Tim Boudreau

Econ 217

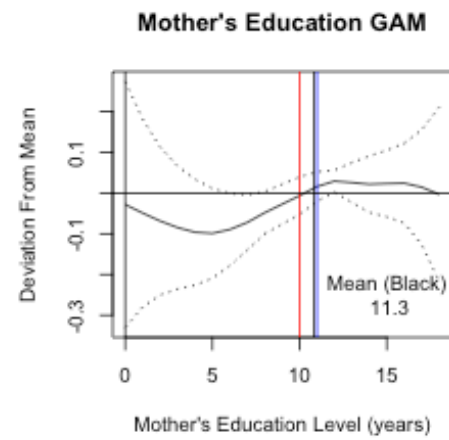Alan Spearot

February 19 2016

Exam 2 – Take Home Midterm
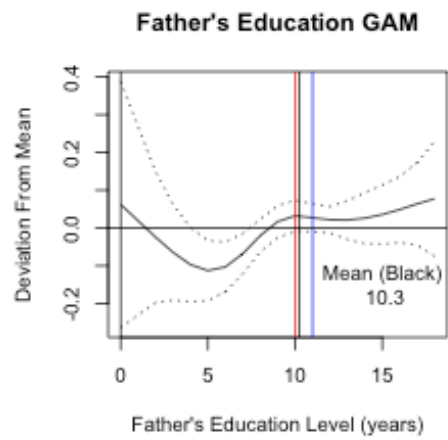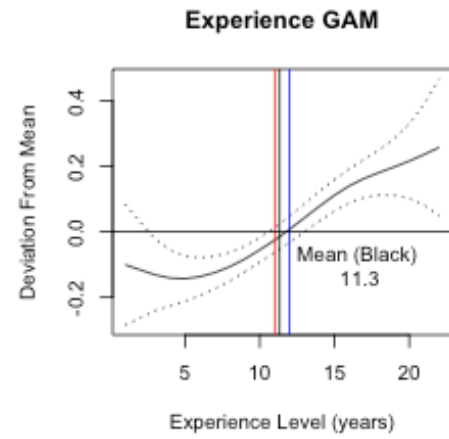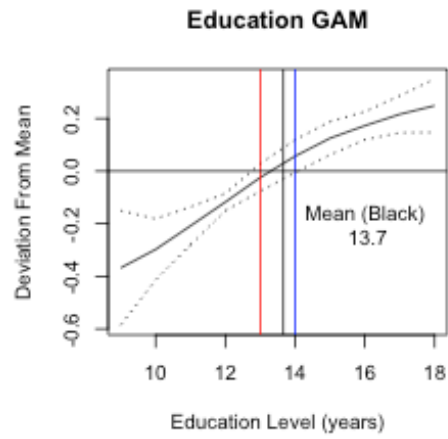
1.
   a. [Graph below]
   b. The only nonparametric statistically significant relationship between a variable and the log of wages was with father's education level (at the 95% level). Education level has a positive relationship with log wage; at the mean education level of 13.7 years, the wage is above the mean by .05, or 5%. Across the mean education level, from 13 years of education to 14, wage goes from approximately 2% below the mean to 6% above the mean wage. Experience also has a positive relationship with log wage; at the mean of experience (11.3 years), the wage is beneath the mean wage by 2.5%. Crossing the mean of experience, from 11 to 12 years of experience, the wage goes from approximately 1% below the mean wage to 1% above it. Father's education level actually has both positive and negative effects on the log wage; with less father's education than the mean of 10.3 years, wage is below the mean wage but is increasing, while after the mean, the wage is above the mean and stays above the mean despite decreasing. Around the mean, from 10 years of father's education to 11, wage goes from approximately 5% above the mean wage to 3% above the mean. On the mean level of father's education, the wage is above the mean by about 4%. Mother's education has a similar effect on wage as father's education, though after the mean of 11.3 years the change in log wage is almost constant (instead of decreasing like with father's education). At the mean mother's education, wage is above the mean wage by 2.5%. Crossing the mean mother's education level, from 10 years to 11, wage goes from .5% beneath the mean wage to about 2% above the mean wage. In summary, for an individual with average education (13.7 years), average experience (11.3 years), average father's education (10.3 years) and average mother's education (11.3), their wage is above the mean wage by about 10% (summing each mean's affect on the individual's wage).
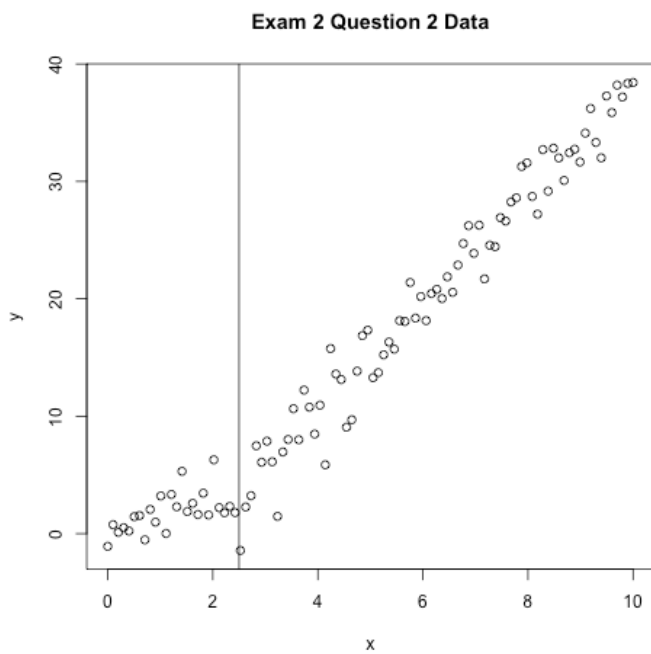
2.
   a. Setting the coefficient on 'x' to equal 1, I end up getting that β_0 equals .576 and β_1 equals 3.695 with a cross validation procedure. My estimated kink value, $\hat{h}$, equals 2.5.
   b. [Graph below] After running the data through a bootstrap procedure with resampled data, I calculated that the mean kink value, $\bar{k}$, equaled 2.455. The 90% confidence interval for my hypothesized kink value is [1.795, 3.305]. All the values in question 2 part b, however, will vary per run through my R-script, as is expected when using random resampling techniques.

Question 1a:

Education GAM

Deviation From Mean vs Education Level (years)

Mean (Black)
13.7

Experience GAM

Deviation From Mean vs Experience Level (years)

Mean (Black)
11.3

Father's Education GAM

Deviation From Mean vs Father's Education Level (years)

Mean (Black)
10.3

Mother's Education GAM

Deviation From Mean vs Mother's Education Level (years)

Mean (Black)
11.3

Question 2a:

Exam 2 Question 2 Data

y vs x

Question 2b:

Distribution of Estimated Kink Values

Density vs Kink Value

Original Value (Blue)
Mean of Distribution (Red)