Empirical Methods in Economic Growth

1. GENERAL OVERVIEW OF THE COURSE

The course will be combining a thorough review of the literature (both theoretical and empirical) along with state-of-the-art econometric analysis of the issues. The course will include in the empirical part a self-contained discussion of nonparametric techniques and their application to estimating nonlinearities in human capital and economic growth. The issue of nonlinearities has recently emerged as one of the most salient features of empirical work in the modelling of economic growth at large. We will apply nonlinear estimation techniques to a comprehensive data set on determinants of economic growth. The course aims to target students who would like a comprehensive exposure to the theoretical and empirical aspects of the human capital-economic growth nexus.

2. CONTENTS OF THE COURSE

Firstly, after reviewing the Solow and the neoclassical model of growth that is used extensively in the literature as the benchmark estimation model we will introduce both linear and nonlinear estimation techniques and include an introduction to the usage of nonparametric techniques in economic growth research.

2.1 Review of the Theoretical Literature used in the Empirics.

This part of the course will contain a thorough review of the theoretical and empirical literature on the link between human capital and economic growth. We will first present in detail the most important theoretical contributions to the literature. We will begin with the Solow model and its extension to consider human capital accumulation (Mankiw, Romer and Weil, Quarterly Journal of Economics, 1992, 407–37). Subsequently we will analyse the neoclassical growth model and various endogenous growth models with human capital accumulation. These two provide the basic approach to studying human capital and growth and the solution of these models yields the determinants of economic growth and provide the framework on which a large part of empirical analysis is based. Moreover, they give rise to a natural distinction between different types of human capital either on the basis of gender or the level of education. The models outlined above imply a linear relationship between human capital and economic growth. In the final part of the theoretical component of the course we will present alternative models that emphasize threshold effects and multiple equilibria and are consistent with a nonlinear treatment of human capital. These include the model of economic growth with threshold externalities in human capital accumulation (Azariadis and Drazen, Quarterly Journal of Economics, 1990, 407–33) and also other channels through which human capital affects growth nonlinearly. Our focus in this part is in terms of providing an explanation for the existence of nonlinearities in the human capital-economic growth relationship.
2.2 Empirics

The second part of the course will review the empirical literature on human capital and growth. We will discuss both the linear and nonlinear approaches to the empirical literature. While in general we will treat human capital in aggregate form, our discussion will also touch on why different types of human capital may have differential effects on growth. For example we will look at differences by gender (male vs. female human capital) or level of education (primary vs. secondary vs. tertiary human capital). We will place emphasis on the data used, the econometric techniques, the specification of the models employed and the results obtained. We will review studies that examine the effect of human capital on the growth of per capita income as well as the growth of total factor productivity. We will also look at the estimation of threshold models.

2.3 Data Sources

The empirical part of the course will review alternative methods researchers have proposed to measure human capital with a view to studying its effect on economic growth. We begin with the earlier attempts focusing on flow measures of education such as primary or secondary school enrolment rates. Subsequently we will discuss the development of stock measures of human capital, culminating in the mean years of schooling in the working-age population measure of human capital. While these measures focus only on one type of human capital (formal education) and measure only the quantity of human capital, recent work has attempted to measure the quality of human capital and assess its impact on economic growth. We will provide a review of these new avenues of research in economic growth.

2.4 Empirical Analysis

In this part we will present and discuss in detail the main econometric methods that can handle nonlinearities (parametric and nonparametric) in applied econometric work. The style chosen will be such that the techniques are made accessible to the non-specialist. Where possible, we will present simple tools (graphical and other) to simplify exposition of the techniques. More rigorous and thorough treatment of the techniques will be relegated to an appendix. In the final chapter we will use these methods to estimate the effect of human capital on growth. As a benchmark we will use the methodology employed in Kalaitzidakis, Mamuneas, Savvides and Stengos (Journal of Economic Growth, 2001, 229–54) and Mamuneas, Savvides and Stengos (Journal of Applied Econometrics, 2006, 111–32) and Savvides A. and T. Stengos, Human Capital and Economic Growth, Stanford University Press: 2009.
3. BASIC OUTLINE

The course will be based on instruction, over a week. Each day there will be instruction on the main methods that we will cover for a total of 15 hours of instruction. There will also be additional 15 hours of hands on empirical applications of the methods covered using data that will be provided by the instructor. The main headings of the topics that will be covered are as follows:

- Introduction to Nonlinear Regression Analysis
- Nonparametric Regression: Estimation and Inference using local smoothers
- Alternative Methods of Nonlinear Analysis in Practice: Threshold Models