EDUCATION (Stiglitz ch. 16, Gruber ch.11)

- Rationale for public intervention
- Efficiency and equity effects of different forms of public intervention
- Some empirical evidence

Why should the government be involved in education? Rationale for public intervention

- Public spending on education is around **6% GDP** in 2005 **in OECD countries**. Public intervention expecially in primary and secondary education. Differences across countries
- Reasons for public intervention:
- **Efficiency reasons: market failures**
  - Positive externalities (productivity, citizenship)
  - Imperfect information and long time lags between decision and outcome;
  - Merit good (parents may be shortsighted, because of too high discount rate or ignore benefits);
  - Incomplete capital markets
- **Equity** (distributional) **reasons**

Theory: The individual decision to invest in human capital /1

- **Human capital model**, assumptions:

  a) more education →higher productivity

  b) higher productivity →higher wage

  c) individual decision is based on the comparison of marginal **private costs and** marginal **private benefits**

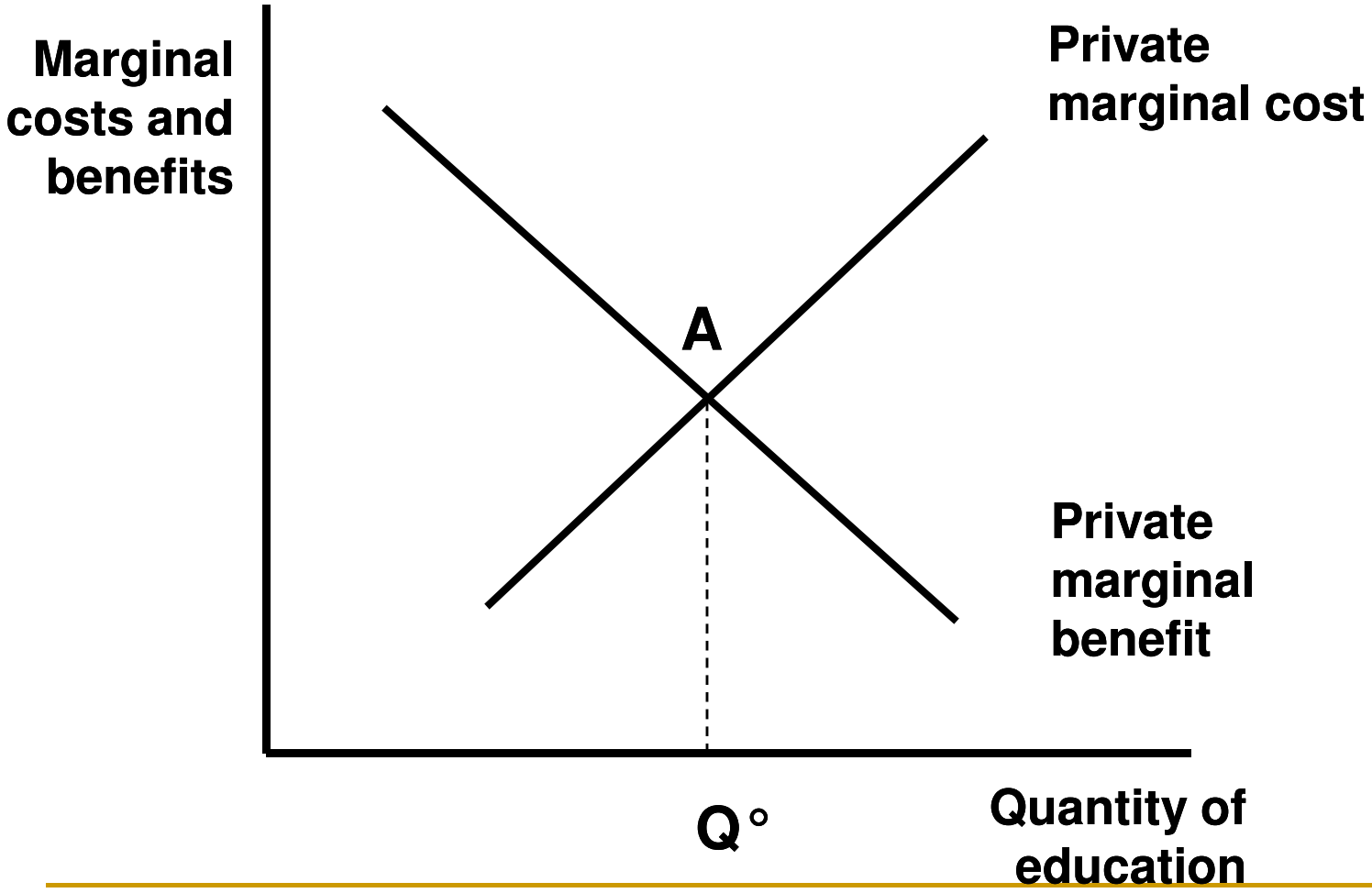
- **Private costs** of investment:
  - *Direct monetary costs*: tuition, books, etc
  - *Opportunity costs:* forgone earnings
  - *Non monetary costs:* effort to continue education
- **Private benefits** :
  - *Higher future earnings* (more educated workers have *higher employment probabilities and higher and faster growing wages* relative to non educated workers)
  - Utility derived from the higher level of education and knowledge

The individual decision to invest in human capital/2

- Based on the comparison between the marginal costs and marginal benefits of the investment in education
- The **marginal benefits curve is decreasing** as education increases, because it is assumed that *education returns are positive but decreasing at the margin* (each additional year of education produces a positive, but decreasing return)
- The **marginal costs curve is increasing** with education (an additional year of tertiary education is more expensive than an additional year of primary education).
- The **optimum level of education** for the individual is reached when:

private marginal costs = private marginal benefits

How much to invest in education: the individual decision



Theory: Different individuals (heterogeneity)/1

- Different educational choices reflect differences across individuals.
- We consider two main sources of differences:
  - **The Individual ability**
  - **The family financial background**

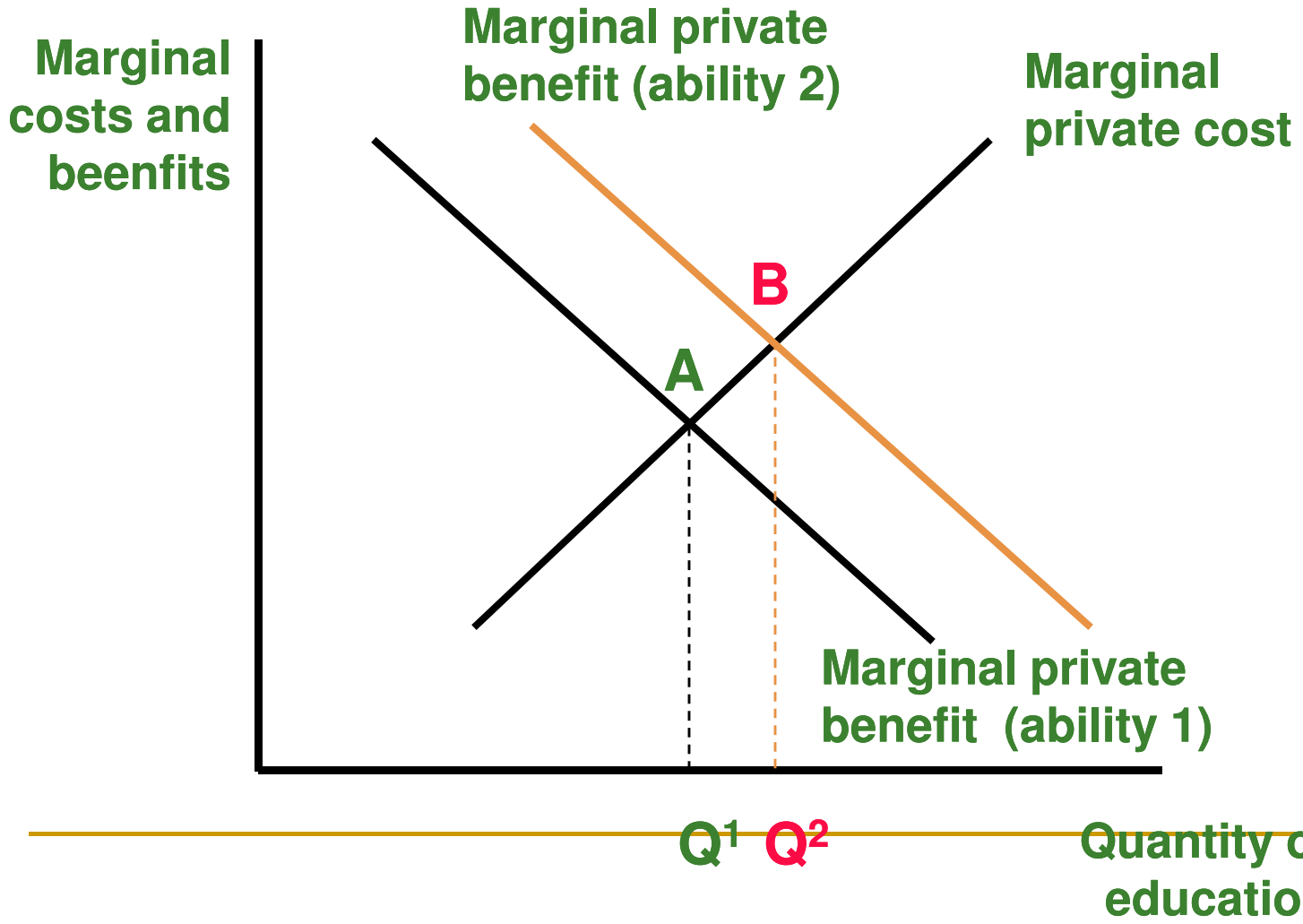
Theory: Different individuals/2

The importance of individual ability:

- More gifted individuals, given other variables, will get higher wages in the labour market relative to the less gifted ones.
- Their marginal benefit curve will be to the right of the less gifted
- ➡ more able individuals will get higher educational levels.

Private costs and benefits of education for different abilities:

ability 2 > ability 1



Theory: Different individuals /3

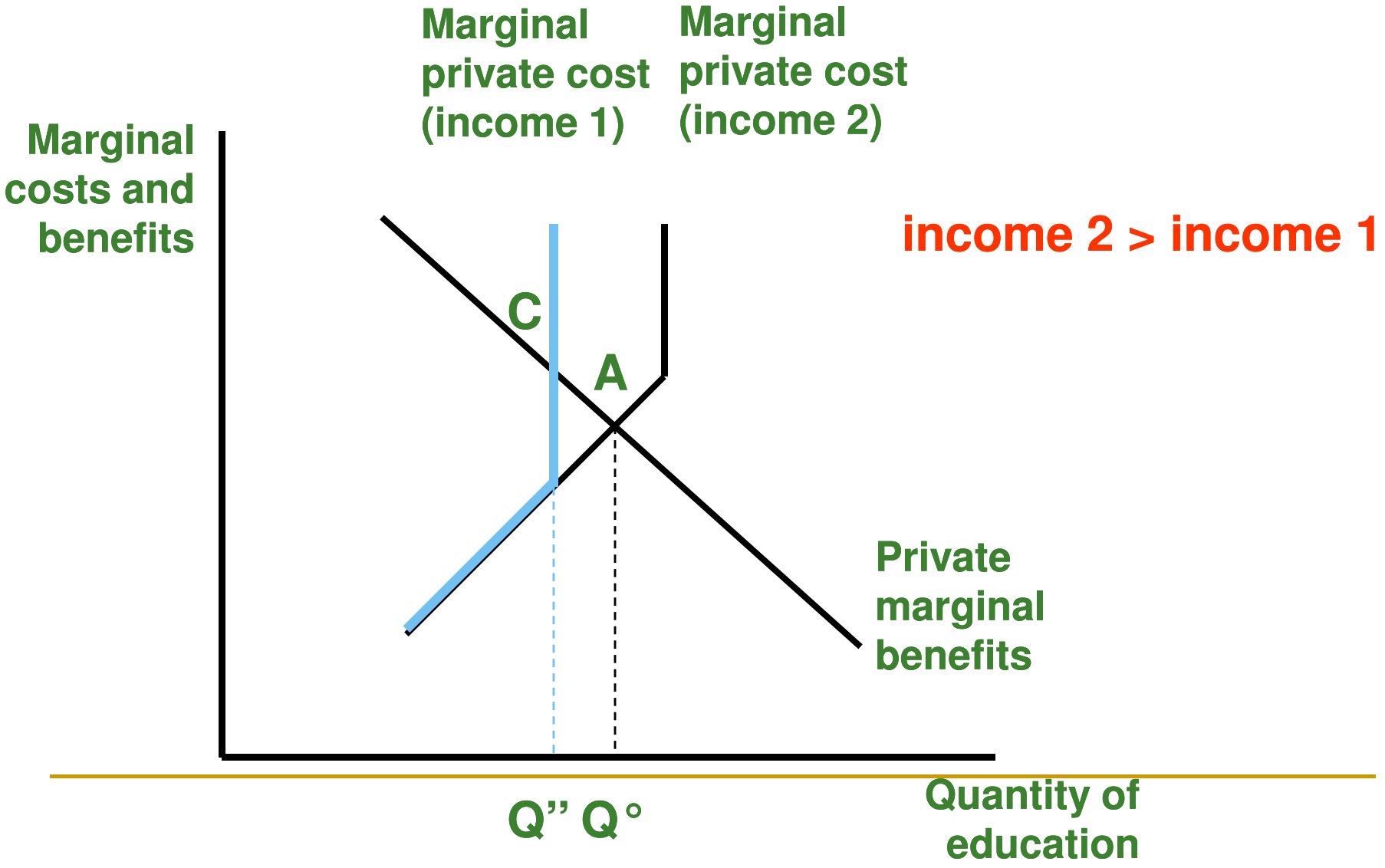
- **The importance of the family background**

  If it is difficult and costly to get loans for the investment in education, the wealth of the family of origin becomes relevant in educational decisions.

- In this case **the marginal costs curve becomes vertical** when the family financial resources end:

  - **only individuals with higher household wealth may reach their optimal choice**,
  - **individuals with lower financial wealth are obliged to select a sub-optimal level.** They will have less education and will get lower wages in the labor market relative to those from wealthy families.

Private costs and benefits of education, with limited financial resources and absence of capital markets



The result is that:

A) individuals with higher ability, and/or

B) individuals with higher income/wealth…

… will invest more in education

Equity and efficiency issues

Rationales for public intervention/1 Imperfections in credit markets

- ***<u>If credit markets are absent or are incomplete</u>*** and it is not possible to borrow money (or credit is rationed) to invest in education, **the wealth of the family of origin becomes** relevant in educational decisions.
- This result is **inefficient**, since individuals with similar abilities, but from poorer family background will have to choose a lower educational level than the optimum and social inequalities will persist across generations (no upward mobility).

Rationales for public intervention/2: Positive externalities

Social benefits are higher than private benefits:

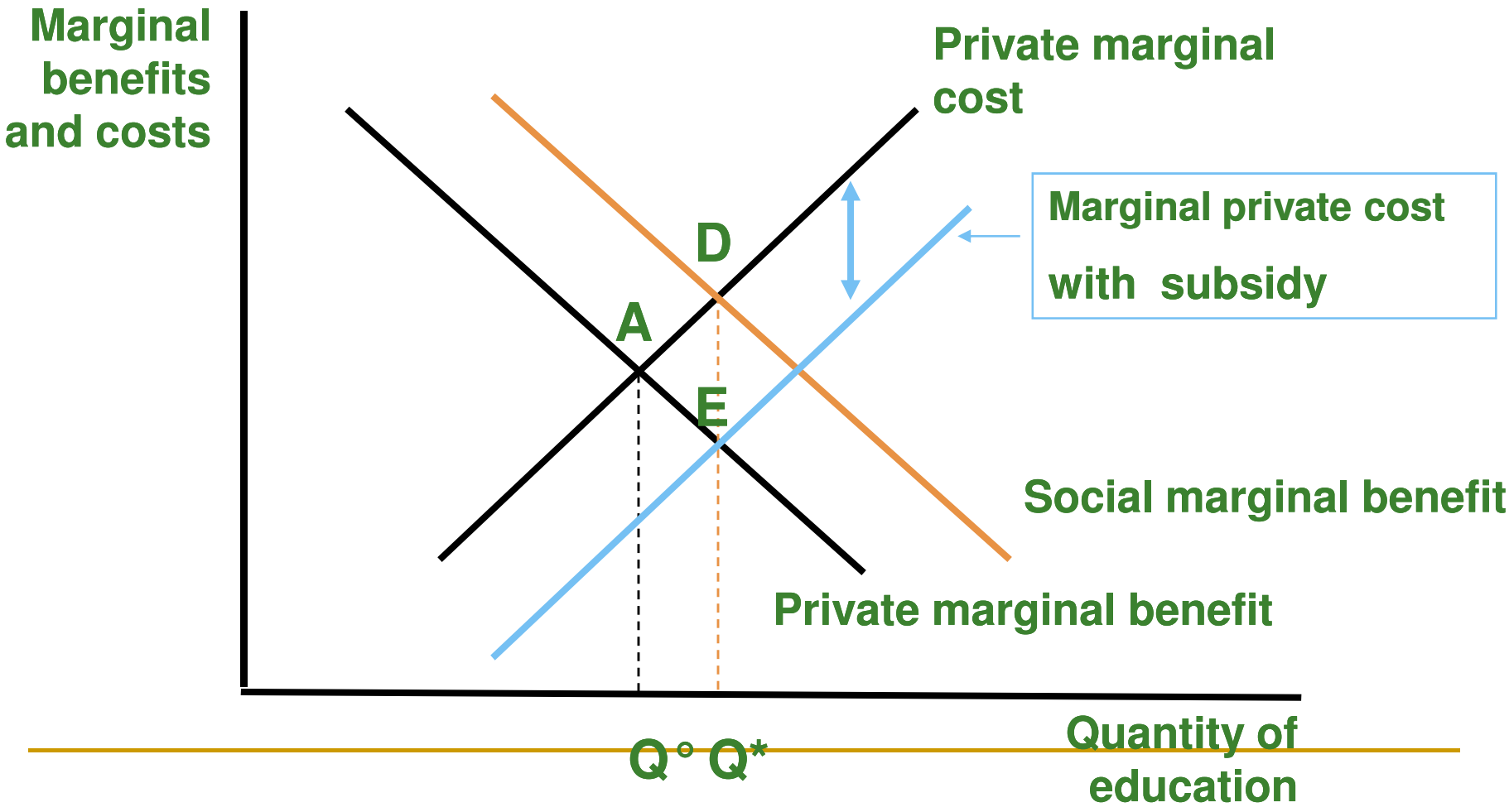
According to the *human capital model:*

- an higher educated workforce has a higher productivity and facilitate technological innovation and economic growth
- the quality of life and social cohesion is improved with a higher educated population (less crime, more informed voters,better health conditions, greater social inclusion of ethnic minorities and immigrants,...)
- If investment choices are left to private decisions there is a risk of underinvestment in education

$$(Q^{*}-Q^{\circ}).$$

- In order to support a greater investment, the government may introduce a subsidy which reduces the private marginal costs of investing in education.

Positive externalities in education



Rationales for public intervention/3

- **Imperfect information** on the characteristics and quality of the service (education is an *experience good*) or on the future benefits (probability of employment)
- **Scale economies:** given the high fixed costs private supply may generate monopoly conditions in less populated areas
- **Certification role**: adverse selection problems, necessity to regulate and certify private education in order to reach minimum standards

Rationales for public intervention/4

- **Distributional equity**:
- low income and low educated families have difficulties in getting the necessary capital and information to invest in human capital and they risk investing too little in the education of their children, thus increasing the gaps in income distribution and **perpetuating social inequalities across generations**.

How much public resources should be invested in education?

- **Theory**: invest up to the point where **SMB=SMC**.

Equity and efficiency trade off:

- **Equity**: support especially those with lower family background and those with lower abilities (???) in order to reduce social inequalities (*progressivity in inputs to reach equity in outcomes*)
- **Efficiency**: concentrate scarce resources on the more gifted to increase efficiency. Support competition between public and private schools and reduce public production.
- The efficiency and equity *trade off* should be considered together with the **redistributive effects of public intervention**.

The choice depends on social preferences in the efficiency-equity trade off and on the distribution of income and ability in the population.

Redistributive effects of public financing to education/1

- If public education is financed through taxation, we may have opposite effects on income distribution:
- ***Regressive effect*** when higher and tertiary education is subsidized: in this case everybody pays for it through taxes, but especially students from higher income families have access to it. Public subsidies to higher education thus increase as income increases.
- ***Progressive effect***: since taxation is usually progressive and education increases social mobility, the higher income individuals pay more for education subsidies

Redistribution effects of public financing to education/2

- Which effect prevails depends on how progressive taxation is and on how easy it is to access education
- *In compulsory education, the* **progressive effect** is prevalent, since all have access to education.
- *In higher and tertiary education* the **regressive effect** may prevail**.** Those individuals which do not go on studying usually pay more taxes than the subsidies they receive. Those continuing education are advantaged: they are more likely to pay less than the subsidies they receive.

Which level of education should be supported with public resources?

- **Primary education:** merit good and positive externality; high social benefits and progressive distributional effect justify public intervention. In most countries it is completely financed with public funds
- **Secondary and tertiary education:** private benefits are more likely to be higher than social ones and there is a higher participation of higher income students. Risk of regressive distributional effects. For these reasons in most countries it is only partially subsidized with public resources
- in most countries gifted students from low income families are supported with **scholarships and student loans**.

Forms of public support to education

In most countries mixed forms of intervention:

- **Public provision in public schools** (especially for primary education): production costs are paid with public resources
- **Subsidies to families** : fiscal deductions, subsidies to cover education costs, school vouchers
- **Support to gifted and/or low income students**: scholarships and students loans

Public vs private provision of education: pros and cons

Public provision

- **Pros:**

1. It is possibile to control directly the quality of the service
2. It is easier to guarantee access to all and reduce discrimination and/or segregation

- **Cons:**

1. Little competition and public inefficiencies
2. Low diversification of educational supply and risks of excess supply
3. Crowding out of private spending (for those who could afford it) and provision

- **Alternatives to public provision:**

- financial support (subsides) to private schools (producers)
- financial support to consumers to reduce the price of education (school vouchers)

Public financing: School vouchers

- **Pros**:
  - If vouchers may be spent either in public and private schools, they consent a high freedom of choice to families and promote committment
  - Support to low income families may be achieved by targeting the voucher to family conditions
  - Promote competition and efficiency
  - Offset crowding out of private spending

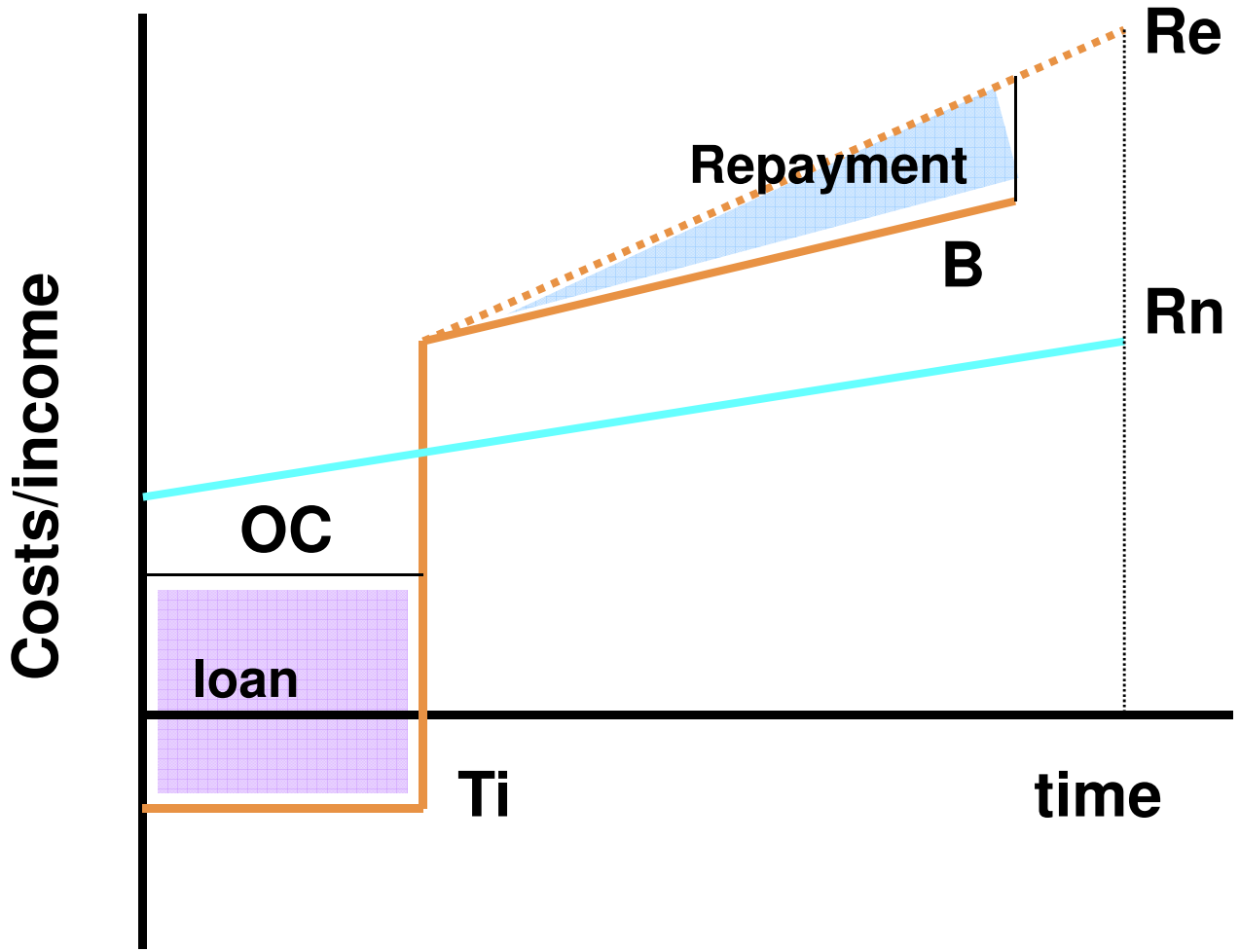
Public financing: School vouchers

- **Cons**:
- *Greater social and economic stratification*, due to incomplete information and lack of complementary resources in low income families. Social exclusion may be accentuated if private or good schools are not obliged to accept difficult or low income students
- *Excessive school specialization* (football schools,…) to attract particular market segments
- Effectiveness in increasing the investment in education depends on the *elasticity of education demand*. If it is low these measures do not increase investment much;
- *Risks of collusion* among schools and families and need to control the quality of services acquired with the voucher.
- If the subsidy is designed as a fiscal detraction, it has a *regressive effect* (supporting more the higher income families).

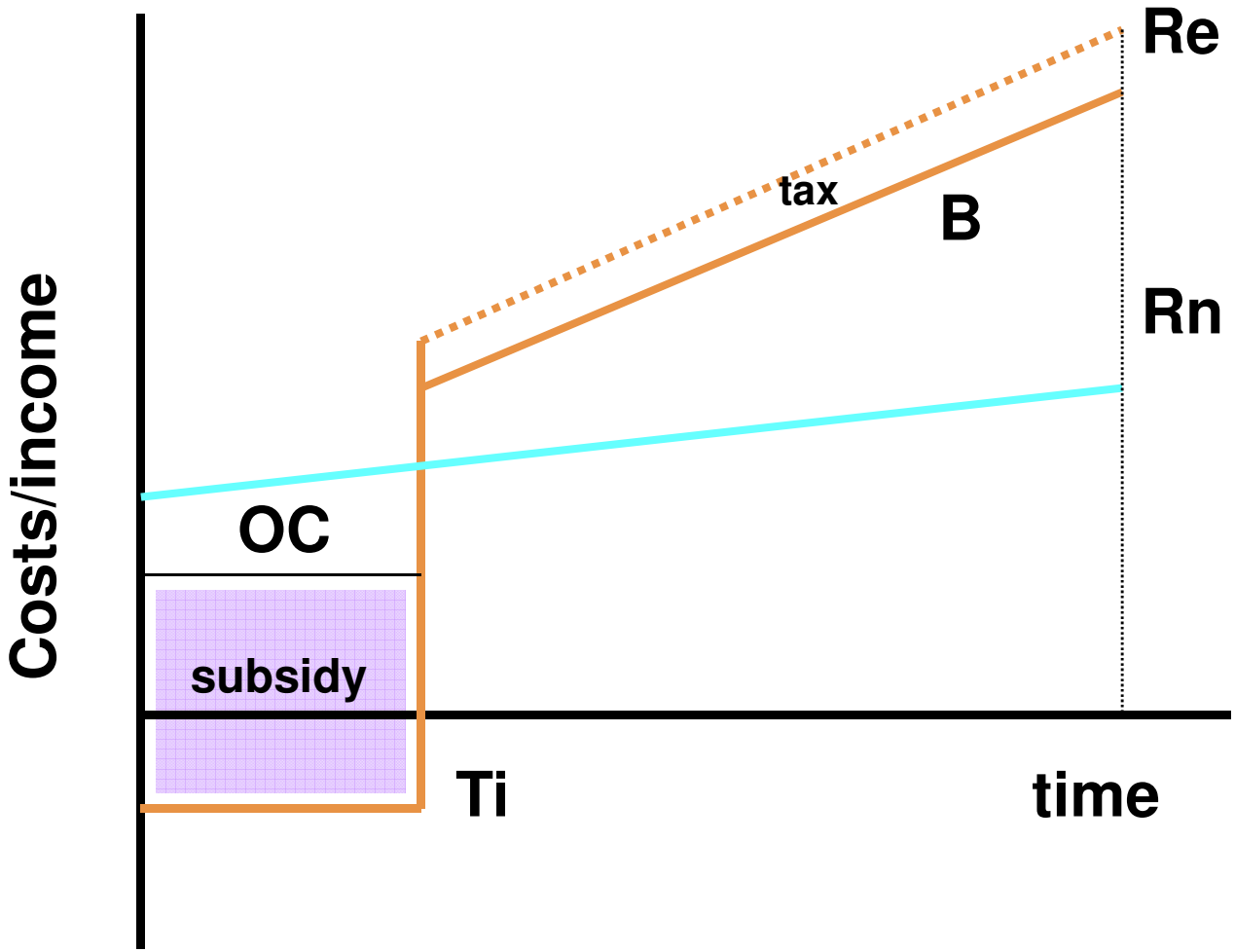
Financial support to students

- **Student loans** at reduced interest rates to be reimboursed once employed on the basis of the income (income contingent). They overcome the problem of incomplete credit and capital markets
- **Graduate Tax**: additional tax on those who complete their higher education. It is a form of socialisation of the investment risk on those who have taken it.
- **Scholarships/grants**: the cost of education for the more able students is entirely on the collectivity. This costs will be repaied by the higher taxes paid by the educated higher income. Higher redistributive effect favouring students, which could be corrected by means tested scholarships.

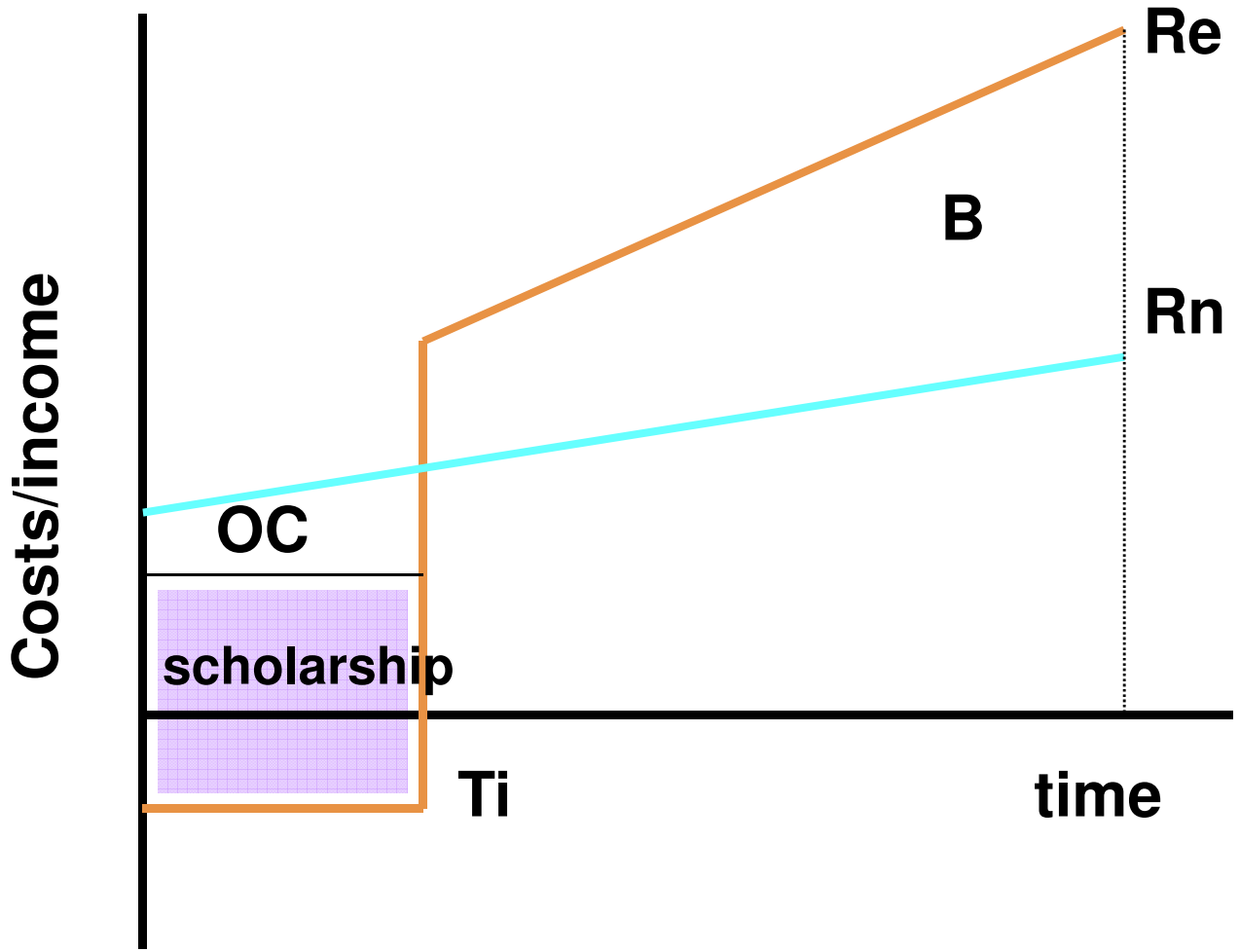
Students loans



Graduate Tax



Scholarships



Which policy to achieve efficiency and equity?

- Distributional equity would suggest to use scholarships rather than loans, given the higher risk aversion of low income families.
- In addition a support system based on loans may discourage women which present shorter employment histories.
- In order to avoid these risks in some countries (such as Sweden and Australia) the repayment of the loan is related to future earnings in a progressive way and in some cases women with children enjoy specific repayment conditions.

Open and controversial issues in education policy/1

- **Are there positive externalities?** Another view of education claims that *social benefits are lower than private ones* because education does not increase productivity, but only acts as a *screening device* to individuate those individuals with higher ability and productivity and higher motivation. In this case there no rationale for public support.

- **Does increased educational expenditure improve the quality of educational services and education performance**? Wide literature and evaluations (also using twins). Most show a positive correlation.

Open and controversial issues in education policy/2

- Does **school decentralisation** improve efficiency and quality of education? If spending and quality standards are defined at the local level and there is high territorial mobility there are greater risks of social segregation, but also greater competition among schools which improve efficiency. Need of a common certification system of educational performance and information on school standards to ease school choice

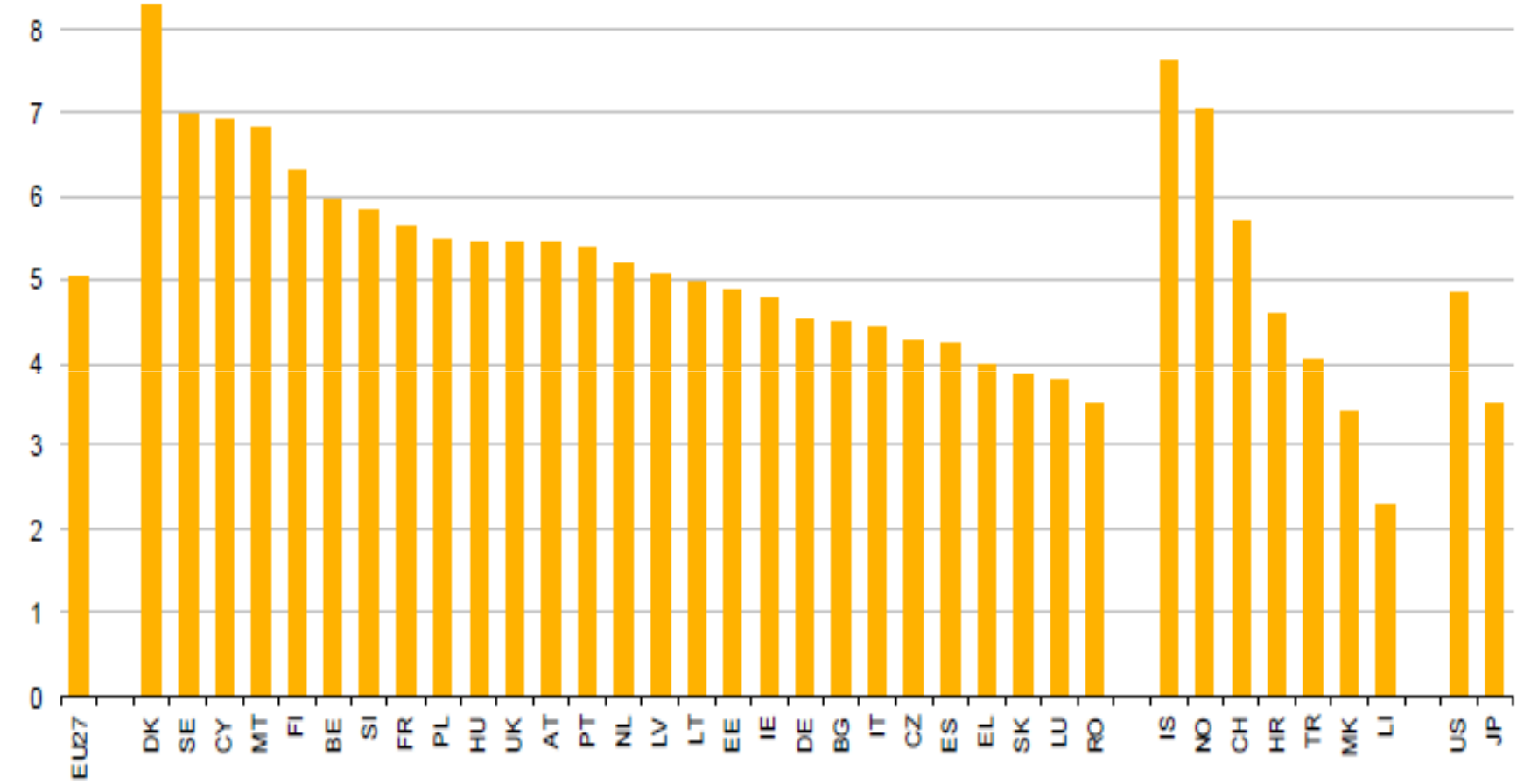
- How to **distribute public resources for education** (weight of efficiency vs equity considerations). Should public financing be related to quality and performance standards?

- How to define **school performance standards**?

Some data and empirical evidence on education

- Large differences across countries in publicv spending and in educational attainment levels
- Positive correlation between spending and educational attainment and between education and lifelong training
- Positive but imperfect correlation between educational attainment levels and countries' growth rates.
- In most countries high correlation between the educational attainment of parents and children
- Recent trends of increasing decentralisation in educational services, greater role of private provision and financing through school vouchers

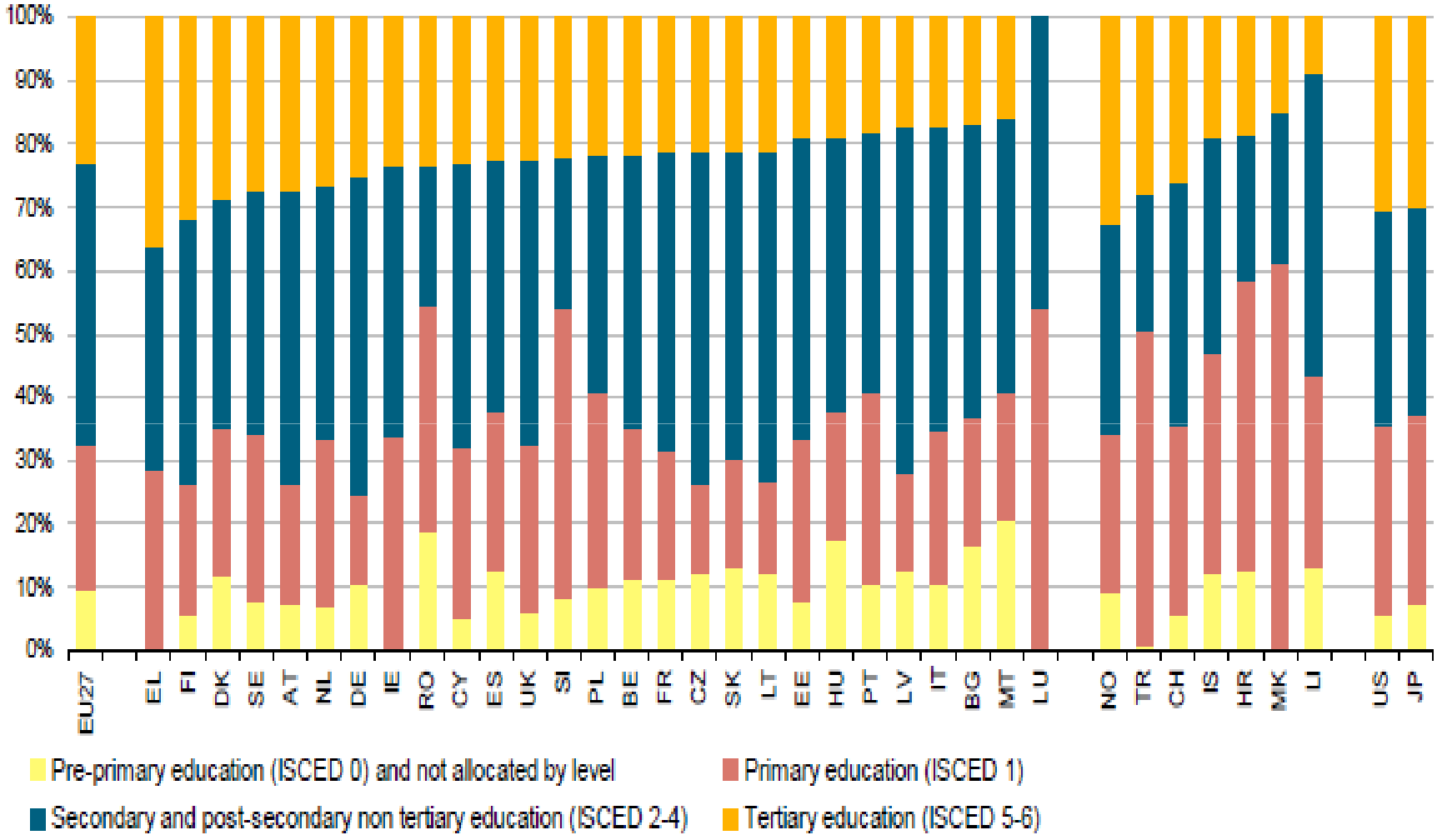
Figure 1: Public expenditure on education as a percentage of GDP - 2005



Note: MK: 2003 data; TR: 2004 data; LU: Expenditure on tertiary education not included

Source: Eurostat (tsiir010)

Figure 3: Breakdown of public expenditure on education by education level - 2005



Note: MK: 2003 data; TR: 2004 data

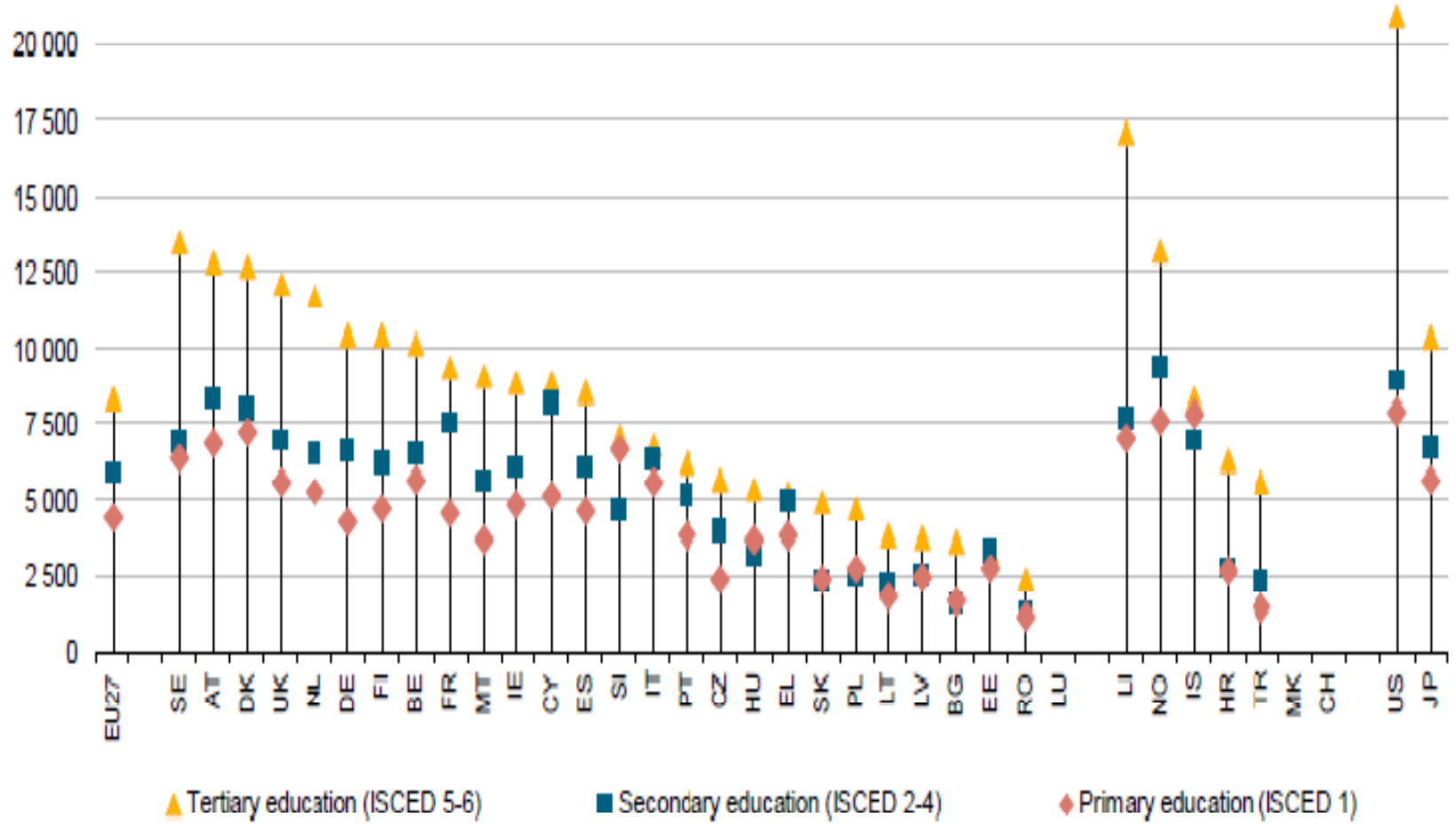
Source: Eurostat (educ_figdp)

Figure 4: Expenditure on educational institutions as a percentage of GDP, by source of the funds – 2005

Note: MK: 2003; TR: 2004

Source: Eurostat (educ_figdp)

Figure 6: Expenditure on educational institutions per pupil/student in PPS - 2005



Note: MK: 2003 data; TR: 2004 data

Source: Eurostat (tps00067)

Performance in math: OECD PISA score (2003)

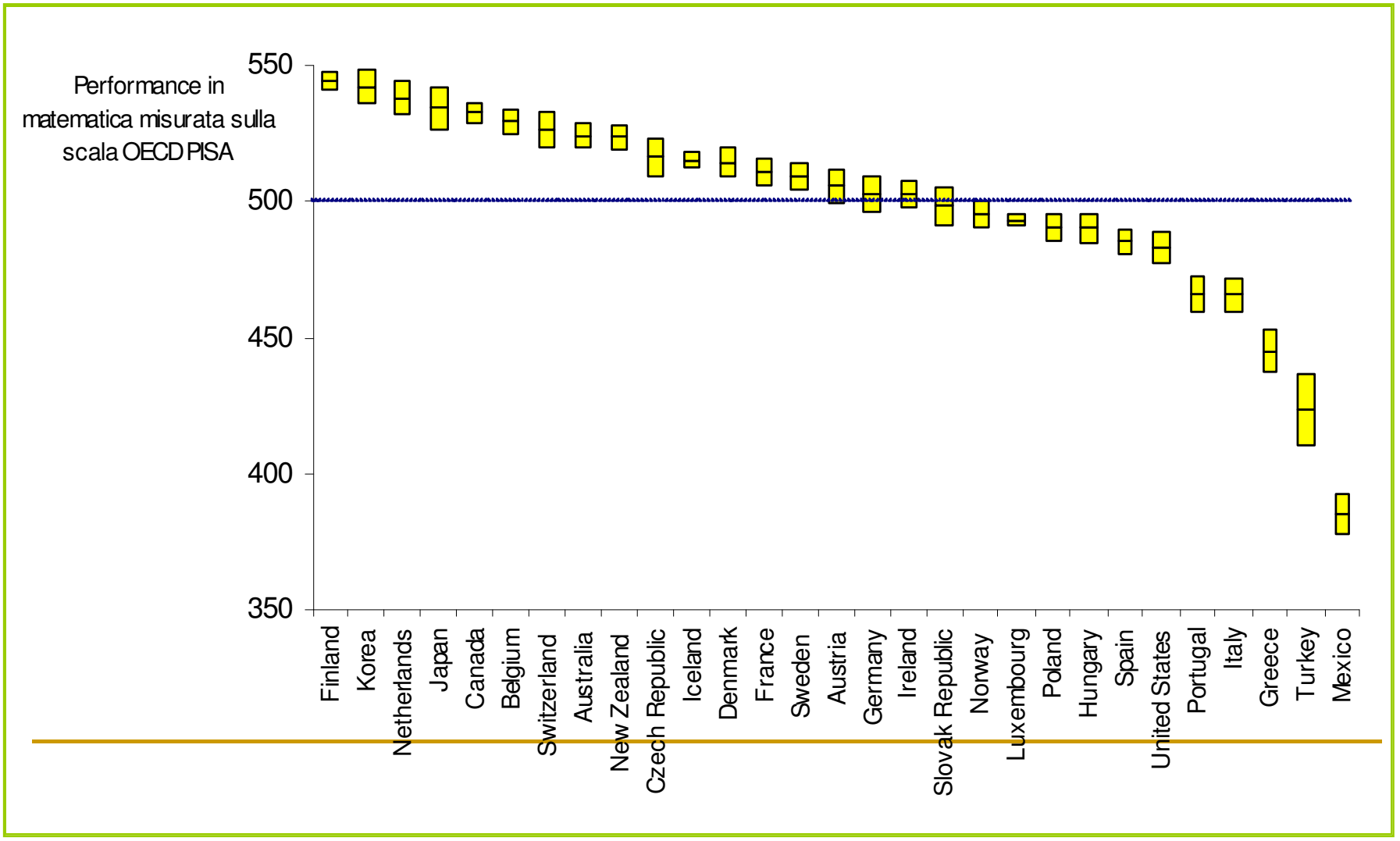


Table 8.1: Information about educational attainments

	Educational expenditures	Years of formal education Men	Women	PISA math score
Australia	6.0	13.0	12.8	108
Austria	5.7	12.1	11.5	105
Belgium	6.4	11.3	11.2	110
Canada	–	13.0	13.1	110
Czech Republic	4.4	12.5	12.3	107
Denmark	7.1	13.6	13.7	106
Finland	6.0	11.9	12.2	113
France	6.1	11.7	11.4	106
Germany	5.3	13.7	13.1	104
Greece	4.1	10.7	10.3	92
Hungary	5.6	11.8	11.5	101
Iceland	7.4	13.7	12.9	107
Ireland	4.4	12.8	13.1	104
Italy	4.9	10.2	9.9	96
Japan	4.7	12.6	12.1	111
Korea	7.1	12.4	11.3	112
Luxembourg	–	13.7	13.2	102
Mexico	6.3	8.9	8.5	80
Netherlands	5.1	13.1	12.7	111
New Zealand	6.8	12.5	12.7	108
Norway	6.9	13.8	13.9	102
Poland	6.1	11.5	11.8	101
Portugal	5.8	8.1	8.4	96
Slovak Republic	4.2	12.5	12.3	103
Spain	4.9	10.6	10.4	100
Sweden	6.9	12.3	12.6	105
Switzerland	6.2	13.4	12.3	109
Turkey	3.8	9.9	9.3	88
United Kingdom	5.9	12.8	12.6	–
United States	7.2	13.8	13.9	100

Note: Expenditure on educational institutions as a percentage of GDP for all levels of education - 2002; Italy and The Netherlands 2001; average number of years in formal education of 25 to 64 years old - 2003; PISA normalized score of 15 year old in mathematics - 2003 (U.S. = 100).
Source: OECD, *Education at a glance*, 2005.