

Shaping Educational Careers of Immigrant Children: Motivation, Cognitive Skills and Teachers' Beliefs

Michela Carlana

Bocconi

Eliana La Ferrara

Bocconi & IGIER

Paolo Pinotti

Bocconi, fRDB &
Dondena

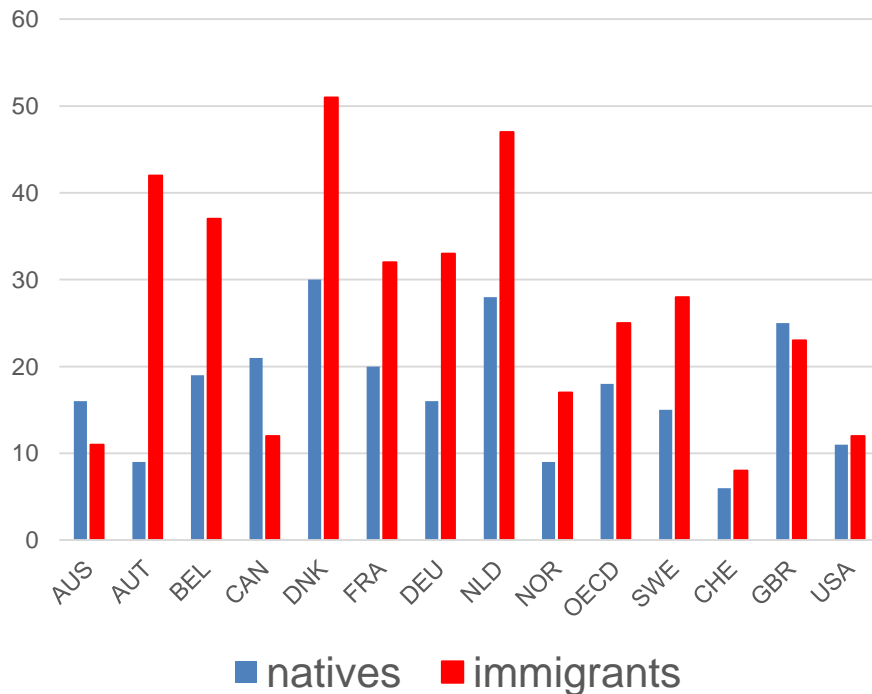
EDePo Conference, 8-9 July 2015

Motivation

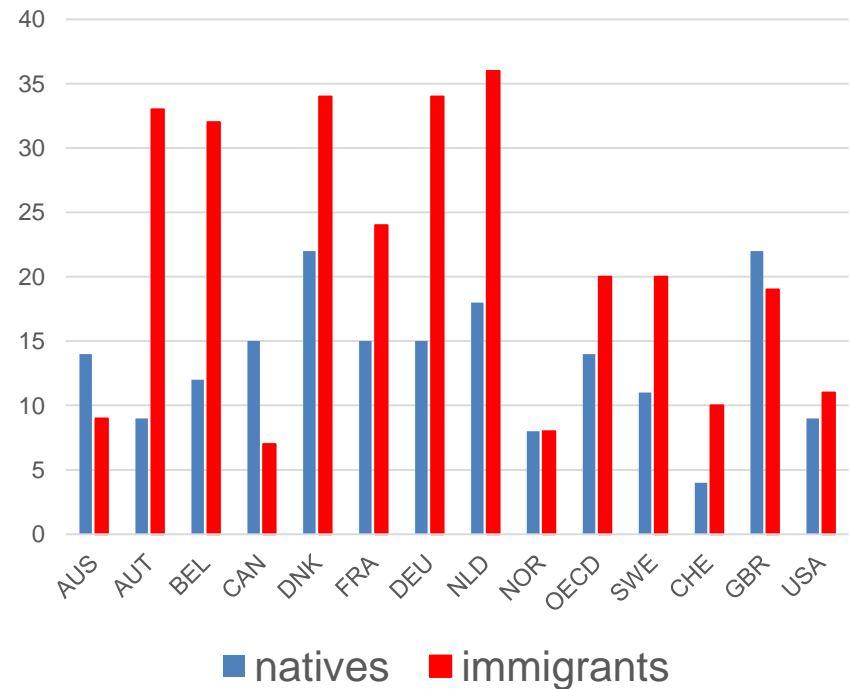
In most countries, children of immigrants disadvantaged in labor mkt due to lower educational attainment

% of aged 20-29 w/ low attainment

Males



Females



Source: OECD, 2011

Greater disadvantage in educational systems characterized by **early tracking** (Cobb-Clark et al. 2009)

- High-school choice is an early career decision w/ long term consequences on labor mkt outcomes (Giustinelli, 2011)
- Early tracking generally detrimental for disadvantaged groups
 - Information gaps (Dustmann et al. 2014)
 - “Aspiration trap”: low aspirations → low investment (Genicot and Ray, 2014; Guyon and Huillery, 2014)
 - Opposite risk: frustration if over-optimistic aspirations (Goux et al., 2014)

This paper

1. Document **educational segregation**: high-achieving immigrant students choose lower tracks than Italian students *w/ comparable academic potential*
2. **Evaluate a large-scale program**, “Equal Opportunities for Immigrant Students” (EOP), aimed at helping students make educational choices congruous to their potential
3. **Analyze the mechanisms** through which EOP works, including cognitive & non-cognitive dimensions

Preview of results

- Male children of immigrants **26% less likely** to choose demanding high-school compared to natives. No difference for girls
- **Treatment** increases enrollment in demanding tracks by **19%** for treated boys (statistically, closes the gap). No effect on girls
- Main **mechanisms**: academic **motivation** and **teachers'** recommendation
- Positive **spillovers** on immigrant classmates of treated students

Literature

Aspirations

- Genicot and Ray (2014); Dalton, Ghosal, Mani (2015)
- Guyon and Huillery (2014), Goux et al. (2014)

Cognitive and Non-Cognitive skills

- Heckman et al. (2013), Hanushek and Woessmann (2008), Almlund et al. (2011)

Economics of education & Program Evaluation

- Tracking: Guyon et al. (2011), Dustmann et al. (2014), Avvisati et al. (2014), Brunello and Checchi (2007)
- Career Choice: Giustinelli (2011), Buser, Niederle, Oosterbeek (2013)
- Peer effects: Gould et al. (2009), Carrell et al. (2013)

Outline

- Background on Italian schooling system & educational segregation
- Intervention
- Impact
- Channels
- Spillovers

1. The Italian schooling system & educational segregation

The Italian schooling system

Stratification of students after 8th grade into 3 tracks

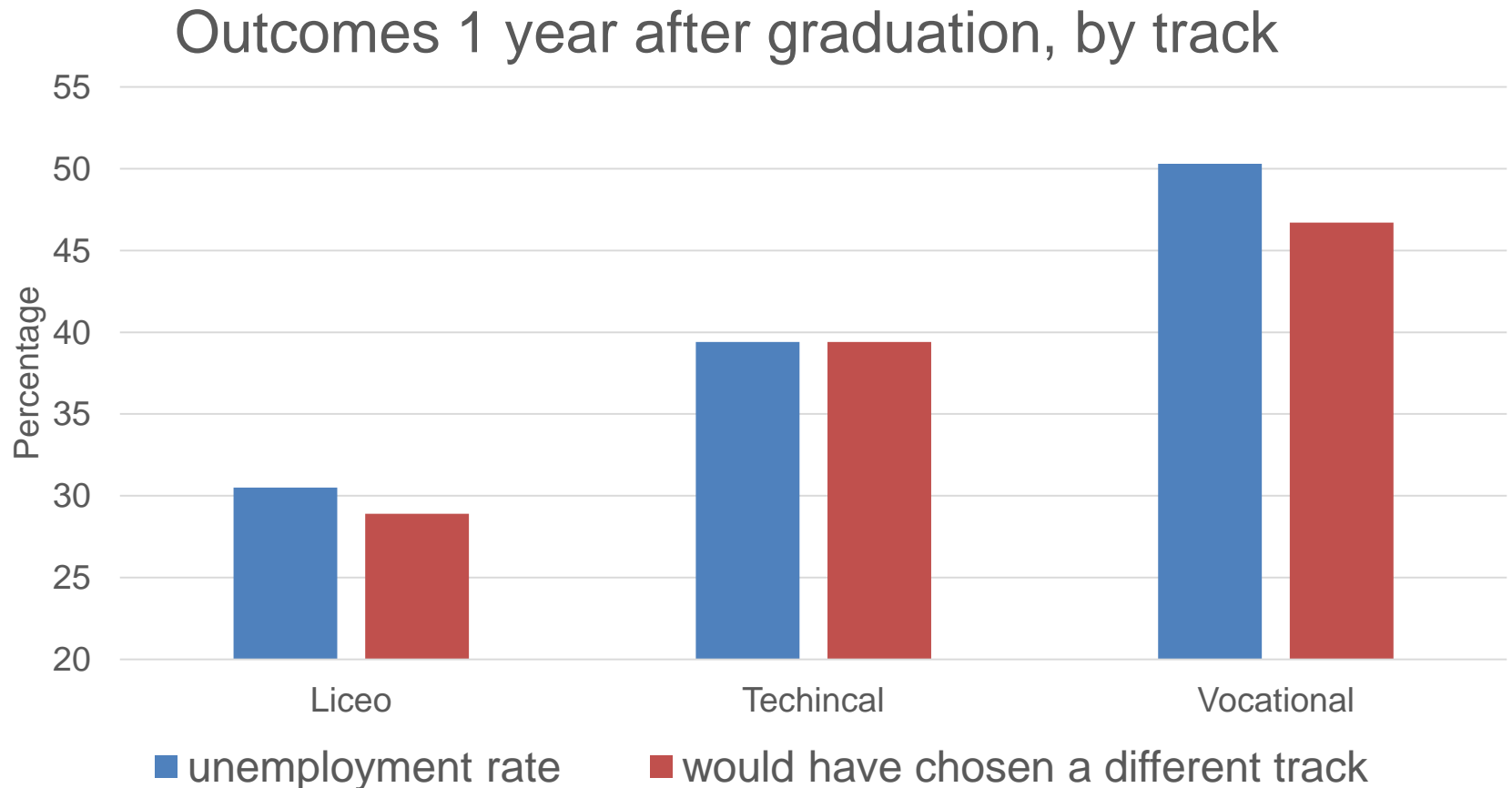
- Academic oriented (**liceo**) → college
- **Technical** → college or white collar jobs
- **Vocational** → blue collar jobs



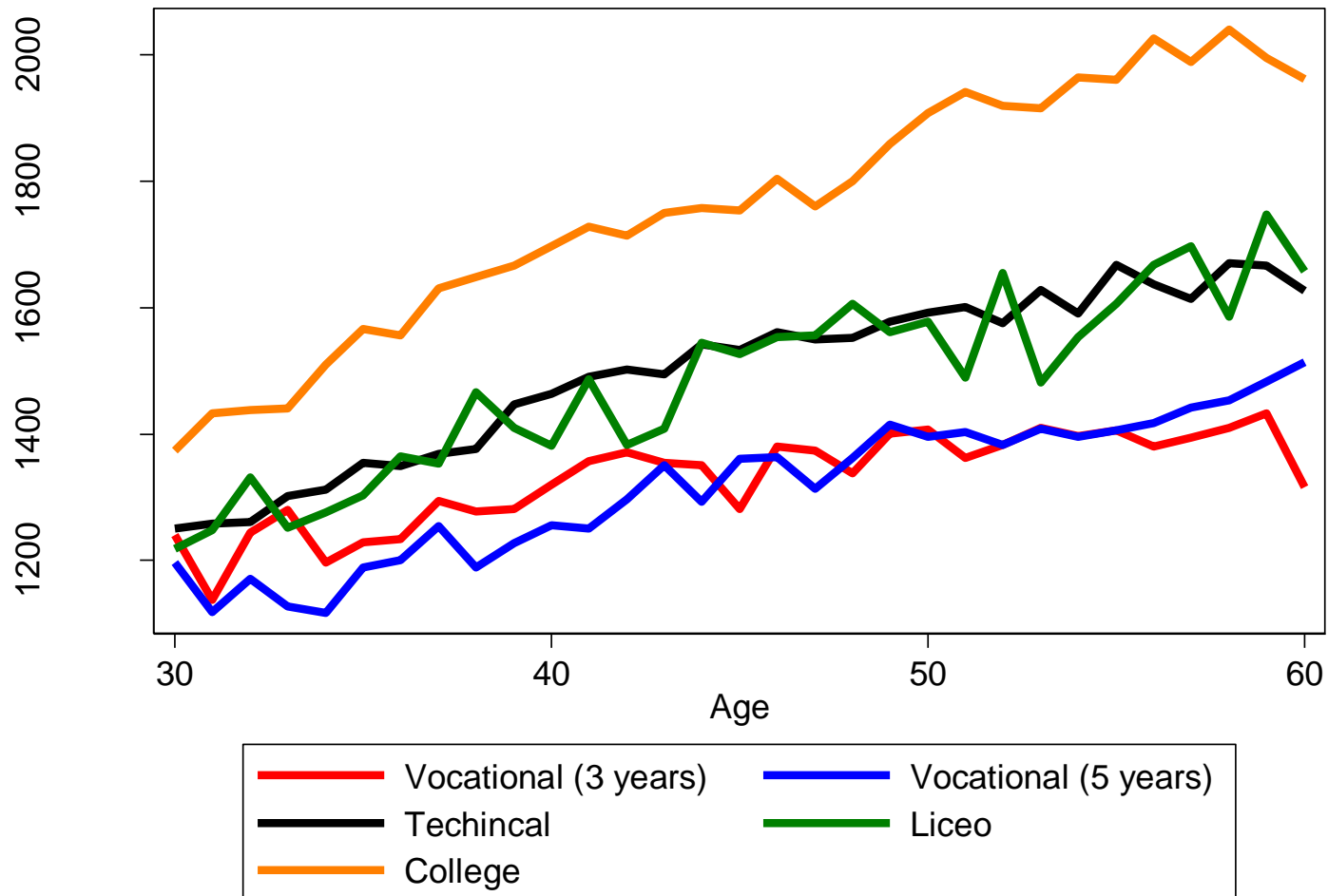
Elementary School					Lower Secondary School			Upper Secondary School				
1	2	3	4	5	6	7	8	9	10	11	12	13

Vocational track is worse under several dimensions

- **Employment & satisfaction** w/ school choice

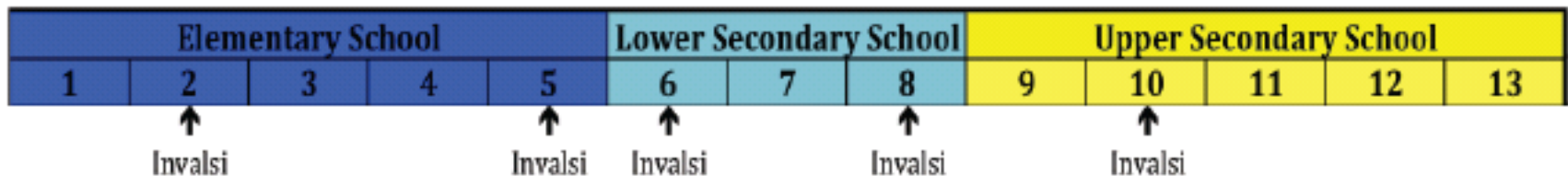


- Earnings profiles by track



Educational segregation

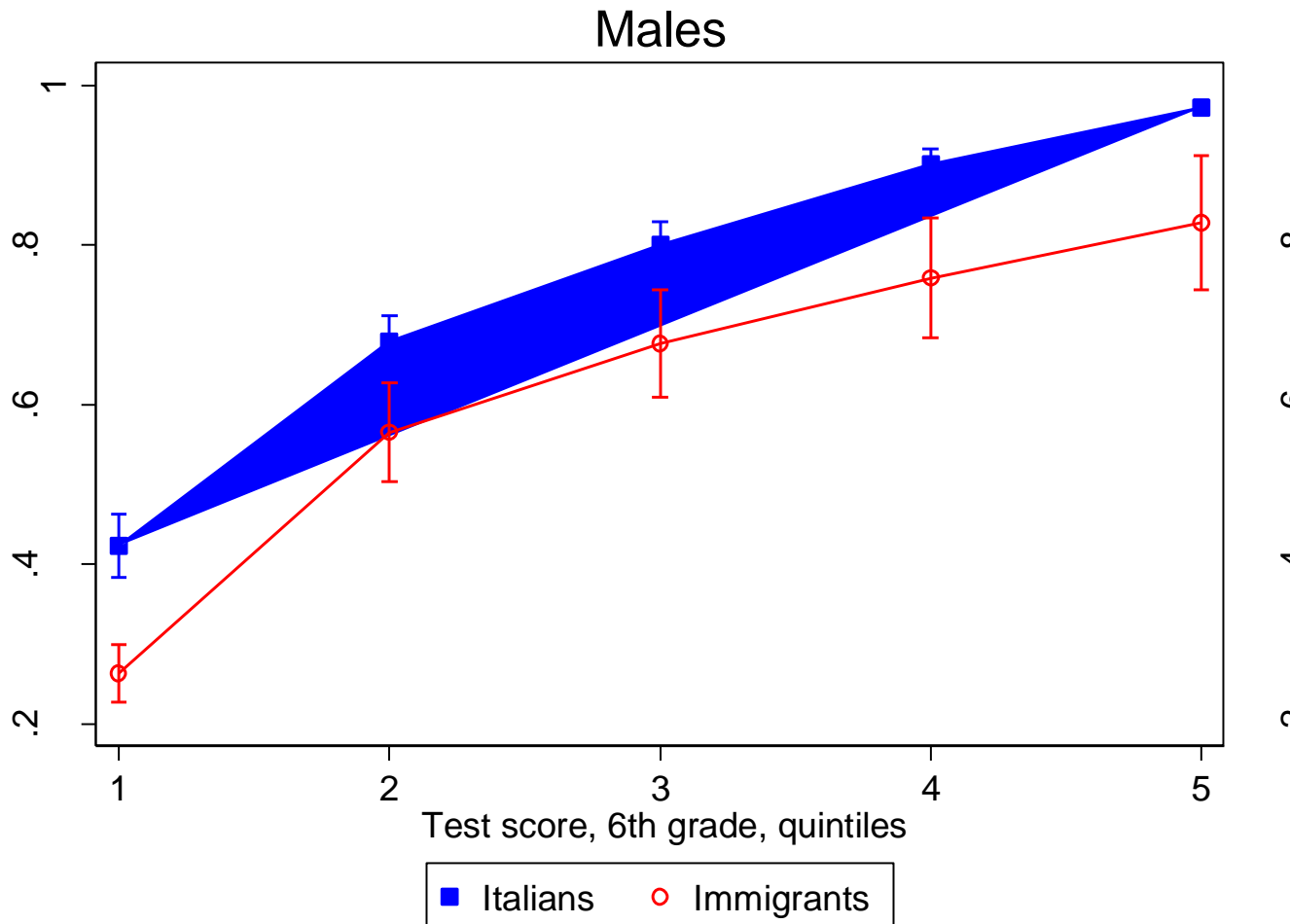
- Immigrant students disproportionately choose **vocational** track compared to Italians
 - Need to control for ability
- Standardized test score in math & italian (**Invalsi**) at different points of school career



- We use Invalsi **6th grade** as proxy for academic potential

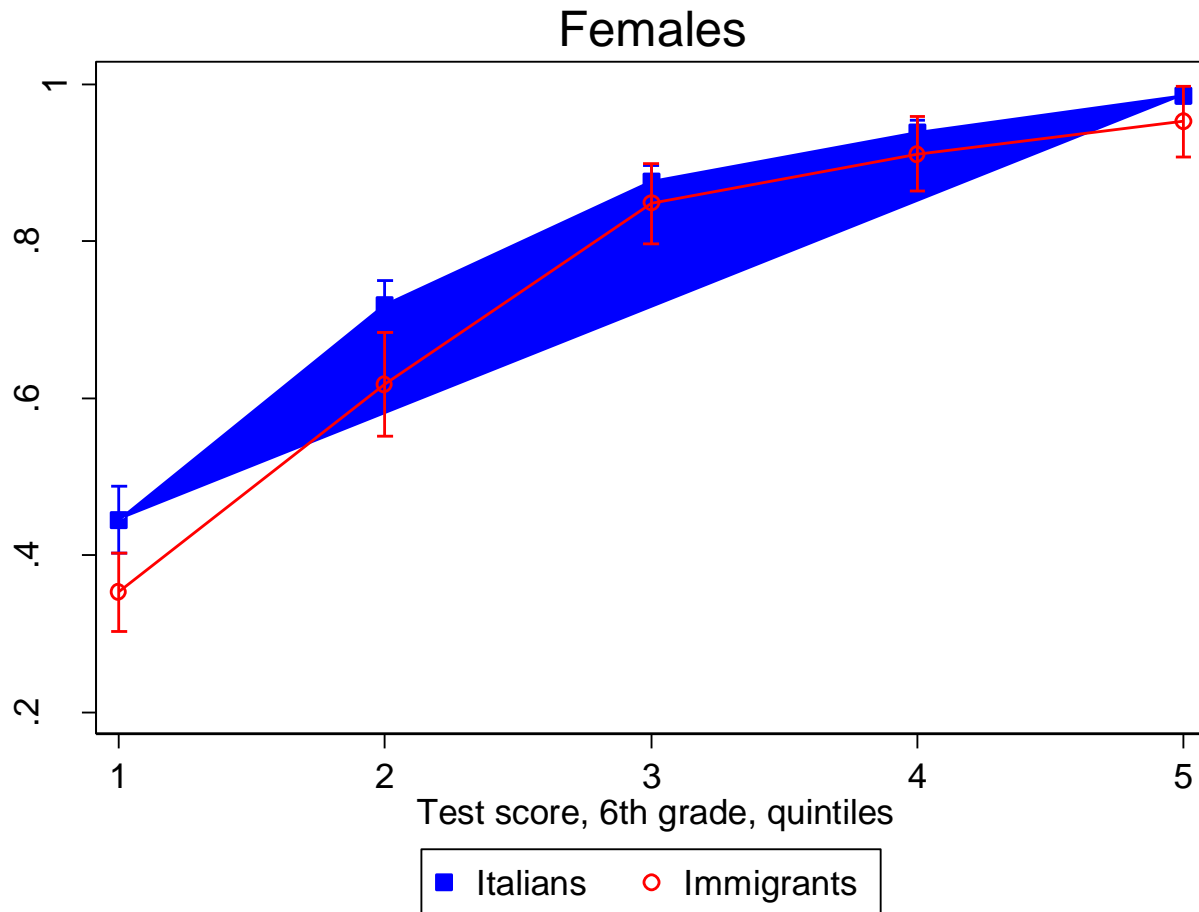
Track choice conditional on quintile of Invalsi score

Probability of enrolling in Liceo or Technical HS



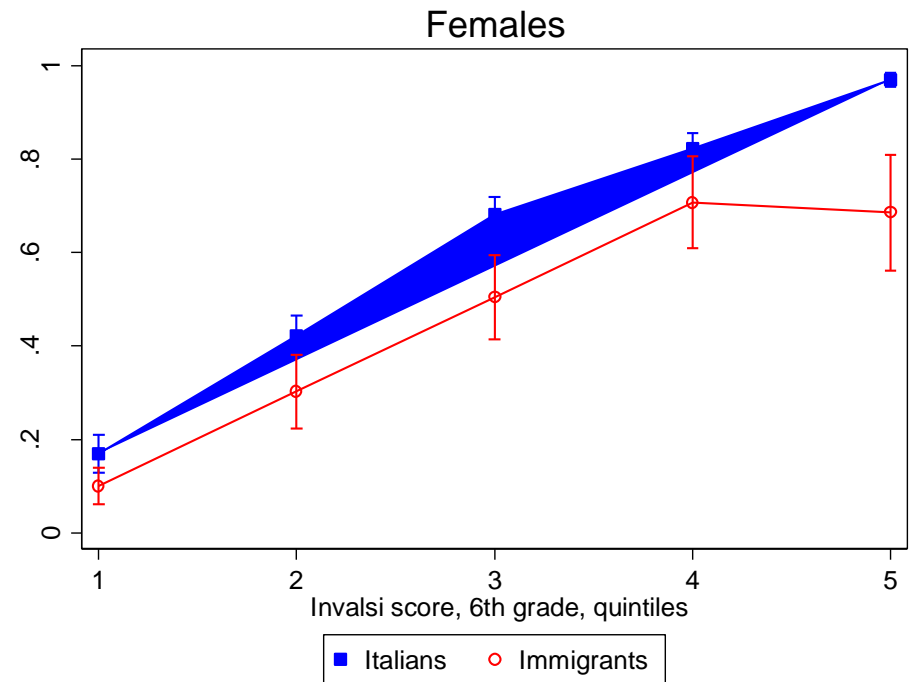
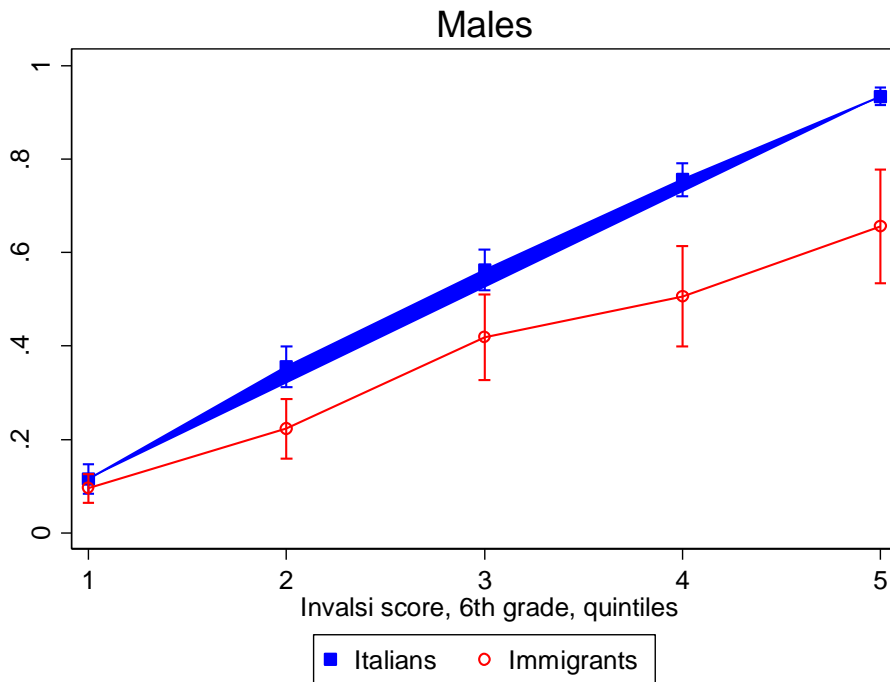
No segregation for **girls** at quintiles 3-5

Probability of enrolling in Liceo or Technical HS



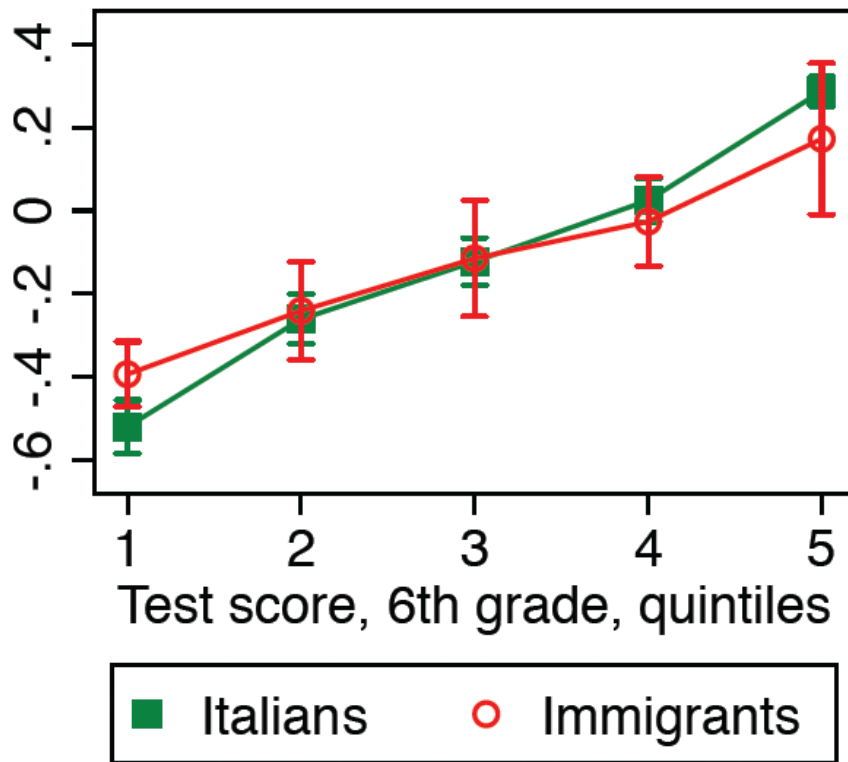
Teachers' official recommendations systematically less oriented to academic tracks for immigrants

Teachers' Recommendation (Liceo or Technical)

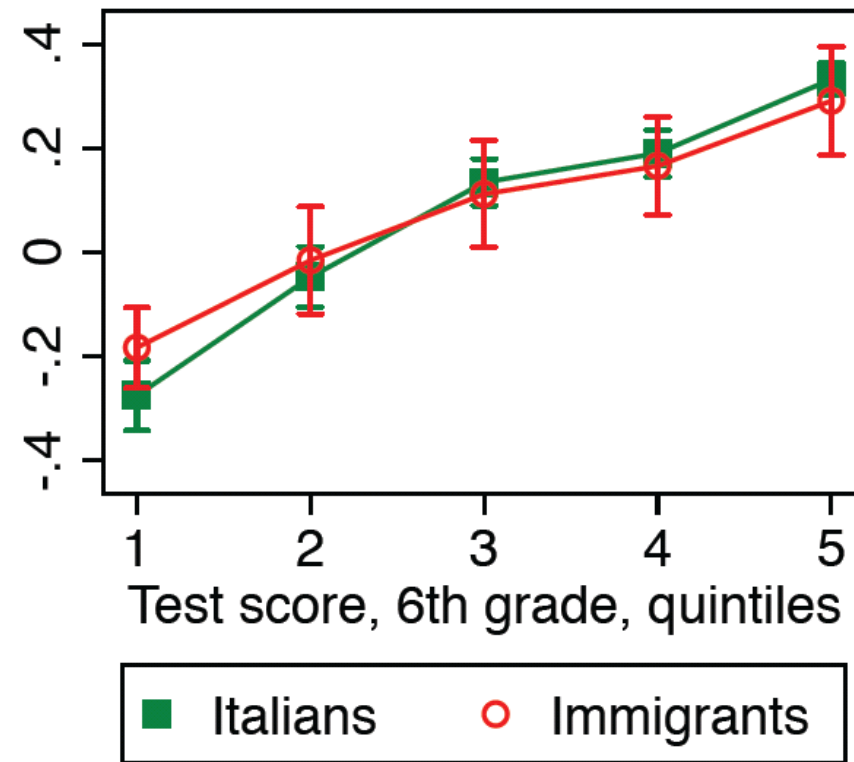


No difference in **motivation** b/w immigrants & Italians

Males

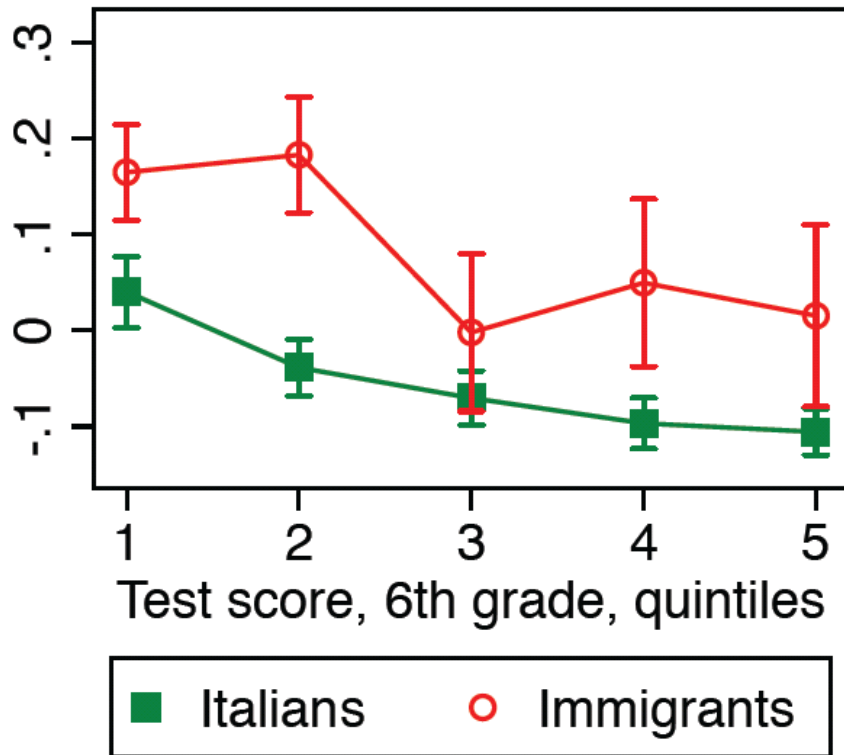


Females

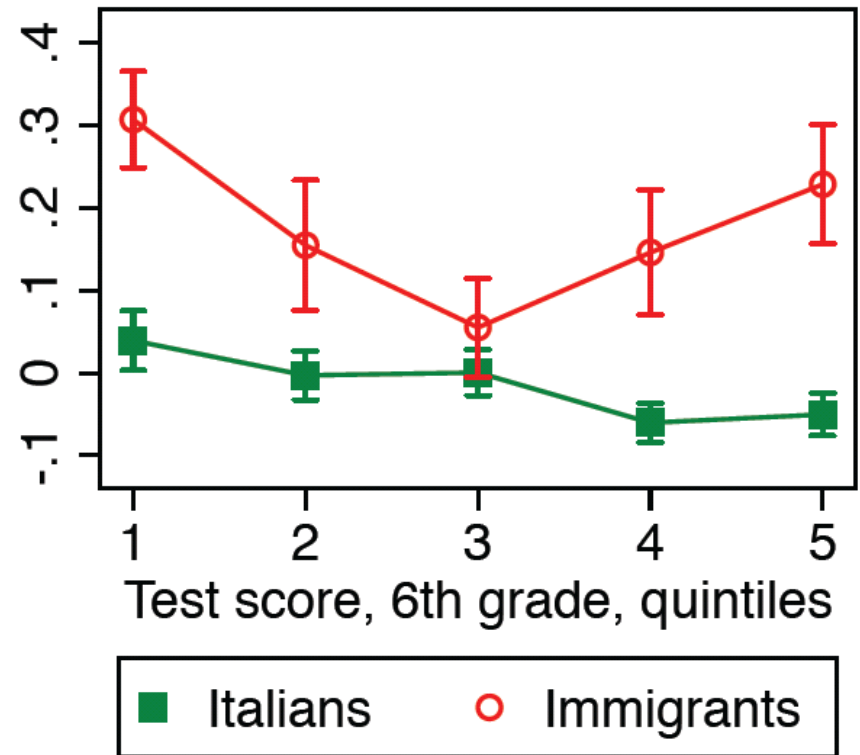


Difference in perceived barriers

Males



Females



2. The intervention

'Equality of opportunity for immigrant students' (EOP)

- Program in collaboration w/ Ministry of Education (MIUR), financed by 3 bank foundations
- Target: high-performing students from low-income countries in lower secondary school
- Goal: align their HS choice w/ their academic potential

Targeting of EOP

Schools

- All schools w/ >20 immigrant students in 5 provinces of Northern Italy
 - 145 schools: randomize 70 treatment, 75 control

Individuals

- In each school, the 10 immigrant students w/ highest Invalsi test score in 6th grade (only countries w/ GDP p/c lower than Italy)
 - Takeup rate: 79%

Components of EOP

Students followed during grades 7 and 8

2 types of activities

1. Career choice consultancy

- **Information** about Italian schooling system
 - type of high-schools, job opportunities, booklet translated in language of home country
- **Psychological** support based on Social Cognitive Career Theory
- 14 meetings during grades 7-8: 5 group meetings, 5 individual, 3 w/ parents, 1 w/ teachers

Examples of psychological support activities

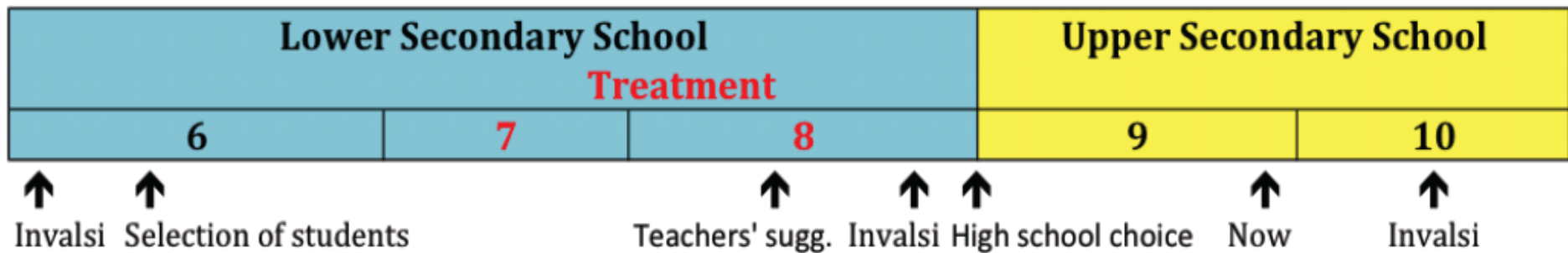
- Peer education, e.g., [video](#) on barriers and self-efficacy of high-school students
- “Thinking about your past life, indicate [5 study experiences](#) and [5 other experiences](#) that you have completed [successfully](#)... Consider now such experiences one by one and briefly indicate where and with whom it happened, what you did and which personal resources helped you doing well in that thing -- your knowledge, skills, personality traits, motivations and everything you believe it was important to have”
- “Please find below the [professions](#) you selected and indicate, for each of them, which [resources are needed](#) (knowledge, skills, personality traits, motivations, ...) then divide them into “I have it” and “I need to develop it”
- “Please list the results [you would like to achieve with your job](#), from the most to the least important”

Components of EOP

2. Cognitive Academic Language Proficiency (CALP)

- **Tutor** on Italian language to facilitate studying and learning all subjects
 - # meetings higher for students w/ lower Invalsi scores in grade 6 (2 thresholds, though little variation)
- The 2 components (Career consultancy & CALP) offered as joint package, not a 2x2 design
 - Budget + “ethics”

Timeline



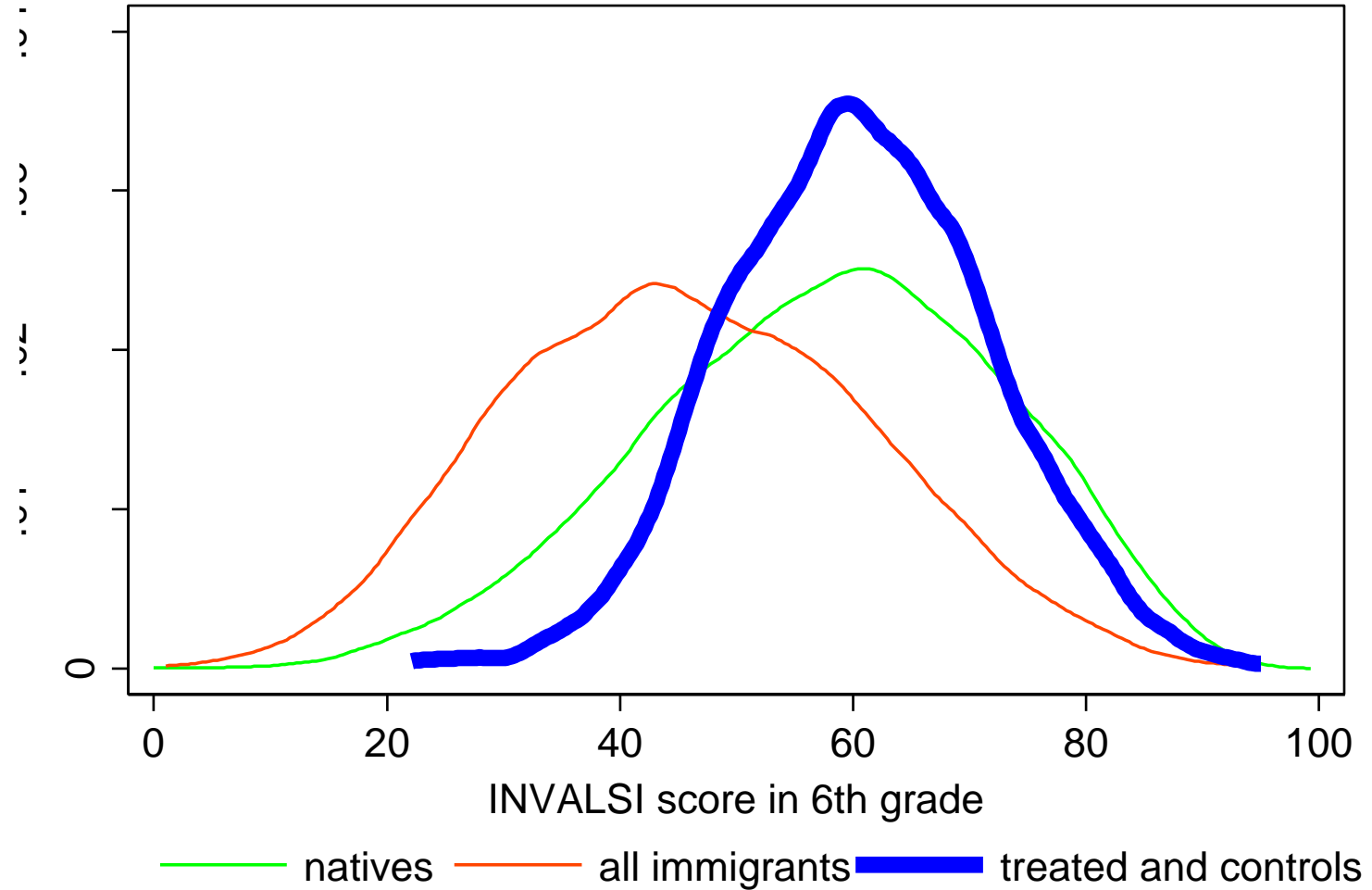
3. Impact

Data

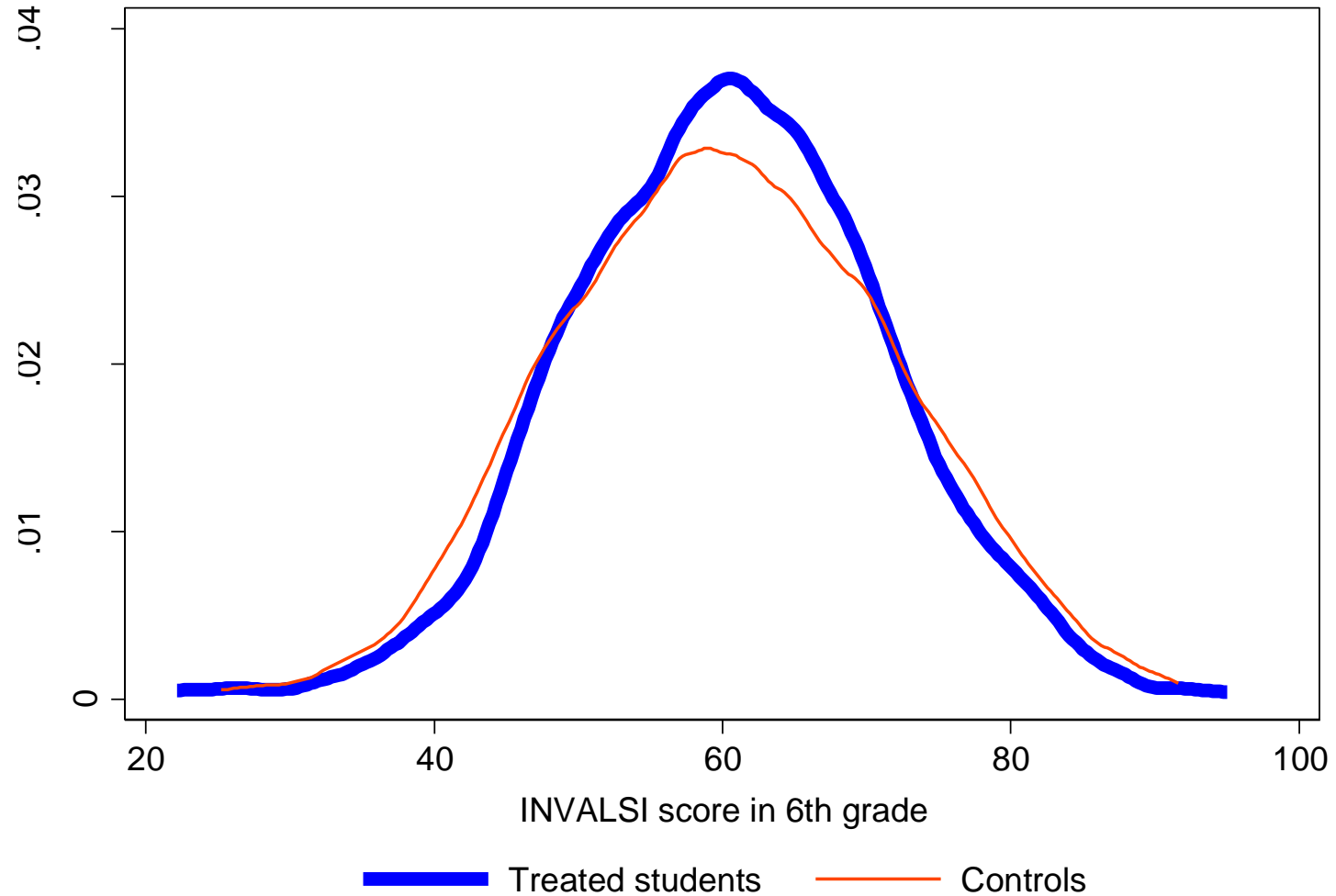
- 1. Ministry of Education, University and Research (MIUR):** information on **educational career** (enrollment, failure rates, teachers' recommendations, final grades)
- 2. Italian Agency for the Evaluation of Educational System (INVALSI):** **standardized test scores** in grade 6 and 8, information on family background
- 3. First-hand data:** questionnaire on **psychological** traits (academic motivation, perception of economic and social barriers on work and educational career)

Characteristics of selected students

INVALSI in grade 6



Balance: standardized test score in grade 6



Balance: other individual characteristics

Variable	Control N=711	Treated N=670	Diff.	s.e.
Female	0.491	0.500	-0.009	(0.027)
Immigrant of second generation	0.425	0.433	-0.008	(0.027)
Born in '97,'98,'99	0.276	0.257	0.019	(0.024)
Missing track choice	0.166	0.139	0.027	(0.019)
Invalsi 6 grade	60.364	60.533	-0.168	(0.601)
Lower than Diploma-Mother	0.349	0.347	0.002	(0.034)
High-School-Mother	0.454	0.481	-0.027	(0.035)
Lower than Diploma-Father	0.340	0.328	0.012	(0.035)
High-School-Father	0.495	0.506	-0.011	(0.037)
Bluecollar-Mother	0.343	0.355	-0.012	(0.033)
Whitecollar-Mother	0.194	0.180	0.014	(0.027)
Unemp-Mother	0.071	0.090	-0.019	(0.019)
Home-Mother	0.392	0.375	0.018	(0.034)
Bluecollar-Father	0.578	0.555	0.023	(0.036)
Whitecollar-Father	0.299	0.334	-0.035	(0.033)
Unemp-Father	0.103	0.092	0.011	(0.021)
Home-Father	0.020	0.018	0.002	(0.010)

Estimation framework

1. Intention to treat (ITT)

$$Y_i = \theta + \rho Z_i + \gamma' X_i + \epsilon_i$$

Y_i = track choice, failure rate, motivation, ...

Z_i = 1 if assigned to treatment

X_i = gender, Invalsi score (& sq.), generation of immigration, family background, province

Std. errors clustered at school level

2. Local average treatment effect (LATE)

Instrument frequency of meetings attended (>75%) w/ treatment assignment

High school choice

	All		Males		Female	
Liceo or Technical	(1)	(2)	(3)	(4)	(5)	(6)
ITT	0.073** (0.031)	0.065** (0.027)	0.124*** (0.040)	0.112*** (0.036)	0.022 (0.035)	0.017 (0.032)
R^2	0.028	0.134	0.019	0.140	0.001	0.100
Constant	0.684*** (0.026)		0.656*** (0.031)		0.824*** (0.024)	
Individual Controls	No	Yes	No	Yes	No	Yes
Obs.	1216	1216	605	605	611	611

Robust Standard Errors clustered at school level. Individual controls include: gender, squared standardized test score Invalsi at the beginning of 6th grade, generation of immigration, school province

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

High school choice

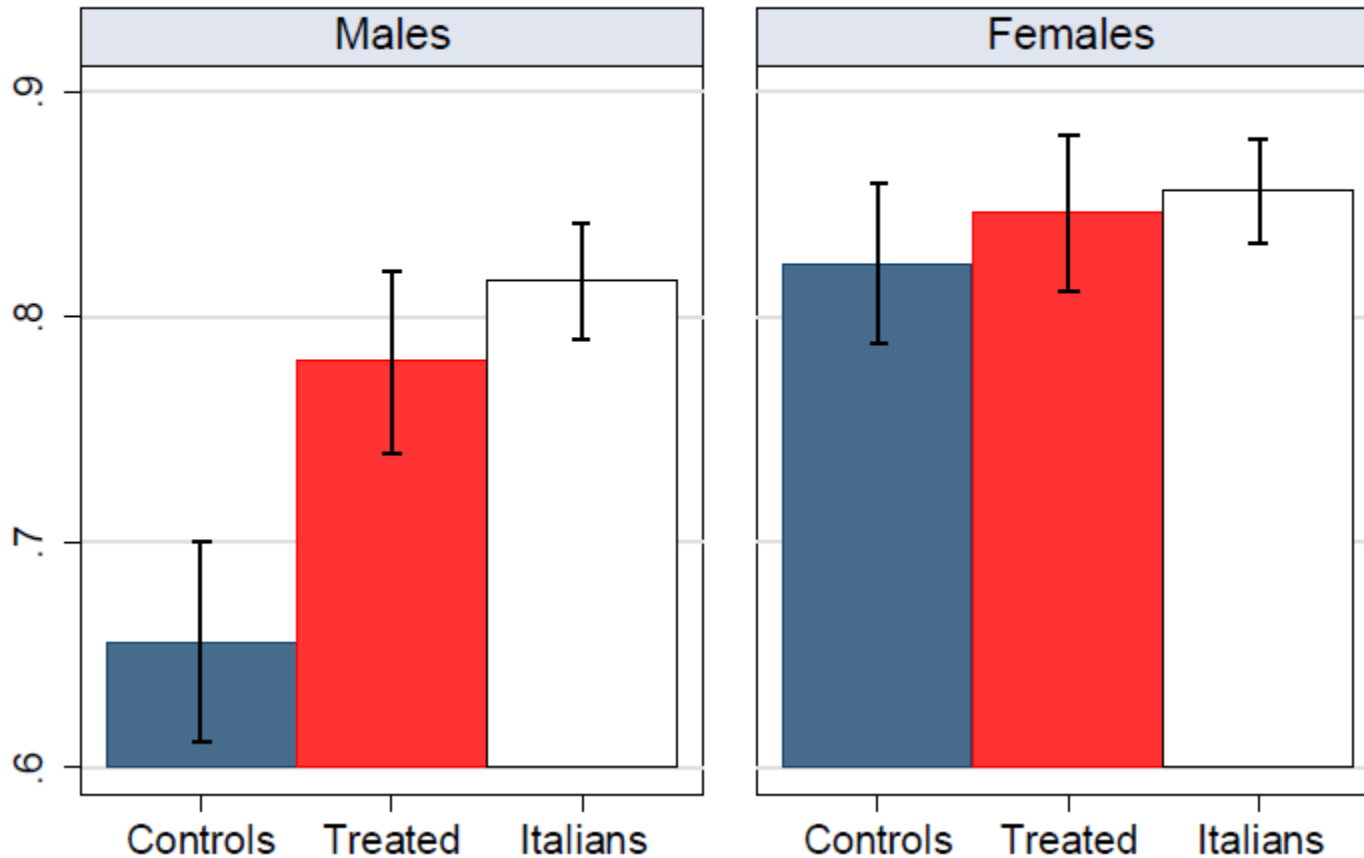
	All		Males		Female	
Liceo or Technical	(1)	(2)	(3)	(4)	(5)	(6)
ITT	0.073**	0.065**	0.124***	0.112***	0.022	0.017
	(0.031)	(0.027)	(0.040)	(0.036)	(0.035)	(0.032)
R^2	0.028	0.134	0.019	0.140	0.001	0.100
LATE	0.117**	0.105**	0.203***	0.184***	0.040	0.030
	(0.049)	(0.043)	(0.067)	(0.060)	(0.054)	(0.049)
R^2	0.049	0.152	0.048	0.161	0.012	0.112
Constant	0.684***		0.656***		0.824***	
	(0.026)		(0.031)		(0.024)	
Individual Controls	No	Yes	No	Yes	No	Yes
Obs.	1216	1216	605	605	611	611

Robust Standard Errors clustered at school level. Individual controls include: gender, squared standardized test score Invalsi at the beginning of 6th grade, generation of immigration, school province

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Closing the gap w/ Italians?

Probability of choosing Liceo or Technical



Note: group of comparable Italian students matched on INVALSI score

Heterog. effects by parents' education

	Males		Females	
	Mother	Father	Mother	Father
Liceo or Technical High-School	(1)	(2)	(3)	(4)
ITT	0.141*	0.038	0.201***	0.096
	(0.073)	(0.067)	(0.065)	(0.075)
High Educ * ITT	-0.066	0.023	-0.238***	-0.092
	(0.087)	(0.089)	(0.068)	(0.077)
High Educ	0.196***	0.086	0.190***	0.141***
	(0.064)	(0.066)	(0.054)	(0.053)
Individual controls	Yes	Yes	Yes	Yes
Obs.	351	325	399	369
R^2	0.146	0.123	0.128	0.089

Robust Standard Errors clustered at school level. Individual controls include: province, generation of immigration, gender, dummy for year of birth, Invalsi and squared Invalsi.

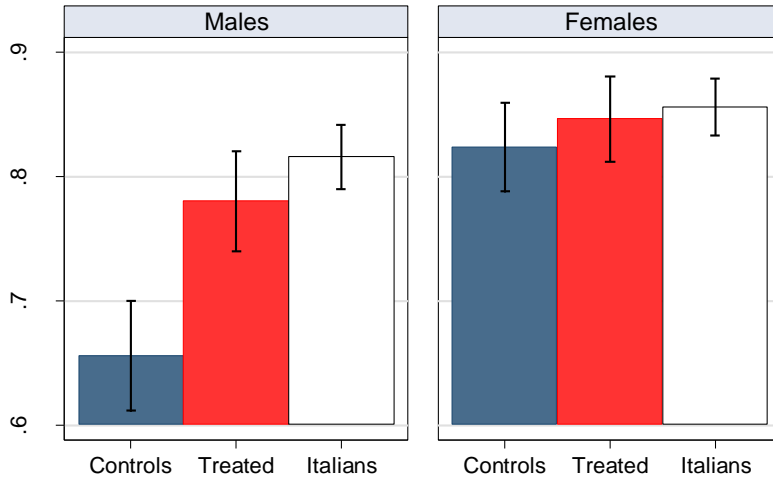
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Other academic outcomes

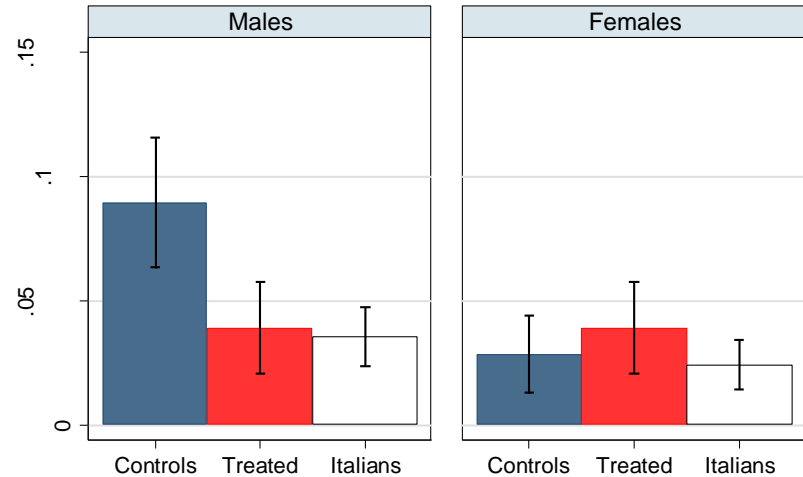
	failing admission to upper sec.			choosing liceo or technical		
	all	males	females	all	males	females
Intention to treat	-0.021 (0.018)	-0.052** (0.024)	0.010 (0.019)	0.065** (0.027)	0.112*** (0.036)	0.017 (0.032)
IV effect	-0.031 (0.028)	-0.080** (0.037)	0.015 (0.029)	0.105** (0.045)	0.184*** (0.060)	0.030 (0.049)
	INVALSI 8th grade			teachers' suggestion		
	all	males	females	all	males	females
Intention to treat	1.347** (0.638)	2.689*** (0.815)	0.178 (0.793)	0.133*** (0.046)	0.146*** (0.051)	0.111* (0.058)
IV effect	1.933** (0.926)	3.871*** (1.201)	0.254 (1.135)	0.193*** (0.068)	0.220*** (0.077)	0.155* (0.084)

Closing the gap w/ Italians?

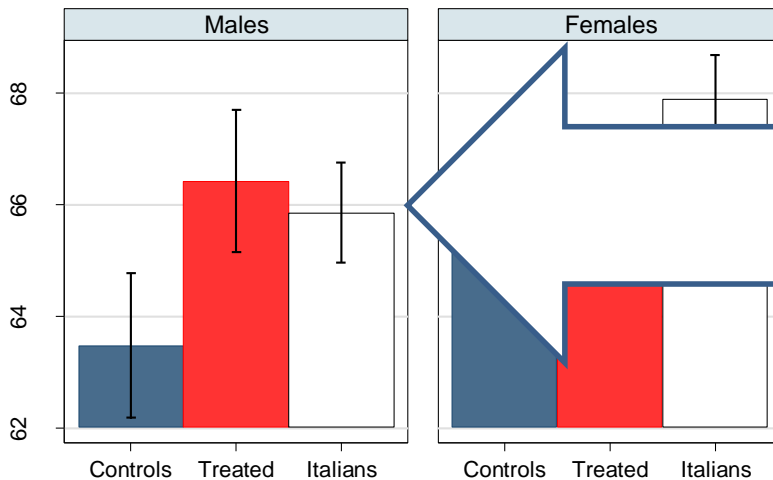
Probability of choosing Liceo or Technical



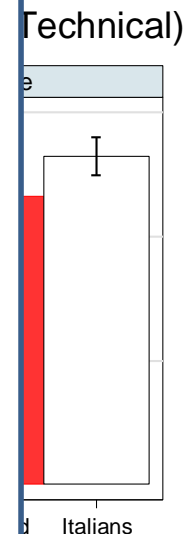
Failure rates during Lower Secondary School



INVALSI score in grade 8



Immigrant children in control grp started off w/ same test score as treated (by design), hence as comparable Italians, and then they are left behind



Additional results

RDD estimates reveal **no effect of CALP** (tutoring on Italian language)

- Small sample issue though ...

4. Channels

Understanding the mechanisms

Heckman, Pinto, Savalyev (AER, 2013)

1. Impact of treatment on **cognitive & non-cognitive skills**
2. Impact of cognitive & non-cognitive skills on life **outcomes**
3. **Decompose** treatment effect into components attributable to each factor

Potential channels

1. **Cognitive skills:** Invalsi score in Italian & Math at the end of grade 8
2. **Teachers'** recommendations on HS track
3. **Soft skills:** questionnaire data on psychological traits → exploratory factor analysis (EFA) & confirmatory factor analysis (CFA) to condense into 2 latent variables:
 - i. Academic **motivation**
 - ii. Perception of **barriers**

Underlying psychological variables: examples

- **Goals**

Thinking about your future, which educational aim do you want to achieve? (University Degree, Diploma, Go to work as soon as possible)

- **Self efficacy**

Independently from your educational aim but thinking about your abilities, do you think you could get an university degree? (Answer in a scale from 1 to 4)

- **Perception of barriers**

Do you think the following barriers could be an obstacle in the achievement of your educational aim? Economic barriers, Racial prejudice, Ideas of the family, ... (Answer in a scale from 1 to 4)

Impact on soft skills

	All		Males		Female	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Motivation						
ITT	0.087** (0.039)	0.090** (0.035)	0.124** (0.054)	0.145*** (0.049)	0.056 (0.047)	0.047 (0.044)
Constant	-0.146*** (0.036)	-1.152*** (0.303)	-0.171*** (0.044)	-0.690* (0.400)	0.046 (0.037)	-1.743*** (0.404)
Obs.	707	707	332	332	375	375
R^2	0.046	0.155	0.016	0.164	0.005	0.103

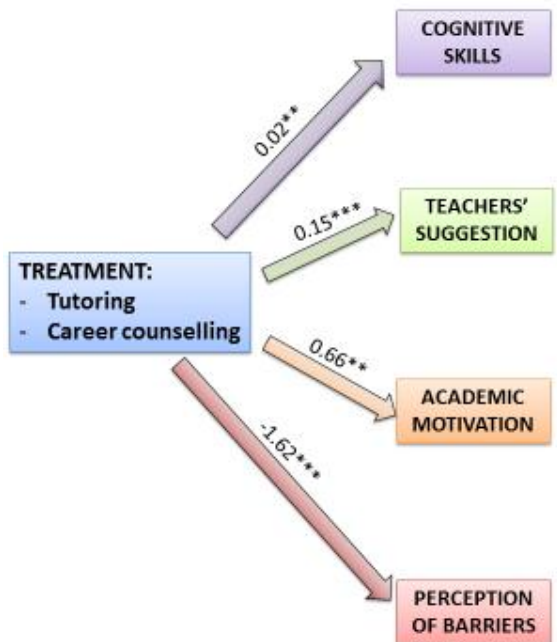
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Panel A: Motivation						
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Constant	-0.146*** (0.036)	-1.152*** (0.303)	-0.171*** (0.044)	-0.690* (0.400)	0.046 (0.037)	-1.743*** (0.404)
Obs.	707	707	332	332	375	375
R ²	0.046	0.155	0.016	0.164	0.005	0.103
Panel B: Perception of barriers						
ITT	-0.114*** (0.024)	-0.115*** (0.024)	-0.108*** (0.036)	-0.110*** (0.035)	-0.118*** (0.032)	-0.121*** (0.030)
Constant	0.043* (0.022)	0.506* (0.275)	0.040 (0.030)	0.318 (0.322)	0.099*** (0.021)	0.883* (0.495)
Obs.	707	707	332	332	375	375
R ²	0.042	0.059	0.030	0.098	0.035	0.084
Individual Controls	No	Yes	No	Yes	No	Yes

Variance decomposition

Method by Heckman et al. (2013)

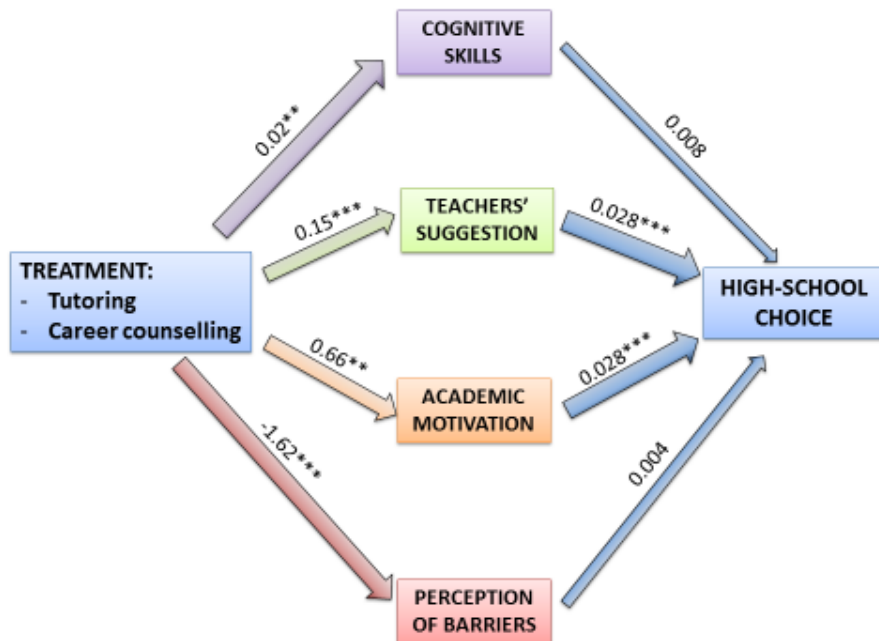
1. Effect of treatment on each channel



Variance decomposition

Method by Heckman et al. (2013)

1. Effect of treatment on each channel
2. Effect of each channel on the outcome of interest
3. Decomposition



Decomposition of Treatment effect (males)

Motivation	.028***	.009
Perception of barriers	.004	.012
Cognitive skills	.007	.006
Teachers' suggestion	.028***	.009
Total explained effect	.069***	.018
Total unexplained effect	0.026	.027

Why no contribution of cognitive skills & perceived barriers?

Simple model where HS choice depends on

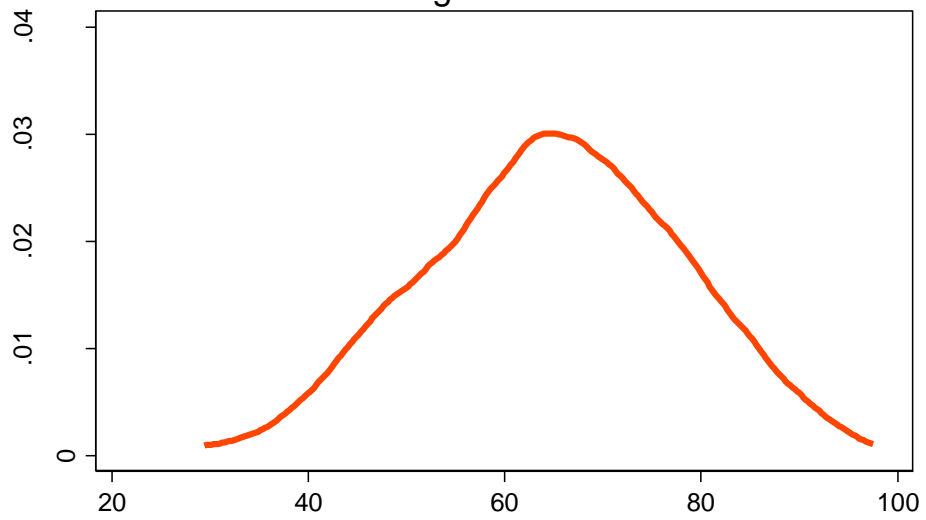
- Expected income differential
- Relative cost of attending academic track, which in turn depends on ability, motivation & barriers

Cutoff rule for choosing academic track:

$$c(\theta_i, m_i, b_i) < f(EY_i^A - EY_i^V)$$
$$c_\theta < 0, c_m < 0, c_b > 0$$

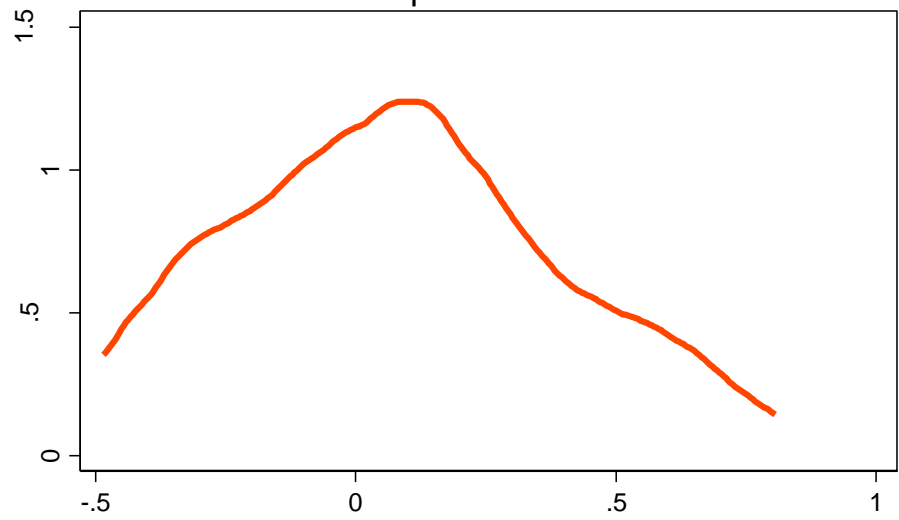


Cognitive skills

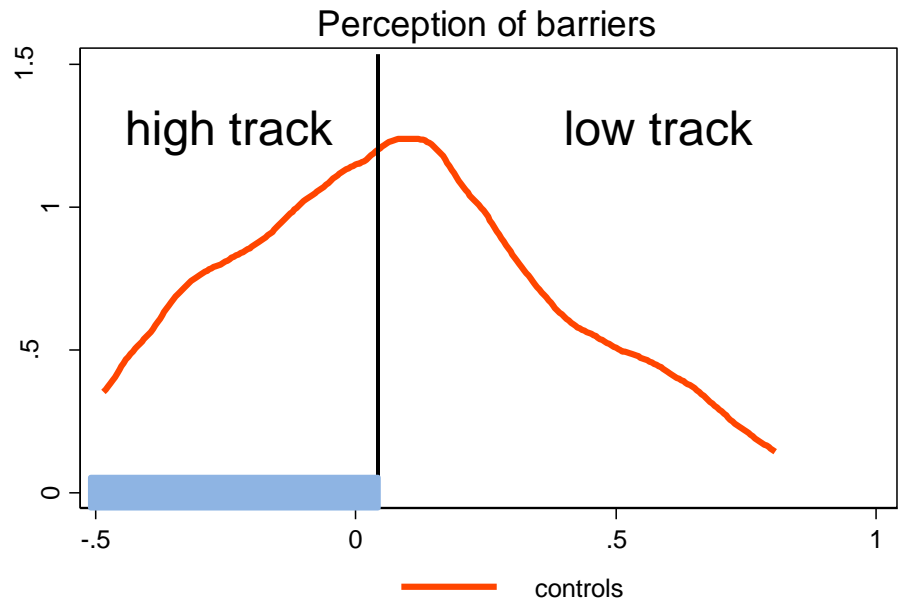
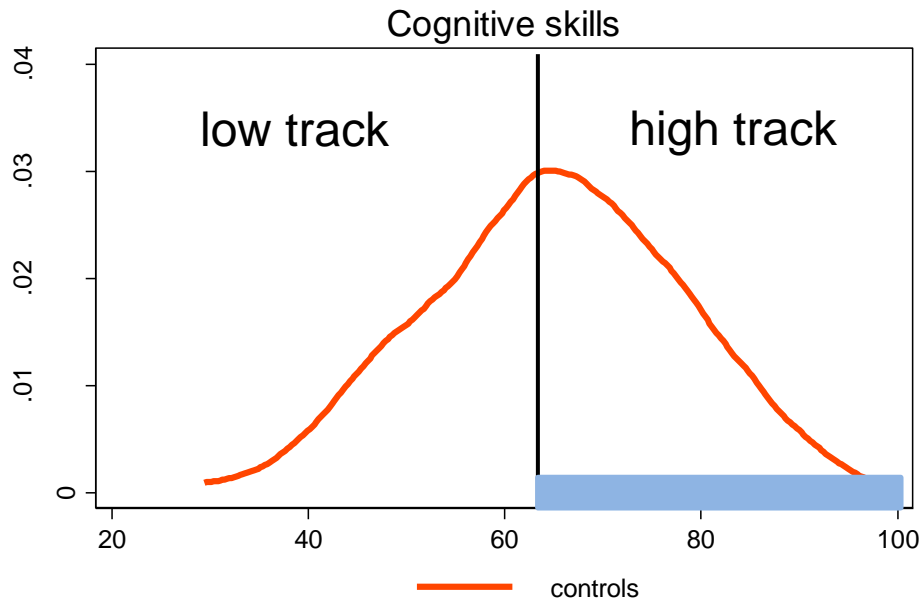


controls

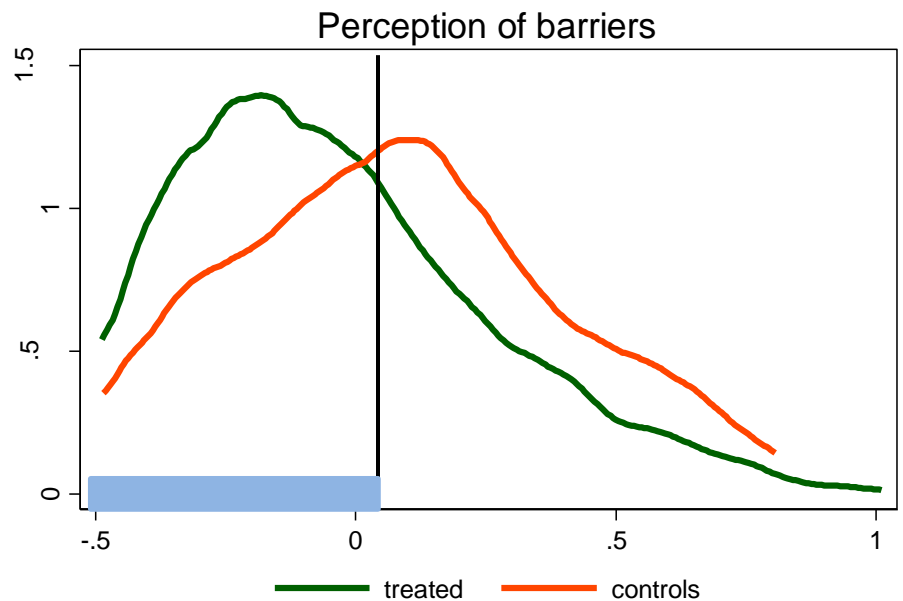
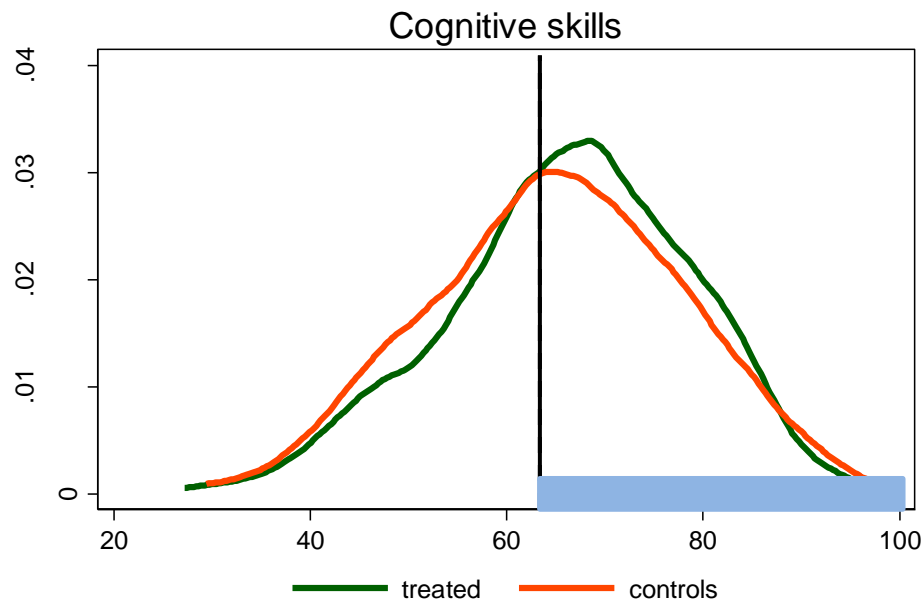
Perception of barriers



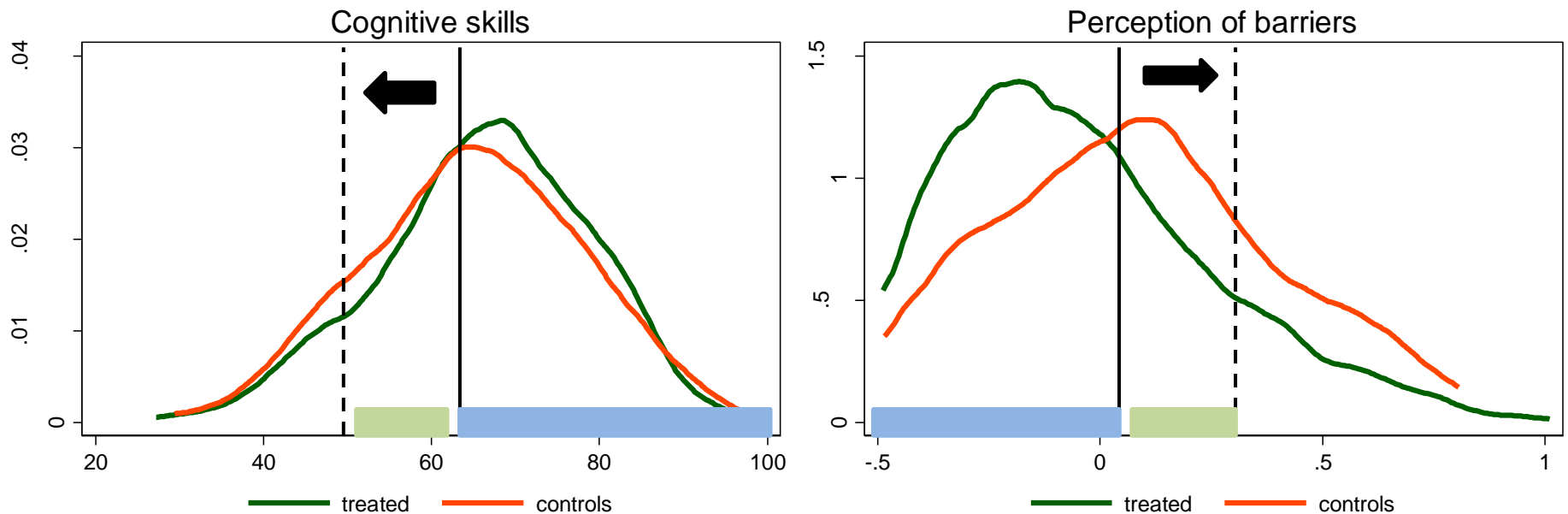
controls



- Treatment improves cognitive skills & decreases perceived barriers



- Treatment improves cognitive skills & decreases perceived barriers
- But at the same time it increases motivation → shift in threshold



- Compositional change can explain zero overall effect

5. Spillovers

Possible spillover effects

- EOP targeted top 10 immigrant students
- Potential impact on classmates (immigrant or natives) due to:
 - **Imitation**, role models, peer guidance
 - Less opportunities for joint **disruptive** behavior
 - **Teachers** adjust effort upwards (e.g., b/c of improved performance of treated students)

Estimation framework

$$y_{ics} = \alpha + \beta \text{treat}_c + \gamma X_i + \delta Z_c + \rho W_s + \epsilon_{ics}$$

$\text{treat}_c = 1$ if there is *at least 1 treated student in class*

X_i = individual controls

Z_c = class controls (size, % immigrants, avg. test score of Italians & immigrants)

W_s = school controls (size)

Results

	Fail (1)	High School Choice (2)	Test Score (3)	Teachers' Sugg. (4)
Panel A: Immigrants' Classmates				
Treat Class	-0.048** (0.022)	0.049* 0.242	-0.550 (0.980)	0.008 (0.027)
Mean Ind.	0.161	0.410	51.874	0.92
Obs.	1347	1298	967	
R ²	0.065	0.155	0.323	
Panel B: Natives' Classmates				
Treat Class	-0.008 (0.007)	0.005 (0.013)	-0.001 (0.001)	
Mean Ind.	0.049	0.802	67.4	
Obs.	8250	7792	744	
R ²	0.061	0.231	0.001	
Individual Controls	Yes	Yes	Yes	
Class, School Controls	Yes	Yes	Yes	

Effect on real outcomes but not on teachers → HS choice not entirely driven by teachers

Conclusions

- EOP reduced educational segregation
 - ↑ cognitive skills (males)
 - ↑ motivation (males)
 - ↓ perceived barriers (males & females)
 - ↑ teachers' recommendations towards academic
- Mechanisms: motivation & teachers' support
- Positive spillovers on immigrant classmates of treated students

Policy implications & future work

Scaling-up? Very expensive, however:

- Fixed costs + costs related to evaluation → increasing returns to scale from scaling up
- CALP (tutor for Italian) was the most expensive part but it was not effective
- Important role of ‘soft skills’ → information & “aspirations” intervention would be cheaper

Ongoing work

- Longer term outcomes (pass grade 9, Invalsi grade 10)
- Teachers’ role / bias (anonymous test vs not)