

# **THE FISCAL RETURNS TO SCHOOLING IN THE EU**

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## I. INTRODUCTION

- Public expenditure on education can be seen as an investment. It increases future tax revenues and may reduce expenditure on social benefits.

- We construct estimates of the fiscal returns to a one-year increase in average attainment in 14 EU countries

using econometric estimates of the effects of schooling on wages and participation and employment rates (adjusted to try to approximate general equilibrium conditions)

and data on educational expenditures, academic failure rates and tax and benefit levels taken mostly from OECD sources.

- We find that in most EU countries post-compulsory *education largely pays for itself in the long run.*

Using a 3% real discount rate, the average recovery rate is close to 90%-- leaving the net cost of post-compulsory schooling per student and year at \$700 in the average EU country.

In six countries there is a net fiscal surplus that ranges between 500 and \$6,000 per student and year.

Sweden and Denmark are the only countries where recovery rates are negative or close to zero.

## II. THEORETICAL FRAMEWORK

- Keeping young people in school for an extra year at the state's expense can be seen as a public investment decision that involves both costs (mostly current) and benefits (that accrue in the future).
- The costs are the sum of *direct government expenditure* on education (including subsidies to households and privately run institutions) and the *opportunity cost* of foregone current tax revenues.

- Benefits come from education's positive effect on wages and participation and employment rates. These affect

- revenues from personal income taxes, social security contributions and consumption taxes

- average levels of unemployment and retirement benefits, and the number of recipients.

- We can discount these flows of costs and benefits to calculate

the net present fiscal value (*NPFV*) of an additional year of schooling = total benefits - total costs, in present value terms

and the *recovery ratio on public educational expenditure* = (net fiscal benefits excluding direct expenditure) / direct expenditure.

- For each country, our calculations try to capture the effects of raising average attainment by one year above the observed average level.

### III. SIMPLIFYING ASSUMPTIONS

- We introduce a number of *simplifying assumptions* that considerably reduce the data and computation requirements.
- The main one is that tax rates depend on an agent's status (student, employed, unemployed or retired) but do not change over time. We use tax rates that try to approximate those applicable at mid-career.
- To calculate the relevant tax rates, we assume the reference individual is single and has no children.

## IV. DATA AND PARAMETERS

- The key ingredients to the calculation are:
  - i) Econometric estimates of the effects of an additional year of schooling on wages, employment probabilities and participation rates.
  - ii) Tax parameters and unemployment and retirement benefit levels.
  - iii) Data on educational expenditures at post-compulsory levels.
  - iv) Estimates of academic failure rates
  - v) Estimates of average retirement ages and life expectancy

Briefly, the sources of this information are as follows:

*1. Estimates of the effects of schooling (and experience) on wages*

Taken from microeconomic wage regressions estimated with individual data. We use several sources that made use of large national samples, and correct their results for the likely net ability bias.

*2. Estimates of the effects of schooling on employment and participation probabilities.*

We estimate them using individual data from the ECHP and introduce an ad-hoc correction for the possible endogeneity bias.

Both sets of figures are estimates of partial equilibrium, individual level effects. We correct them to try to approximate general equilibrium effects, which should be smaller. The wage

correction is derived from a simple model, but the other two are ad-hoc.

### *3. Tax and benefit parameters*

Average and marginal tax rates and social security contributions for student part-time workers, employed and unemployed adult workers and pensioners are estimated using OECD data from *Taxing Wages*. They assume that an individual of average attainment and experience earns the same wage as the average production worker (APW) as estimated by the OECD.

Consumption tax rates are from Carey and Tchilinguirian (2000)

Average and marginal replacement rates for unemployed workers are estimated using data from the OECD's *Benefit Systems and Work Incentives*.

For pensions, we make a uniform assumption about benefit levels that is meant to provide an upper bound on the cost of induced pensions. We assume that pensions are initially set at 67% of retirement wages and grow at the same rate as prices.

#### *4. Educational expenditure*

Data are from the OECD's *Education at a Glance*. We consider a weighted average of expenditure per student at secondary and tertiary levels, with weights of  $2/3$  and  $1/3$  respectively. We assume that the government pays all the relevant costs.

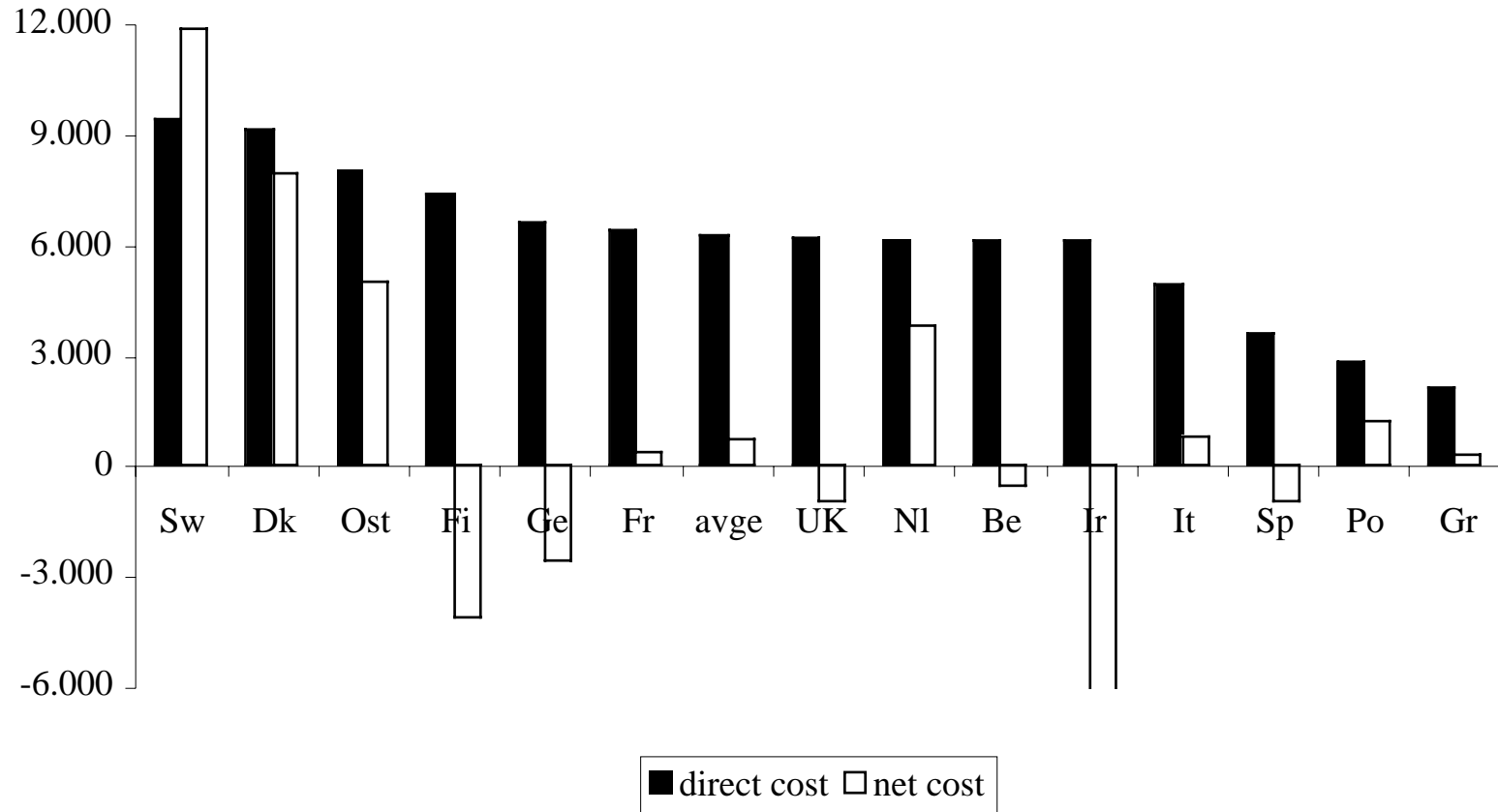
### 5. *Academic failure rates*

We try to approximate the average time it takes to successfully complete a school grade, using data on school survival rates from *Education at a Glance*.

## V. RESULTS

- All calculations assume a real discount rate of 3%. This is of the order of twice the observed real return on government bonds in the sample over the last few decades.
- Figure 1 shows the direct and net costs per student of an additional year of schooling, that is, actual government expenditure and government expenditure net of fiscal returns ( $=-1 \cdot \text{NPFV}$ ).

**Figure 1: Direct and net cost per student of an additional year of schooling**



**Figure 2: Recovery rates on public educational expenditure**

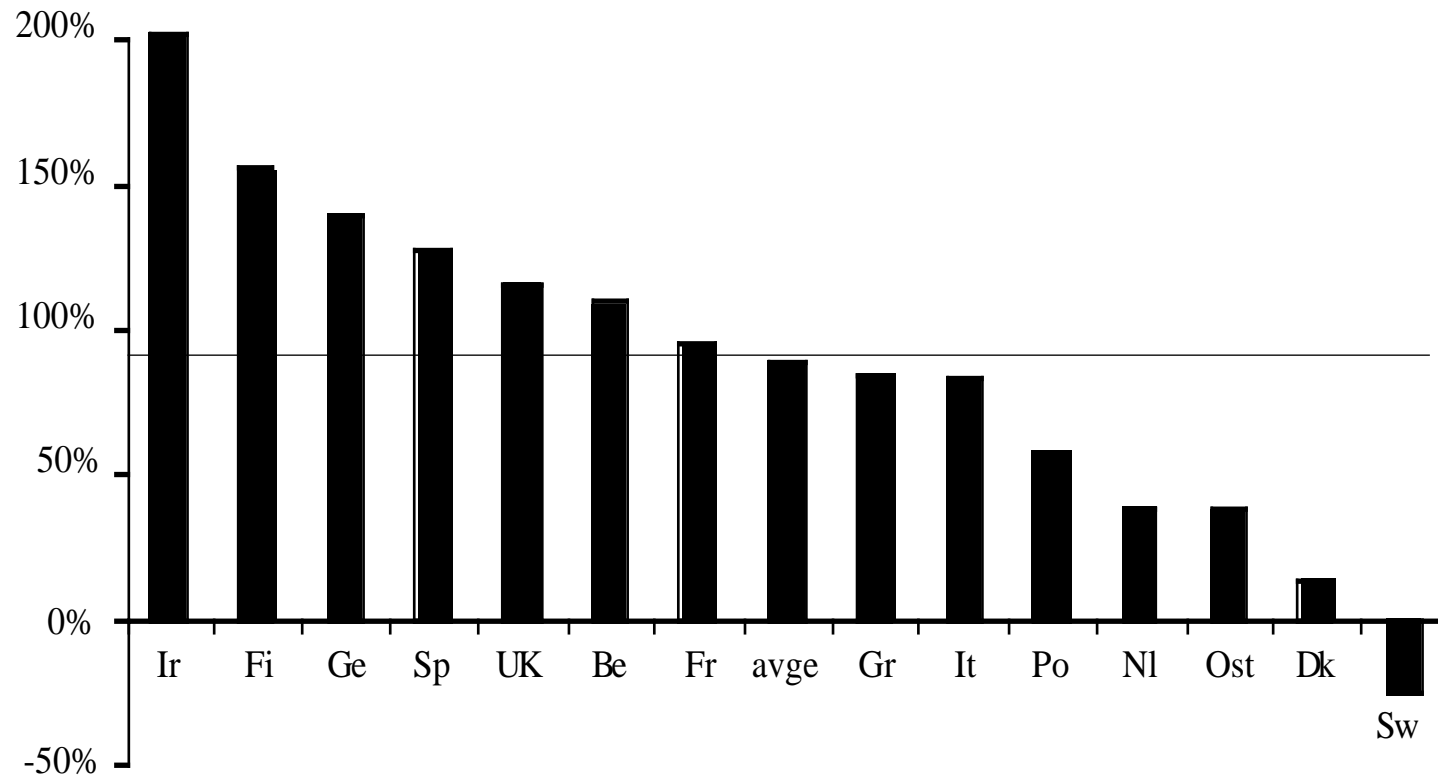
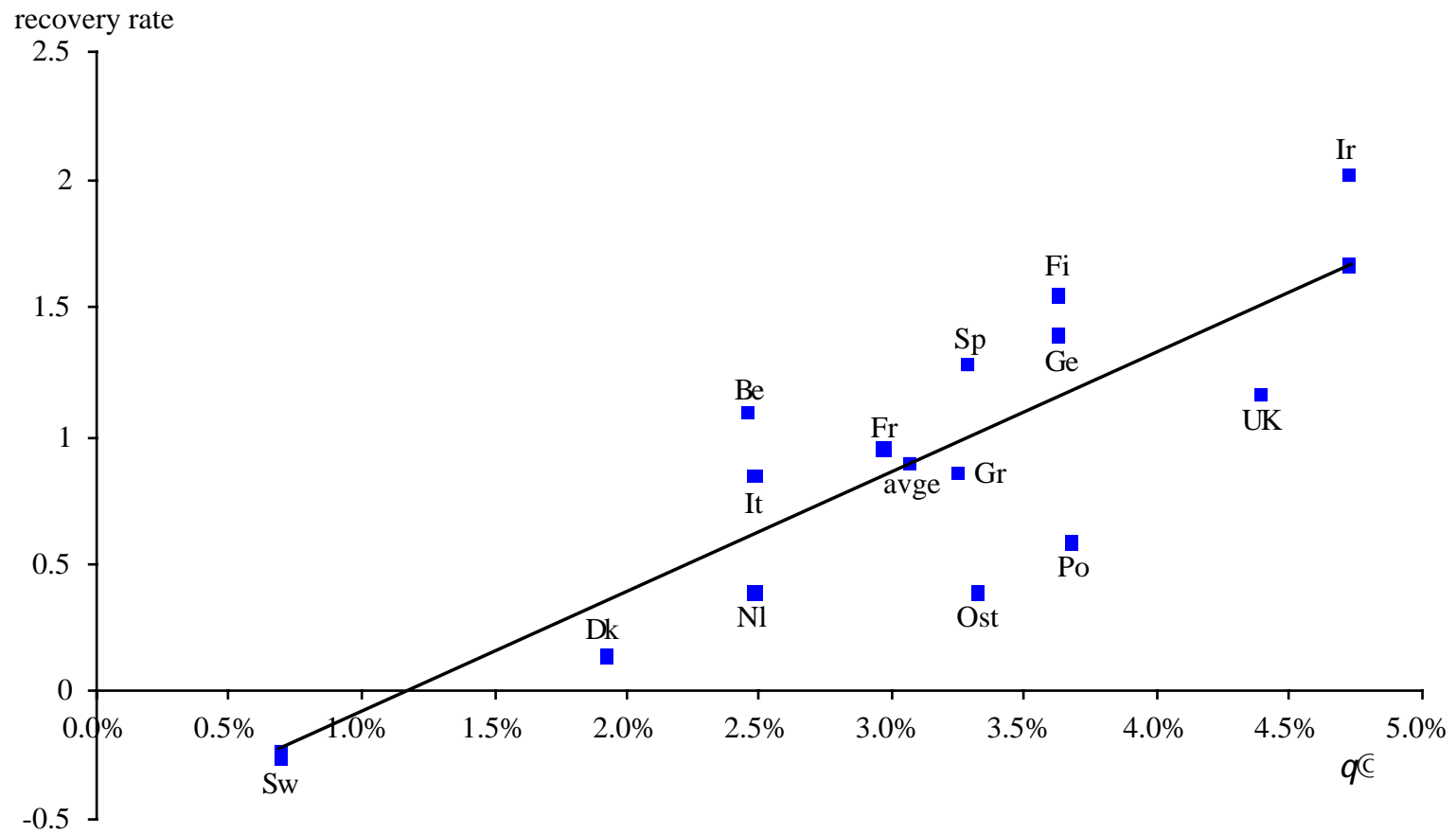


Figure 3: Recovery rate vs.  $q'$



- Figure 2 shows the estimated recovery ratios on public educational expenditure (=net fiscal benefits/ direct costs).
- The dominant determinant of recovery rates is the size of the net wage benefits of schooling ( $q' = \% \text{ increase in wages induced by a year spent in school, taking into account academic failure and the loss of experience}$ ). (See Figure 3).

Deviations from the fitted regression line have to do with tax rates and expenditure levels mostly.

## VI. POLICY IMPLICATIONS?

- They should be drawn with care for many reasons.
- The one clear lesson we draw from our results is that (most EU) governments should not subordinate educational policies to short-term budget concerns.
- But our findings do not necessarily imply that educational subsidies should be raised, in part because they are already quite high. The gross subsidy rate in the average EU country is 45%, and 16% after taking into account the disincentives due to taxes and social benefits. (See companion paper).