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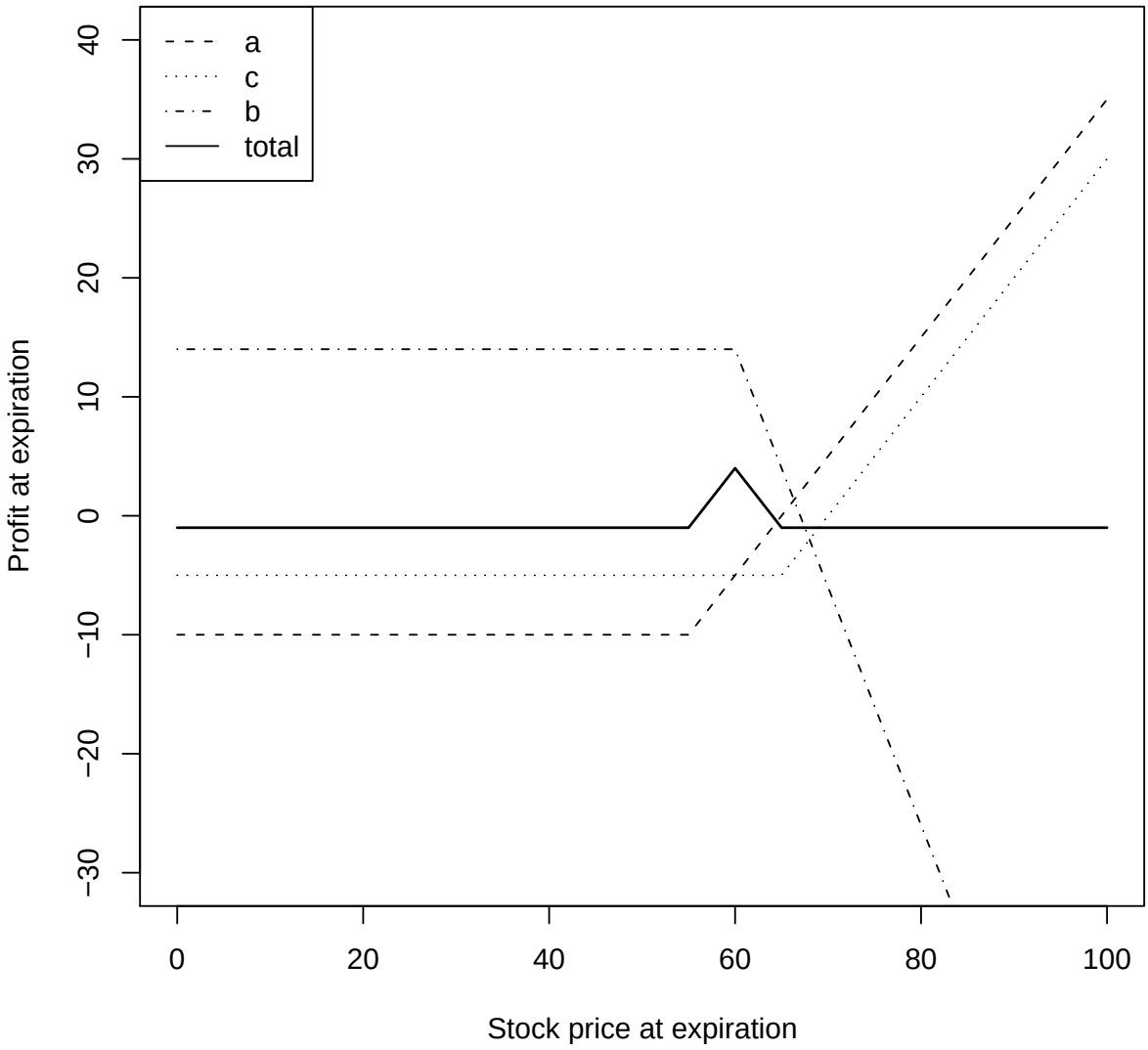
Department of Statistics

Statistics 19 **Instructor: Nicolas Christou**

Butterfly spread using R

```
#Butterfly spread:
#Create a vector with possible values of the stock at expiration.
s1 <- c(seq(0,55,5), seq(56,64,1), seq(65,100,5))

#(a) Buy one call with:
E1 <- 55
C1 <- 10

#(c) Buy one call with:
E3 <- 65
C3 <- 5

#(b) Sell two calls with:
E2 <- 60
C2 <- 7

#Profit from (a) at expiration:
x1 <- ifelse(s1 > E1, s1-E1-10, -C1)

#Profit from (c) at expiration:
x3 <- ifelse(s1 > E3, s1-E3-C3, -C3)

#Profit from (b) at expiration:
x2 <- ifelse(s1 > E2, 2*(E2-s1+C2), 2*C2)

#Total profit at expiration:
total <- x1+x2+x3

#The diagram:
plot(s1,x1, type="l", ylim=c(-30,40), ylab="Profit at expiration",
     xlab="Stock price at expiration", lty=2)
lines(s1,x3, lty=3)
lines(s1,x2, lty=4)
lines(s1,total, lwd=1.5)

legend("topleft", lty=c(2:4,1), legend=c("a", "c", "b", "total"))
```


a
c
b
total
Profit at expiration
40
30
20
10
0
−10
−20
−30
0
20
40
60
80
100
Stock price at expiration