Notes

Monday, August 22, 2022 9:26 AM

Myroslava Sánchez Andrade A01730712 | 19/08/2022

Interpretation of beta coefficients

The beta1 coefficient in the model reflects the magnitude, sign and significance of this relationship. The beta0 coefficient is the expected value of the dependent variable when the independent is zero.

- **Beta 1:** measure of the linear relationship between a dependent variable and an independent variable.
  If beta1 > 0 => on average the linear relationship will be positive.
  If beta1 < 0 => on average the linear relationship will be negative.

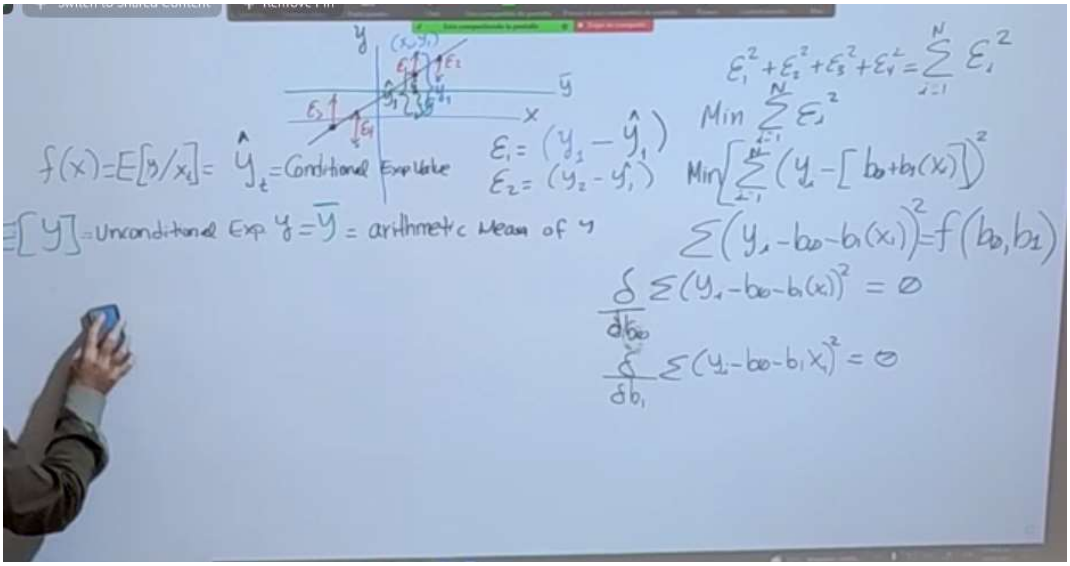
- **Beta0:** expected value of the dependent variable when the independent variable is equal to zero, thus the **intercept**. It defines how high or low the regression line will be.

Since beta0 and beta1 are linear combination of random variables, then according to the CLT, both will behave like a normal distributed variable with mean equal to their OLS estimated value and standard deviation equal to the OLS standard error.

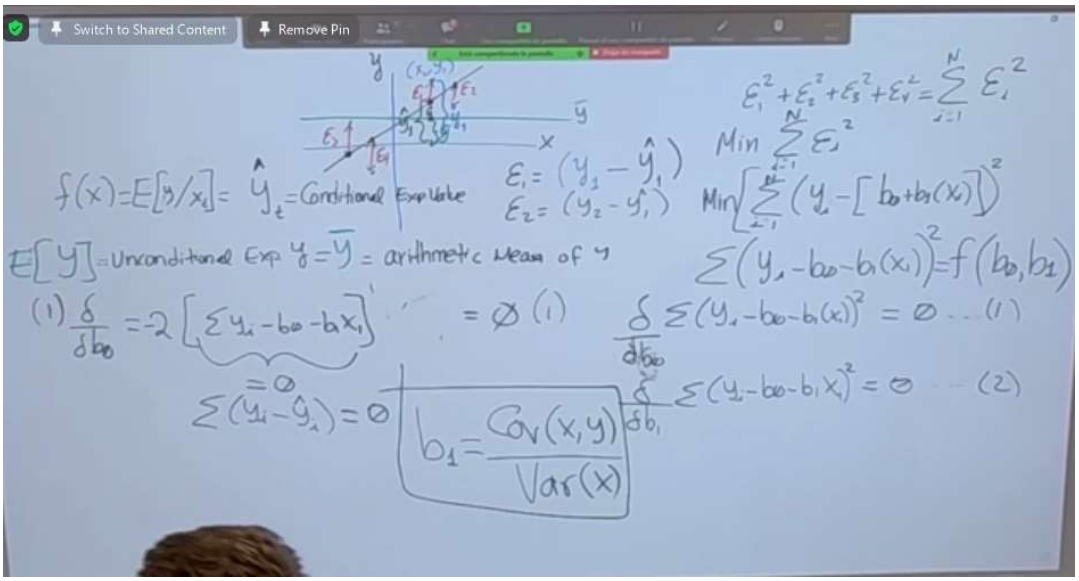
In a stock returns in comparation with the market returns:

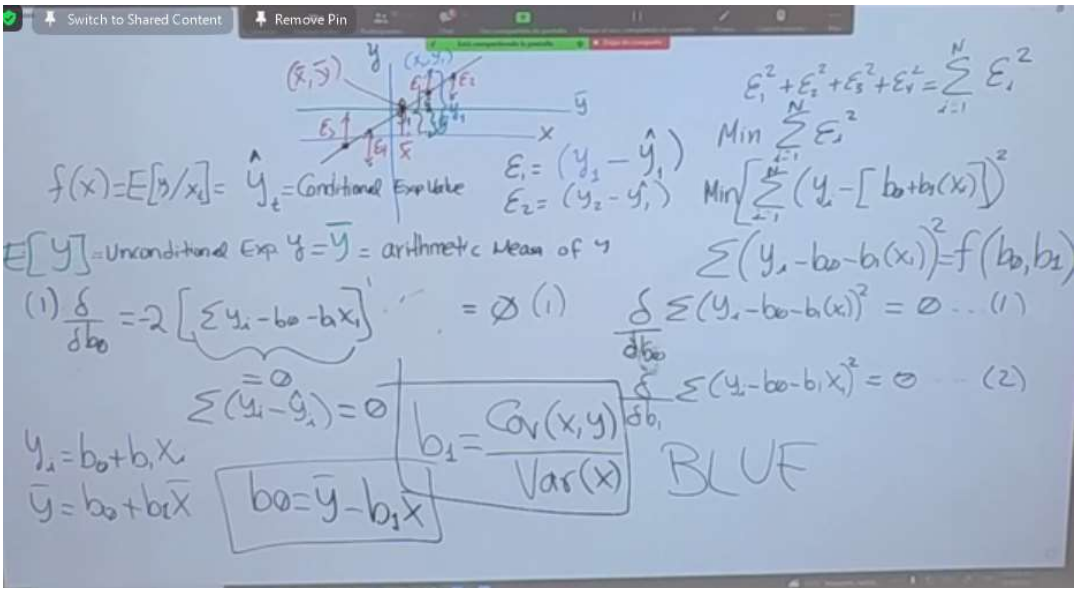
- If **beta1=1** or is **NOT significantly different than 1**, this means that the stock is practically **equally risky** than the market;
- if **beta1>1** and is **significantly bigger than 1**, this means that the stock is **significantly riskier** than the market;
- if **beta1<1** and is **significantly less than 1**, this means that the stock is **significantly less risky** than the market;
- if **beta1=0** and is **NOT significantly different than 0**, this means that the stock is **not significantly related to the market**.
- If **beta0=0** and is **NOT significantly different than 0**, this means that the stock is NOT offering excess returns or less returns over the market; in other words, when the market returns=0, it is expected that the stock also will have returns=0.
- if **beta0>0** and is **significantly greater than 0**, this means that the stock is significantly offering returns over the market; in other words, the stock is **significantly beating the market**. it is supposed that according to the efficient hypothesis in financial markets, there is NO stock, instrument or portfolio that systematically beats the market.
- if **beta0<0** and is **significantly less than 0**, this means that the stock is significantly offering returns bellow the market

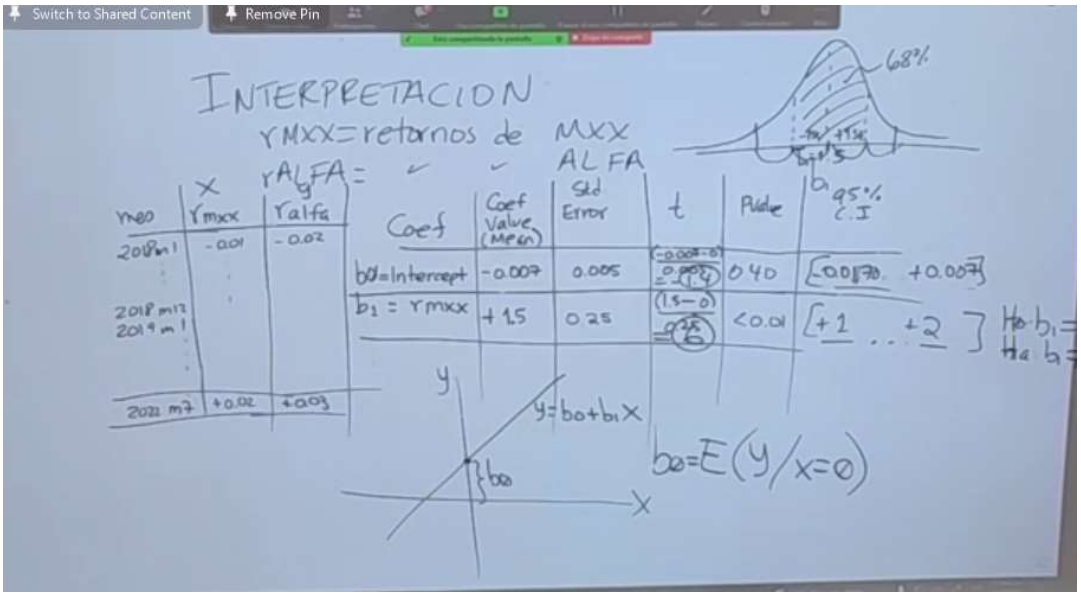
- beta coefficient (OLS BLUE - Best, Linear, Unbiased estimator). It is the mean value of its 95% Confidence Interval
- Standard error (SE) - the standard deviation of the beta coefficient; it is the average movement or variability that the beta will have with new data
- t-Statistic or tvalue - the # of standard deviations of the coefficient that the estimated beta value is away from the zero (the null value)
- pvalue - the probability that I will be wrong if I reject the null hypothesis, which states that the beta = 0.
- 95% confidence interval - the minimum and maximum possible values that the beta can have 95% of the time when new observations are considered.



Unconditional expected value = arithmetic mean
Conditional expected value = conditional mean = regression function




Switch to Shared Content
Remove Pin
$f(x)=E[y/x_i]=\hat{y}_t$ = Conditional Expected
$E[y]$ = Unconditional Exp $y=\bar{y}$ = arithmetic Mean of y
$\varepsilon_1=(y_1-\hat{y}_1)$
$\varepsilon_2=(y_2-\hat{y}_1)$
$\varepsilon_1^2+\varepsilon_2^2+\varepsilon_3^2+\varepsilon_4^2=\sum_{i=1}^{N}\varepsilon_i^2$
$\text{Min}\sum_{i=1}^{N}\varepsilon_i^2$
$\text{Min}\left[\sum_{i=1}^{N}(y_i-[b_0+b_1(x_i)])^2\right]$
$\sum(y_i-b_0-b_1(x_i))^2=f(b_0,b_1)$
$\frac{\delta}{\delta b_0}\sum(y_i-b_0-b_1(x_i))^2=0$ ... (1)
$\frac{\delta}{\delta b_1}\sum(y_i-b_0-b_1x_i)^2=0$ ... (2)
$(1)\ \frac{\delta}{\delta b_0}=-2\left[\sum y_i-b_0-b_1x_i\right]=0$ (1)
$\sum(y_i-\hat{y}_i)=0$
$y_i=b_0+b_1x_i$
$\bar{y}=b_0+b_1\bar{x}$
$b_0=\bar{y}-b_1\bar{x}$
$b_1=\frac{Cov(x,y)}{Var(x)}$
BLUE


Switch to Shared Content
Remove Pin
INTERPRETACION
rMXX=retornos de MXX
rALFA= ALFA
68%
$b_1=1.5$
mes | X rmxx | y ralfa
2018 m1 | -0.01 | -0.02
2018 m12
2019 m1
2022 m7 | +0.02 | +0.03
Coef | Coef Value (Mean) | Std Error | t | Pvalue | 95% C.I
b0=Intercept | -0.007 | 0.005 | (-0.007-0)/0.005 = -1.4 | 0.40 | [-0.0170 +0.003]
b_1 = rmxx | +1.5 | 0.25 | (1.5-0)/0.25 = 6 | <0.01 | [+1 .. +2]
Ho: b_1=
Ha: b_1≠
y
$y=b_0+b_1x$
b_0
x
$b_0=E(y/x=0)$