

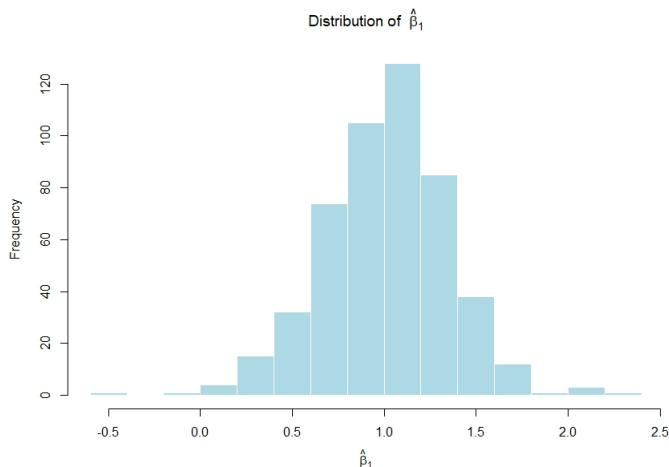
# Asymptotics

- 1 Consistency
- 2 Asymptotic normality

# Consistency

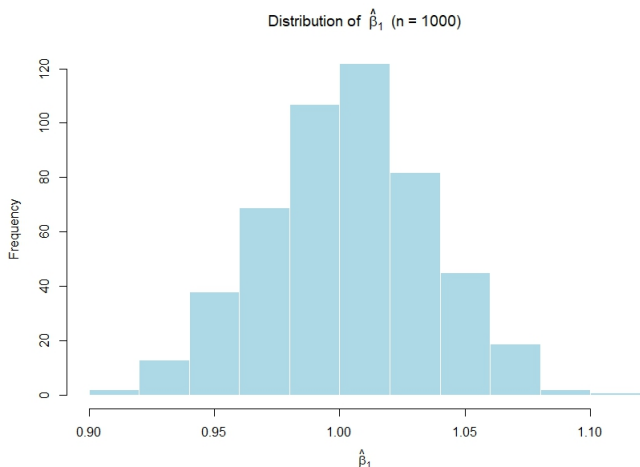
## Consistency (cont.)

- $n = 10$ , reps = 500,  $x \sim N(0, 1)$ ,  $u \sim N(0, 1)$
- $y = 1 + x + u$ , distribution of  $\hat{\beta}_1$



## Consistency (cont.)

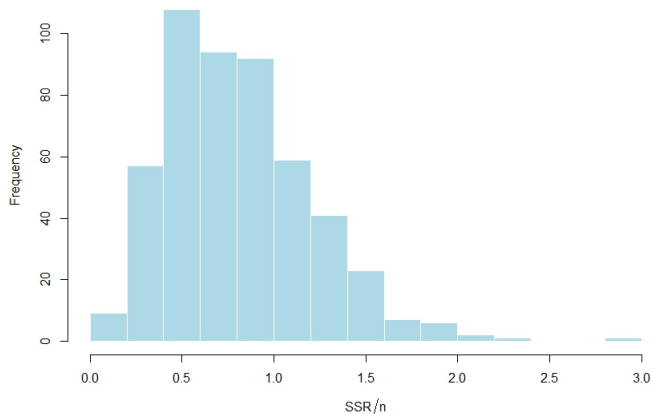
- $n = 1000$ , reps = 500,  $x \sim N(0, 1)$ ,  $u \sim N(0, 1)$
- $y = 1 + x + u$ , distribution of  $\hat{\beta}_1$



## Consistency (cont.)

- $n = 10$ , reps = 500,  $x \sim N(0, 1)$ ,  $u \sim N(0, 1)$
- $y = 1 + x + u$ , distribution of  $SSR/n$

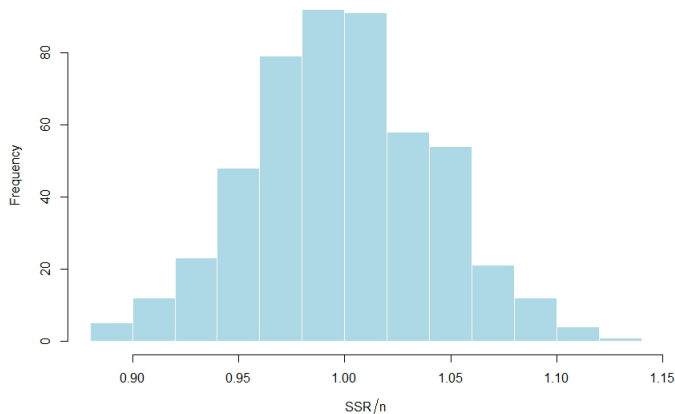
Distribution of  $SSR/n$  ( $n = 10$ )



## Consistency (cont.)

- $n = 1000$ ,  $\text{reps} = 500$ ,  $x \sim N(0, 1)$ ,  $u \sim N(0, 1)$
- $y = 1 + x + u$ , distribution of  $SSR/n$

Distribution of  $SSR/n$  ( $n = 1000$ )

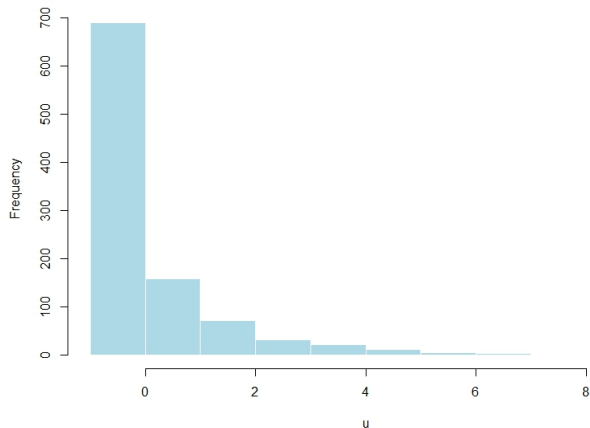


# Asymptotic Normality

# Asymptotic Normality (cont.)

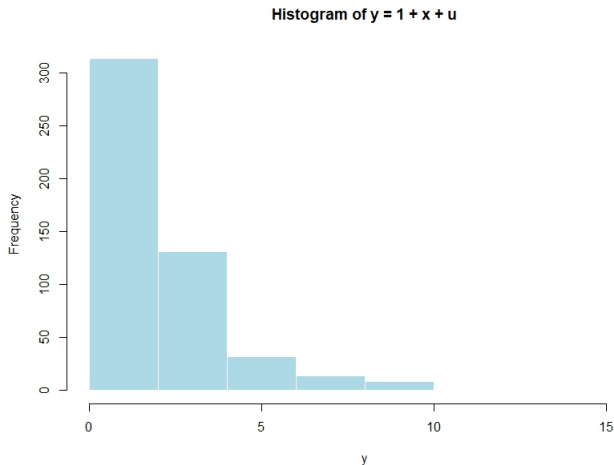
- $u \sim \chi^2(1) - 1$

Histogram of  $u = \text{Chi-square}(1) - 1$



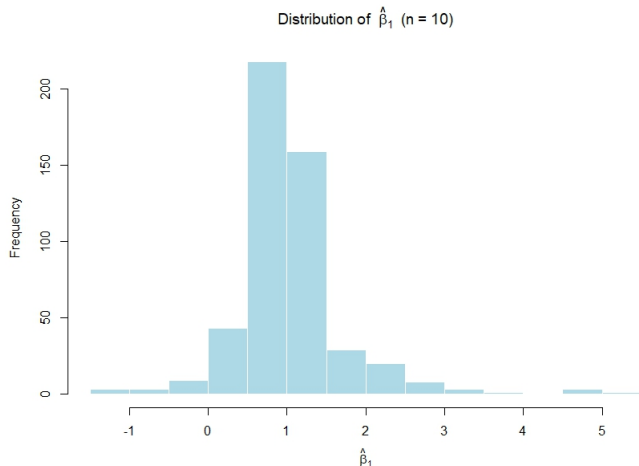
## Asymptotic Normality (cont.)

- $x \sim \chi^2(1)$ ,  $u \sim \chi^2(1) - 1$
- $y = 1 + x + u$



# Asymptotic Normality (cont.)

- $n = 10$ , reps = 500
- $x \sim \chi^2(1)$ ,  $u \sim \chi^2(1) - 1$
- $y = 1 + x + u$



# Asymptotic Normality (cont.)

- $n = 1000$ , reps = 500
- $x \sim \chi^2(1)$ ,  $u \sim \chi^2(1) - 1$
- $y = 1 + x + u$

