

## Module 4: Bivariate Displays

(The attached PDF file has better formatting.)

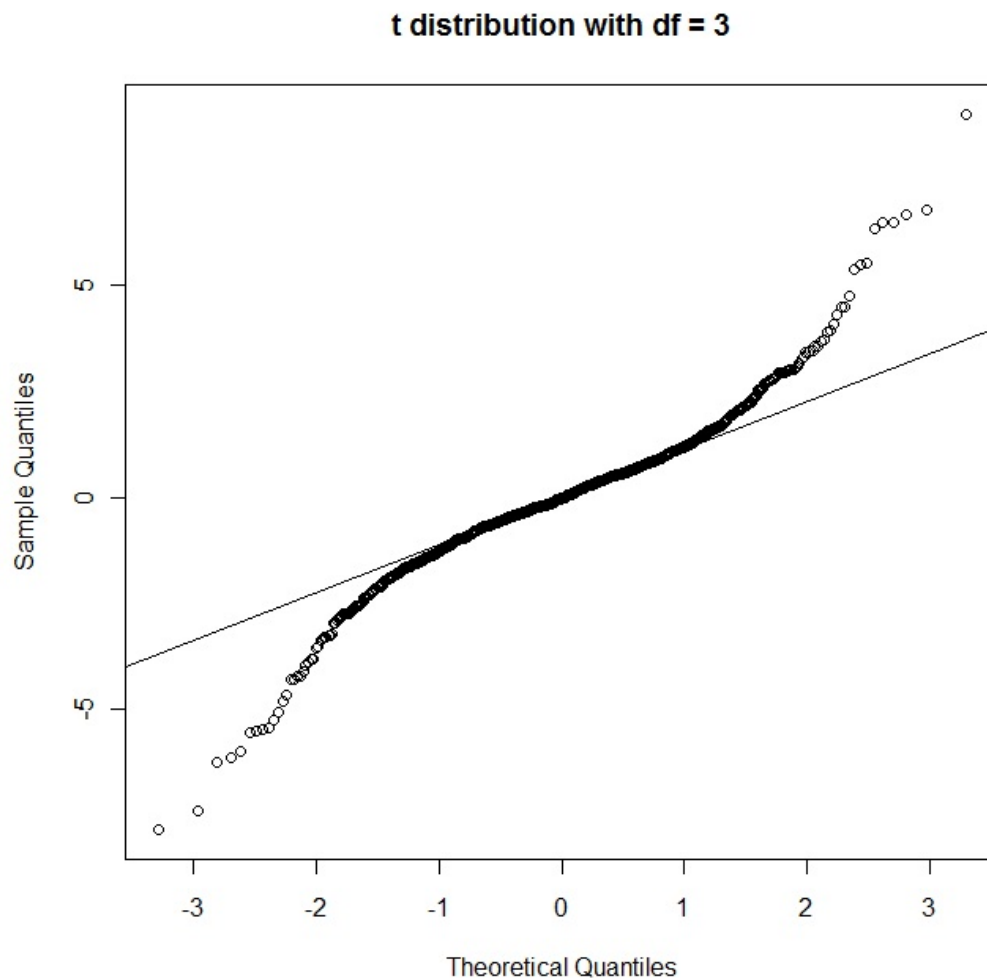
### *Homework Assignment: quantile comparison plots*

Quantile comparison plots are discussed in Module 3 and are used later in the text. This homework assignment discusses quantile comparison plots, not bivariate displays

We compare quantile comparison plots for two distributions:

- Figure 3.9 on page 37: A  $t$ -distribution with 3 degrees of freedom.
- Figure 3.8 on page 37: A  $\chi$ -squared distribution with 2 degrees of freedom.

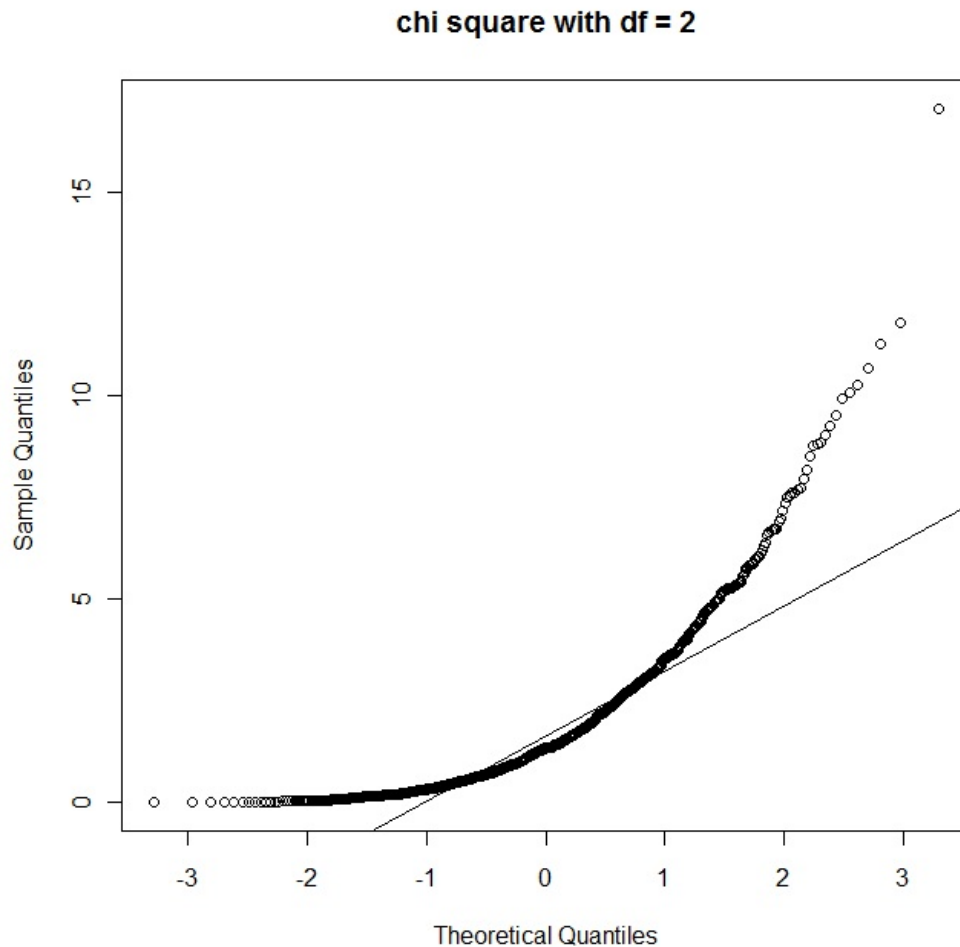
Below is a quantile comparison plot for 1,000 random draws from a  $t$ -distribution with 3 degrees of freedom.



The quantile comparison plot for a  $t$ -distribution with 2 degrees of freedom is shaped like an S-curve.

- A. At the upper tail, are values more or less extreme than in a normal distribution?
- B. At the lower tail, are values more or less extreme than in a normal distribution?
- C. Is the  $t$ -distribution with 2 degrees of freedom (i) symmetric thin-tailed, (ii) symmetric thick-tailed, (iii) positively skewed, or (iv) negatively skewed?

Below is a quantile comparison plot for 1,000 random draws from a  $\chi$ -squared distribution with 2 degrees of freedom.



The quantile comparison plot for a  $\chi$ -squared distribution with 2 degrees of freedom is shaped like a convex banana.

- A. At the upper tail, are values more or less extreme than in a normal distribution?
- B. At the lower tail, are values more or less extreme than in a normal distribution?
- C. Is a  $\chi$ -squared distribution with  $df = 2$  (i) symmetric thin-tailed, (ii) symmetric thick-tailed, (iii) positively skewed, or (iv) negatively skewed?