# FNCE611 Problem Set 4

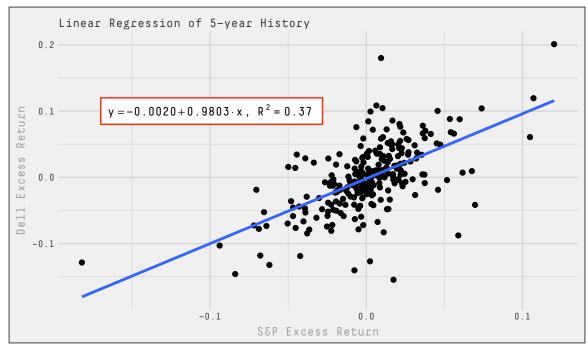
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# 1 Question 1

```
dell_data <- read_csv("fnce611_hw4.csv")
```

#### 1.1 Part a

```
lm1 <- lm(dell_excess_return ~ sp_excess_return, data = dell_data)</pre>
equation = function(x) {
 lm_coef <- list(a = formatC(coef(x)[1], digits = 4, format = 'f'),</pre>
                  b = formatC(coef(x)[2], digits = 4, format = 'f'),
                  r2 = formatC(summary(x)$r.squared, digits = 2, format = 'f'));
 lm_eq \leftarrow substitute(italic(y) == a + b \%.\% italic(x)*", "~~italic(R)^2~"="~r2,lm_coef)
 as.character(as.expression(lm_eq));
dell_data %>%
  ggplot(aes(x = sp_excess_return, y = dell_excess_return)) +
  geom_point() +
 geom_smooth(method = 'lm', se = FALSE) +
 annotate("rect", xmin = -.17, xmax = -.028, ymin = .08, ymax = 0.12, fill="white", colour = pal538[['red']]) +
  annotate("text", x = -0.1, y = 0.1, label = equation(lm1), parse = TRUE,
           family = "DecimaMonoPro", size = 3) +
 theme_jrf(users_v = 'rstudio') +
 labs(title = "Linear Regression of 5-year History", x = "S&P Excess Return",
       y = "Dell Excess Return")
```



```
beta <-
lm1 %>%
tidy() %>%
filter(term == "sp_excess_return") %>%
select(estimate) %>%
unlist() %>%
unname()
```

We find that  $\beta = 0.9803$ .

## 1.2 Part b

Dell's expected return is 0.0726.

#### 1.3 Part c

$$r_{dell} = r_f + \beta_{dell}(r_m + r_f) \tag{1}$$

$$= 0.0387 + 0.9803(0.0845 - 0.0387) \tag{2}$$

$$=0.0836$$
 (3)

- Pros:
- Cons:

## 1.4 Part d

```
variance <-
dell_data %>%
summarise(
  dell_var = sd(dell_return)^2 * 52
, sp_var = sd(sp_return)^2 * 52
)
```

Table 1: Annualized Variance of Dell and the market return

dell_var	sp_var
0.1342	0.0513

## 1.5 Part e

$$Var(r_{dell}) = \beta_{dell}^2 Var(r_m) + [\text{firm specific risk}]$$
 (4)

$$0.1342 = 0.9803^2 \cdot 0.0513 + [firm specific risk]$$
 (5)

Of Dell's sample variance, 0.1342, we can say that 0.0493 is from market risk and 0.0849 is firm specific risk.

- 2 Question 2
- 3 Question 3
- 4 Question 4