

# Estimating the equity beta of Norsk Hydro, 2023

Bernt Arne Ødegaard

University of Stavanger

Sep 2023

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  $\beta_i$  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

## Norsk Hydro ASA (NHY.OL)

Oslo - Oslo Delayed Price. Currency in NOK

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**61.94** -1.82 (-2.85%)

As of 12:23PM CEST. Market open.

Summary

Chart

Conversations

Statistics

Historical Data

Profile

Financials

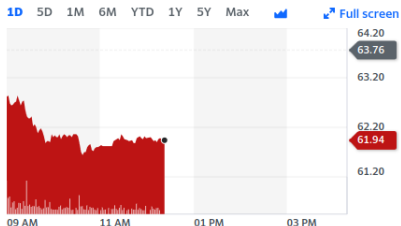
Analysis

Options

Holders

Sustainability

Previous Close	63.76	Market Cap	125.49B
Open	63.30	Beta (5Y Monthly)	1.41
Bid	61.96 x 1100	PE Ratio (TTM)	9.31
Ask	62.00 x 410000	EPS (TTM)	6.65
Day's Range	61.60 - 63.36	Earnings Date	Oct 24, 2023
52 Week Range	53.42 - 84.04	Forward Dividend & Yield	5.65 (9.12%)
Volume	1,226,086	Ex-Dividend Date	May 11, 2023
Avg. Volume	3,178,243	1y Target Est	80.00



## Estimating NHY beta

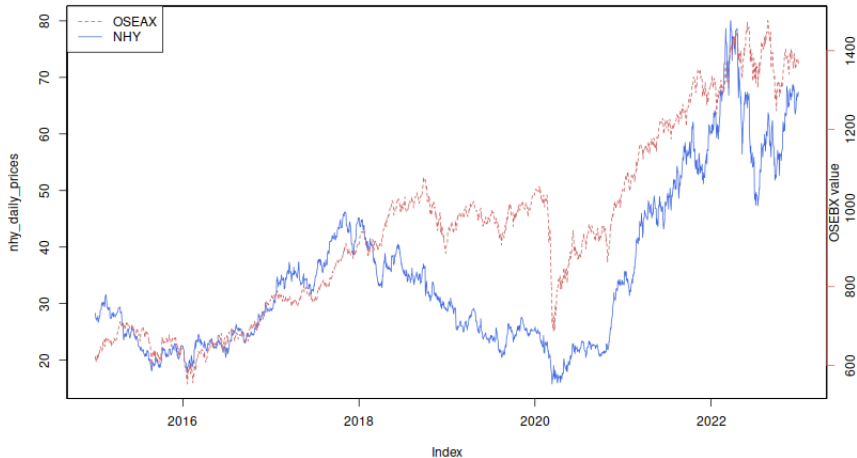
Date for estimation: Yearend 2022.

Using data 2015-2022.

Eight years of monthly returns.

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["2015/2022"]  
> ri <- data[,1]  
> rm <- data[,2]
```

Estimate beta by direct calculation:

```
> beta <- cov(ri,rm)/var(rm)  
> print(beta)  
1.49
```

## 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	1.494*** (0.190)
Constant	0.0003 (0.008)
Observations	95
Adjusted R <sup>2</sup>	0.394

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