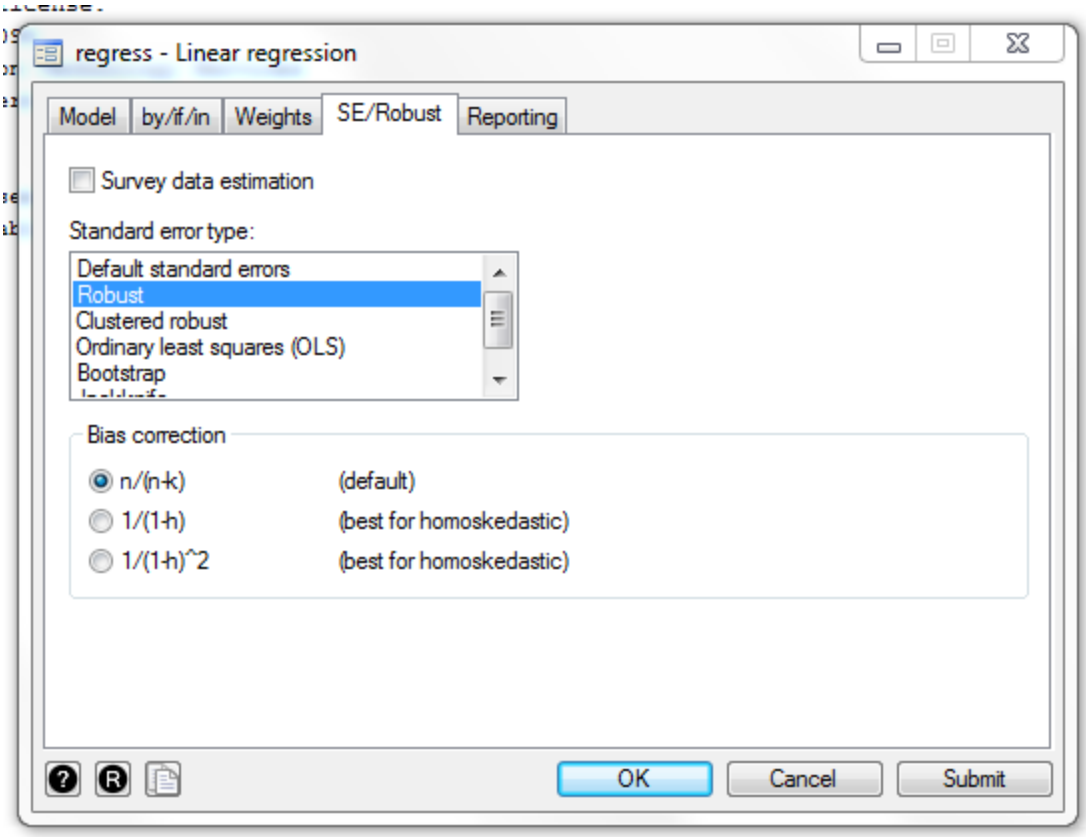
Problem Set 1
Bivariate Regression

1. Do problem 5.2 from Stock and Watson (wage sex regression).
2. Do problem 5.15 from Stock and Watson (standard error of difference in coefficients). (See the Key Concept 2.3 in Chapter 2 on Means, Variances, and Covariances of Sums of Random Variables.)

3. Is per capita municipal spending on non-school services related to per capita income? Estimate this relationship by regressing spendns_pc on income_pc for the 342 Massachusetts cities and towns in the data set muni.dta (from fiscal year 2000).
    a. Calculate the regression line of municipal spending against income and the fitted values of the regression. Use robust standard errors (see the dialogue box below).
    b. Graph a scatterplot of municipal spending (vertical axis) versus income (horizontal axis) overlaid with a graph of the regression line.
    c. What is the expected change in per capita municipal spending on non-school services per dollar increase in per capita income?
    d. What is the 95% confidence interval for this change?
    e. Test the null hypothesis that municipal spending on non-school services and income are actually not related at all.
    f. What proportion of the variance in per capita municipal spending on non-school services is explained by per capita income?
    g. What is the expected per capita municipal spending on non-school services for a town with:
        i. Per capita income at the 10th percentile of per capita income? (use "`sum income_pc, detail`" to find the 10th and 90th percentiles.)
        ii. Per capita income at the 90th percentile of per capita income?
    h. There is one town with an exceptionally large deviation from the regression line (called an "outlier"). What is this town, and what might account for its seemingly "strange" behavior?


regress - Linear regression
Model
by/if/in
Weights
SE/Robust
Reporting
Survey data estimation
Standard error type:
Default standard errors
Robust
Clustered robust
Ordinary least squares (OLS)
Bootstrap
Bias correction
n/(n-k)
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1/(1-h)
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