money. Since I have no children and I intend to die with no money left, I can consume \$60,000 of interest plus $1/30^{\text{th}}$ of the \$1.5m each year. That comes to \$110,000 so my retirement plan is conservative.” Do you agree? Why or why not? If you disagree, please explain which part of your uncle’s argument is wrong.

Use the Excel spreadsheet Econ70_Assignment3_Question4.xlsx to answer this question. Read the instructions at the top of the spreadsheet carefully and complete steps 1 and 2 for this part of the question. This should help you see if your uncle’s plan is viable or not.

- b) If you take your uncle’s 4% return as given, what constant level of spending can he maintain over 30 years given his \$1.5m in retirement assets today? First solve the question by hand using the equation given in the lecture slides. Then verify this is the correct answer following the instructions under step 3 in the Excel spreadsheet.
- c) In parts a) and b), we did not say anything about inflation. Comment on how inflation should affect retirement planning. Should a real or nominal rate of return be used in calculations like the one in part b)?