Asymptotics Primer

Econ 583
Econometric Theory I
Fall 2008

Consistency of Sample Mean from iid N(0,1) Data
Consistency of Sample Mean from iid U(-1,1) Data

Consistency of Sample Mean from iid Chi-Square 1 Data

\[ E[\chi^2(1)] = 1 \]
Sample Mean from iid Student's t with 1 df

Student's t with 1 df = Cauchy
Expected value of Cauchy rv does not exist because tails are too thick

100 Simulated Sequences of $Y_n$

N(0,1) Data

U(-1,1) Data

Chi-Square 1 Data

Cauchy Data
Distribution of Sample Mean for iid N(0,1) data

\[ SD(\bar{X}) = \sigma / \sqrt{T} \]

\[ \sqrt{T} \left( \frac{\bar{X} - \mu}{\sigma} \right) \text{ for } X_i \sim iid N(0,1) \]
\[
\sqrt{T \left( \frac{\bar{X} - \mu}{\sigma} \right)} \quad \text{for } X_i \sim iid \chi^2(1)
\]