

Compound interest assignment

[Business](#)



MODULE 5 SESSION LONG PROJECT Take the current amount you have in your checking or savings account. Suppose you have a choice of keeping your money for five years in a savings account with a 2% interest rate, or in a five year certificate of deposit with an interest rate of 4.5%. Calculate how much interest you would earn with each option over five years time with continuous compounding. I'm going to do this for my checking and savings account amount

Checking Account

$A = Ce^{RT}$ My total money in the checking account is 2100 dollars Since the formula for the continuous compounding is $A = Ce^{RT}$ where C is the initial deposit or capital, T for time, R is the rate of interest and A will be the final amount. Capital = 2100, Interest Rate (R) = 2% Time (T) = 5 years, $e = 2.7182818284$ When money kept for five years in a savings account with a 2% interest rate: By using the values into formula: $= 2100 e^{(0.02 \cdot 5)} = 2318.57$ Interest earned = $2318.57 - 2100 = 218.57$ dollars Five year certificate of deposit with interest rate of 4.5%. So $A = Ce^{RT} = 2100e^{4.5 \cdot 5} = 2680.19 - 2100 = \516.98 Savings Account = $P \cdot e^{rt} = Pe^{(0.02 \cdot 5)} = Pe^{0.1} = 1.105171P$ Therefore, Interest = $A - P = 0.105171P$ Amount with certificate of deposit account = $P \cdot e^{rt} = Pe^{(0.045 \cdot 5)} = Pe^{0.225} = 1.252323P$ Therefore, Interest = $A - P = 0.252323P$ $A = 10,000e^{(.02 \cdot 5)} = \11051.71 ; - 2% $A = 10,000e^{(.045 \cdot 5)} = \$12,523.23$ <- 4.5% (I would opt for the CD)

While the CD generates more interest in this case, the question becomes the nature of a CD itself. CD's have a maturity date, and though the money can be pulled out before the said date, in most cases a penalty will occur from the issuer. In my case I would prefer the CD because I have alternate income

and other savings that I could pull from in the case of an emergency. I think you should diversify to satisfy your personal and plan B emergency needs. For example if I were to put all my savings into high risk, high return stocks I have the potential to gain greatly or lose it all. Therefore I would only put into something of that nature what I could afford to lose. Well a CD doesn't seem that risky (well we'll see with the whole bailout deal); sometimes the reward can dampen other personal needs. I have to know I have a certain amount of money available, or the gains are worth the risk if I have to pull the money out before maturity. In this case in my current situation if I was given the same example as above I would opt for the CD.