Taller 02
Universidad Externado de Colombia
Departamento de Matemáticas
Estadística 2

Probabilidad

De Thijseen (2016), leer y sintetizar las Secciones 2.1, 2.2, y 2.3.

Muestreo

1. De Keller (2014), leer y sintetizar la Sección 5.1 (p. 162).

2. De Keller (2014), leer y sintetizar la Sección 5.4 (p. 169).

3. En qué consiste el muestreo aleatorio simple.

4. En qué consiste el muestreo aleatorio estratificado.

Distribución Normal

1. (Keller 2014, problem 8.62)According to the Statistical Abstract of the United States, 2012 (Table 721), the mean family net worth of families whose head is between 35 and 44 years old is approximately $325,600. If family net worth is normally distributed with a standard deviation of $100,000, find the probability that a randomly selected family whose head is between 35 and 44 years old has a net worth greater than $500,000.

2. (Keller 2014, example 8.3) Consider an investment whose return is normally distributed with a mean of 10% and a standard deviation of 5%.

   a. Determine the probability of losing money.

   b. Find the probability of losing money when the standard deviation is equal to 10%.

3. (Berenson et al. 2012, problem 6.51) All the major stock market indexes posted strong gains in 2009. The mean one-year return for stocks in the S&P 500, a group of 500 very large companies, was 23.45%. The mean one-year return for the NASDAQ, a group of 3,200 small and medium-sized companies, was 43.89%. Historically, the oneyear returns are approximately normally distributed, the standard deviation in the S&P 500 is approximately 20%, and the standard deviation in the NASDAQ is approximately 30%.

   a. What is the probability that a stock in the S&P 500 gained value in 2009?

   b. What is the probability that a stock in the S&P 500 gained 10% or more?

   c. What is the probability that a stock in the S&P 500 lost 20% or more in 2009?

   d. What is the probability that a stock in the S&P 500 lost 40% or more?

   e. Repeat (a) through (d) for a stock in the NASDAQ.

   f. Write a short summary on your findings. Be sure to include a discussion of the risks associated with a large standard deviation.

4. (Anderson et al. 2011, Sec. 6.2, problem 18) The average stock price for companies making up the S&P 500 is $30, and the standard deviation is $8.20 (BusinessWeek, Special Annual Issue, Spring 2003). Assume the stock prices are normally distributed.

   a. What is the probability a company will have a stock price of at least $40?

   b. What is the probability a company will have a stock price no higher than $20?

   c. How high does a stock price have to be to put a company in the top 10%?

5. (Sosa et al. 2012, problema 10.4) Estudiando los productos de una compañía fabricante de una maquinaria específica, se identificó que la vida promedio de dicha maquinaria es dos años con una desviación estándar de un mes. La empresa reemplaza gratis todas las maquinarias que fallen dentro del tiempo de garantía y ha decidido reemplazar solo el 1% de las maquinarias que fallen. Si la duración de la maquinaria sigue una distribución normal, ¿de qué duración debe ser la garantía que ofrezca la compañía?