

The laboratory of an education economist. Testing cures for disadvantaged students.

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This talk

Overviews my research agenda on socio-economic segregation in education

→ Discussion of various quasi-experimental evaluations of interventions to change the odds for disadvantaged students.

This talk

1. The issue

2. Impact of additional resources on cognitive and non-cognitive outcomes

3. Efficiency effects of additional resources

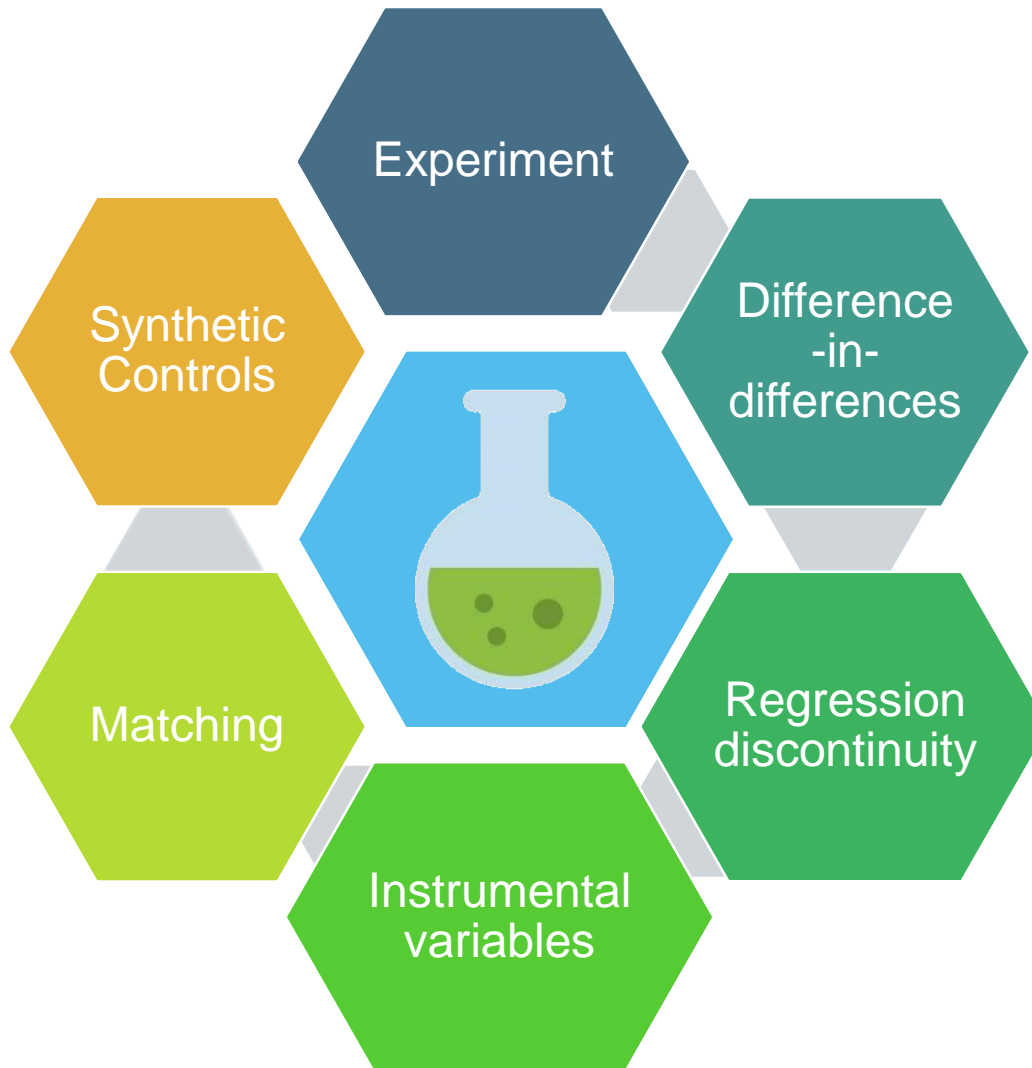
4. Impact of intensity of the treatment

5. Impact of information on school composition

6. Impact of curriculum change

7. The long run effects of a high school degree

The laboratory of an education economist...

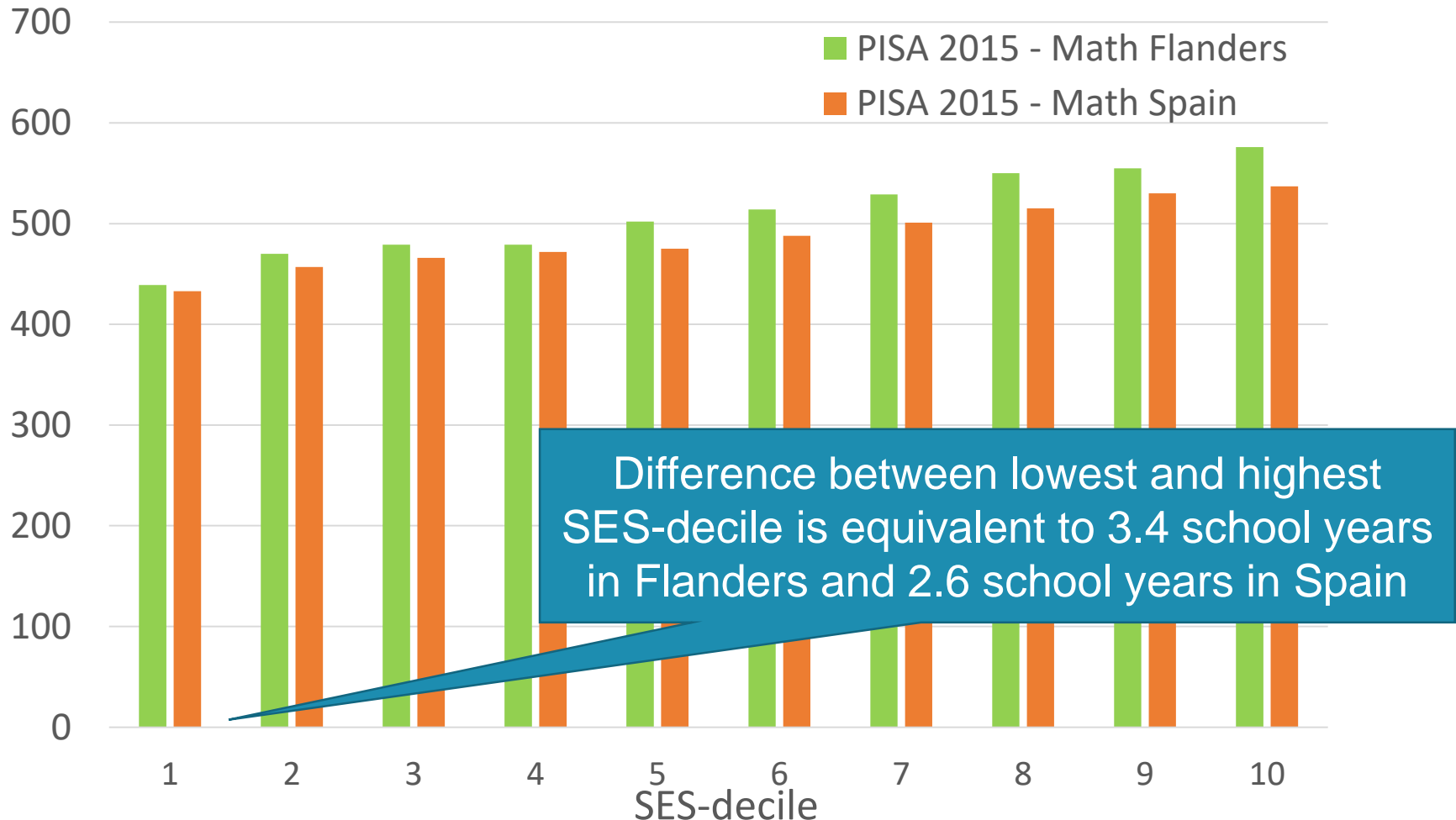


Step 1: Equal educational opportunities. The issue

Joint work with Jean Hindriks (UCL)

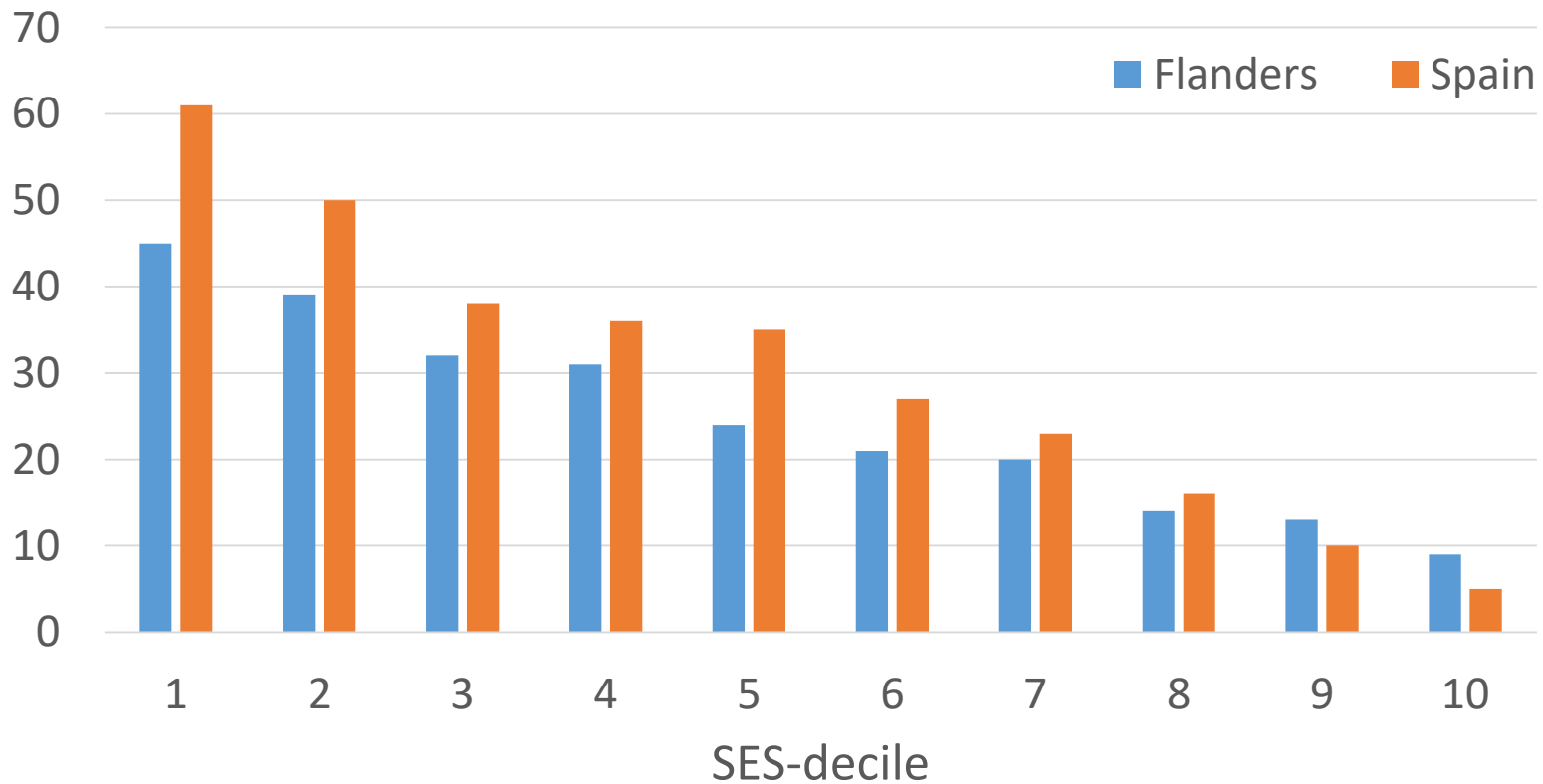
Unequal educational opportunities

Average math test scores per SES-decile (Pisa 2015)



Unequal educational opportunities

Probability for grade retention per SES-decile (Pisa 2015)



Literature

Equal educational opportunities:

“... the school’s task is – besides increasing the opportunity for all, through what it imparts - to reduce the unequalising impact of adult life of differential environments.” (Coleman, 1975).

→ How can we ‘cure’ the disadvantaged students?

Many programs and policies aim to reduce the impact of SES on educational achievement

- Voucher programs (Angrist et al., 2006; Hoxby, 2003; Nechyba, 2000)
- Duration of programs (Aakvik et al., 2010; Oosterbeek & Webbink, 2007; Oreopoulos, 2007)
- Class size reductions
- Additional funding (few causal evidence by Leuven et al., 2007; Henrey et al., 2010).

Step 2: The impact of additional resources at school level on cognitive and non-cognitive outcomes

Joint work with Mike Smet and Ruben Van Assche (LEER, KU Leuven)

The laboratory...

We exploit an exogenous cutoff which provides additional funding for schools with more than 25% disadvantaged students

- Unique and detailed panel data of 12 years at student and school level (+3 million observations)
- A clear definition of disadvantaged students avoids endogeneity issues due to systematic noise
- Fuzzy regression discontinuity as there is also a second eligibility condition (i.e., 25% disadvantaged students AND minimum of 6 teaching hours generated)

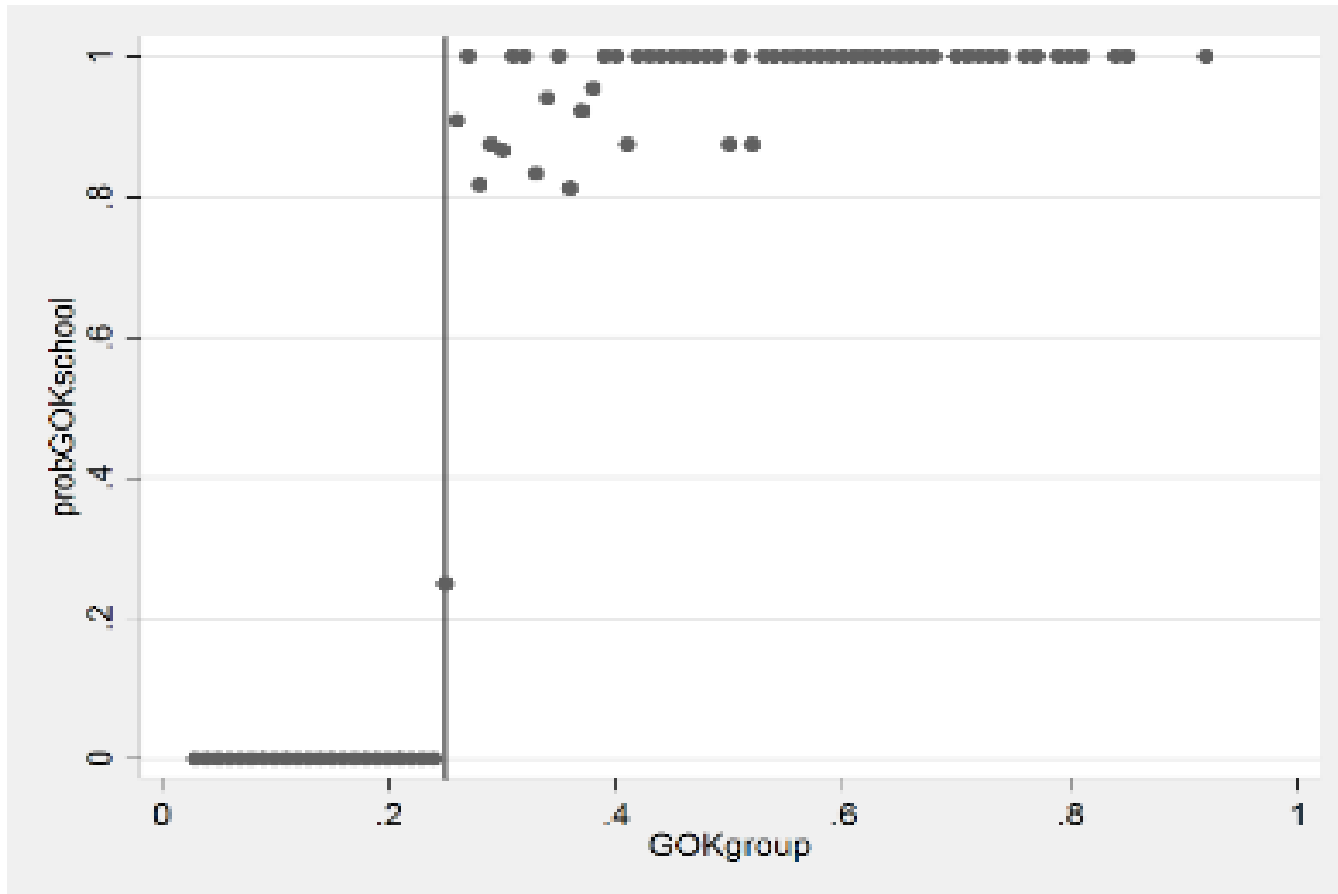
The laboratory...

In administrative data of all Flemish students, we have a clear indicator for disadvantaged student:

- the student receives an educational grant
- the mother has not completed secondary school
- the child does not live with his or her parents
- the student is part of the travelling population
- at home the child speaks a language other than Dutch

The laboratory...

Probability of treatment in the second and third stage of secondary education, where 25% disadvantaged students serves as the cutoff. Data for 2011.



The laboratory...

Our RDD does not suffer from the traditional endogeneity issues:

Selection bias

- Self-selection by secondary school track choice
- Self-selection into teaching

Omitted variable bias

- Ability, motivation
- Teacher characteristics

Reversed causality

- Low performing schools receive more funding

Results

We do not find a significant effect of additional funding on grade retention, absenteeism, start in professional bachelor, start in academic bachelor, graduation in professional or academic bachelor.

→ Conclusion:

1. Providing funds at a low cut-off does not result in improved outcomes.
2. We need to dig deeper.

Step 3: The impact of additional resources on efficiency

Joint work with Giovanna D'Inverno (LEER, KU Leuven)

The laboratory...

Again, we exploit the exogenous cutoff of 25% disadvantaged students that makes schools eligible for additional resources.

Here, we estimate the implications on **efficiency** of the policy. Interestingly, we provide a framework to estimate causal efficiency scores

Research question:

1. How to assess the causal impact within the efficiency framework?
2. Do more resources promote better school performance?

Methodology

To provide a causal interpretation of the findings, we decompose the overall school efficiency by using:

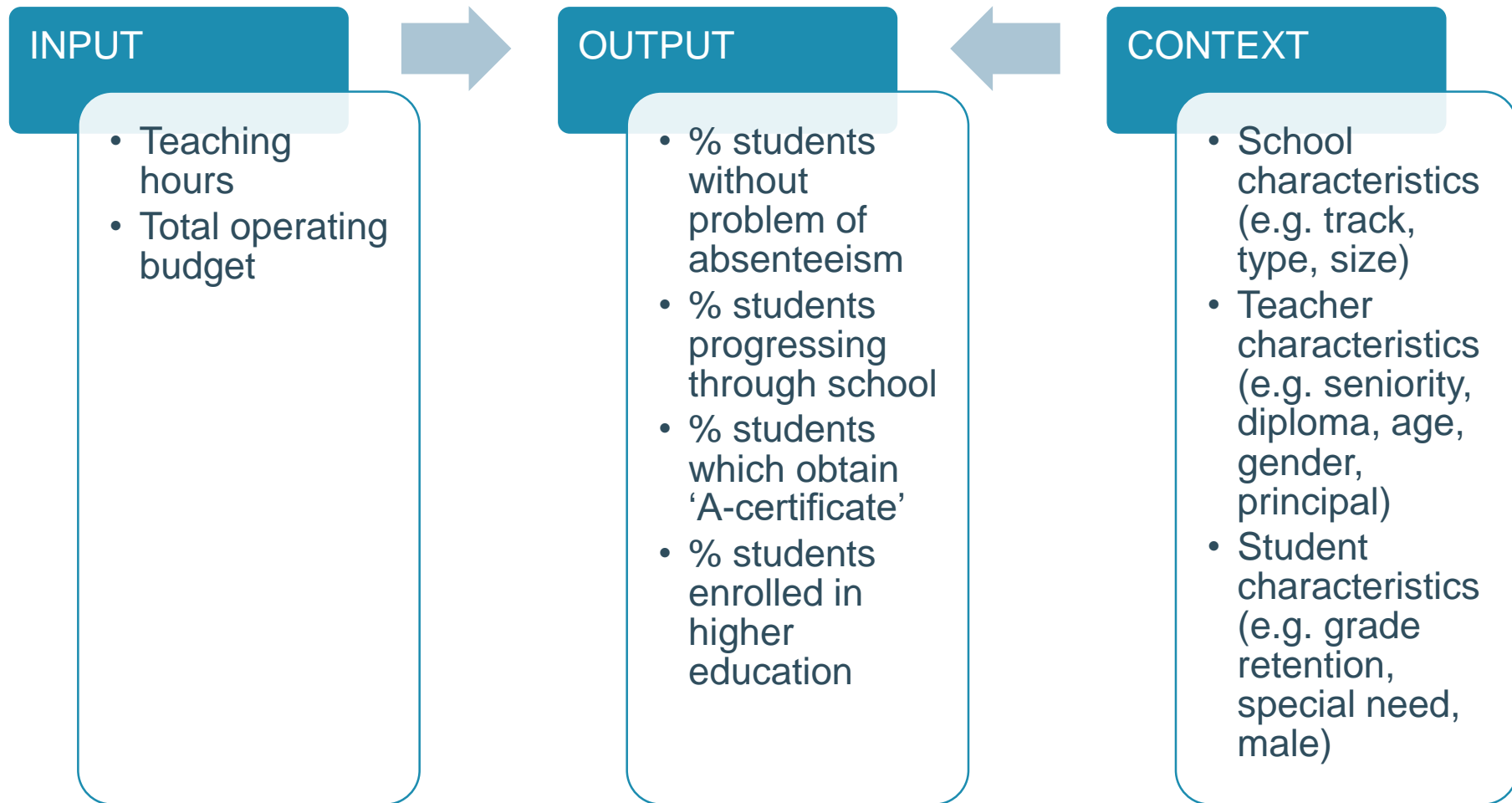
A fully non-parametric conditional efficiency model

- Avoids imposing any functional form
- Multiple inputs and outputs
- Mitigates influence of atypical observations
- Captures heterogeneity at school level

Concept of metafrontier approach is adapted for program evaluation

- Overall school efficiency = 'school-specific efficiency' x 'program efficiency'

Methodology



Results

Overall efficiency



Treated schools are only more efficient when accounting for the environment

Program efficiency



Treated schools around the threshold do not successfully convert more resources into outputs

→ Conclusion:

The threshold for eligibility is too low?
Intensity of the treatment is too low?

Step 4: Does the intensity of the treatment matter?

Joint work with Benny Geys (Oslo) and Catharina Solondz (TU Dresden)

Research question

Are resource-driven policies effective in increasing educational quality and student performance?

Results of studies analyzing whether resource-driven policies increase schooling quality and student performance are, at best, ambiguous

→ Reason:

- Different objective functions of teachers, schools or public authorities
- Exam systems differ widely
 - Without standardized tests, a change in education spending may therefore have a different *observed* impact

The laboratory...

The intervention: In 2007, 83 postcode areas situated in 18 large and medium-sized Dutch cities received *earmarked* funds to improve their social, physical and economic environment

→ The total subsidy amounted to 250 million euro annually: ranging from €1.2 million to €29.3 million across districts, or €333 to €3995 per inhabitant

→ Selection process obviously was non-random since the government aimed at selecting the worst-performing districts, BUT: a substantial number of similarly 'underperforming' districts outside the chosen sample

Methodology

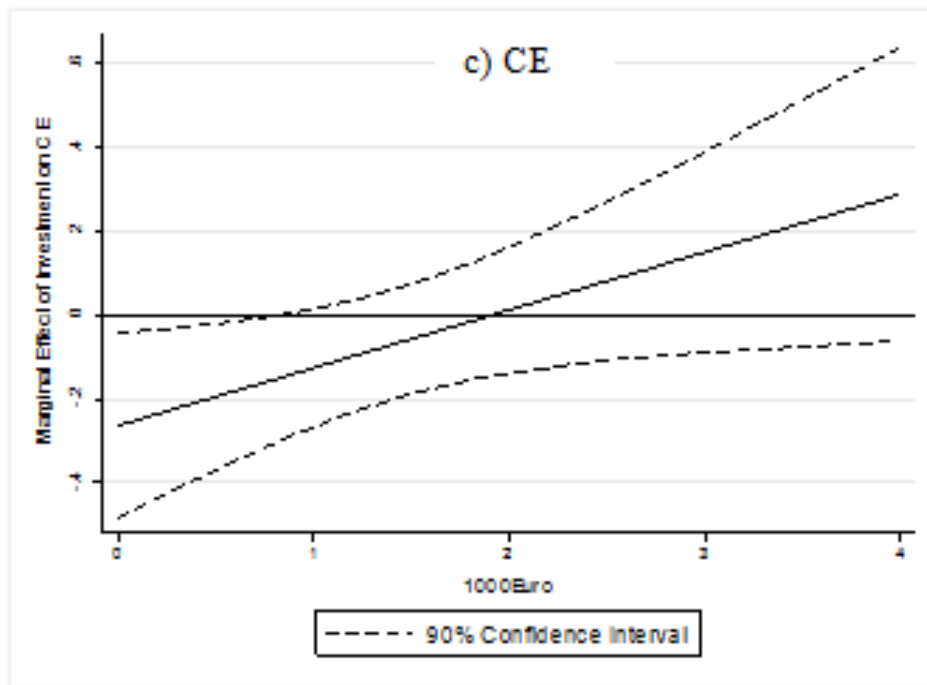
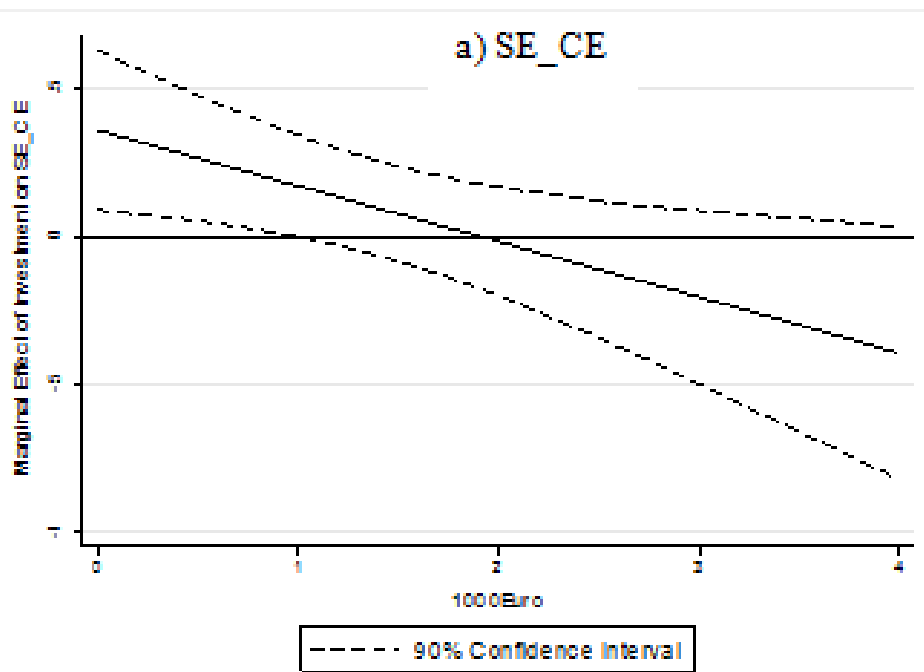
Exploits the variation in public investment across space and time due to the July 2007 policy intervention via a difference-in-differences (DiD) approach

Outcome variables:

- ✓ **School exam:** Fewer quality controls in its construction and evaluation as it is set up and corrected only by the school teacher
- ✓ **National exam:** A national standardized assessment constructed by the Central Institute for Assessments (CITO), Externally screened by professors, Prior test on a sample of students, Uniform correction model and second corrector

Results

The policy intervention worked to halt falling central exam results in the selected districts when additional funds were sufficiently elevated, but induced grade inflation – by schools (teachers) failing to downgrade mean locally-assigned grades in spite of declining scores on national exams – when such funds were limited.



Conclusion

- Additional resources only have an effect when they are sufficiently substantial. Limited resources result, at best, in grade inflation.
- Can we improve the outcomes by providing more information on school quality to parents?

Step 5: If money is not effective, can we provide information to parents to improve equal educational opportunities?

Literature provides conflicting answers

1. Are schools affected by information shocks?

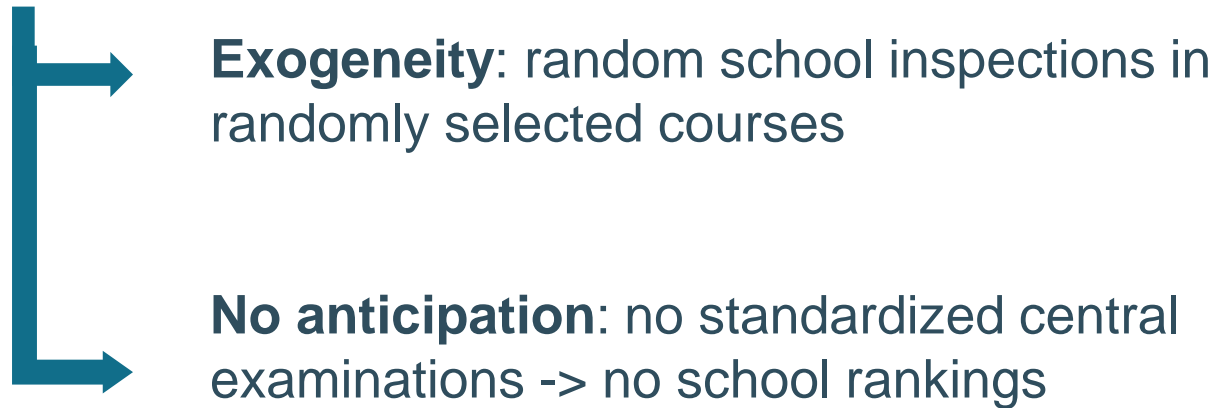
- YES: Hastings & Weinstein (2008), Koning & Van der Wiel (2013), Nunes et al. (2015)
- NO: Mizala & Urquiola (2013)

2. Does school composition change following these shocks?

- YES: Hastings & Weinstein (2008), Burgess et al. (2015)
- NO: Koning & Van der Wiel (2013), Nunes et al. (2015)

The laboratory...

Information shocks in Flemish primary education:



Report is drafted and published within 5 weeks



Methodology

- Difference-in-differences
- Generalized Synthetic control (Xu, 2017) with multiple treated units and variable treatment periods

Results – Rural schools

Information shocks, and particularly positive evaluations, result in an increase in the school size.

No effect on school composition in rural schools

Rural Variables	Schools size			SES composition		
	(A)	(B)	(C)	(A)	(B)	(C)
D: School inspection in t	1.040*			-0.001		
	(0.626)			(0.009)		
D x Positive evaluation [#]		1.501**			-0.002	
		(0.742)			(0.012)	
D x Negative evaluation [#]			0.850			0.004
			(0.936)			(0.013)
Fixed effects: Year, School	YES	YES	YES	YES	YES	YES
School-specific time trends	YES	YES	YES	YES	YES	YES
Observations	4,207	3,422	2,925	4,207	3,422	2,925
Number of schools	333	274	240	333	274	240

Results – Urban schools

In urban schools:

→ No response in school size due to capacity constraints

→ Response in composition: 3% less disadvantaged students after an inspection, and 5% less disadvantaged students after a favorable inspection.

→ Suggests that high SES parents respond more

Step 6: If money is not effective, can we change the school system to improve equal educational opportunities?

Joint work with Deni Mazrekaj (LEER, KU Leuven)

Changing the school system

By modular education: the division of conventional courses into smaller components or modules. Each module enables the students to obtain a partial certificate that can be combined into a qualification.

→ Assumption: Modular education should increase intrinsic motivation by more flexibility and frequent experiences of success, and improve labour market outcomes by partial certification

→ Frequently used as a dropout prevention program in secondary and higher education

The laboratory...

Exogenous source of variation:

Flemish decree of July 10, 2008 introduced modularisation in a specific list of around 20% of the vocational education programs in school years 2008, 2009 and 2010

→ 88.5% of the schools offered both linear and modular programs.

Methodology:

Within schools that offer both linear and modular education, we use a difference-in-differences framework with time varying treatment date

Results



Modular education reduces school dropout rate by 2.5 percentage points (from a baseline dropout rate of 28 percent)

Heterogeneous effects: modular education decreases the school dropout rate by 2 percentage points for the native Belgian students and by 7.7 percentage points for the foreign origin students (from a baseline dropout rate of 42 percent for foreign origin students)



Modular education increases students' employment and earnings up to two years after leaving high school

Conclusion: Modular education could become an important tool enabling the foreign origin students to come at par with their native peers

Step 7: Do equal educational opportunities matter? What is the long run impact?

Joint work with Deni Mazrekaj and Sarah Vansteenkiste (LEER, KU Leuven)

Doubt on whether education influences earnings

Authors	Year	Country	Returns to schooling
Angrist & Krueger	1991	US	7.5%
Harmon & Walker	1995	UK	15%
Staiger & Stock	1997	US	9%
Uusitalo	1999	Finland	13%
Ashenfelter, Harmon, & Oosterbeek	1999	Meta-analysis	0%
Acemoglu & Angrist	2000	US	8%
Meghir & Palme	2005	Sweden	0%
Black, Devereux & Salvanes	2005	Norway	7%
Oosterbeek & Webbink	2007	The Netherlands	0%
Pischke & von Wachter	2008	Germany	0%
Devereux & Hart	2010	UK	3%
Aakvik, Salvanes, & Vaage	2010	Norway	7%
Grenet	2013	France	0%
Stephens & Yang	2014	US	0%
Dolton & Sandi	2017	UK	6%

However...

Potential endogeneity issues due to the use of years of schooling:

- Measurement error due to imputation
- Unobserved heterogeneity due to disregarding curriculum interruptions and grade retention
- Use of survey data with non-response and reporting bias
- Regression to the mean by ignoring education tracks and timing on the labour market

The laboratory...

- **Administrative** data from Flanders with **all students** who left secondary education with or without a diploma in school year 2010-2011
- **Instead of the years of schooling, we compare high school dropouts to high school graduates** who did not enroll into higher education, but immediately entered the labour market
- Quarterly gross labour market outcomes **from quarter 3 of 2011 until last quarter of 2013**

Methodology: 2SLS with mother's education as an instrument for the endogenous decision to dropout.

Results

On average: no returns to a high school diploma

- In contrast with survey data literature on returns to a high school diploma
- In line with administrative data literature on returns to a high school diploma

However, important heterogeneous effects:



23%



12%



11%



0%

Mechanism

Self-selection into employment sectors

→ Different sectors offer different returns to education:

Sectors with positive returns

- Self-selection of females
- Graduates of vocational education
- e.g., government, health, trade

Sectors with no returns

- More graduates (cf. Supply and demand)
- Graduates of general education
- e.g., manufacturing, construction, catering

Sectors with negative returns

- Self-selection of males
- e.g., support services

Conclusion

Testing cures for disadvantaged students

1. Many opportunities to find a laboratory for an education economist.
2. There are few effective cures for disadvantaged students.
3. Providing more money to schools does not work and, at best, results in grade inflation
4. High SES parents are more responsive to information shocks, reinforcing social segregation
5. Changes in the curriculum, as modular education, might be more effective

Invitation

5th LEER Workshop on Education Economics – Leuven, April 4-5, 2019
Inaugural lecture by Dan Goldhaber on April 3, 2019



Dan Goldhaber,
Washington
University,
AE Economics of
Education Review



Dinand Webbink,
Erasmus University,
AE Economics of
Education Review



Anna Vignoles,
University of Cambridge,
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