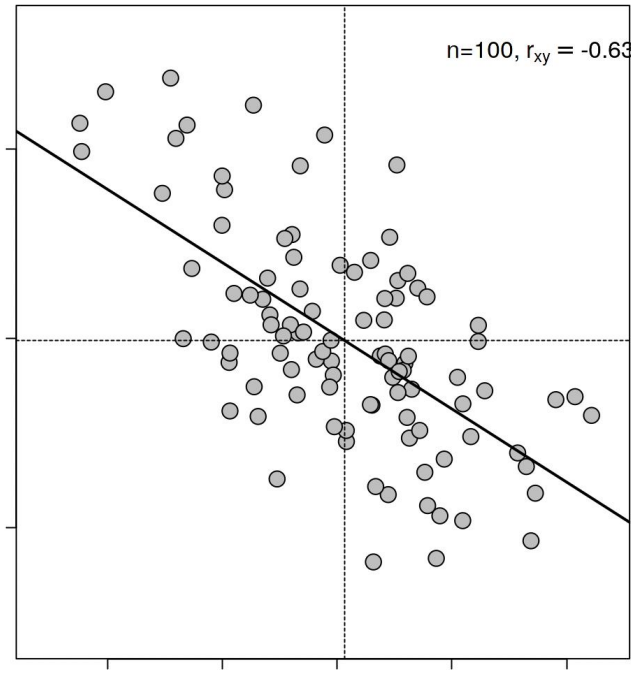
Fundamentals of Econometrics Models



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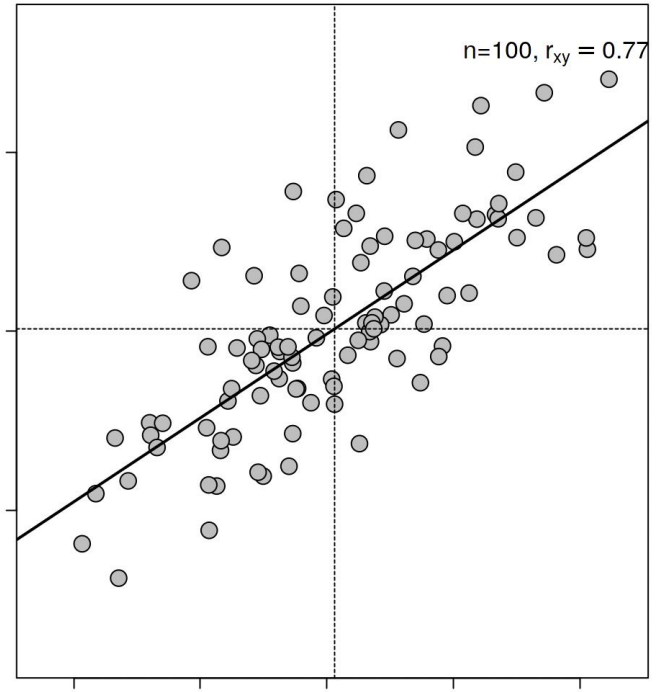


Quick reminder

What is a dependent variable?

It is the variable that we try to **explain or predict**. Usually, denoted by the letter Y.

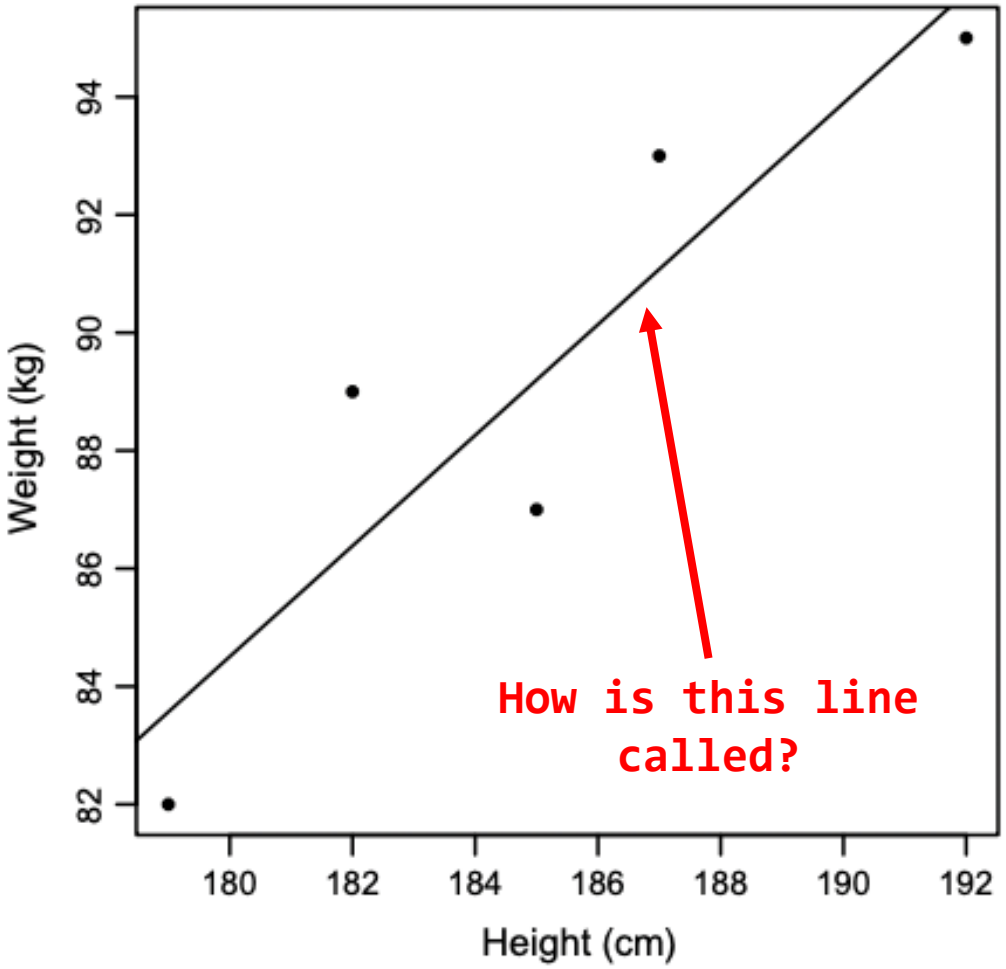
Quick reminder

What is an independent variable?

It is the variable that we use to **explain or predict** our dependent variable. Usually, denoted by the letter X.

Quick reminder

Regression line



Quick reminder

In this linear equation…

$$y = a + \beta x$$

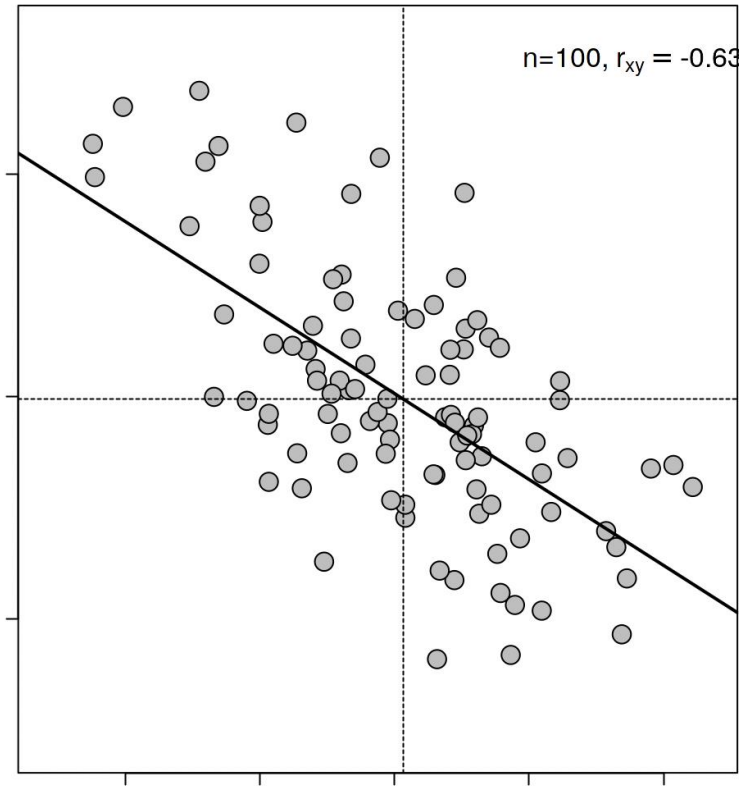
$$Weight = -83.47 + 0.94 * Height$$

What is the slope? And the intercept?

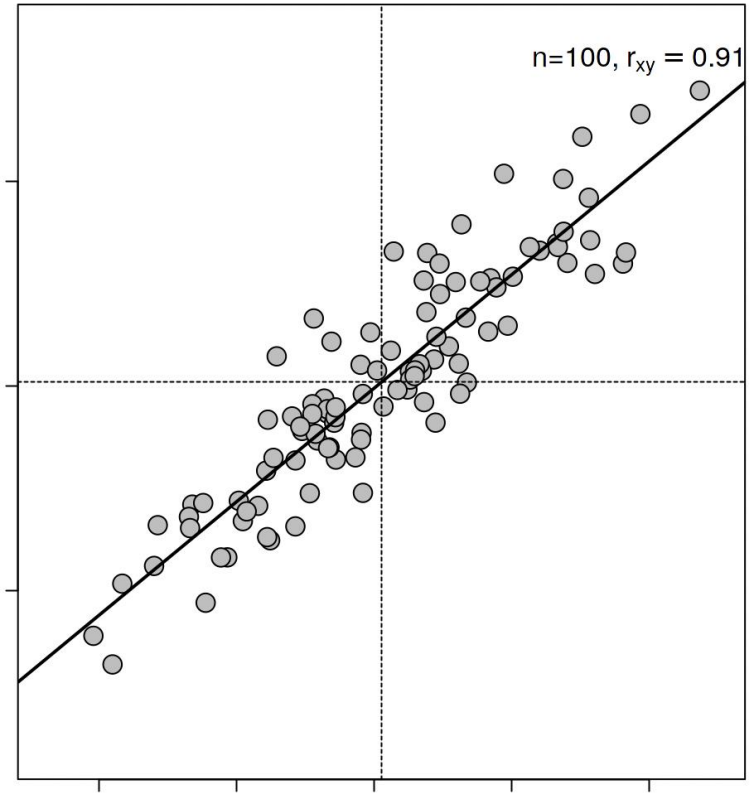
Slope = 0.93 (or β) and Intercept = -83.47 (or a)

Quick reminder

Which linear regression has a smaller error?

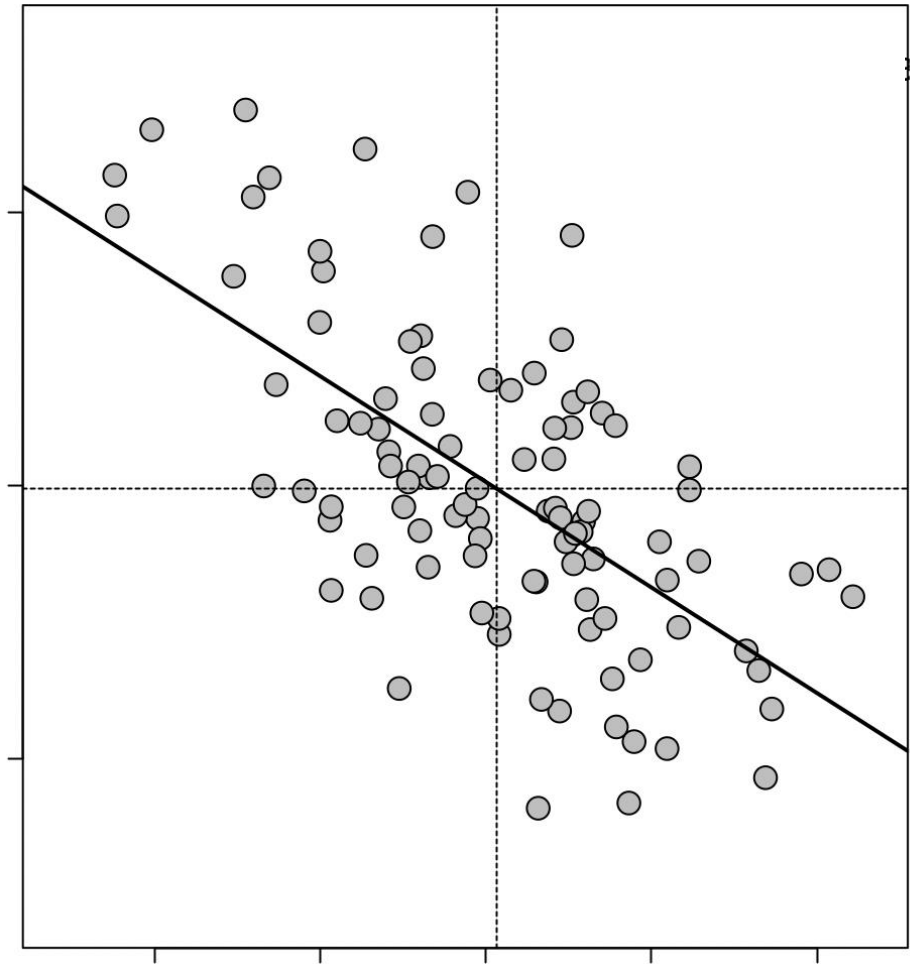


Bigger error



Smaller error

Quick reminder



Is there a correlation?

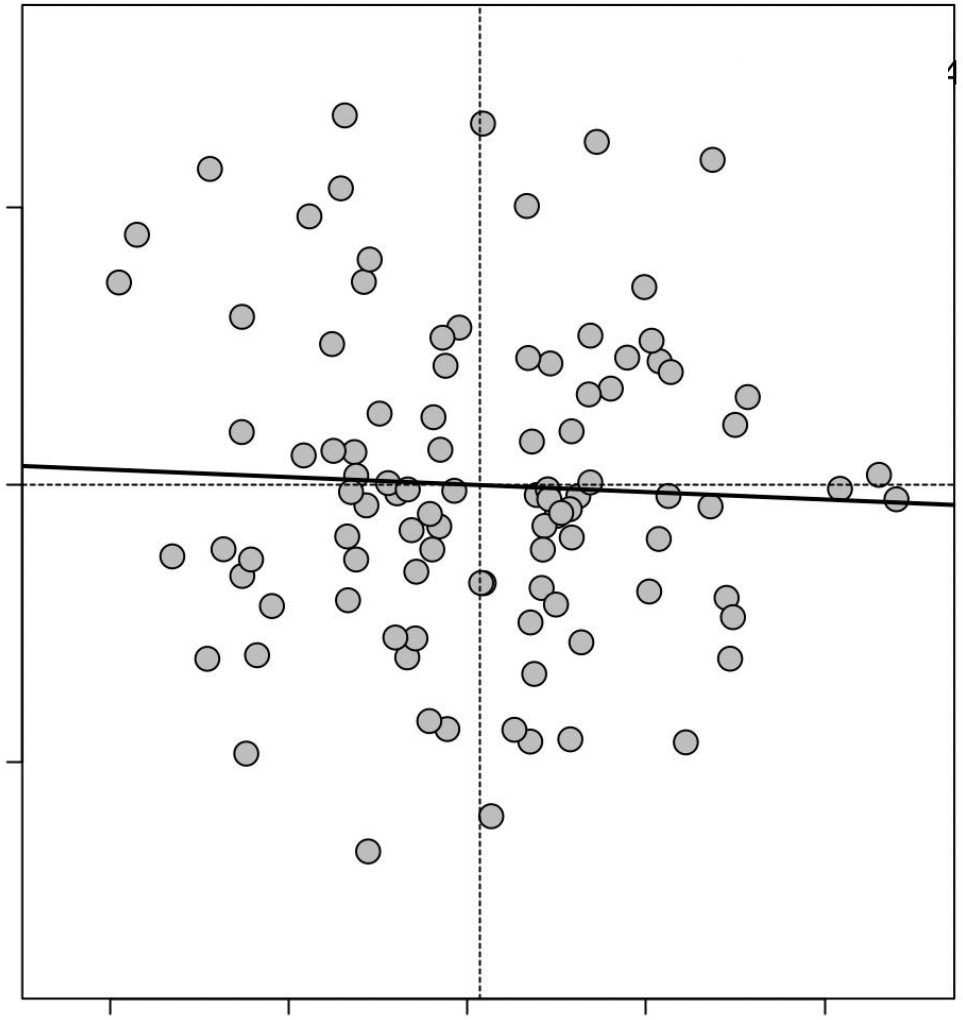
If so, positive or negative?

Weak or strong?

Can you guess the correlation coefficient (between -1 and 1)?

R = -0.63

Quick reminder



Is there a correlation?

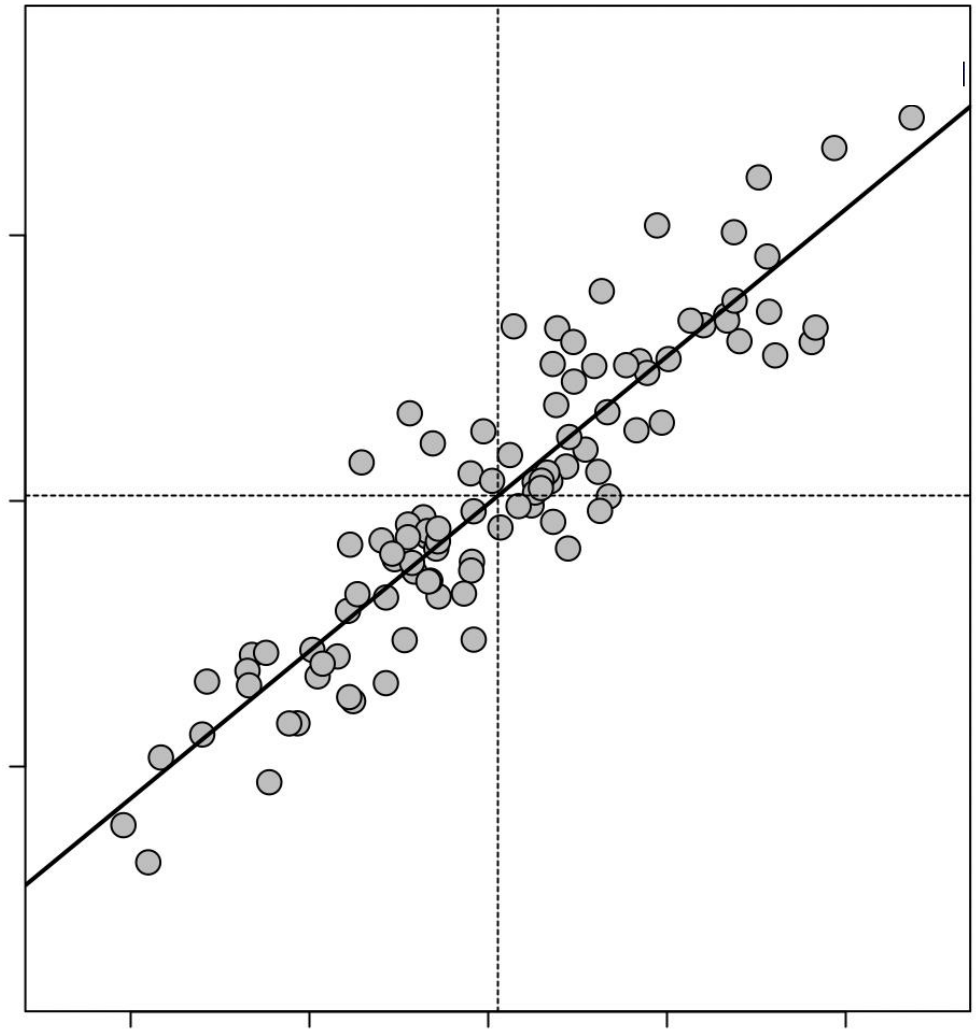
If so, positive or negative?

Weak or strong?

Can you guess the correlation coefficient (between -1 and 1)?

R = -0.04

Quick reminder



Is there a correlation?

If so, positive or negative?

Weak or strong?

Can you guess the correlation coefficient (between -1 and 1)?

R = 0.91

Practice for the final project

```
Call:
lm(formula = Mshare ~ TropPremium + Trop + MMaid + Aldi, data = dataset)

Residuals:
    Min      1Q  Median      3Q     Max
-8.9771 -2.9296 -0.6031  2.3847 16.6914

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  11.4101     8.2955   1.375    0.172
TropPremium   8.3962     6.9659   1.205    0.231
Trop         -4.1488     6.9982  -0.593    0.554
MMaid        -8.5738     0.7558 -11.343  < 2e-16 ***
Aldi          4.1263     0.7390   5.584 1.57e-07 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 4.519 on 116 degrees of freedom
Multiple R-squared:  0.5627,    Adjusted R-squared:  0.5476
F-statistic: 37.32 on 4 and 116 DF,  p-value: < 2.2e-16
```

	Dependent variable:			
	Resistance (1)	Resistance (2)	Resistance (3)	Resistance (4)
Cement	0.988*** (0.027)			0.846*** (0.056)
Additives		64.266*** (2.682)		
Water			0.196*** (0.067)	
Additives				15.160*** (5.284)
Water				-0.073 (0.065)
Constant	0.738 (7.150)	97.890*** (6.694)	211.884*** (14.240)	15.925 (14.846)
Observations	804	804	804	804
R2	0.617	0.417	0.011	0.623
Adjusted R2	0.617	0.417	0.009	0.621
Residual Std. Error	37.778 (df = 802)	46.616 (df = 802)	60.740 (df = 802)	37.563 (df = 800)
F Statistic	1,293.782*** (df = 1; 802)	574.388*** (df = 1; 802)	8.700*** (df = 1; 802)	439.929*** (df = 3; 800)
Note:				*p<0.1; **p<0.05; ***p<0.01

```
> model_parameters(z1, summary = TRUE)
Parameter    | Coefficient |   SE |          95% CI | t(116) |      p
-----------------------------------------------------------------------
(Intercept)  |       11.41 | 8.30 | [ -5.02, 27.84] |   1.38 | 0.172
TropPremium  |        8.40 | 6.97 | [ -5.40, 22.19] |   1.21 | 0.231
Trop         |       -4.15 | 7.00 | [-18.01,  9.71] |  -0.59 | 0.554
MMaid        |       -8.57 | 0.76 | [-10.07, -7.08] | -11.34 | < .001
Aldi         |        4.13 | 0.74 | [  2.66,  5.59] |   5.58 | < .001

Model: Mshare ~ TropPremium + Trop + MMaid + Aldi (121 Observations)
Residual standard deviation: 4.519 (df = 116)
R2: 0.563; adjusted R2: 0.548
```

Practice for the final project

Create groups of 3 or 4 people and sit next to each other

Practice for the final project

The main objective is to apply, at least, a multiple linear regression

Other techniques will add extra points to your grade

Practice for the final project

Minimum requirement

A multiple linear regression

Extra points

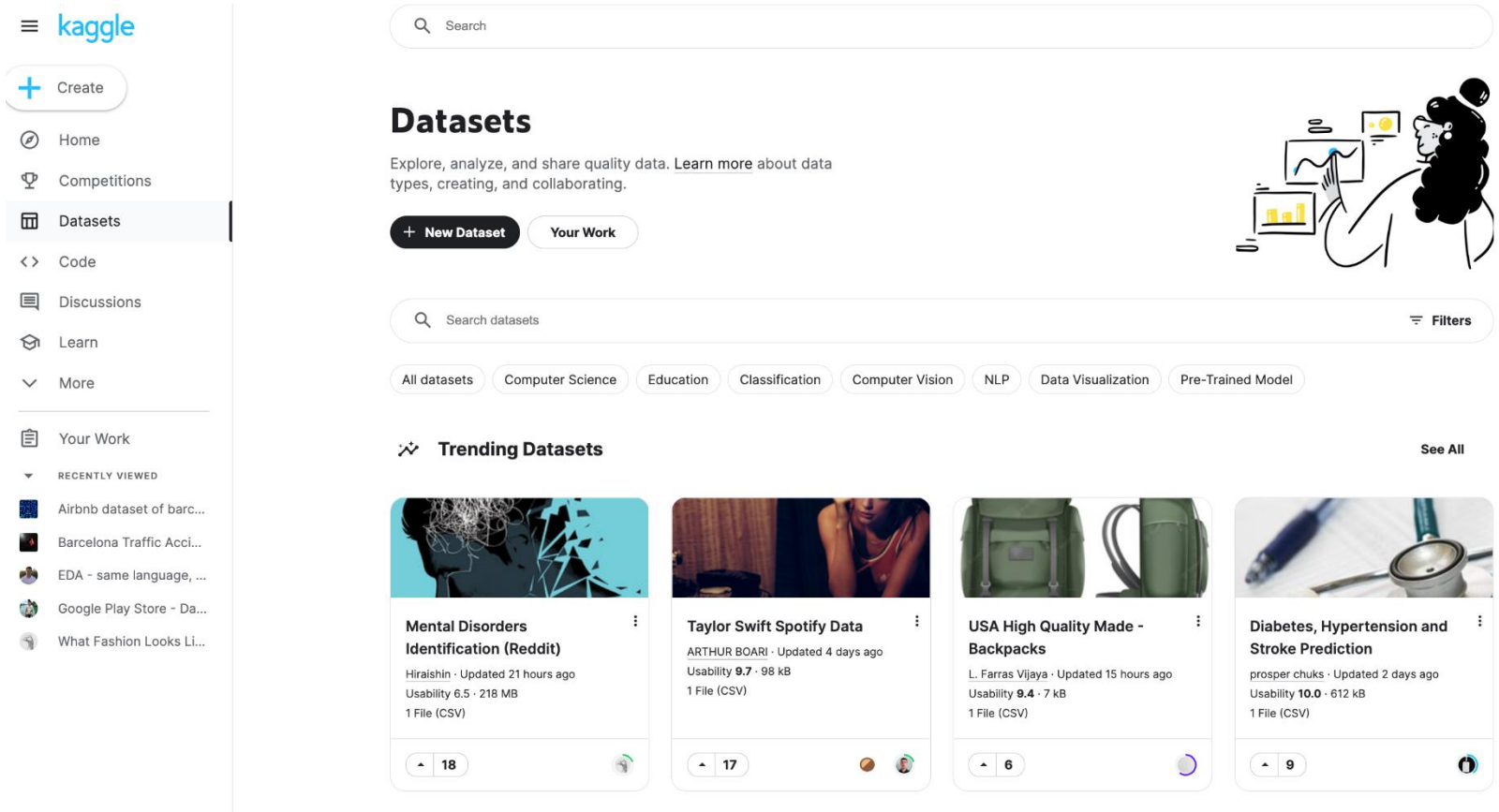
Several simple linear regressions

scatter plots

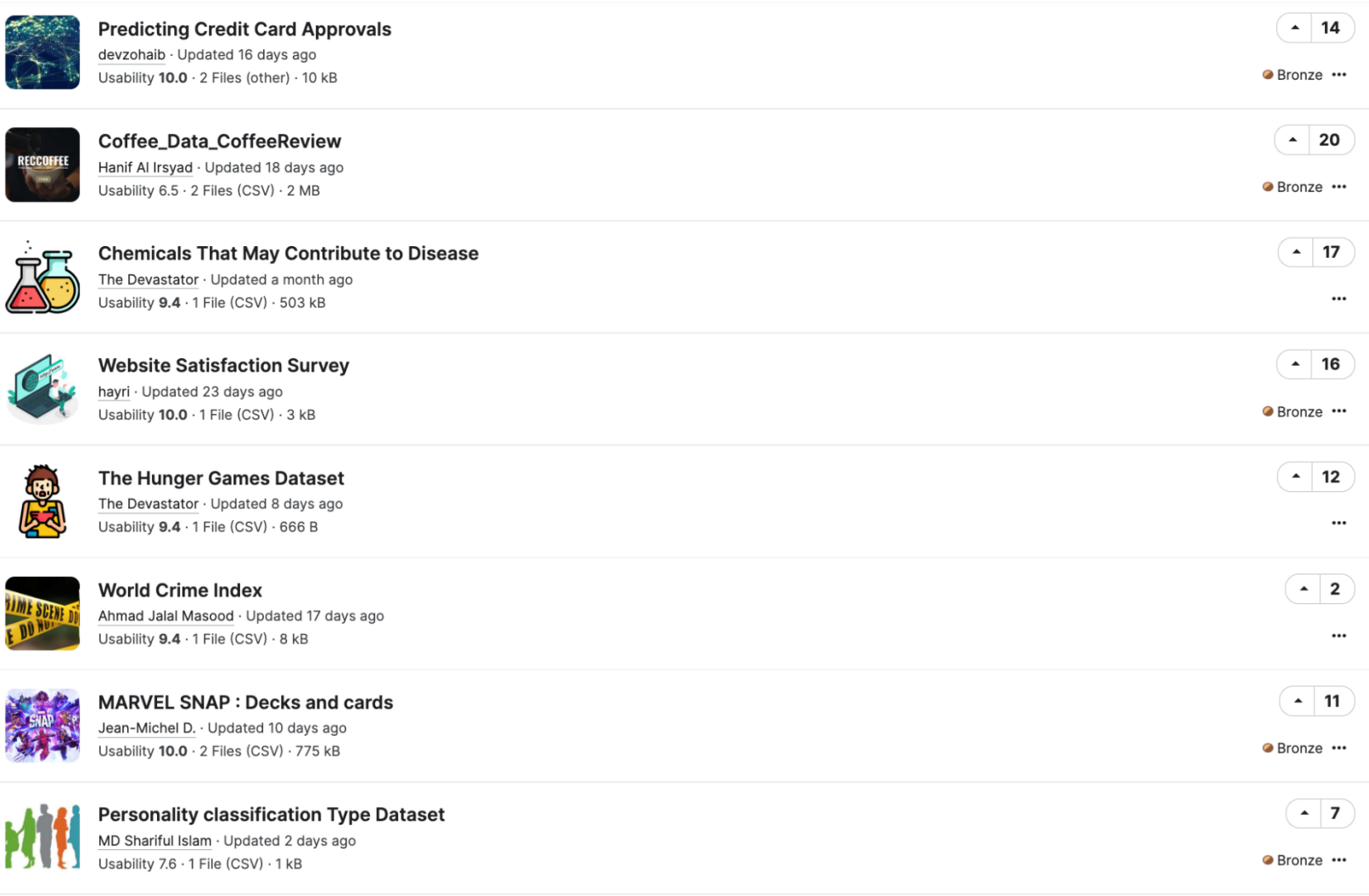
(Nice) data visualization using R…

Practice for the final project

Go to https://www.kaggle.com/datasets



Practice for the final project



Practice for the final project

1. **Identify a dataset you are interested in** **(you cannot repeat next Monday!)**
2. **Select your dependent variable**

   Try to explain your dependent variable using the independent variables in the dataset

   Visualize some relationships using scatter plots
3. **Explain your results in business terms**

   What are the implications of your results? What would you recommend to do?
4. **Prepare a 10 minutes presentation**

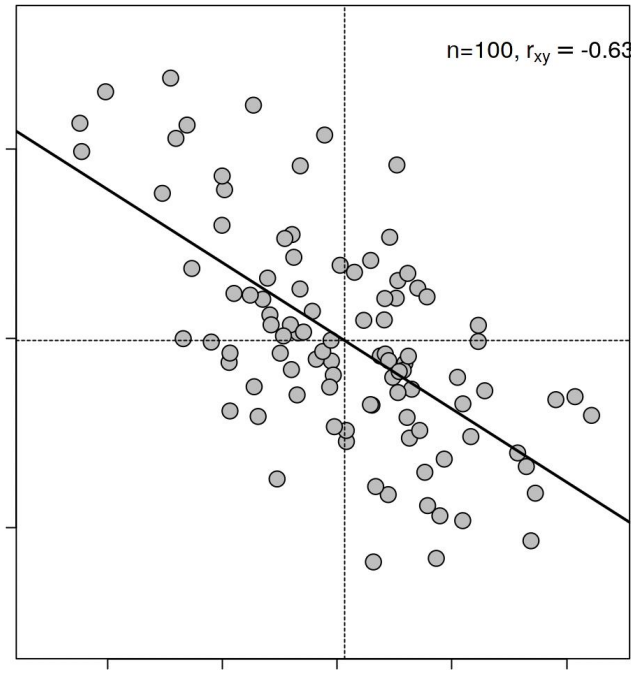
What should you include in the presentation?

1. Context of your data (organization/company, problem to solve, why is this important, etc.)
2. What variables do you have in the dataset?
3. Show the multiple regression results in a table (tell us about what is and what is not significant, how big is the effect, etc.)
4. Show some data visualization (using R)
5. Business recommendations

Practice for the final project

QUESTIONS?

Fundamentals of Econometrics Models



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