# Эконометрика-2 ММАЭ
# Семинар 27

Лекции: А.А. Пересецкий
Семинары: Е.С. Вакуленко

## *Квантильная регрессия*

**Problem 1:** © *Economics 508: Applied Econometrics, 2011. Roger Koenker, Department of Economics, University of Illinois. http://www.econ.uiuc.edu/~econ472/tutorial15.html*

This problem set concerns predicting productivity of new workers in a large American manufacturing firm (use "weco.dta"). There are five variables:
$y_i$ – an observed standardized physical productivity measure for the i-th worker after the initial training period
$male_i$ – a dummy variable for the workers' sex, (males are 1)
$dex_i$ – a score on a physical dexterity exam administered before the worker was hired
$lex_i$ – the number of years of education of the worker
$quit_i$ – whether the person quit within the first six months (quitters are 1).
The last two columns of the data provide actual duration of employment and a censoring indicator, respectively. If the censoring indicator is 0 then the corresponding duration is censored.

1. Estimate the model
$$y_i = \beta_0 + \beta_1 male_i + \beta_2 dex_i + \beta_3 lex_i + \beta_4 lex_i^2 + \varepsilon_i$$
   (a) Test the hypotheses $H_0: \beta_3 = \beta_4 = 0$ and $H_0: \beta_4 = 0$. Interpret the results of the tests in economic terms.
   (b) Given the results in part part a) draw a diagram illustrating the dependence of "mean productivity" on education. Set dexterity at its mean and male = 0. Interpret the picture. How does it change for men? Suppose you thought the whole shape of the education effect was different for men and women; reestimate your respecifed model. Does this improve things?
   (c) Use the delta-method and/or the bootstrap to construct a confidence interval for $lex$ = level of education maximizing expected productivity.
2. Now consider the possibility that the dispersion and perhaps even the shape of the conditional density of productivity depends on the $male, dex, lex$ variables.
   Propose a quantile regression model of this type, estimate and interpret it. For this purpose, redoing the prior plots of mean productivity for several quantiles would be helpful.