

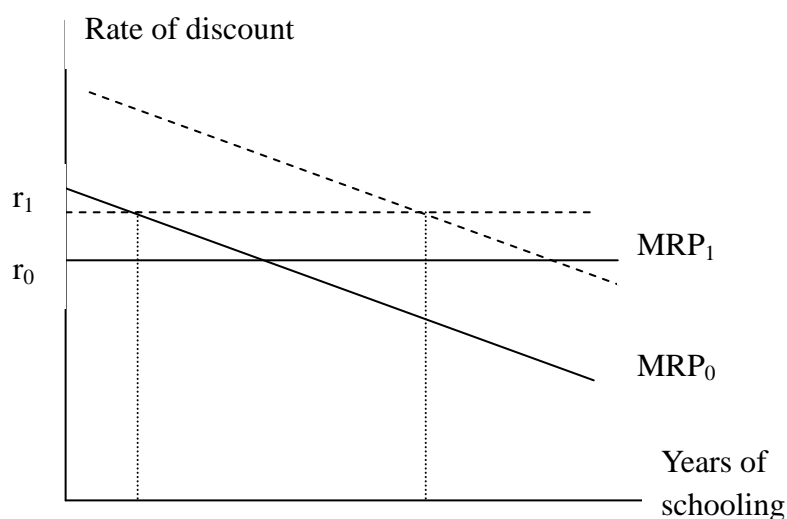
## Lecture 5. The Determinants of Educational Production

### 1. The determinants of educational production

#### (1) Individual characteristics

Some people are able to learn more and faster or simply willing to study harder than others. For them, the marginal cost of education is lower and the marginal benefit of education is higher and decline slowly. So they will demand for more education.

- Differences in the rate of discount
- Differences in ability



#### (2) Family background

How much education a person will demand is also determined by the

expected level of future pay and the money cost of education. Richer families can afford to pay for education of their children and therefore for those children the financial cost of education may be lower. Furthermore, families with better “connection” may find well-paid job for their children more easily than those without “connections”. Both of these affect the location of the marginal benefit and cost curves and the lead to demand for more education.

### **(3) School quality**

- Teacher quality
- School resources
- Class-size

## **2. Empirical studies**

Estimation of an educational production function:

$$A = \mu_0 + \mu_1 S + \mu_2 \alpha + \mu_3 Q + \varepsilon$$

Where  $A$  is the student performance index (such as test scores for math or literacy);  $S$  is years of schooling;  $\alpha$  is the “learning efficiency” of the child (including innate ability, child motivation, and parental motivation and capacity to help children with their school work, etc.);  $Q$  is the measure of school quality (including

school resources per student, teacher quality, class size and etc.);  $\mu$  is unknown coefficients to be estimated; and  $\varepsilon$  is a measurement error term, including the errors in measurement of  $A$  and other missing variables.

Common problems associated with the estimation of the production function:

- missing information (e.g. innate ability and motivation)
- endogeneity (e.g. parents' choice of school)

Some Empirical findings:

a. Individual vs. family: (Plug & Vijverberg, 2003 JPE)

Data source: Wisconsin Longitudinal Survey with information on family background (parental income, education attainment and IQ), the educational attainment of both biological and adopted children.

Main findings:

- Both parental IQ and income matter for children's educational achievement
- Parental ability (contributes to a lower bound 50%) dominates parental income (contributes to about 15%) in determining children's educational achievement

For further evidence on individual vs. family See pp.52-59 of Polachek & Siebert for a summary.

b. [Robertson & Symons](#) (July 2001 in *Economica*)

Data sources: UK National Childhood Development Survey

Main findings:

- Peer group effect and parental qualities are main determinants of student academic performance
- Conventional measures of school quality (e.g. class size) are not good predictors of academic attainment
- Academic attainment is a key determinant of subsequent labour market success as measured by earnings

c. [Wößmann](#) (2003, *Oxford Bulletin of Economics and Statistics*)

Data sources: Third International Mathematics and Science Study

Main findings:

- International differences in student performance cannot be attributed to resource differences but are considerably related to institutional differences
- centralized examinations and control mechanisms, school autonomy in personnel and process decisions, individual

teacher influence over teaching methods, limits to teacher unions' influence on curriculum scope, scrutiny of students' achievement and competition from private schools are positively associated with student performance.

- Family background also has positive impact on student performance

### **3. Family background, school quality & educational outcome**

Which is more important: family background or school quality? The debate is still on-going. The answer is important as it has profound implication on policy. If school quality has little to do with education outcome government policies aiming at improving school quality or education inequality can play little role to help the poor.

Main findings:

- School quality (especially teacher quality) seems to matter for student performance and labour market outcome
- Family background and peer group effects are important determinants for student performance and labour market outcome
- School resources is not a good measure of school quality