

Should we raise expenditure in basic education and reduce expenditure at college?

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Public expenditure on education as a fraction of total expenditure
2002

Source: OECD/UNESCO

| | Pre-primary education | Primary, secondary and post-secondary non-tertiary | Tertiary education |
|------------------|--------------------------|--|-----------------------|
| Belgium | 97.4 | 96.1 | 86 |
| France | 95.9 | 93.0 | 85.7 |
| Spain | 85.8 | 93.5 | 76.3 |
| USA | 77.6 | 91.6 | 45.1 |
| OECD mean | 82.1 | 92.8 | 78.1 |

Distribution of total public expenditure on primary, secondary and post-secondary non-tertiary education, 2002

Source: OECD

| | Direct expenditure on public institutions | Direct expenditure on private institutions | Indirect transfers and payments to the private sector |
|------------------|--|---|---|
| Belgium | 44.3 | 53.5 | 2.2 |
| France | 83.2. | 13.5 | 3.3 |
| Spain | 84.5 | 14.3 | 1.1 |
| USA | 99.8 | 0.2 | --- |
| OECD mean | 85.8 | 10.9 | 3.8 |

Distribution of total public expenditure on tertiary education, 2002

Source: OECD

| | Direct expenditure on public institutions | Direct expenditure on private institutions | Indirect transfers and payments to the private sector |
|------------------|--|---|---|
| Belgium | 34.3 | 50.6 | 15.1 |
| France | 88.1 | 3.3 | 8.7 |
| Spain | 90.5 | 1.6 | 7.9 |
| USA | 72.9 | 11.6 | 15.5 |
| OECD mean | 71.1 | 11.5 | 17.4 |

Annual expenditure on educational institutions by student in
equivalent US dollars adjusted using PPPs, 2002

Source: OECD

| | Primary education | Secondary education | Tertiary education | Primary to tertiary education |
|------------------|----------------------|------------------------|-----------------------|----------------------------------|
| Belgium | 5,665 | 8,272 | 12,019 | 7,933 |
| France | 5,033 | 8,472 | 9,276 | 7,467 |
| Spain | 4,592 | 6,010 | 8,020 | 5,914 |
| USA | 8,049 | 9,098 | 20,544 | 11,152 |
| OECD mean | 5,313 | 7,002 | 10,655 | 6,687 |

Education levels

Primary and secondary education (basic education)

- Strong positive externalities
- Compulsory
- Expenditure does not affect enrolment, but quality
- Provides “general” human capital

Tertiary education (college education)

- Weaker externalities
- High private returns
- Non-compulsory
- Expenditure affects both enrollment and quality
- Provides “specific” human capital

What do we do?

We explore a model with 2 levels of education. Each level has a different public funding structure

Basis education

- Mandatory
- Funded exclusively by government
- Provides a uniform endowment of human capital to all individuals

College education

- Optional
- Students can be required to finance partially their education
- Public expenditure affects participation
- Public spending has a stronger effect on high ability individuals

What we do in this paper (II)

- Individuals decide whether or not to attend college by comparing lifetime income if they attend with lifetime income if they do not.
- There are borrowing constraints
- The government has 3 instruments: (i) Per capita expenditure in basic education; (ii) Per capita expenditure in college education; (iii) The college subsidy.
- We determine the proportion of individuals attending college, together with what we call college “excellence:” Mean ability of college students
- We explore how changes in the way government divides its budget between basic and college education affects college attendance and college excellence (and hopefully how it affects total production in the economy)

Overview of the results

- As financial markets improve their quality, the government should reduce the extent to which it subsidizes higher education
- If the government wants to increase excellence at college, it should simply **raise per capita expenditure on basic education**
- If the government wants to increase excellence at college but without excluding poor students, it should **raise per capita expenditure on basic education and reduce per capita expenditure in higher education**
- If the government wants to increase both excellence and attendance at college, it should **raise per capita expenditure on basic education and reduce per capita expenditure in higher education**

Model

- Individuals live 2 periods. In the first part of the first period, all attend basic education. In the second part of the first period (a fraction δ) they either go to college or get an unskilled job
- In the second period all of them work:
 - As skilled if college
 - As unskilled if not
- Individual characteristics: ability $a \sim U[0,1]$ and income $y \in [0, y^{\max}]$
- c_L, c_H : expenditure per capita in basic and college education
- $\beta = c_H/c_L$ ($\beta_{\text{USA}} \approx 2.4, \beta_{\text{Belgium}} \approx 1.7, \beta_{\text{Spain}} \approx 1.5, \beta_{\text{France}} \approx 1.4$)
- College subsidy $s, 0 \leq s \leq 1$.
- Government pays c_L and sc_H . Students pay $(1-s)c_H$
- T : total budget for education (fixed)

Model (II)

- π : Proportion of individuals attending college
- Budget constraint of the government:

$$c_L + s\pi c_H = T$$

Who attends college?

- Only basic education (unskilled job) get wage c_L
- College education (skilled job) get wage $c_L + c_{Ha}$
- Attend college if:

$$c_L + c_{Ha} - c_H(1-s) \geq (1 + \delta)c_L$$

- Threshold value of ability $\hat{a} = 1 - s + \delta c_L / c_H$ (\hat{a} = excellence)
- We have $0 < \hat{a}$. Provided $s > \delta c_L / c_H$, then $\hat{a} < 1$

Model (III)

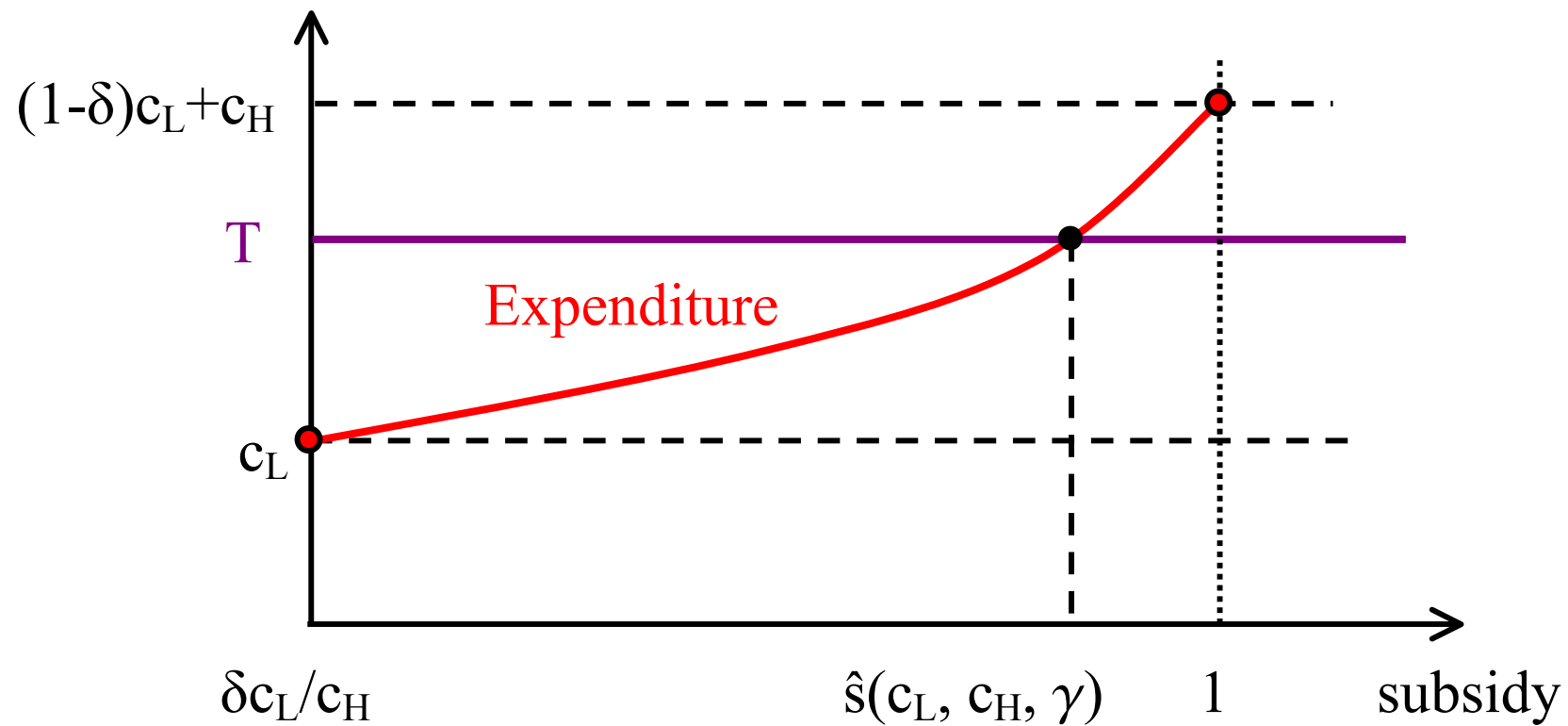
- Cost of attending college is $c_H (1-s)$. Income must be above a threshold level $\hat{y} = (1-\gamma) c_H (1-s)$. Here $\gamma \in [0, 1]$ represents the “quality” of capital markets. Individuals can borrow at most the amount $\gamma c_H (1-s)$.
- $p(c_H, s, \gamma)$ is the proportion of individuals with income above \hat{y}
- **So, who attends college?** Those with ability above \hat{a} and income above \hat{y} . College attendance is, therefore:

$$\pi = p(c_H, s, \gamma) \times (1-\hat{a})$$

- College attendance rises with s and γ . It gets lower with c_L . The effect of c_H is ambiguous (but it is expected to be positive in developed countries)
- Policy variables: c_L, c_H, s . Only 2 free parameters because of the budget constraint

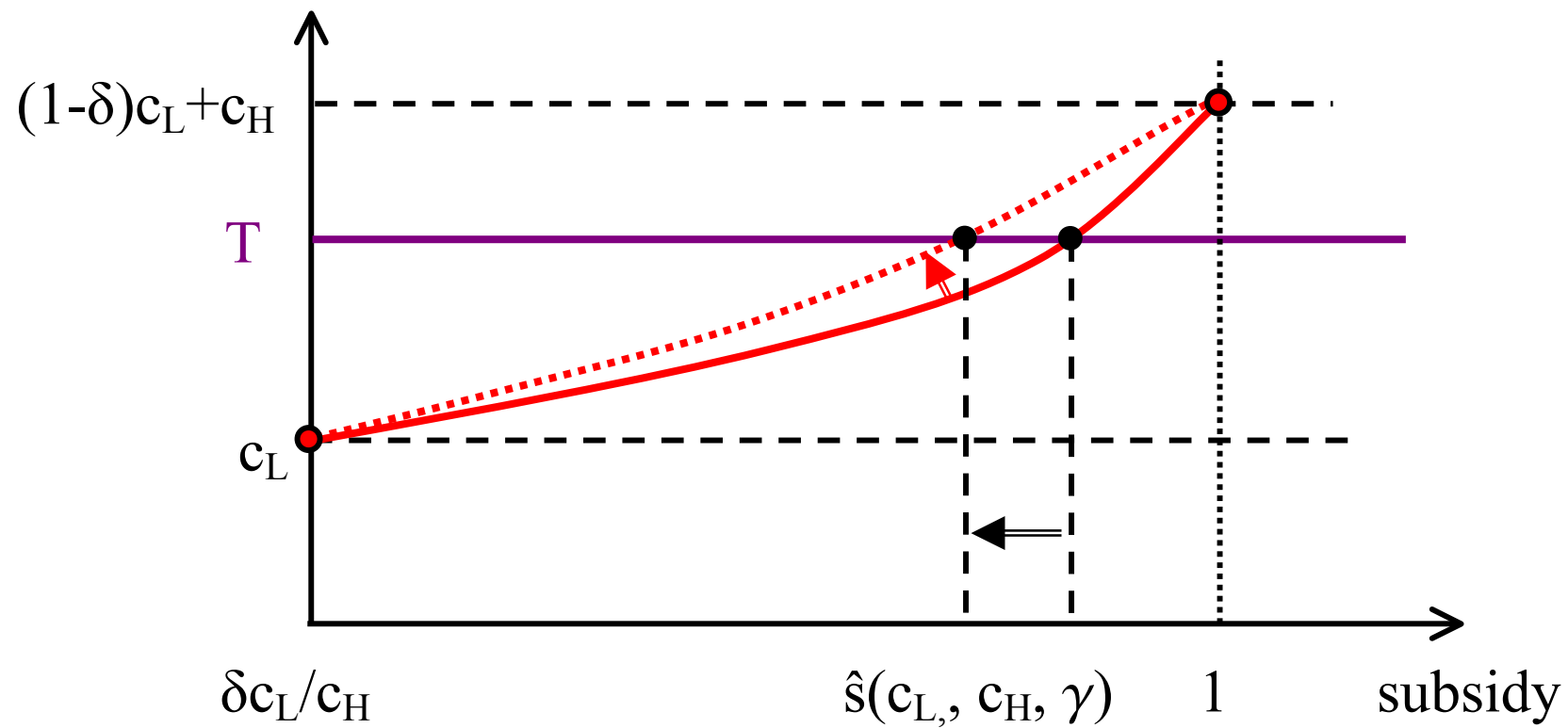
Model (IV)

- We focus on c_L and c_H , taking s as determined through the constraint



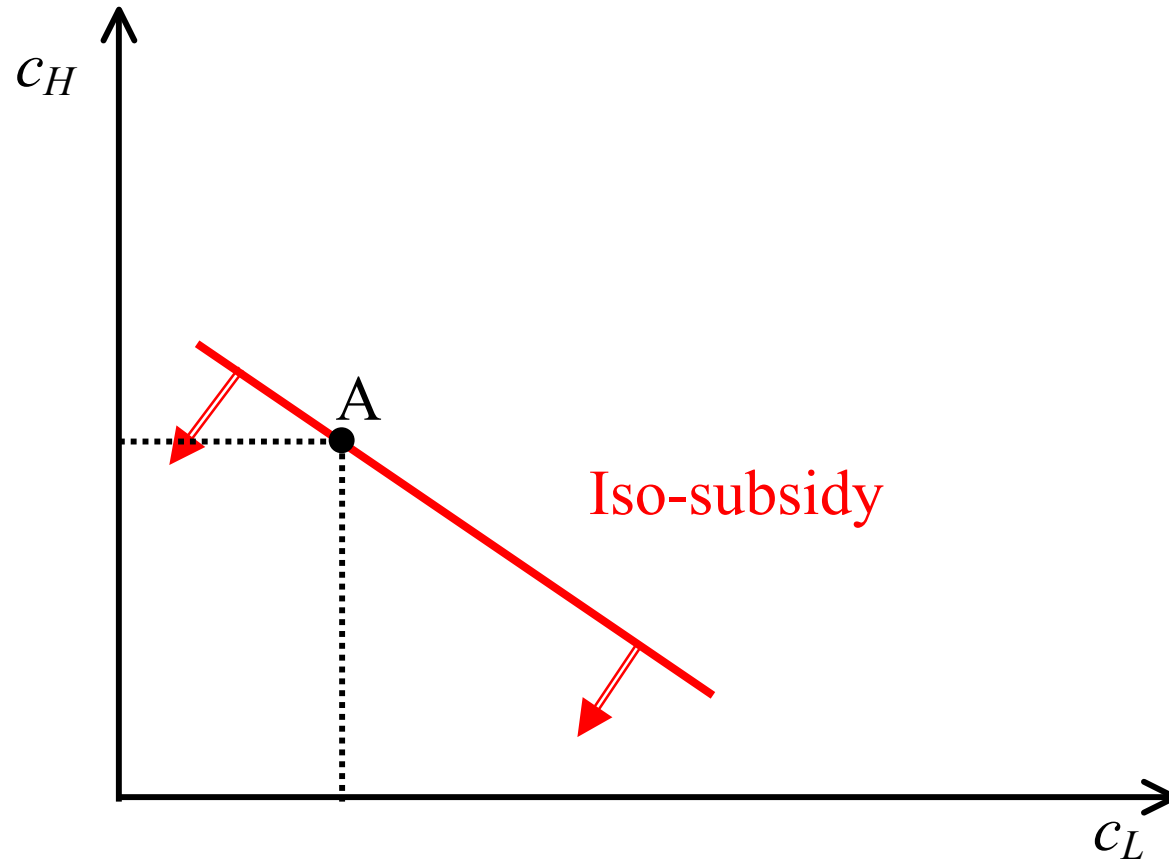
Model (V)

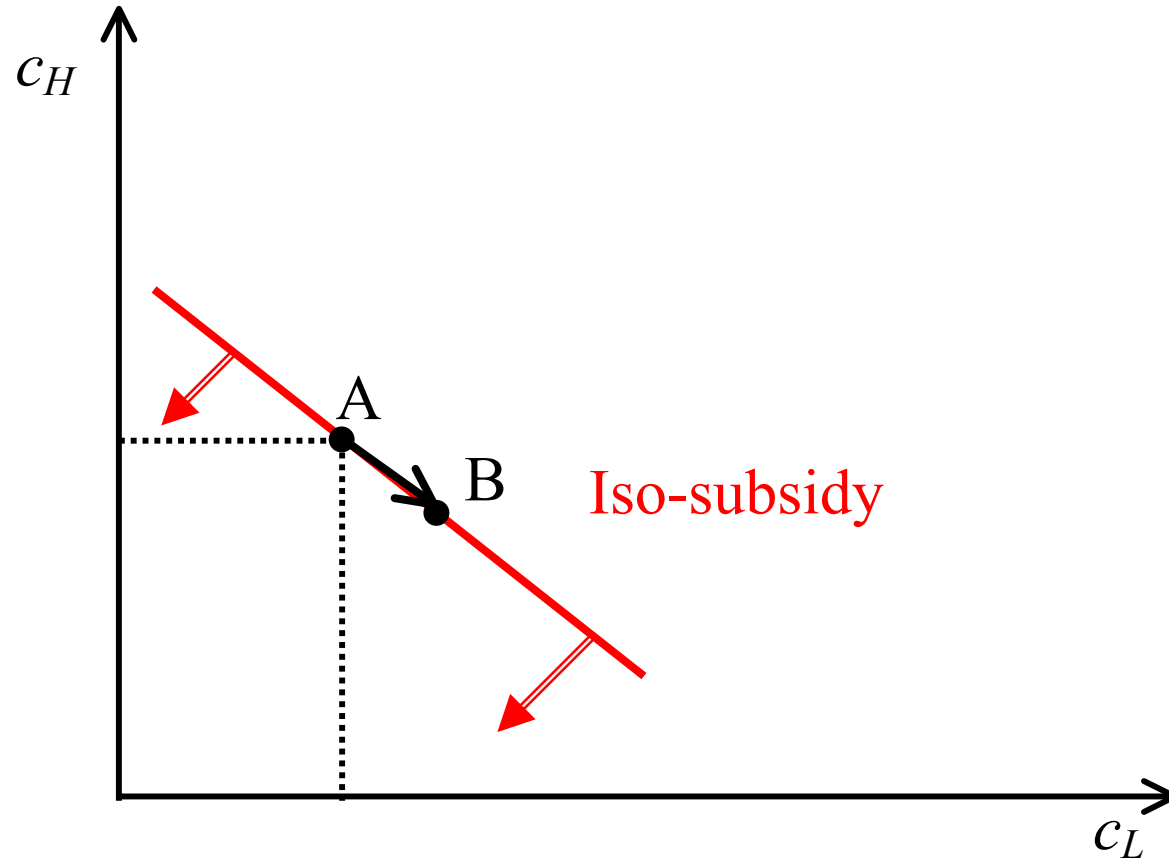
- Effect of an increase in γ :

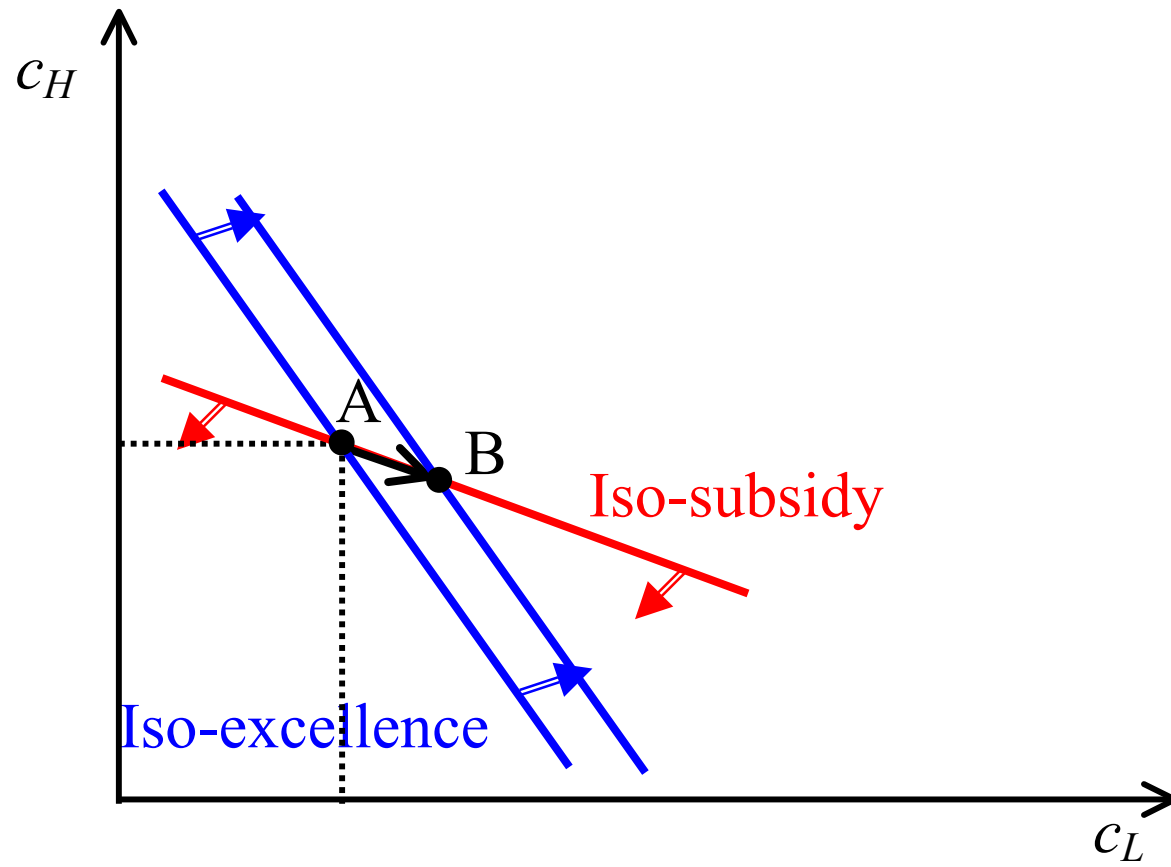


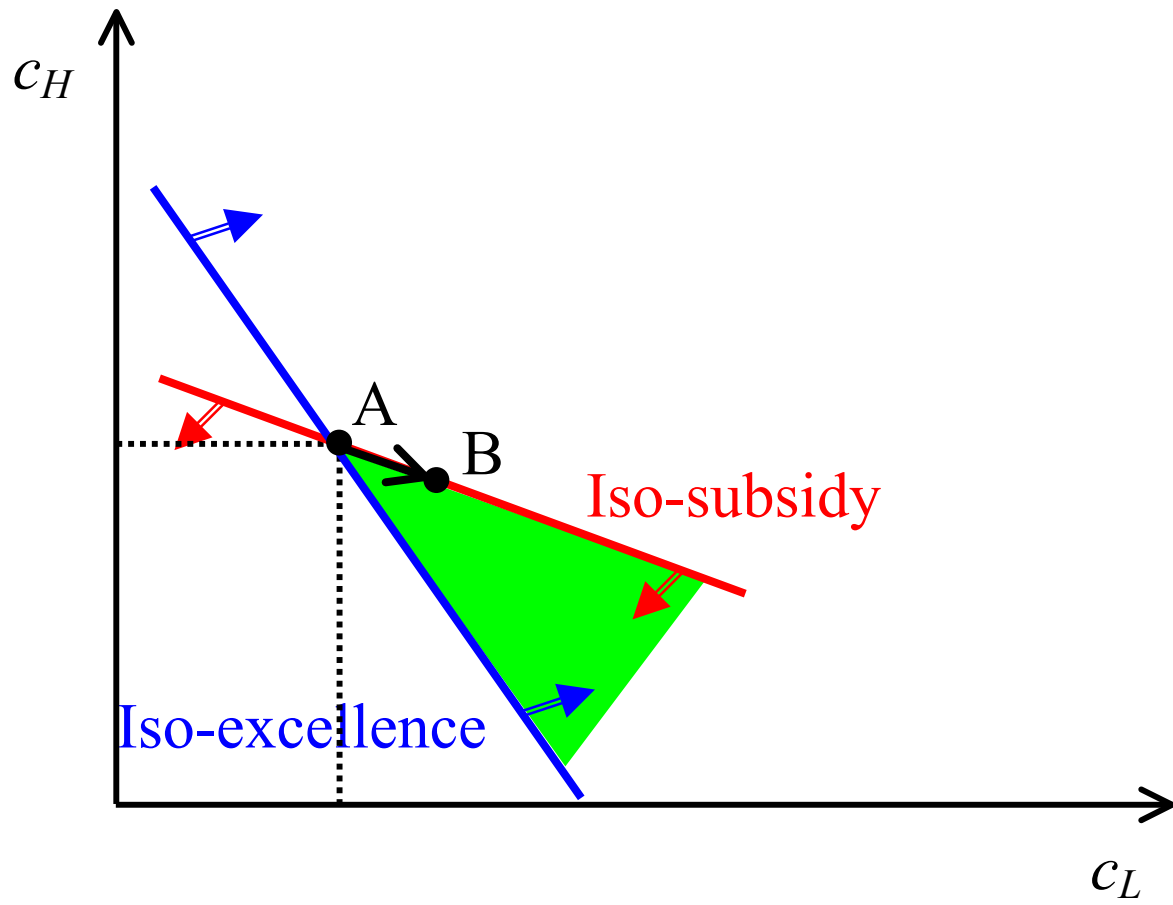
Results on college excellence and attendance

- If we just care for excellence: **Hold fixed c_H and increase c_L .** The threshold \hat{a} is a monotonically increasing function of c_L .
- **PROBLEM:** The subsidy gets lower, rising the income threshold \hat{y} excluding from college some highly talented but poor individuals. Note that this policy has also a negative effect on college attendance. We face a trade-off between excellence (quality) and attendance (quantity)
- To solve this problem: **Increase c_L and, at the same time, decrease c_H so as to hold constant s .** As the subsidy remains constant, this policy does not change the income threshold \hat{y} , while it increases excellence.
- **PROBLEM:** It may have a negative effect on college attendance.



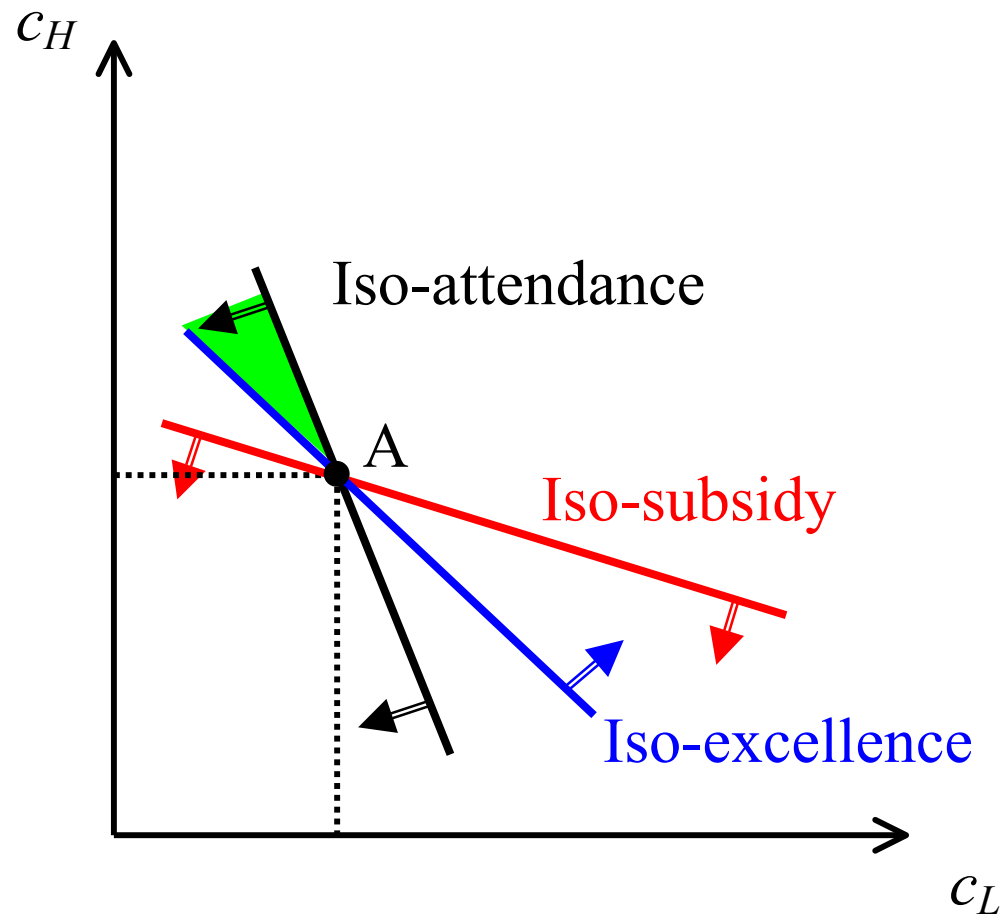




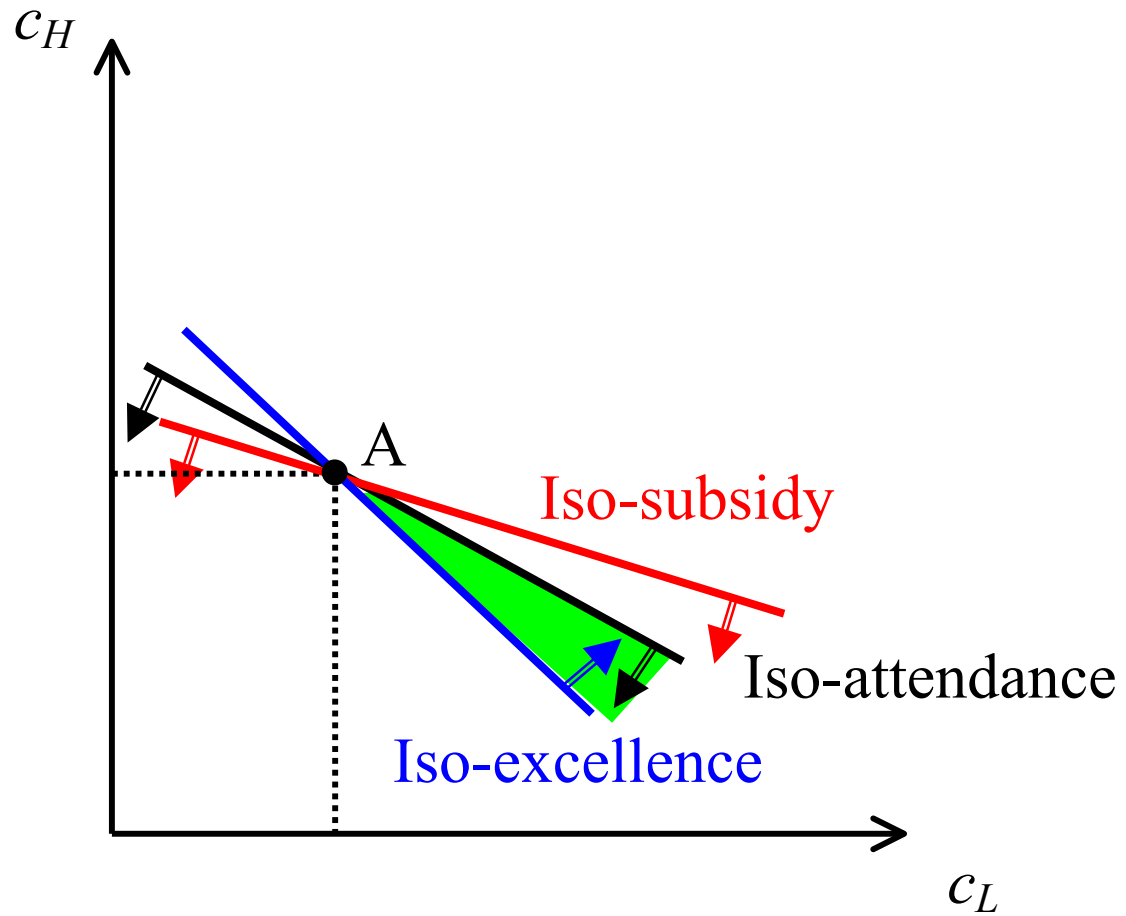


Results (II)

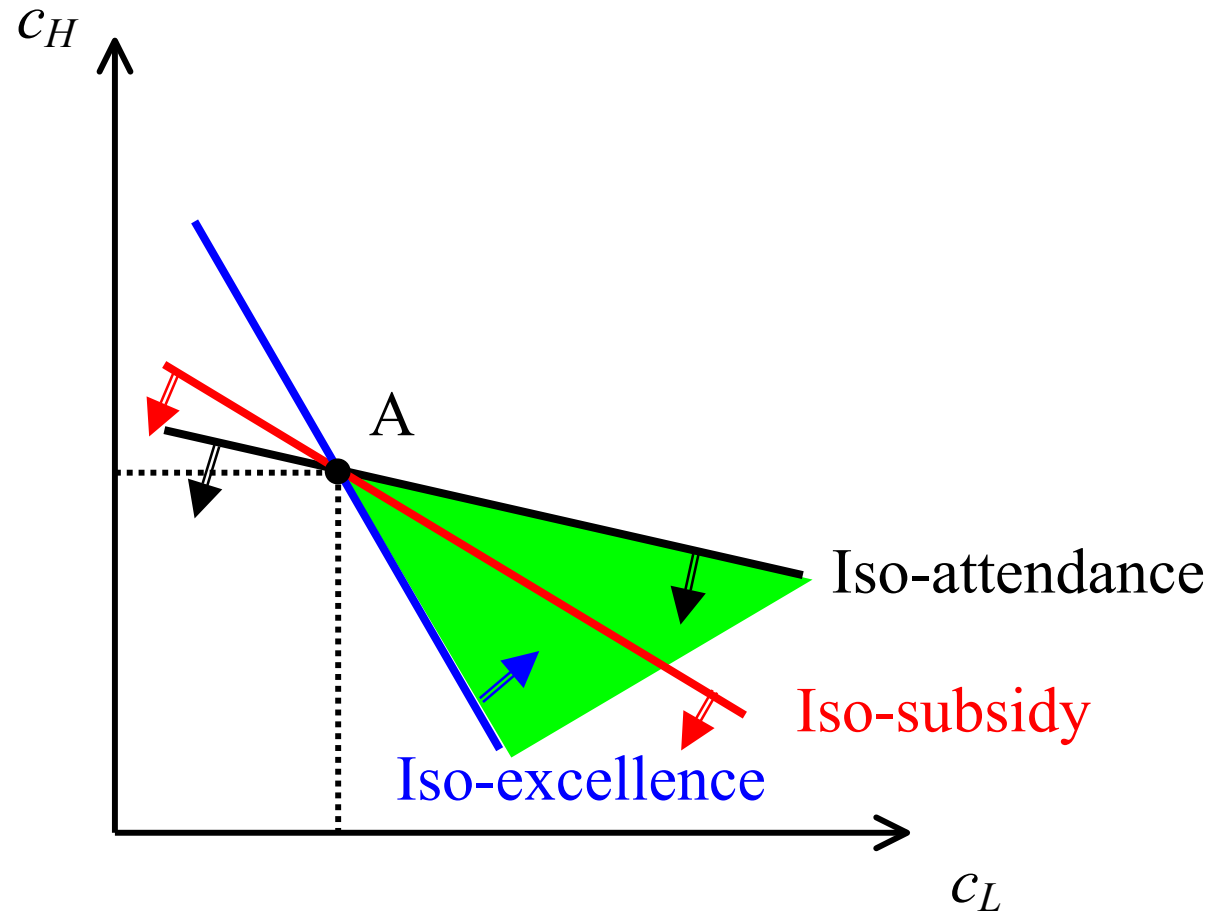
- Now suppose we care for college excellence and college attendance at the same time. The only way of doing this is by **reducing c_H and increasing c_L , that is, by reducing the ratio $\beta = c_H/c_L$.**
- Note that this policy change has always the effect of reducing the threshold level of income



A case that can never happen



Iso-attendance is flatter than iso-excellence



More possibilities if flatter than Iso-subsidy