

IEMS 326, Homework 2, Due 10/29/2012

1. A relatively new company called “Lending Club” allows individuals to invest as little as \$25 in individual loans to consumers. Thus an investor seeking with \$1000 to invest can split the money among 40 different loans (investing \$25 in each). Suppose 10 of these loans are grade A, 20 are grade C, and the remaining 10 are grade E. Grade A loans have a 7% APR, grade C loans a 12% APR, and grade E loans an 18% APR (i.e., interest rate compounded monthly). Suppose each loan has 36 equal monthly payments, and suppose that the probability of default is 3% for grade A loans, 8% for grade C loans, and 15% for grade E loans. Suppose that loans which default will make exactly 5 payments before defaulting. What is the overall fraction of the investor’s loans which are expected to default? If no loans default (only for this question), then what is the monthly payment that the investor will receive? Assuming (loans can default and) no reinvestment of the monthly payments (i.e., they just sit in the bank account earning no interest), how much money does the investor expect to receive after three years? What is the corresponding effective annual interest rate (i.e., the annual rate of return)? Make a histogram of the amount of money the investor receives after three years.

2. Mortgages are slightly more complicated than we’ve talked about in class. So in this problem I will let you do some modeling (which means that there isn’t a single right answer, though there are still wrong ones). Note that the interest paid on a mortgage can be deducted from taxes, that is if \$100 of your mortgage payments go to interest, then your taxes are reduced by  $t \cdot 100$ , where  $t$  is your marginal tax rate. I am currently renting a condo for \$1100/mo. I have the opportunity to buy it for \$200,000. If I buy it, then I must pay yearly condo fees of \$1400 and taxes of \$1800. The current mortgage rates assuming a 20% down payment are 3.46% for a 30-year fixed rate and 2.84% for a 15-year fixed rate. Assume \$5000 in fees for purchasing (for the mortgage, closing costs, etc.) and a marginal tax rate of 31%. Should I buy the condo? Is there any reason to wait 6 months before buying? If I expect to sell the house in five years, how sensitive is my decision on the selling price? Help me decide what to do (this might involve a decision tree). Make realistic assumptions for stuff that you don’t know. Please clearly describe your assumptions and what you suggest I do. Limit your answer to no more than 1.5 pages. You may not be able to deal with all these issues in the allotted space, so do your best (and focus on those that you think are important). Be very clear on what you think the bottom line is (i.e., what you recommend).