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MSDS 8390

Question 1

1. For option B, it has an accounting profit of $300k. This is calculated by revenue ($600k) – expenses ($300k). For option C, it has an accounting profit of $250k. This is calculated by revenue ($800k) – expenses ($550k). Even though this option brings in more revenue, it’s costs are higher than B’s. For option A, you keep your salaried $150,000 job and invest your $1,000,000 into the market every year. This value will rise as the years go assuming the same rate of return(10%) because you will keep reinvesting your capital into the market. This gives a profit in the first year of $250,000. However, this number will increase over time if you reinvest earnings.
2. With the economic profit we must take into account that in options B & C, you have an implicit loss from wages forgone ( - $150,000). This means that option B brings a profit of $150k and option C bring a profit of $100k. The economic profit does not change for option A. Therefore, option A is better than option B or C. Option B is better than option C.
3. From the perspective of opportunity cost, the best option is option A. If you reinvest your annual return into the $1M you started to invest, you will eclipse options B & C’s accounting profit in 5 years and it will keep growing. If you reinvest your salary every year as well, you will eclipse option B & C’s accounting profit in 3 years.

Question 2

The rule of 72 is a simple rule for, assuming a fixed annual rate of return, determining how long an investment would take to double your money invested. For an annual return of 7.2%, we will calculate 72 / 7.2 = 10. Therefore, it will take 10 years to double one’s investment at this annual return of 7.2%.

Question 3

1. A change in the stock price would cause a change along the demand curve. This is because the demand curve is demand vs price. If the price goes up, the demand will decrease. If the stock price goes down, demand will increase.
2. A change of the demand curve, also called a shift, would be caused by a factor other than price affecting the demand of the stock. This could be due to buyers having an increased income, changes in trends, or expected future prices.

Question 4

1. Inflation is when the prices of goods rise while the worth of currency simultaneously falls. This means that goods become more expense relative to what they were previously. I can be caused by having too much currency in circulation.
2. Deflation occurs when the cost of goods is lowered while the worth of currency simultaneously rises. It can be caused by decreasing the amount of currency in circulation.
3. If inflation was to be known to continue and rise, then consumers would be more likely to spend money today instead of tomorrow. This is because as inflation increases, it becomes more expensive to buy goods. For example, with inflation, $80 of groceries for a couple may become $90 next week for the same amount of groceries due to inflation. This means that one’s purchasing power will be strongest before inflation continues.

Question 5

All of the code for the following function quicksort is credited to Jason A. French from <http://www.jason-french.com/blog/2014/07/26/recursion-in-r/>. I created the part that creates random numbers and then applies them to the quicksort function. A recursive function is a function that calls itself. The code seems to take a vector and split it into two categories, the sorted and the not yet sorted.

> #!/usr/bin/env Rscript

> # Author: Jason A. French

>

> quickSort <- function(vect) {

+ # Args:

+ # vect: Numeric Vector

+

+ # Stop if vector has length of 1

+ if (length(vect) <= 1) {

+ return(vect)

+ }

+ # Pick an element from the vector

+ element <- vect[1]

+ partition <- vect[-1]

+ # Reorder vector so that integers less than element

+ # come before, and all integers greater come after.

+ v1 <- partition[partition < element]

+ v2 <- partition[partition >= element]

+ # Recursively apply steps to smaller vectors.

+ v1 <- quickSort(v1)

+ v2 <- quickSort(v2)

+ return(c(v1, element, v2))

+ }

> numlist <- sample(1:100,10)

> quickSort(numlist)

[1] 18 19 23 27 30 32 63 66 74 90

> numlist

[1] 63 74 23 32 90 27 66 18 19 30

>

Question 6

1. The R code “ confint(jour\_lm, level = 0.99) “ is calculating a confidence interval from jour\_lm with 99% confidence. This means that the confidence interval given will be a very conservative estimate. Jour\_lm is performing a regression from the data “Journals”, and after log transforming it, regressing “subs” over “citeprice”. It outputs that the intercept of the regression equation is between [4.65, 4.91] with 99% certainty and that the log(citeprice) is between [-0.62, -0.44] with 99% certainty.
2. The R code “ linearHypothesis(jour\_lm, “log(citeprice) = -0.5”) “ performs a hypothesis test on jour\_lm. We are testing the null hypothesis that log(citeprice) = - 0.5. The output gives a F statistic of 0.3546. With an alpha of 0.05, this means that our alpha value is smaller than our F statistic meaning we should not reject the null hypothesis.