

The Importance of GPA Requirements for VET Educations and Low-Income Students

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- What we mean by CTE/VET in this project: *Secondary education with emphasis on skills directly relevant to the labor market*
- System features vary by country
 - Denmark, Germany, Switzerland: Apprenticeship based
 - Sweden: School based
 - UK and US: Some school based, some apprenticeship based, but varies for example by area
- A general goal
 - Provide non-academic path to labor market attachment
 - Important for students less likely to attain good High school/college degrees
- The big policy question
 - What program structures increase continued enrollment and labor market success?

Research Question and Results

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- *What is the effect of non-binding GPA screening at VET entry on student retention rates?*

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This Paper

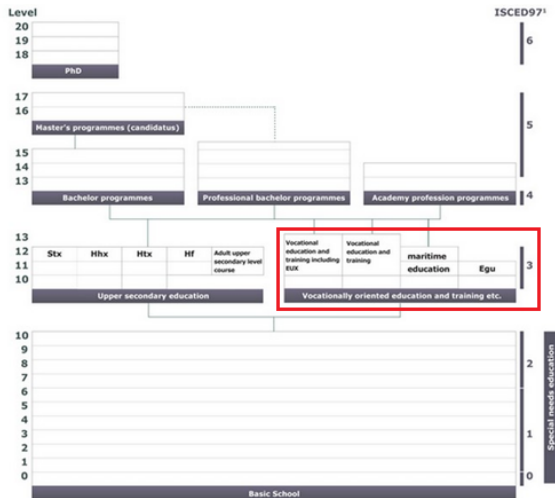
- Danish Reform from 2014 - GPA Screening with option for second test
- Danish administrative data 2009-2017 and Diff-in-Diff evidence
- Theoretical model to explain student effort in apprenticeship search

Main Findings

- ① GPA screening leads to lower 1st month of maintained enrollment
- ② Enrollment differential diminishes at time of firm apprenticeship screening
- ③ Consistent with model of student search

- VET Graduation and Returns
 - Böckerman et al (2018), Brunner et al (2019), Dougherty (2018), Festerer et al. (2008), Hanushek et al (2017), Hemelt, et al (2018), Kemple & Willner (2008), Krueger & Kumar (2004), Silliman & Virtanen (2019), Wolter & Ryan (2011)
- Firm Training and Apprenticeships
 - Becker (1962), Acemoglu & Pischke (1998, 1999, 2001), Autor (2001), Dustman & Schönberg (2007, 2009), Katz & Ziderman (1990), Schumann (2017)
- Features of VET systems and at risk students
 - Culpepper (2003, 2007), Dougherty & Macdonald (2019), Dougherty et al (2019), Dustman & Schönberg (2009), Hall & Soskice (2001), Ryan et al (2013), Visser (2009), Wolter & Ryan (2011)

The Danish Education System



Source: Danish Ministry of Education, 2019.

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Introduction

Setting, Reform, and Data

Results

Conclusion

The Setting and Reform

VET in Denmark.

- 3-4 years, often ending in entry to labor market
- Application to VET (or HS) in last year of Primary School
 - Between 18-25 percent of a youth cohort applies to VET
- General structure
 - Year 1: School based introduction and search for apprenticeship
 - Year 2-4: Apprenticeship and school based learning
 - *We focus primarily on year 1*

The Setting and Reform

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Reform of 2014

- Before: All students *applying* to VET granted access
- After: Students must pass elementary school Math and Literature to enter, but have option to take a second test to pass

Danish Administrative Data

- Primary School grades by subject (2003-2017)
- Application to secondary education programs (2009-2018)
- Education participation by spell (1980-2017)
- Child and Parental demographics, including age, gender, income, labor market participation, ... (1980-2015)

Danish Administrative Data

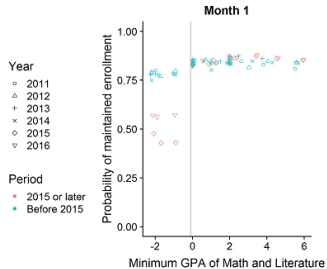
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Sample

- Students at the end of primary school who have applied to VET [▶ Applications](#)
- Period 2011-2017
- 73,314 observations

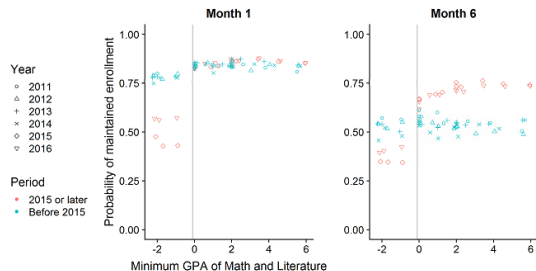
- Estimation
 - DiD around minimum GPA cut-off, before and after reform
 - High GPA group: Passing grades (at or above 0)
 - Low GPA group: Not passing grades (below 0)
 - Identifying assumptions
 - Exogeneity of policy cut-off wrt outcomes *around cutoff*
 - No-pretrends
 - SUTVA
 - Event study representation
- Outcomes
 - Maintained enrollment 0, 6, 9, 12, 15 months into program
 - Participation in other education or labor market (not included today)

Main Results - Graphical DiD representation



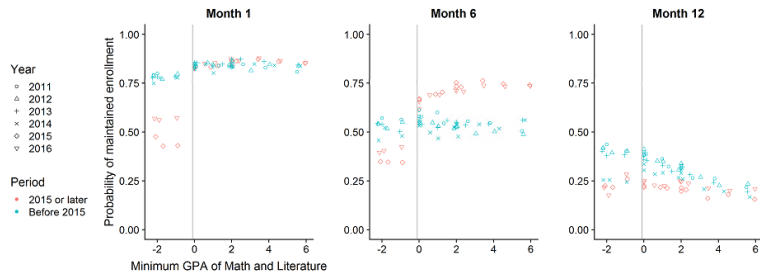
- Reform leads to 30 pct-point drop in non-passing students participation in first month

Main Results - Graphical DiD representation



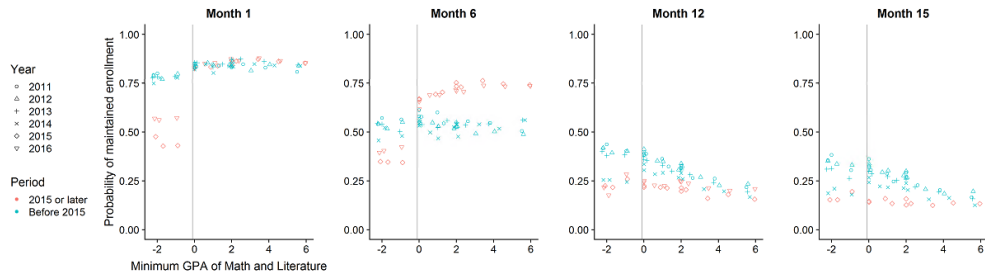
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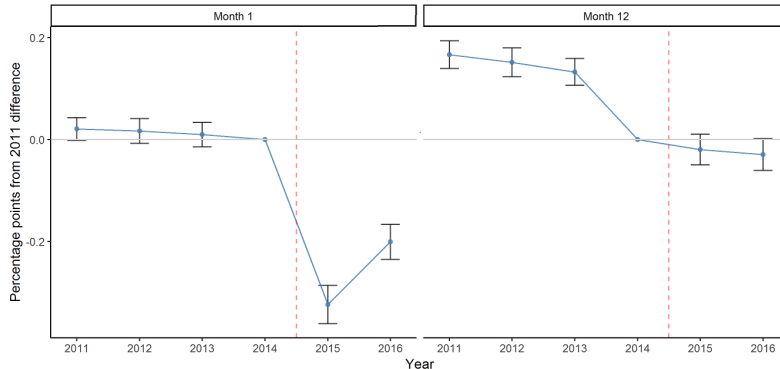
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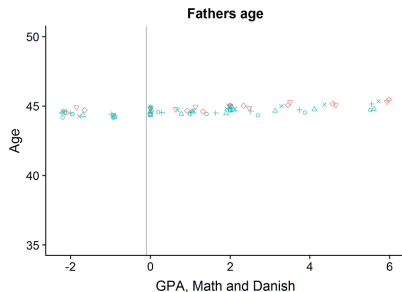
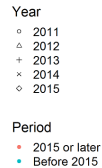
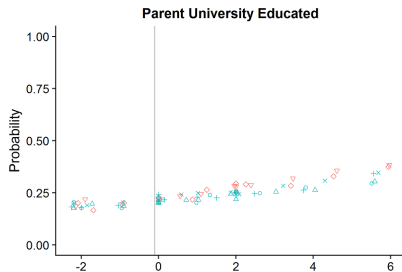
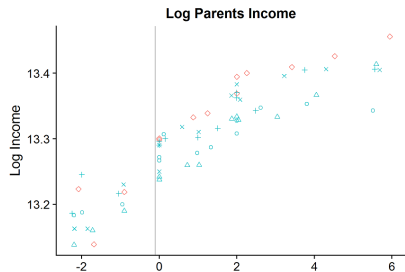
Main Findings (2) - Event Study representation



Event study effects estimated with GPA bandwidth of 2 and standard errors clustered at primary school.

- Month 1: Strong negative effect after reform
- Month 12: Negative effect (weaker) appears before reform
- Effect at month 12 is consistent with firms' updating expectations on applicants productivity at policy implementation

Covariate balance



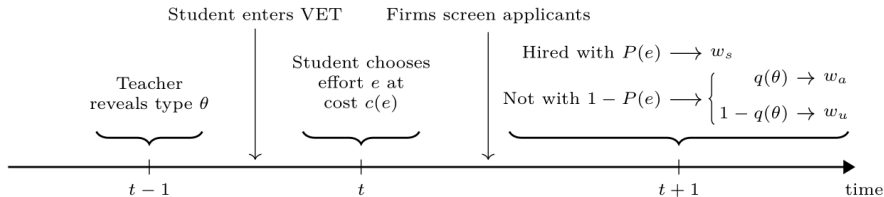
Understanding results - A Model of effort and signalling

Intuition of model

- Students have enrolled in VET and search for apprenticeship positions
 - Have academic ability signal from primary school
 - Effort in search depends on (1) effort's effect on search-success, and (2) outside options (primary school signal)
- Firms pick students as apprentices
 - Screen applicants on search effort - effect of effort increases in students' productivity heterogeneity
- Equilibrium student intake: Perfect Bayesian Nash equilibrium (firms' expectations about number of applicants and their effort satisfied)
- Model takeaways
 - If effort is importance for search success, low GPA students put in higher effort and get more apprenticeships
 - If firms' get signal of more productive students then they screen less, low GPA students lowers effort - GPA-Enrollment gradient weakens

Understanding results - A Model of effort and signalling

- Student chooses search effort e for apprenticeship at cost $c(e)$
 - Receives signal of academic ability θ from primary school
 - Expected wage: Skilled wage w_s , academic/college wage w_a , and unskilled wages w_u .
 - Probability of apprenticeship $P(e)$. Probability of academic success in outside option $q(\theta)$.
- Firms choose an amount of apprentices, n , among applicants
 - n is a function of belief of worker productivity distribution
 - Individual student's ability signal θ is not considered



Conclusion

Conclusions

- GPA screening leads to lower 1st month retention rates
- Effect diminishes strongly at time of firm apprenticeship screening
- Initial effects of screening is fewer accepted low-SES students
- *Tentative*: Firm Screening for apprentices is potentially relevant screening process than GPA screening
 - Consistent with negative or no gradient between primary school grades and likelihood of gaining apprenticeship position

Upcoming work

- Heterogeneity by school shares of students above/below cut-off (investigating peer effects in positive retention effect above cut-off during first year)
- Empirical leverage on model (who gets apprenticeships with 'good firms')

Thank you for listening!

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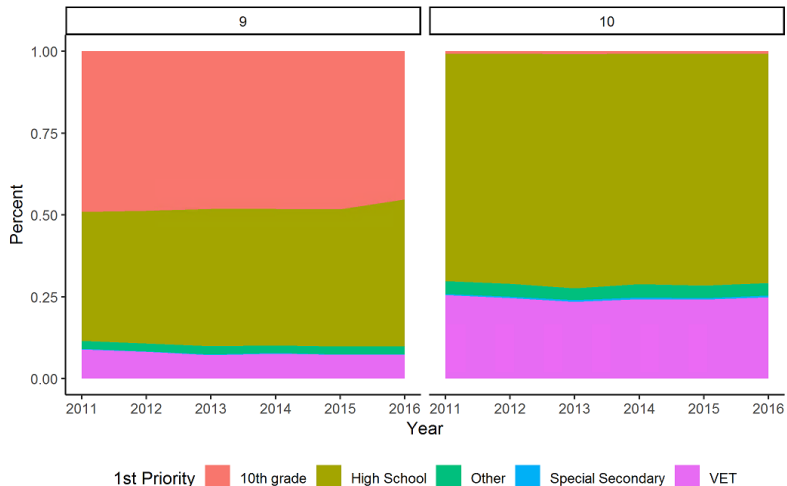
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Appendix

Primary School Students' Applications

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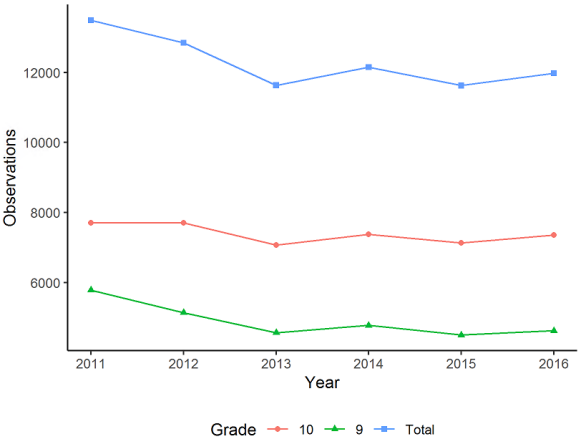


Sample includes all students with application information from the application system.

- The figure shows primary school students' first priority education choice at the end of compulsory 9th grade and optional 10th grade.

Number of students with VET as first priority

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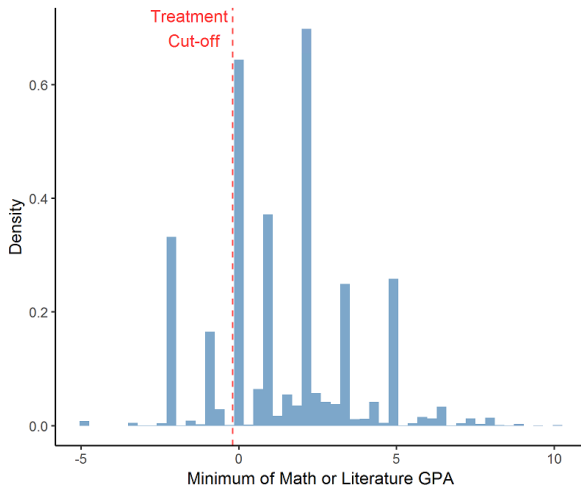


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