

# Econometrics Assignment 3

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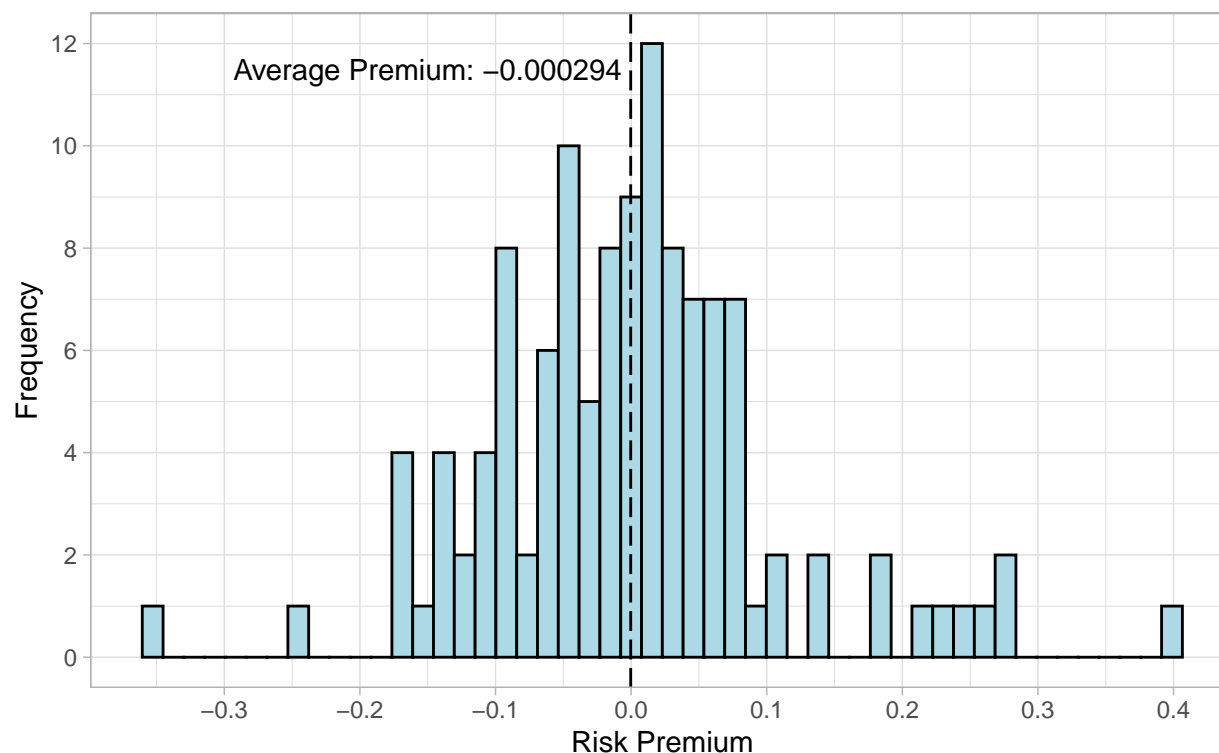
## C) Data Summary:

Variable	Mean	SD	Min	Max
General Motors Return	-0.0122	0.1291	-0.3893	0.2766
Microsoft Return	0.0023	0.1072	-0.3435	0.4078
Exxon-Mobil Return	0.0097	0.0538	-0.1165	0.2322
General Motors Risk Premium	-0.0147	0.1289	-0.3893	0.2714
Microsoft Risk Premium	-0.0003	0.1072	-0.3479	0.4038
Exxon-Mobil Risk Premium	0.0072	0.0537	-0.1195	0.2301
Market Return	0.0009	0.0464	-0.1847	0.0839
Market Risk Premium	-0.0017	0.0463	-0.1849	0.0819
Risk Free Return	0.0026	0.0014	0.0000	0.0052

## D)

### Distribution of Microsoft Risk Premium

Using data from 120 monthly observations from January 1999 – December 2008



## E)

Using OLS regression of company risk premium on the market risk premium, we find that the CAPM beta values for the three companies are as follows: Microsoft: 1.332; General Motors: 1.302; Exxon-Mobil: 0.395.

These security beta values suggest Microsoft and General Motors are more aggressive stocks - with Microsoft being slightly more aggressive - while Exxon-Mobil presents a more defensive position.

**F)**

```
null <- 1
se_msft <- 0.174326
beta_msft <- 1.33228
t_msft <- (beta_msft - null) / (se_msft)
p_msft <- 2*(1 - 0.9716)
# p-value Microsoft 0.0568

se_gm <- 0.22656
beta_gm <- 1.30222
t_gm <- (beta_gm - null) / (se_gm)
p_gm <- 2*(1 - 0.9082)
# p-value GM 0.1836

se_xom <- 0.1005
beta_xom <- 0.3945
t_xom <- (beta_xom - null) / (se_xom)
# p-value Exxon < 0.0001
```

Based on the above calculations, we find the p-value for Microsoft is 0.0568, which is greater than the alpha value of 0.05 at a 5% significance level. Therefore, we fail to reject the null hypothesis that the beta for Microsoft is equal to 1 at a 5% significance level. The p-value of General Motors is 0.1836, well above 0.05; we are unable to reject the null hypothesis that the beta of General Motors is 1. The p-value of Exxon-Mobil is extremely close to 0 and well below 0.05, meaning we are able to reject the null hypothesis that the beta of Exxon-Mobil is equal to 1.

**G)**

For a company in a given month, a factor that may contribute to the error term is a new product that increases the stock's monthly return above its normal performance.