

Estimating the equity beta of Norsk Hydro, 2019

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In the CAPM, the *equity beta* of a stock is an estimate of the degree to which the stock covaries with the broad equity market, typically proxied by an broad stock market index.

If we let r_{it} be the stock return, and r_{mt} the market return, both observed at time t , the beta β_i is calculated as

$$\beta_i = \frac{\text{cov}(r_{it}, r_{mt})}{\text{var}(r_{mt})}$$

beta needs to be estimated.

Typical procedure: historical returns

- ▶ the stock
- ▶ stock market index.

Estimating NHY beta

Gather data: Internet

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S&P 500

2,878.38

+31.27 (+1.10%)



Dow 30

25,898.83

+269.93 (+1.05%)



Nasdaq

7,853.74

+101.97 (+1.32%)



Russell 2000

1,476.00

+16.52 (+1.13%)



Crude Oil

53.76

-0.41 (-0.76%)



U.S. Markets closed

Norsk Hydro ASA (NHY.OL)

Oslo - Oslo Delayed Price. Currency in NOK

Add to watchlist

Quote Lookup

27.03 -0.34 (-1.24%)

At close: 4:25PM CEST

Summary

Chart

Conversations

Statistics

Historical Data

Profile

Financials

Analysis

Options

Holders

Sustainability

1D 5D 1M 6M YTD 1Y 5Y Max

Full screen



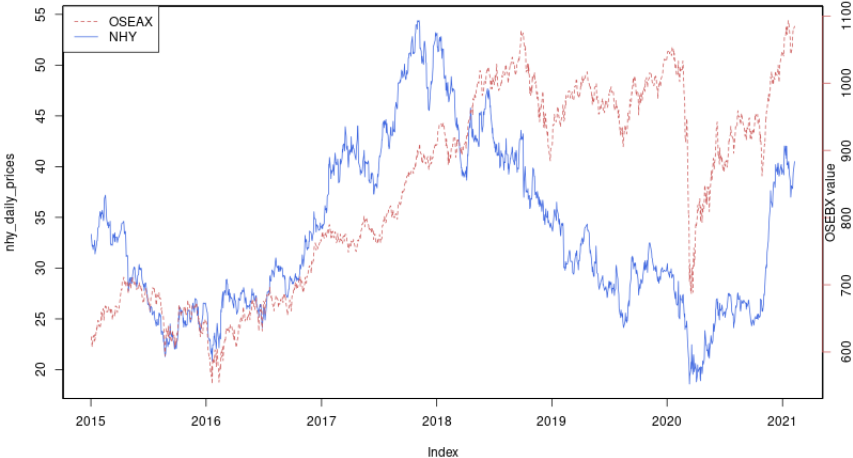
Estimating NHY beta

Date for estimation: Yearend.

Using data 2015-2019

Index choice: OSEAX.

Estimating NHY beta - evolution of index and NHY



Estimating NHY beta - actual calculation - in R

Actual estimation is illustrated using R (refer to your quantitative courses):

To calculate beta, read the data on NHY and the stock market index.

R actually has routine for downloading stock market data from Yahoo finance (and calculating returns).

```
getSymbols("NHY.OL",  
           from="2015-01-01",  
           source="yahoo")  
nhy_daily_prices <- na.omit(NHY.OL$NHY.OL.Adjusted)  
nhy_monthly_returns <- monthlyReturn(nhy_daily_prices)
```

Estimating NHY beta - actual calculation - in R

Align data:

```
> data <- merge(nhy_monthly_returns,  
               oseax_monthly_returns,all=FALSE)  
> data <- data["2015/2019"]  
> ri <- data[,1]  
> rm <- data[,2]
```

Estimate beta by direct calculation:

```
> beta <- cov(ri,rm)/var(rm)  
> print(beta)  
1.17
```

Estimating NHY beta - actual calculation - in R

Alternatively, estimate beta as the coefficient estimate of a regression with r_{it} (NHY return) as the dependent variable, and r_{mt} (stock index return) as explanatory variable:

$$r_{it} = a_i + \beta_i r_{mt} + \varepsilon_{it}$$

```
> regr <- lm(ri~rm)
```

<i>Dependent variable:</i>	
	ri
rm	1.172*** (0.297)
Constant	-0.010 (0.010)
Observations	59
Adjusted R ²	0.200

Note: *p<0.1; **p<0.05; ***p<0.01