



Do you want to be as smart as a Nobel laureate?

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The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2013



Eugene F. Fama, Lars Peter Hansen and Robert J. Shiller

"for their empirical analysis of asset prices"

S&P500 Index 1965-2013



Fama-French 3-Factor Model

$$r_{it} - r_{ft} = \alpha_i + \beta_{im}(r_{mt} - r_{ft}) + \beta_{is}SMB_t + \beta_{ih}HML_t$$

Excess Return of Asset =

Return by Effective Management +

Excess Return by General Market +

Size Premium as Measured by Capitalization +

Value Premium as Measured by Book/Market



Data Scientist Skills



```
prices <- na.locf(prices) # Copy last traded price when NA
# To make weekly returns, you must have this incantation:
monthly.prices <- aggregate(prices, as.yearmon, tail, 1)
# Convert monthly prices to monthly returns
r <- diff(log(monthly.prices))
r1 <- exp(r)-1
# Now shift out of zoo to become an ordinary matrix --
rj <- coredata(r1)
rj <- rj[1:120]
rjrf <- rj - rf
d <- lm(rjrf ~ rmrf + smb + hml) # FF model estimation.
print(summary(d))
```



```
Call:
lm(formula = rjrf ~ rmrf + smb + hml)
```

Residuals:

	Min	1Q	Median	3Q	Max
	-0.010823	-0.001461	-0.000252	0.001382	0.015389

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	-0.001749	0.000281	-6.22	8.1e-09	***
rmrf	0.995072	0.006006	165.67	< 2e-16	***
smb	-0.134611	0.010601	-12.70	< 2e-16	***
hml	0.030516	0.008340	3.66	0.00038	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.00298 on 116 degrees of freedom
Multiple R-squared: 0.996, Adjusted R-squared: 0.996
F-statistic: 1.01e+04 on 3 and 116 DF, p-value: <2e-16

Performance of Selected Equities Between 11/2008 & 10/2013

symbol	intercept	rmrf	smb	hml	R2
GE	-0.0038559	1.45239952	-0.4172285	1.17259738	0.75877429
AAPL	0.01476582	1.02141966	0.06330729	-0.4844512	0.25368132
LUV	-0.0066026	0.74488681	1.60127522	0.64579317	0.5605626
SPY	-0.0002201	1.00127462	-0.1569232	0.0218588	0.99809094
PG	0.00254373	0.56367688	-0.8327881	0.34030775	0.40188037
amzn	0.01448324	1.07191465	0.61736332	-1.7062493	0.2641298
cost	0.0086883	0.61196707	-0.2109416	0.30541223	0.39494548
ba	0.00661195	1.13550583	-0.3414494	0.48820615	0.51552055

Effective Management: APPL, AMZN

Outperformed Market: GE, APPL, AMZN, BA

Size Premium: LUV, AMZN

Value Premium: GE, LUV, PC, COST, BA