

# Bus 274: Further Statistics for Business

Spring 2010

## PROBLEM SHEET # 3

**Problem 1:** When the euro was introduced, statisticians said that the one euro coin does not have an equal chance of landing “heads” or “tails”. They allege that, when spun on a smooth surface, the coin comes up heads more often. Let

$p$  = unknown probability (unknown proportion) that a one euro coin lands “heads”  
when spun on a smooth surface.

In a spin experiment carried out by students, this coin fell heads 1087 times in a series of 2000.

- Using the students’ data, compute a 95% confidence interval for  $p$ .
- Test the null hypothesis  $H_0 : p = 0.5$  against the alternative  $H_1 : p \neq 0.5$ . (Assume  $\alpha = 0.05$ .)
- Is it correct to say that the probability that the coin is not fair is 95%? (Give reasons for your answer.)

**Problem 2:** One item in a survey about the political knowledge of young adults in Japan was: “Name the only communist country in the western hemisphere.” In a random sample of 300, the number of respondents who knew the answer was 174.

- Compute an approximate 95% confidence interval for the true share of young adults who know the answer.
- Which null hypothesis, against which alternative, has to be tested if we want to show that a majority of young adults in Japan know the answer?
- Carry out the test.