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15.3.3 Unbiased versus Biases Estimators

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MO2.13

MO2.14

From the previous section, we observed the variation that occurs for sample estimates (statistics) and saw that the variation scaled with $1/\sqrt{N}$ (N being the sample size). Next, we consider on average how good is an estimate. Let's start with our sample mean estimate and ask what's the average value of $\bar{x} - \mu_x$? To do this, we take the expectation of the entire population, and we arrive at the following result:

$$E[\bar{x} - \mu_x] = 0$$

(15.16)

We do not show the proof here, but you might try it out yourself. This result means that while some times \bar{x} can be higher than μ_x , and other times lower, the average of these excursions of $\bar{x} - \mu_x$ is zero!

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