

Department of Statistics

COURSE STATS 330

Assignment 5, 2006

Instructions: Hand in your completed assignment to the Student Resource Centre by 4pm on Thursday October 12.

Note: No data is supplied for this assignment. You must type your own and construct suitable data frames using the **expand.grid** function.

The data in Table 1 overleaf come from two classic studies on social mobility*. One study looked at social mobility in Britain, while the other is a Danish study.

Q1. Make an appropriate data frame with variables “Father’s occupational status” (**father**, taking values 1:5), “Son’s occupational status” (**son**, taking values 1:5), **country** (taking values “Britain” and “Denmark”) and **count**. [5 marks]

Q2. Suppose we want to ask the question “Is the relationship between Father’s occupational status and Son’s occupational status is different for the two countries?” How could we reformulate this question in terms of testing a sub-model of the saturated model? Recall that relationships in two-way tables are measured in terms of sets of odds ratios. [5 marks]

Q3. Make a 4x4 table of odds ratios for the British data, and another table for the Danish data. Compare the tables. What does this tell you about the question raised in Q2? [10 marks]

Q4. Fit a saturated model to these data. Use your model to resolve the question posed in Q2. [10 marks]

Q5. Can you suggest some measures or measures of social mobility based on these tables? Which country has more social mobility? [10 marks]

* Social mobility is the extent to which the social-economic status of children differs from that of their parents. Thus, total social mobility would mean that the status of children is independent of the status of parents.

PTO for Table 1

Table 1: Data for Assignment 5.

| | | Country | Status of son | | | | |
|------------------|---|---------|---------------|-----|-----|-----|-----|
| | | | 1 | 2 | 3 | 4 | 5 |
| Status of father | 1 | British | 50 | 45 | 8 | 18 | 8 |
| | | Danish | 18 | 17 | 16 | 4 | 2 |
| | 2 | British | 28 | 174 | 84 | 154 | 55 |
| | | Danish | 24 | 105 | 109 | 59 | 21 |
| | 3 | British | 11 | 78 | 110 | 223 | 96 |
| | | Danish | 23 | 84 | 289 | 217 | 95 |
| | 4 | British | 14 | 150 | 185 | 714 | 447 |
| | | Danish | 8 | 49 | 175 | 384 | 198 |
| | 5 | British | 3 | 42 | 72 | 320 | 411 |
| | | Danish | 6 | 8 | 69 | 201 | 246 |