Outline

• What is tracking and the related debate

• Theory review

• Empirical analyses review

• Conclusions
Topic under study: tracking vs comprehensive

Most of OECD countries employ some strategies of *ability grouping* in order to divide students with different endowment of abilities:

- **tracking**: students (at different ages) are sorted into schools of different types (academic vs vocational oriented)

- **streaming**: the education provided is formally equal for all, but some courses are taught at different level of complexity.

While *comprehensive* systems provide the same quality of education to everybody, irrespective of their abilities.
Why tracking?

• to increase output of the school system in terms of aggregate wages: by creating more homogeneous classes teaching becomes easier and the accumulation of H is faster.

Why not?

• to guarantee equality of opportunity to all, equipping all students with the same level of knowledge;

• difficulties in identifying and predicting abilities: influence of family’s background
Two main implications

Efficiency:

→ which scheme will increase aggregate productivity—net of costs of education?

Equality of opportunities:

→ which scheme will lead to higher productivities for disadvantaged students?
Theory review

A. Peer effect
B. Signaling value of education
C. Specialization
D. Optimal age
A. Peer effect

- the overall effect of average ability in a class, through social interaction.
- externality created by each individual on other people

Complement variety: H formation improves only when there is a generalised increase in the quality of all students.
Substitute variety: the ability of better–endowed students can compensate for low performances of lesser-endowed.
A. Peer effect (II)

This effect is incorporated in the educational production function:

\[ h = a^\alpha m^\beta e^\gamma, \]

- \( a \) = initial ability of the student
- \( m \) = mean ability of the class
- \( e \) = expenditure/student
- \( \alpha, \beta, \gamma \) = production coefficients

Positive and diminishing marginal productivities

Increasing the marginal productivity of mean ability in class can imply a tendency in favor or against streamed classes

→ ambiguity in the prediction of outcomes
B. Signaling value of education

Education is not productive per se. Its function is to provide the employer with some information about the productivity of the applicant.

→ Higher ability screening in tracking systems, so it is considered to be more informative.

C. Specialization

A comprehensive system allows for more flexibility of the students, H is kept more versatile... but...

Accumulation of H is faster if the student specializes early
→ the choice depends on the environment
D. Optimal age

If separation is too early:

- risk of mismatch the needs of firms
- depreciation of vocational training: obsolete knowledge when entering the LM
- abilities are revealed gradually and strong differences in maturity

But gains from early introduction of specialization.
Empirical analyses

A. What to observe?
B. Older literature on peer effect
C. USA literature
D. Variance in mean ability
E. Policy reforms
F. International comparisons
A. What to observe?

- monitoring major reforms or local reform experiments
- variation of ability grouping policies within and across schools
- institutional variations across countries using international achievement tests
B. Older literature on peer effect

Summers and Wolfe (1977): peer group effects are present for everybody and work strongest for weak students.

Henderson et al. (1978): Raising +1 point IQ class mean the test score gains are diminishing with increasing mean ability.

→ Negative effect of tracking
Datasets:
- Longitudinal Study of American Youth (LSAY)
- National Education Longitudinal Study

Common aim: to determine the size of peer group effects in tracked and non-tracked US high schools.

Results: similar, in suggesting that tracking does not seem to be related to substantial efficiency gains, but it has different effects on students, according to their ability levels.

Shortcomings: no definition of tracking in the questionnaires.
- track placement may be correlated to unobservable factors
- the selection of students is presumably endogenous
C. USA literature (II)

<table>
<thead>
<tr>
<th>Paper</th>
<th>Tracking /Streaming information</th>
<th>Results</th>
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</table>
| Hoffer (1992)             | a) Dummy variable if school uses ability grouping in math classes  
b) Teacher's evaluation of average ability level of class compared to other classes in same school | No effect of ability grouping on overall achievement. Placement in high group has positive effect, placement in low group has negative effect |
| Betts and Shkolnik (2000a) | a) Dummy variable if school uses ability grouping in math classes.  
b) Teacher's evaluation of average ability level of class compared to other classes in same school. | No effect of ability grouping on overall achievement. Low ability children not affected by ability grouping, middle ability students harmed, high ability students gain |
| Argys et al. (1996)       | Teacher's evaluation:  
a) achievement level in mathematic class considered above average, average, below average, widely differing  
b) class is honours, academic, general or vocational track | Students in lower tracks gain from detracking, students in higher tracks lose. Detracking reduces average test scores by two percent |
| Figlio and Page (2002)    | Tracking dummy  
a) from principals' reports: whether school uses ability grouping or tracking in math classes.  
b) combining answers from teachers' reports | Overall, no effect of tracking. Using two-stage least squares: Tracking helps students in bottom third of test distribution |
D. Variance in mean ability

Aim: to measure the impact of tracking by looking at the changes in variance within and between groups.

Zimmer and Toma (2000): higher variance within is associated to higher individual student achievements. But it depends on the mean level of the class: small effect if over mean, high effect if lower mean.

Low-ability students capture higher gains from a better peer set.
E. Policy reforms

Observing reforms in education systems for establishing causal effects.

Galindo-Rueda and Vignoles (2004); Manning and Pischke (2006) → reforms in UK
Meghir and Palme (2005) → reform in Sweden

Datasets:
- National Child Development Study (a cohort of individuals born in England and Wales in March 1958)
- 1948 and 1953 cohort survey, Sweden
## E. Policy reforms

<table>
<thead>
<tr>
<th>Paper</th>
<th>Data + Country</th>
<th>Reform information</th>
<th>Outcome variable</th>
<th>Results</th>
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<tbody>
<tr>
<td>Galinda-Rueda and Vignoles (2004)</td>
<td>National Child Development Study, England and Wales</td>
<td>Change from selective to comprehensive school system</td>
<td>Test scores in mathematics at age 16</td>
<td>Tracking helps high ability students, insignificant effects on others</td>
</tr>
<tr>
<td>Meghir and Palme (2005)</td>
<td>1948 and 1953 cohort survey, Sweden</td>
<td>Abolishment of tracking, extension of compulsory schooling, introduction of national curriculum.</td>
<td>Final educational attainment and annual earnings</td>
<td>Educational attainment and earnings increased for individuals with low-skilled fathers</td>
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F. International comparisons

Aim: to analyze the effects of family background; effects of timing of tracking and of the number of distinct tracks available.

Datasets:
Progress in International Reading Literacy Survey (PIRLS)
Programme for International Assessment (PISA)
Trends on International Mathematics and Science Study (TIMSS)
European Community Household Panel (ECHP)
International Social Survey Programme
International Adult Literacy Survey
## F. International comparisons

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<tr>
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<th>Results</th>
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</thead>
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<tr>
<td>Ammermüller (2005)</td>
<td>Change in impact of family background on test achievement between primary and secondary schooling</td>
<td>Impact of family background higher with more school types (tracks) in secondary schooling</td>
</tr>
<tr>
<td>Hanushek and Woessmann (2006)</td>
<td>Change in dispersion of student test scores between primary and secondary schooling</td>
<td>Early tracking increases inequality, tendency for tracking to reduce mean achievement</td>
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<tr>
<td>Schütz et al. (2005)</td>
<td>Impact of family background on test achievement</td>
<td>Impact of family background higher when tracking occurs earlier</td>
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<tr>
<td>Brunello and Checchi (2006)</td>
<td>Educational attainment, literacy, employment, earnings</td>
<td>Effect of family background stronger with tracking, tracking reinforces dispersion of earnings</td>
</tr>
<tr>
<td>Waldinger (2006)</td>
<td>Student test scores in reading and mathematics</td>
<td>Family background more important in countries that track early, inequality already present before tracking occurs</td>
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## Conclusions

### Theoretical analyses

<table>
<thead>
<tr>
<th>PROs</th>
<th>CONs</th>
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<td>if talented students can achieve a strong increase in performance</td>
<td>When weak students benefit a lot from the presence of strong students.</td>
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<td>Or</td>
<td>Delaying the age of tracking lowers the risk of mistaken choice of school</td>
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<td>if substantial gains from specialization can be expected.</td>
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Conclusions

Empirical analyses

• relative advantages of tracking or detracking may still depend on timing, the composition of student population and institutional features;

• on average it has not proved to have major effects on average achievements

• insignificant or negative effect of tracking in student’s achievements do not exclude positive impacts on productivities
Conclusions

A lot of literature on the topic but still results are ambiguous and the topic is hotly debated.

→ No clear-cut messages, no definitive answer to the question, only some PROs and CONs