

Announcements

9/5

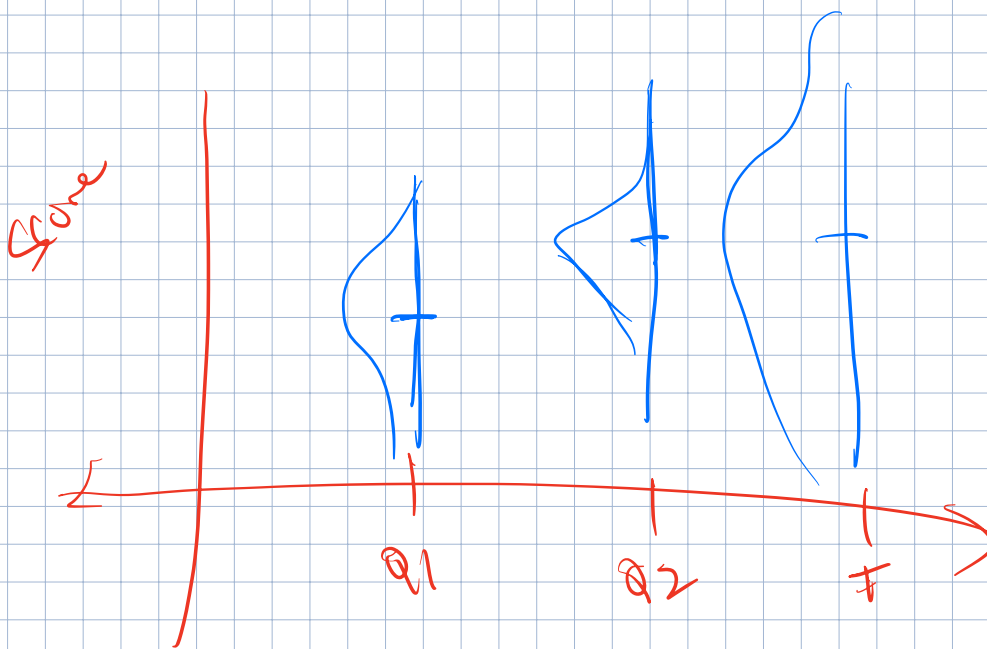
- Quiz 1 Next Thurs 9-10AM

↳ Come early!!

↳ Start: 8:45a End: 9:55a //

- Calculators?

- Don't Forget - OH Today! 4-5p Rm 451



DIAGNOSTICS

Recall our classical SLR model

$$y_i = \beta_0 + \beta_1 x_i + \varepsilon_i, \quad i = 1, \dots, n$$

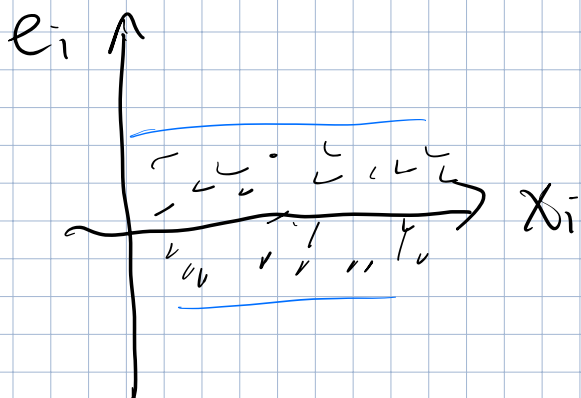
With these assumptions:

① $\varepsilon_i \stackrel{\text{iid}}{\sim} N(0, \sigma^2)$ constant in x
"homoskedastic"

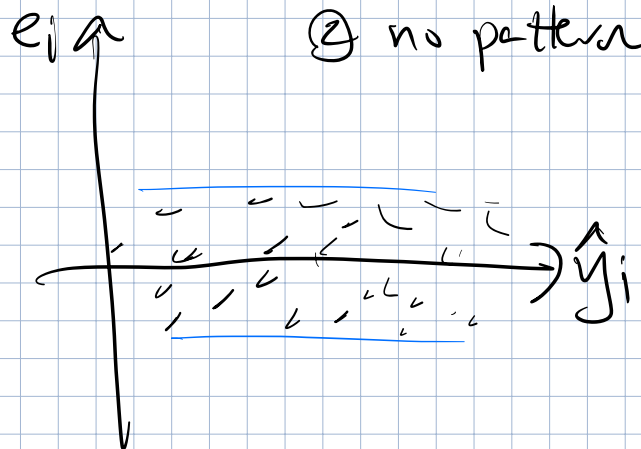
② x_i fixed

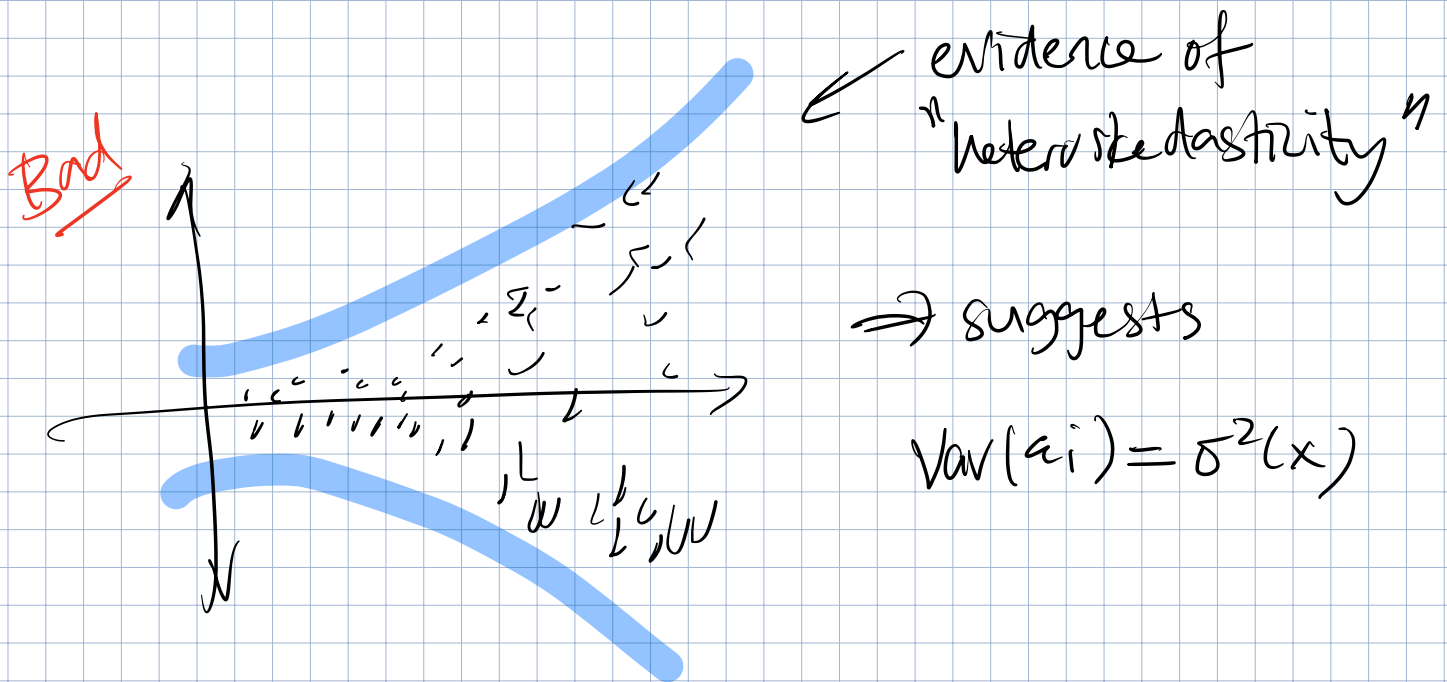
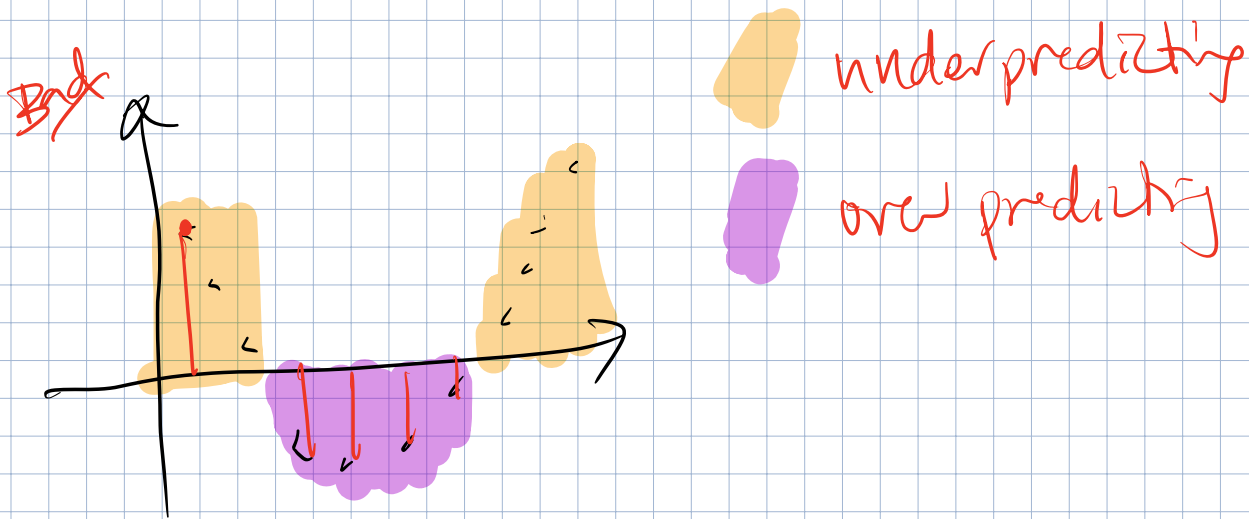
We can use plots to assess whether these assumptions hold empirically.

Good ① Residual Plot



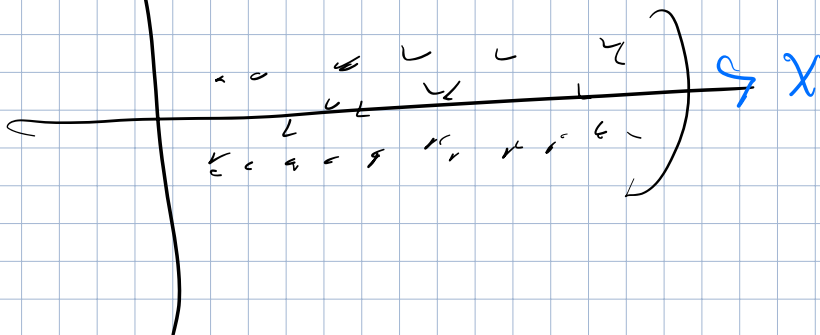
① centered @ 0
② no pattern





Watch out
residual

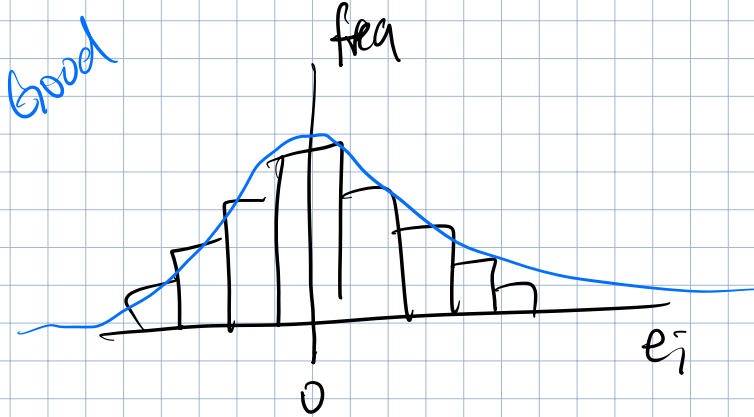
outliers can sometimes be seen in residual plots



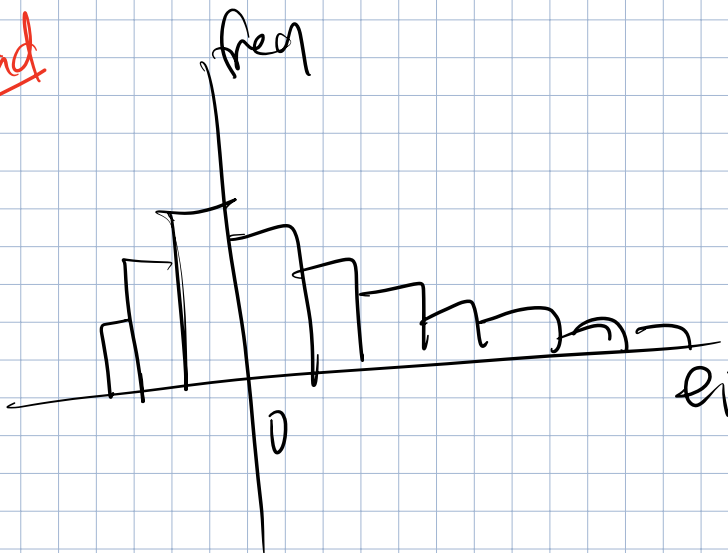
$$\hat{\beta}_1 = \sum_{i=1}^n \frac{(x_i - \bar{x})}{\text{SSX}} y_i$$

How to ck for Normality of errors

① Histogram of residuals

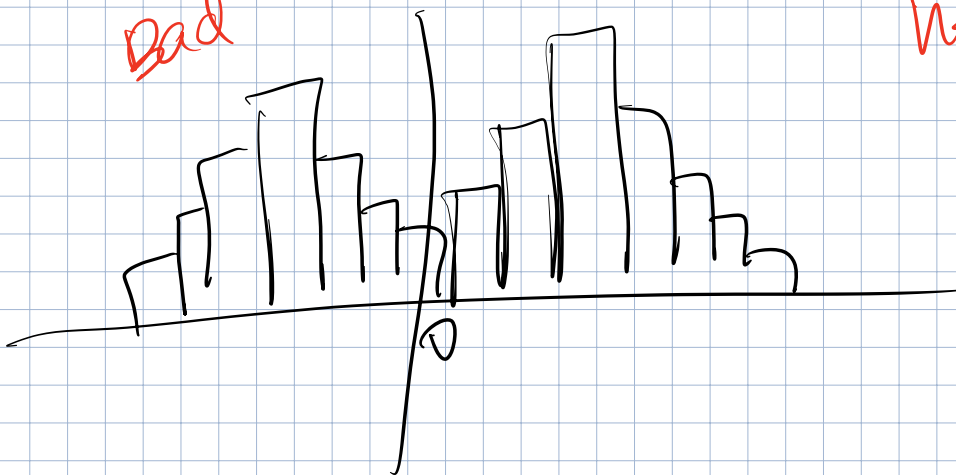


Bad



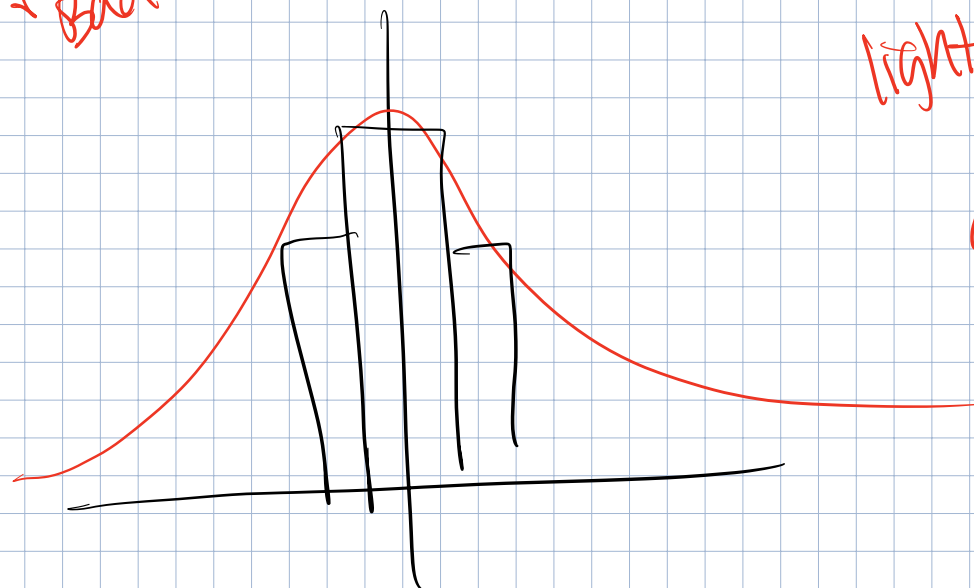
right skewed

Bad



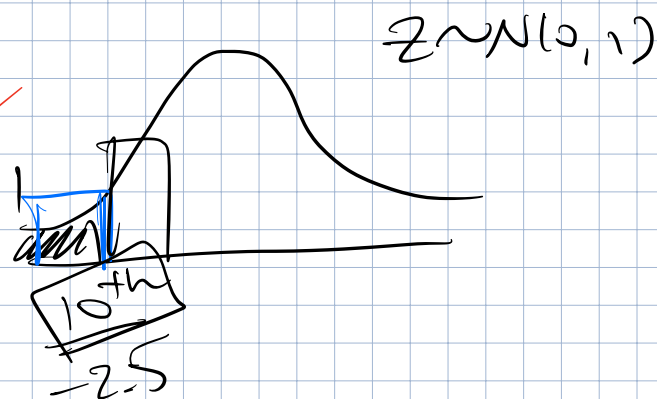
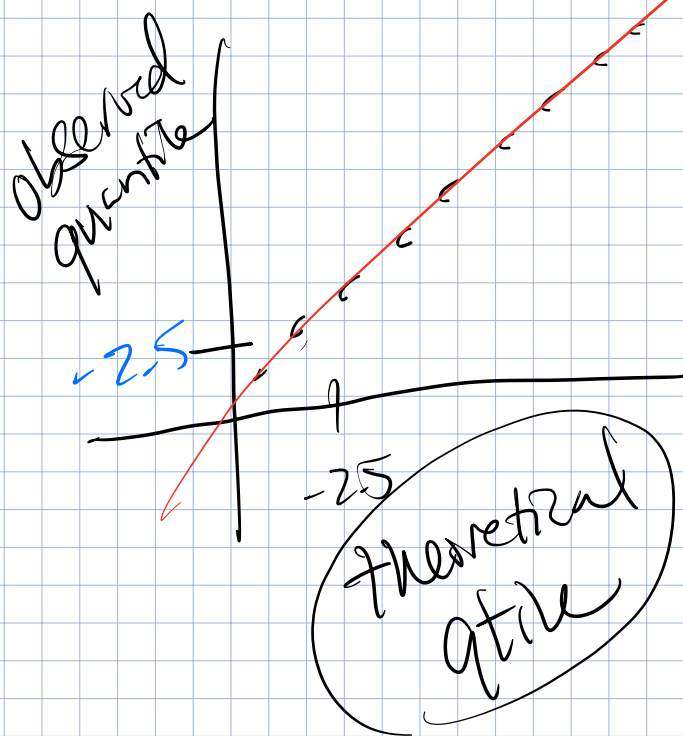
heavy-tailed
⇓
anti-conservative
G

→ Bad"



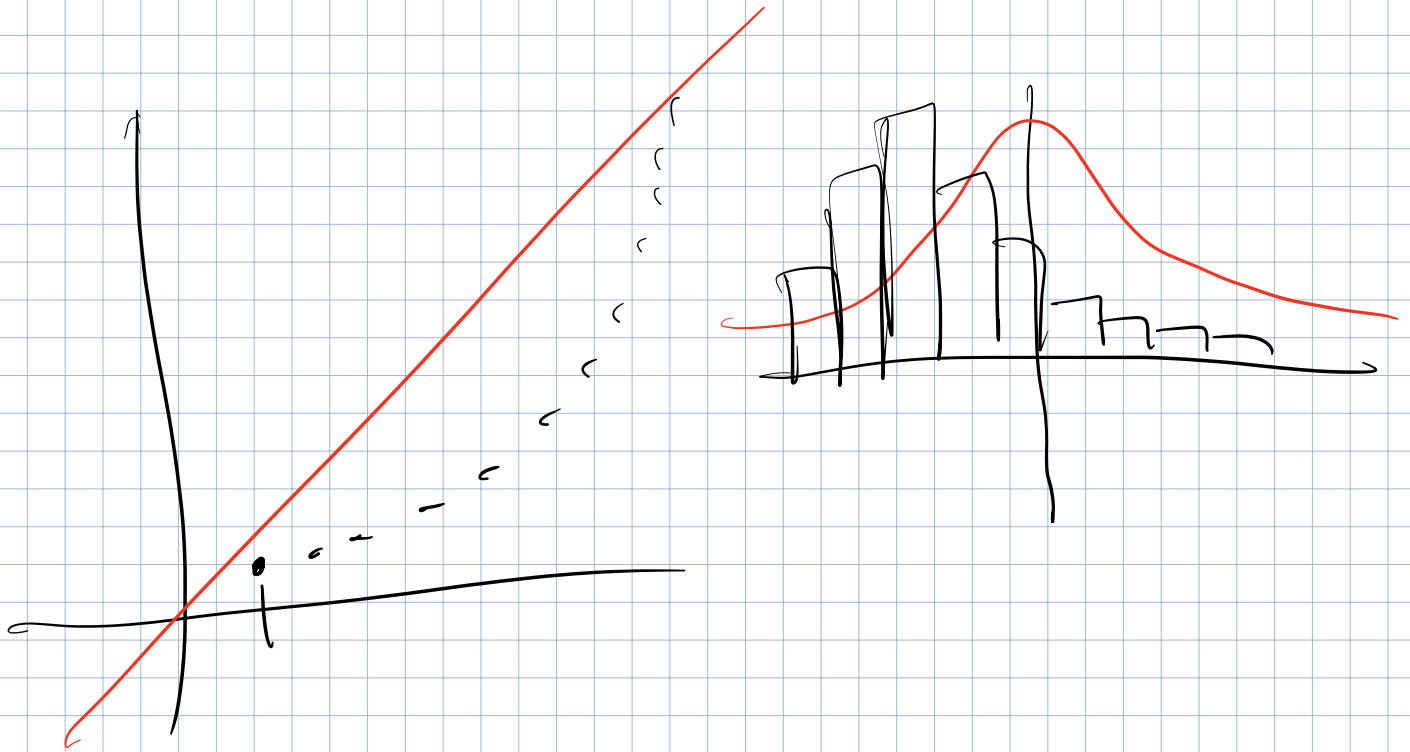
light-tailed
↓
a CI which
is wider
than it
needs to be

② QQ Plots

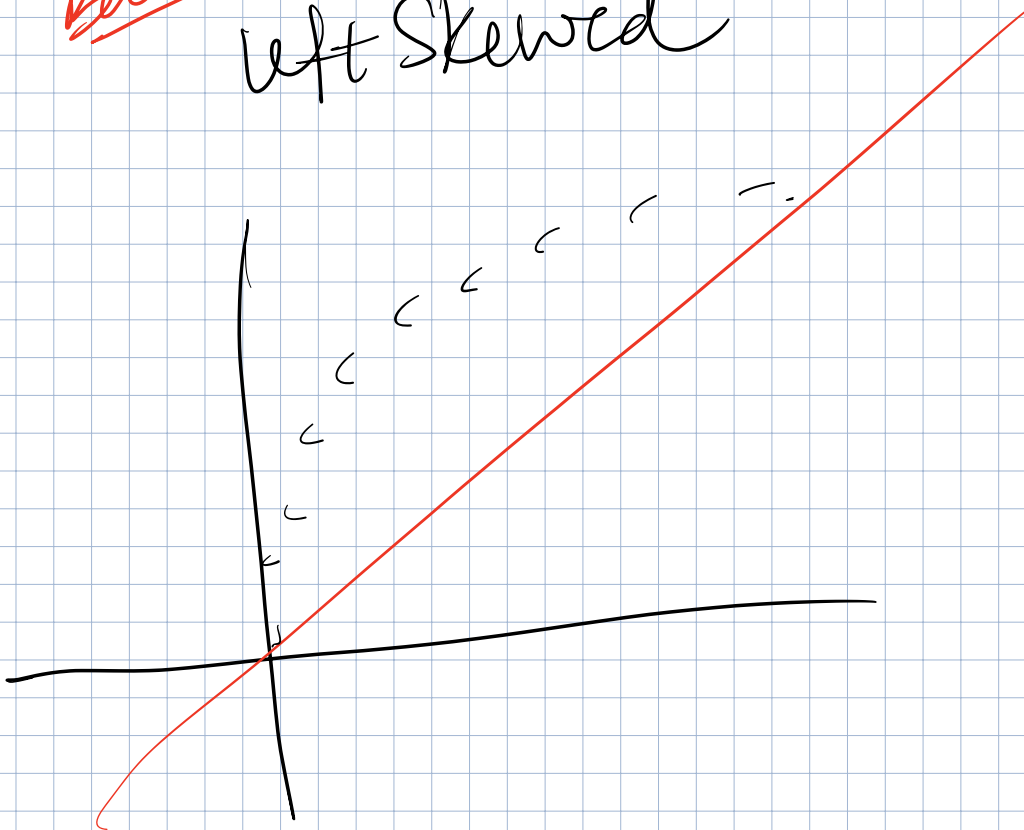


If normality is
not aggressively
violated the
QQ plot falls
roughly on $y=x$

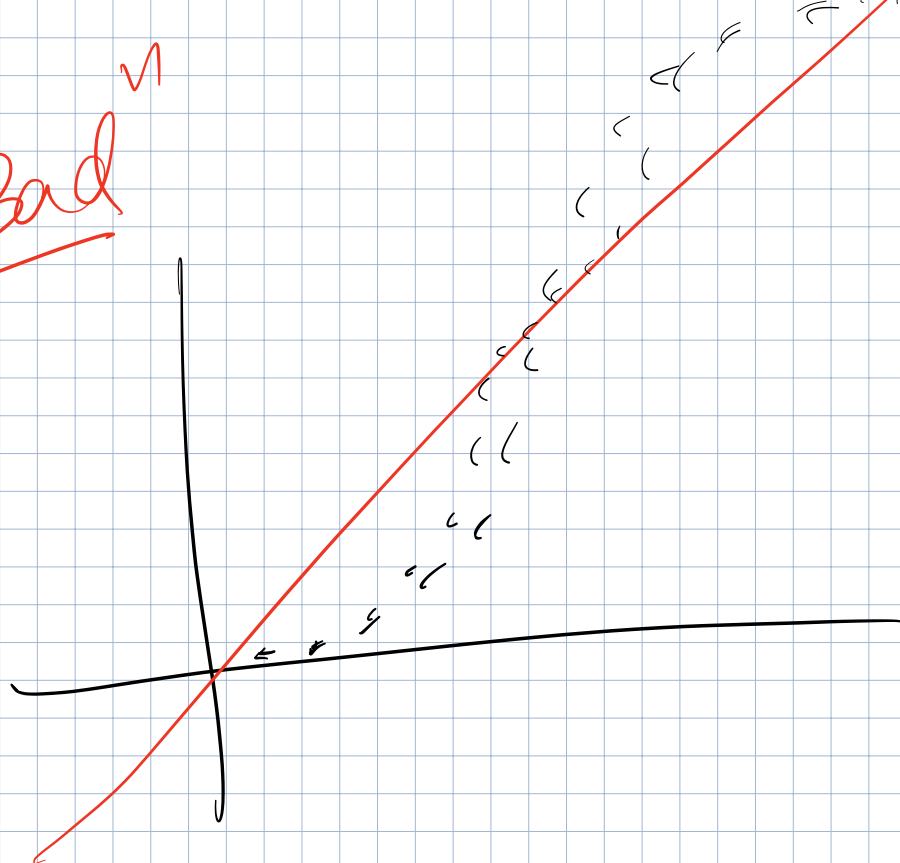
Part Right Skewed



Part Left Skewed

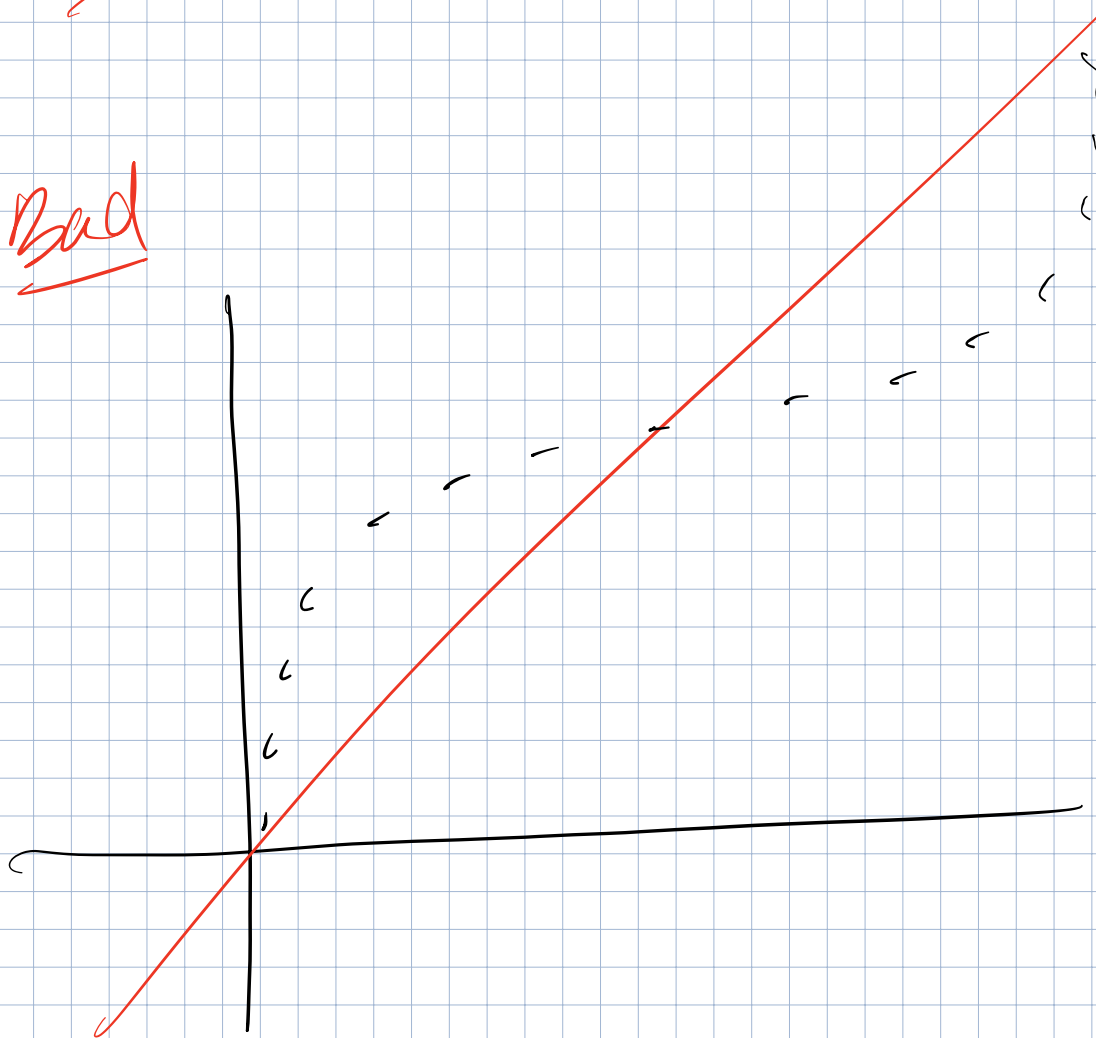


Bad



light
tails

Bad



heavy
tails