

Spring 2014  
Problem Set #2  
Due Tuesday Feb 4, 1pm

1. Suppose  $y$  takes possible values  $\{0, 1, 2\}$  with the probability distribution

$$\begin{aligned}P(y = 0) &= \frac{1}{4} \\P(y = 1) &= \frac{1}{2} \\P(y = 2) &= \frac{1}{4}\end{aligned}$$

- (a) Given the loss function  $L(e) = e^2$ , calculate the risk (expected loss) of the point forecasts  $\hat{y} = 0$ ,  $\hat{y} = 1$ , and  $\hat{y} = 2$ .  
(b) Which of the three forecasts yields the smallest risk? Is this the best point forecast?  
(c) Now suppose that the distribution of  $y$  is

$$\begin{aligned}P(y = 0) &= \frac{1}{4} \\P(y = 1) &= \frac{1}{4} \\P(y = 2) &= \frac{1}{2}\end{aligned}$$

What is the best (minimum risk) point forecast  $\hat{y}$  for  $y$ ?

2. Suppose  $y$  is distributed  $U[0, 10]$ , uniform on the interval  $[0, 10]$

- (a) Given the loss function  $L(e) = e^2$ , what is the best point forecast  $\hat{y}$  for  $y$ ?  
(b) Give your answer to (a), what is the forecast error  $e$  if  $y = 8$ ?  
(c) Construct a 90% forecast interval for  $y$ . (Don't use the normal distribution. Use the property of the uniform distribution.)

3. Suppose  $y$  is distributed  $N(16, 9)$  (mean=16, variance=9)

- (a) Given the loss function  $L(e) = e^2$ , what is the best point forecast  $\hat{y}$  for  $y$ ?  
(b) What is the 90% forecast interval for  $y$ ?

4. Go to the Bureau of Labor Statistics web page, and download into STATA and plot the following series:

- (a) Number of employees in the Information Sector, monthly, 1939-present, seasonally adjusted  
From the BLS webpage, try the following sequence: Subject/Employment/National Employment/CES Databases/One-Screen/All employees/Information/Information/Get Data  
(b) Unemployment rate for women age 16-24, monthly, 1948-present, seasonally unadjusted  
From the BLS webpage: Subject/Unemployment/National Unemployment rate/CPS Databases/Labor Force Statistics One-Screen/Women/All races/All origins/16 to 24 years/Unemployment Rate/Get Data  
(c) CPI for all urban consumers, 1947-present, seasonally adjusted. Also create and plot monthly CPI inflation (percentage change, or first difference in natural logarithm, from month to month)  
From the BLS webpage: Subject/Consumer Price Index/CPI Databases/