Exercise 12.4

The dependent variable is not binary here but is a fraction. Therefore the logit model would be more appropriate. First compute $Z = \ln[H/(1-H)]$ and regress Z against a constant, Y, P, and R.

Exercise 13.5

(a) If homes are expensive, they are targets for burglaries and hence property crime can be expected to increase (that is, $\alpha_2 > 0$). If POPDEN is high, there are two effects. There may be more houses to burgle and hence POPCRIME might go up. But if an area is dense, more people might be alert and report crimes. The sign of α_3 is therefore ambiguous. If unemployment rate is high more people might turn to crime ($\alpha_4 > 0$). If more police are around, crime is likely to be less ($\alpha_5 < 0$, and $\beta_2 < 0$). Death penalty is likely to reduce violent crimes ($\beta_3 < 0$). The effect of age is ambiguous. If crime is up, a municipality is likely to hire more police officers. Hence we would expect γ_2 and γ_3 to be positive.

(b) We need two variables to be absent from each equation. The first equation has DEATH, MEDAGE, and VIOLNTCRIME missing. The second equation has MEDHOME, POPDEN, UNEMP, and PROPCRIME missing. The third equation has MEDHOME, POPDEN, UNEMP, DEATH, and MEDAGE missing. The order condition is therefore satisfied by all equations.

(c) First regress each of POLICE, PROPCRIME, and VIOLNTCRIME against a constant, MEDHOME, POPDEN, UNEMP, DEATH, and MEDAGE, and save the predicted values. In the second stage use these predicted values in place of the actual values and estimate the three equations. In obtaining residuals and standard errors however, actual values will be used. Thus

$$\hat{w} = POLICE - \hat{\gamma}_1 - \hat{\gamma}_2\, PROPCRIME - \hat{\gamma}_3\, VIOLNTCRIME$$