Local Labor Markets and Postsecondary Education

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Motivation

- **Stylized fact:** Countercyclical college-going (Graves and Kuehn, 2022) - College as *safe port in a storm* (Betts and McFarland, 1995)
- **Theory:** Emphasis on outside options (Becker, 1962)
- **Germany:** *Dual education system* ensures stable outside options (Brunello, 2009)
- **Tradeoff:** Applied skills directly remunerated and facilitate school-to-work transition. But: Lower long-term returns (Hanushek et al., 2017)

This paper

Effects of LLM conditions on postsecondary education in Germany?

1. Effect on overall first-time college enrollment?
2. Effect on skill content?
3. Role of economic preferences?

How:

- German administrative- and survey data on postsecondary education
- Exploit within-region across-time variation in local UR
- Estimate enrollment shares at different programs

Preview / Contribution

1. A one pp increase in local UR *decreases* first-time enrollment by 1.7%
   - Contrasts consensus estimates (Dellas and Sakellaris, 2003; Charles et al., 2018)

2. Shift from academic (-3.1%) to more applied institutions (+2.8%)
   - Novel evidence of LLM shocks on skill investment (Acton, 2021; Weinstein, 2022)
   - Effects moderated by economics preferences

3. Increased share of new apprentices w/ upper secondary degree (+7.1%)
   - Stable overall number of new apprentices (Lüthi and Wolter, 2020)

Literature

Institutional context

Postsecondary education in Germany

Sample:

- High school graduates w/ (highest) upper secondary degree (*Abitur*)

Choice set:

- Classic public universities w/ academic focus
- Other colleges: E.g., *Universities of Applied Sciences* w/ dual option
- Apprenticeship: On-the-job w/ schooling component

Tradeoff:	**Payoff**	**Skills**
University	Long-term	general
Other College	depends	mixed
Apprenticeship	Immediate	applied

Data and Identification

Data (1998–2017)

Student register:

- All students enrolled in higher education (Federal Statistical Office)
  - No ID, but county and year of high school graduation

Regional data:

- High school graduates, population and GDP (*Regionaldatenbank*)
- County-level unemployment rates (Federal Employment Agency)

Final dataset:

- Panel at region $\times$ cohort level

$\rightarrow$ 1,907 cells with 5,160,522 high school graduates

Identification

- Panel data model with region and cohort fixed effects:

$$ln(E_{rt}^{c}) = \alpha_r + \gamma_t + \beta UR_{rt} + \varepsilon_{rt}$$

  - E_{rt}^{c} = enrollment share of graduates w/ *Abitur* at college type c w/i one year
  - UR_{rt} = local unemployment rate
  - α_r, γ_t = region r and cohort t fixed effects
  - ε_{rt} = error term (clustered on regional level)
  - Cells weighted by number of graduates

- Assumption:

$$E(\varepsilon_{rt} \mid UR_{rt}, \alpha_r, \gamma_t) = 0,$$

  i.e., local labor demand is exogenous conditional on FEs

Outcome Definition

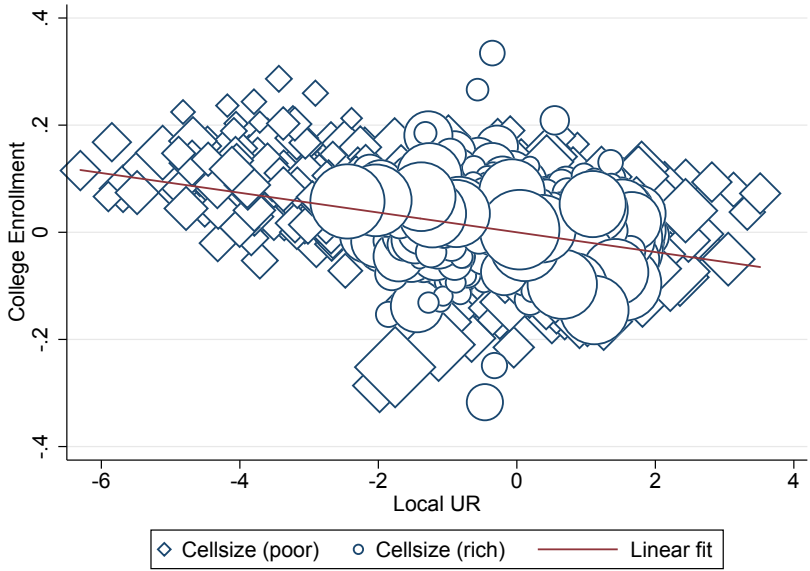
Evidence from administrative data – (1) College enrollment

Results: College enrollment shares

	Any college (1)	University (2)	Other college (3)
Panel A. Full sample (N=5,160,522)			
Local UR	-0.017***	-0.031***	0.028***
	(0.003)	(0.004)	(0.007)
	[79.95]	[59.76]	[20.18]
Panel B. $\geq$ median GDP p.c. (N=3,271,572)			
Local UR	-0.011	-0.015	-0.011
	(0.009)	(0.010)	(0.012)
	[82.62]	[62.14]	[20.48]
Panel C. $<$ median GDP p.c. (N=1,888,950)			
Local UR	-0.021***	-0.036***	0.026***
	(0.003)	(0.004)	(0.005)
	[75.32]	[55.64]	[19.67]
Region and year FEs	Yes	Yes	Yes

More outcomes: Degree choice | Major choice | Within STEM
Robustness: Region-specific trends | Alternative BC-measures
Heterogeneity: All graduates | By gender

Within-region across-time variation per cell (*rich*/*poor*)



Evidence from administrative data – (2) Apprenticeships

Results: Apprenticeships (absolute)

- **Data:** *Berufsbildungsstatistik* (2008-2017, state-level)
- **Outcome:** New apprentices w/different secondary school degrees
- Relatively *busines cycle proof* (Brunello, 2009; Lüthi and Wolter, 2020)

		By GDP p.c.	
Dependent variable:	All (1)	$\geq$ median (2)	$<$ median (3)
Panel A. All degrees			
State UR	200	-200	488*
	(293)	(464)	(215)
Outcome mean	33,677	46,334	21,020
No. cells	160	80	80
State and year FEs	Yes	Yes	Yes
Panel B. Upper secondary			
State UR	968***	851	862***
	(308)	(525)	(211)
Outcome mean	8,128	11,873	4,384
No. cells	160	80	80
State and year FEs	Yes	Yes	Yes

Results: Apprenticeships (degree shares)

	Upper secondary *Abitur* (1)	Intermediate Secondary (2)	Secondary General school (3)	None or other (4)
Panel A. Full sample (N=5,388,279)				
State UR	0.071***	-0.016	-0.045***	0.089**
	(0.014)	(0.013)	(0.011)	(0.032)
	[0.25]	[0.43]	[0.27]	[0.05]
Panel B. $\geq$ median GDP p.c. (N=4,272,606)				
State UR	0.037	-0.012	-0.033	0.124
	(0.021)	(0.022)	(0.029)	(0.069)
	[0.28]	[0.39]	[0.28]	[0.05]
Panel C. $<$ median GDP p.c. (N=1,115,673)				
State UR	0.103***	-0.027***	-0.043**	0.133*
	(0.014)	(0.003)	(0.013)	(0.066)
	[0.21]	[0.47]	[0.27]	[0.06]
State and year FEs	Yes	Yes	Yes	Yes

Evidence from survey data

German Socio-Economic Panel (SOEP)

- Largest longitudinal household survey in Germany (Goebel et al., 2019)
- N = 1,688 individuals with data on the state of graduation 1998–2017
- Obtain estimates on:
  - **Full picture:** Linear probability model for full choice set SOEP and NEPS
  - **Mechanisms:** Associations with household income, Income
  - **Heterogeneity:** Analyze effects separately by SES, By SES
  - **Heterogeneity:** Analyze the role of economic preferences. Preferences

Conclusion

Conclusion

- **Local labor market shocks ...**
- ... *decrease* overall first-time college going:
  - Decreased enrollment at public universities
  - Increased enrollment at more applied colleges
- ... likely *increase* share of high school graduates in apprenticeship
- **So?** Outside options still matter - but investment in **applied skills** more attractive in the dual education system.

Thank you!

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☕ coffee?

References I

Acton, Riley K, "Community College Program Choices in the Wake of Local Job Losses," *Journal of Labor Economics*, 2021, *39* (4), 1129–1154.

Alessandrini, Diana, "Is post-secondary education a safe port and for whom? Evidence from Canadian data," *Economics of Education Review*, 2018, *67*, 1–13.

Becker, Gary S., "Investment in Human Capital: A Theoretical Analysis," *Journal of Political Economy*, 1962, *70* (5), 9–49.

Belzil, Christian and Marco Leonardi, "Risk aversion and schooling decisions," *Annals of Economics and Statistics*, 2013, pp. 35–70.

Betts, Julian R and Laurel L McFarland, "Safe Port in a Storm: The Impact of Labor Market Conditions on Community College Enrollments," *Journal of Human Resources*, 1995, pp. 741–765.

Black, Sandra E, Paul J Devereux, Petter Lundborg, and Kaveh Majlesi, "Learning to Take Risks? The Effect of Education on Risk-Taking in Financial Markets," *Review of Finance*, 02 2018, *22* (3), 951–975.

References II

Brodaty, Thomas, Robert J Gary-Bobo, and Ana Prieto, "Do risk aversion and wages explain educational choices?," *Journal of Public Economics*, 2014, *117*, 125–148.

Brunello, Giorgio, "The effect of economic downturns on apprenticeships and initial workplace training: a review of the evidence," *Empirical research in vocational education and training*, 2009, *1* (2), 145–171.

Charles, Kerwin Kofi, Erik Hurst, and Matthew J Notowidigdo, "Housing Booms and Busts, Labor Market Opportunities, and College Attendance," *American Economic Review*, 2018, *108* (10), 2947–94.

Dellas, Harris and Plutarchos Sakellaris, "On the Cyclicality of Schooling: Theory and Evidence," *Oxford Economic Papers*, 2003, *55* (1), 148–172.

Dohmen, Thomas, Armin Falk, David Huffman, and Uwe Sunde, "Are risk aversion and impatience related to cognitive ability?," *American Economic Review*, 2010, *100* (3), 1238–1260.

References III

Ersoy, Fulya Y, "The Effects of the Great Recession on College Majors," *Economics of Education Review*, 2020, *77*, 102018.

Fidan, Muervet and Christian Manger, "Why do German students reject free money?," *Education Economics*, 2022, *30* (3), 303–319.

Goebel, Jan, Markus M Grabka, Stefan Liebig, Martin Kroh, David Richter, Carsten Schröder, and Jürgen Schupp, "The German socio-economic panel (SOEP)," *Jahrbücher für Nationalökonomie und Statistik*, 2019, *239* (2), 345–360.

Graves, Jennifer and Zoë Kuehn, "Higher Education Decisions and Macroeconomic Conditions at Age Eighteen," *SERIEs*, 2022, *13* (1), 171–241.

Hanushek, Eric A, Guido Schwerdt, Ludger Woessmann, and Lei Zhang, "General education, vocational education, and labor-market outcomes over the lifecycle," *Journal of Human Resources*, 2017, *52* (1), 48–87.

Jung, Seeun, "Does education affect risk aversion? Evidence from the British education reform," *Applied Economics*, 2015, *47* (28), 2924–2938.

References IV

Long, Bridget Terry, "The financial crisis and college enrollment: How have students and their families responded?," in "How the financial crisis and Great Recession affected higher education," University of Chicago Press, 2014, pp. 209–233.

Lovenheim, Michael F, "The Effect of Liquid Housing Wealth on College Enrollment," *Journal of Labor Economics*, 2011, *29* (4), 741–771.

Lüthi, Samuel and Stefan C Wolter, "Are apprenticeships business cycle proof?," *Swiss Journal of Economics and Statistics*, 2020, *156* (1), 1–11.

Middendorff, Elke, Beate Apolinarski, Karsten Becker, Philipp Bornkessel, Tasso Brandt, Sonja Heißenberg, and Jonas Poskowsky, "Die wirtschaftliche und soziale Lage der Studierenden in Deutschland 2016. 21," Bonn/Berlin: German Federal Ministry of Education and Research 2017.

Tawiah, Beatrice Baaba, "Does education have an impact on patience and risk willingness?," *Applied Economics*, 2022, *54* (58), 6687–6702.

Weinstein, Russell, "Local Labor Markets and Human Capital Investments," *Journal of Human Resources*, 2022, *57* (5), 1498–1525.

Literature

Existing Literature

Labor market conditions and college enrollment:

- Stylized fact: **countercyclical** postsecondary enrollment (Long, 2014; Charles et al., 2018)
- Large SES differences (Lovenheim, 2011; Alessandrini, 2018)
- Shocks affect share in sector-relevant degrees (Ersoy, 2020; Acton, 2021; Weinstein, 2022)

Risk aversion and educational choices:

- Risk aversion negatively associated with college enrollment (Belzil and Leonardi, 2013; Brodaty et al., 2014).
- Simultaneously: Mixed evidence on effects of education on risk-taking (Jung, 2015; Black et al., 2018; Tawiah, 2022)

◂ Findings

Institutional context

German higher education system

Academic institutions and degrees

- *Universities* = colleges w/ right to award doctorates
- Since Bologna reform: Formally equivalent Bachelor degrees
- Bachelor can be obtained in full-time, part-time and combination with paid internship or vocational training (*dual studies*)

Entry qualifications

- 12-13 years of school + 1 year of military service
- Three main entry qualifications:
  1. allgemeine Hochschulreife (*Abitur*) →all majors at all institutions
  2. Fachhochschulreife →all majors at non-universities
  3. fachgebundene Hochschulreife →all majors, some at university
- Here: Focus on largest subgroup (≈60%) w/ full choice set (*Abitur*)

Borrowing constraints?

Student finances

- Average monthly income of under 21 y/o students:
  1. 66% allowances (parents)
  2. 13% earnings
  3. 12% *BAFöG*
  4. 9% other sources (Middendorff et al., 2017)

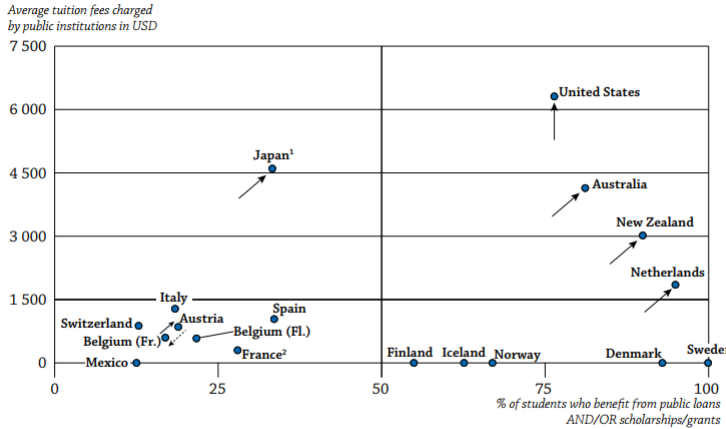
Loan aversion

- Only 5% of students take on private loan
- Interest-free, means-tested federal aid program (*BAFöG*), with relatively low take-up (Fidan and Manger, 2022)
- 37% of low SES students: debt as reason for non-application for aid (Middendorff et al., 2017)

◂ Institutional context

Cross-country comparison (OECD, 2008)

For full-time national students, in USD converted using PPPs

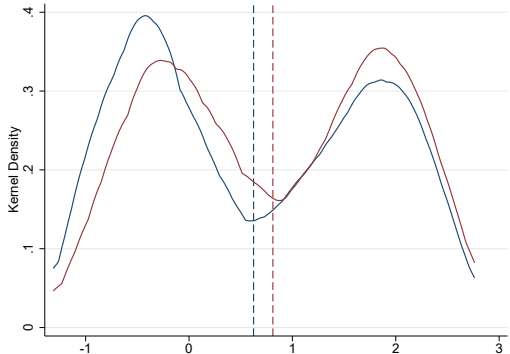


1. Tuition fees refer to public institutions but more than two-thirds of students are enrolled in private institutions.
2. Average tuition fees from USD 190 to 1 309 for university programmes dependent on the Ministry of Education.

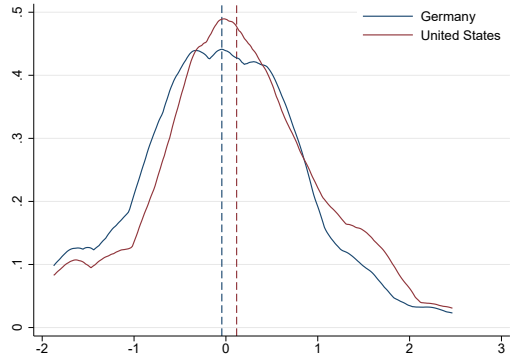
Source: OECD. Tables B5.1 and B5.2. See Annex 3 for notes (*www.oecd.org/edu/eag2011*).

StatLink http://dx.doi.org/10.1787/888932461199

Economic preferences across countries



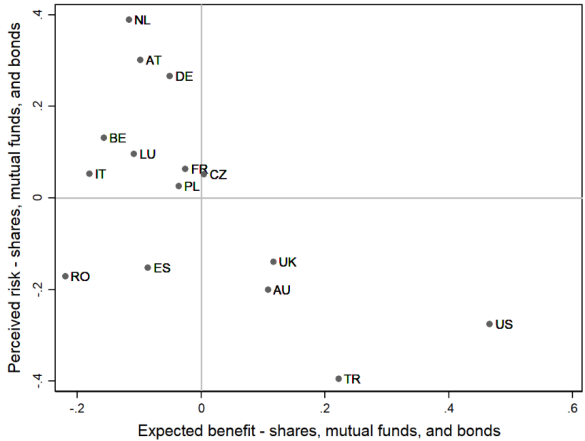
Patience



Risk taking

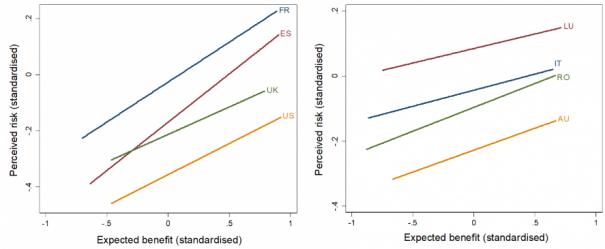
◂ Institutional context

Average perception of risks and benefits (Ferreira, 2018)



◂ Institutional context

Country-specific correlations (Ferreira, 2018)



Data and summary statistics

Main outcome variables

Extensive margin

- Share of graduates (w/ *Abitur*) enrolling within one year of graduation:

$$E_{rt} = \frac{\sum_{\tau=t}^{t+1} \sum_{i \in r,t} Enrolled_i^{y=\tau}}{\sum_{i \in r,t} Abitur_i},$$

with

- i = individual entry in student register
- r = region of high school graduation
- t = high school graduation cohort
- y = year of first-time enrollment

◂ Identification

Main outcome variables

Intensive margin

- Share of first-time students (w/ *Abitur*) enrolling in given field of study:

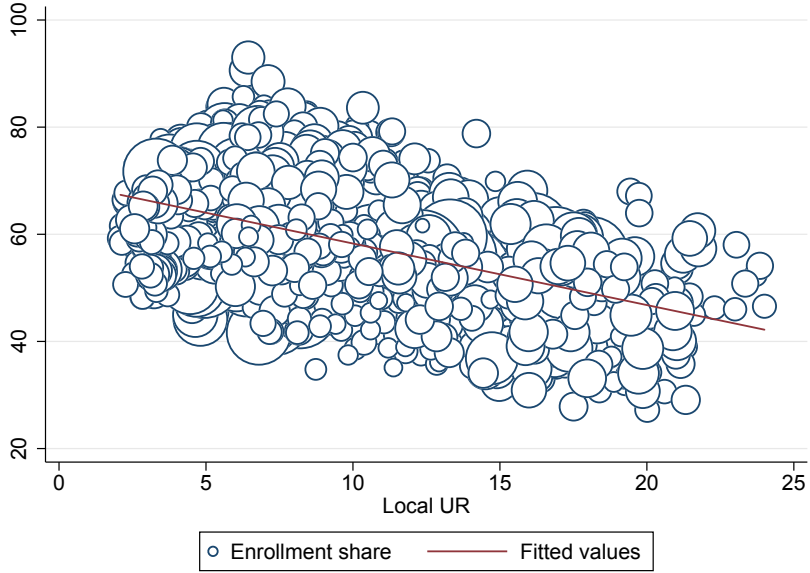
$$E_{rt}^{f} = \frac{\sum_{m \in f} \sum_{i \in r,t} Enrolled_{im}^{f}}{\sum_{i \in r,t} Enrolled_{i}},$$

with

- m = major (e.g. Engineering)
- f = field of study (e.g. STEM)

◂ Identification

Descriptive evidence



Conceptual Framework

Roy-type conceptual framework

- Expand framework in Charles et al. (2018)
- Two college types: B (academic) and A (applied)
- Lifetime payoff of hs-graduate i with ability θ_i, parental income w_i, and risk aversion γ_i – attending college type c:

$$R_i^c(\theta_i, \gamma_i, w_i) = \mathrm{E}[\pi^c] - (1+\gamma_i)\mathrm{Var}[\pi^c] - (1+\gamma_i)(F_c - w_i) - \kappa_c(1-\theta_i) - Y^0,$$

where:

- $\pi^c = Y^c - Y^0$: college premium ($f[\pi^B] > f[\pi^A]$)
- $(F_c - w_i)$: funding gap ($F_B \geq F_A$)
- $\kappa_c(1-\theta_i)$: psychic costs of learning ($\kappa_B > \kappa_A$)

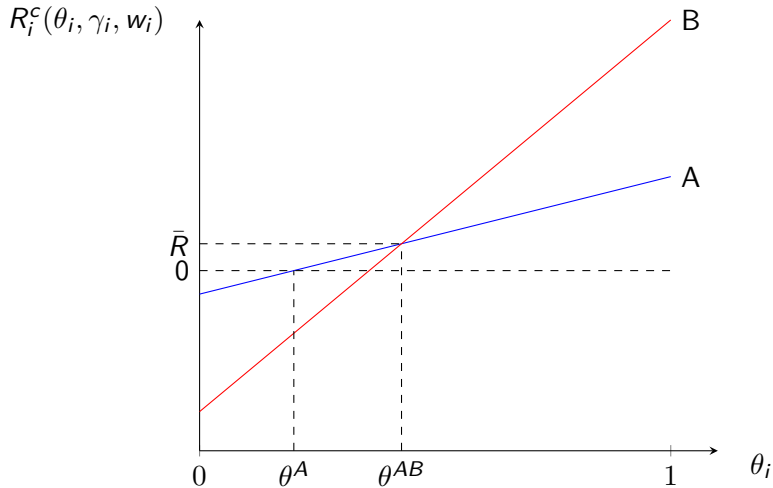
◂ Mechanisms

Roy-type conceptual framework

- Normalize: $R_i^0(\theta_i) = 0$
- Decisions can be characterized as follows:

$$\text{if } \begin{cases} R_i^A, R_i^B < 0 & \text{labor market entry,} \\ R_i^A > R_i^B, 0 & \text{enroll at type A,} \\ 0, R_i^A < R_i^B & \text{enroll at type B.} \end{cases}$$

Sorting in equilibrium



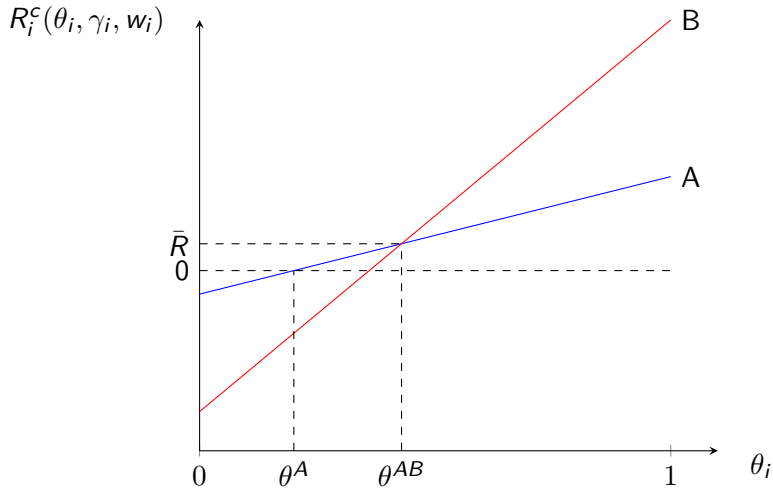
Roy-type conceptual framework

- Effect of shock can be split into four sub-components:

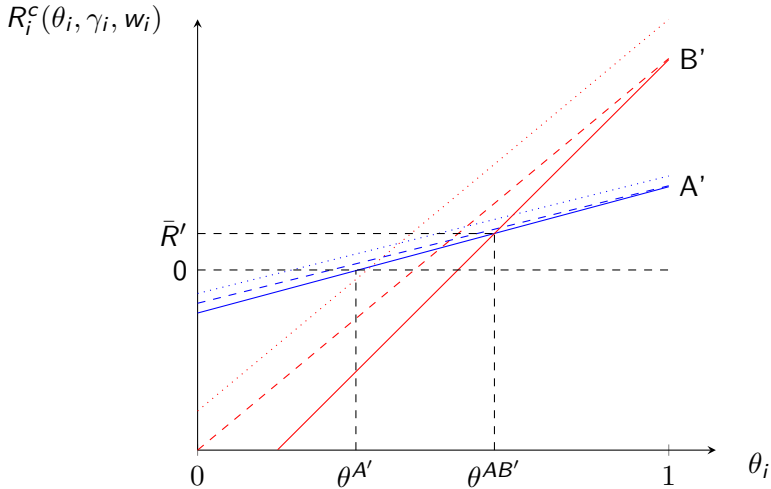
$$\frac{dR_i^c(\theta_i, \gamma_i, w_i)}{d\text{UR}} = \underbrace{\frac{d\text{E}[\pi^c]}{d\text{UR}}}_{(i)} - (1+\gamma_i)\left(\underbrace{\frac{d\text{Var}[\pi^c]}{d\text{UR}}}_{\text{(ii)}} - \underbrace{\frac{dw_i}{d\text{UR}}}_{\text{(iii)}}\right) - \underbrace{\frac{dY^0}{d\text{UR}}}_{\text{(iv)}}$$

- Assume: (i) $= 0$; (ii) > 0; (iii) < 0; (iv) $Y^0 < 0$
- (ii) and (iii) outweigh outside option (iv) under high risk aversion
- Risk aversion and ability negatively correlated (Dohmen et al., 2010). Larger shifts for low ability individuals.

Sorting in equilibrium



Equilibrium after shock



More evidence from administrative data

Results: College enrollment shares

		By gender		By GDP p.c.	
	Main	Female	Male	$\geq$ median	$<$ median
Dependent variable:	(1)	(2)	(3)	(4)	(5)
Overall enrollment	-0.017***	-0.021***	-0.011***	-0.011	-0.021***
	(0.003)	(0.004)	(0.003)	(0.009)	(0.003)
	[79.95]	[76.61]	[84.12]	[82.62]	[75.32]
At university	-0.031***	-0.036***	-0.024***	-0.015	-0.036***
	(0.004)	(0.004)	(0.003)	(0.010)	(0.004)
	[59.76]	[58.89]	[60.84]	[62.14]	[55.64]
At other college	0.028***	0.035***	0.026***	-0.011	0.026***
	(0.007)	(0.007)	(0.006)	(0.012)	(0.005)
	[20.18]	[17.70]	[23.27]	[20.48]	[19.67]
No. graduates	5,160,522	2,865,289	2,295,233	3,271,572	1,888,950
No. cells	1,907	1,907	1,907	956	951

◂ Main results

Degree choice

	Main	Gender		By GDP p.c.	
		Female	Male	$\geq$ median	$<$ median
Dependent variable:	(1)	(2)	(3)	(4)	(5)
Full time	-0.006***	-0.005***	-0.007***	-0.010***	-0.003
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)
	[94.4]	[95.3]	[93.5]	[94.0]	[94.9]
Dual study	0.066*	0.050	0.074*	0.136***	0.012
or part time	(0.037)	(0.036)	(0.042)	(0.032)	(0.040)
	[5.6]	[4.7]	[6.5]	[6.0]	[5.1]
No. students	1,990,936	1,046,917	944,019	1,366,912	624,024
No. cells	768	768	768	384	384
Region and year FEs	Yes	Yes	Yes	Yes	Yes

◂ Main results

Major choice

Table: Major choice (freshmen w/ *Abitur*)

	STEM	Arts & Humanities	Political & Social Sciences	Business & Economics	Law & Administration	Pedagogy	Health & Medicine	Other or Missing
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Local UR	0.023***	0.012*	0.036***	0.003	0.000	-0.062***	-0.010	0.022*
	(0.005)	(0.006)	(0.009)	(0.008)	(0.008)	(0.006)	(0.006)	(0.012)
Outcome mean	31.9	12.9	5.3	11.3	7.7	21.2	7.1	2.7
No. students	3,083,976	3,083,976	3,083,976	3,083,976	3,083,976	3,083,976	3,083,976	3,083,976
No. cells	1,907	1,907	1,907	1,907	1,907	1,907	1,907	1,907
Region and year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table presents estimates from a two-way-FE regression on the regional level for the log share of first-year students with *Abitur* enrolling for different fields of study at the university, spanning high school cohorts 1998–2017. All regressions include region and cohort fixed effects. Regions are weighted by the number of first-year students with *Abitur*. Standard errors in parentheses allow for clustering at the regional level. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

◂ Main results

Within STEM major choice

Table: Within STEM major choice (freshmen w/ *Abitur*)

	Engineering	Mathematics	Computer Science	Physics	Chemistry	Biology	Geological Sciences	Other
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Local UR	0.019**	0.031***	0.052***	0.002	-0.003	0.035***	0.031***	0.084**
	(0.009)	(0.009)	(0.008)	(0.015)	(0.009)	(0.009)	(0.011)	(0.038)
Outcome mean	11.5	2.8	5.2	2.6	4.3	3.1	2.2	0.3
No. students	3,083,976	3,083,976	3,083,976	3,083,976	3,083,976	3,083,976	3,083,675	2,618,152
No. cells	1,907	1,907	1,907	1,907	1,907	1,907	1,906	1,421
Region and year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table presents estimates from a two-way-FE regression on the regional level for the log share of first-year students with *Abitur* enrolling for different STEM majors at university, spanning high school cohorts 1998–2017. All regressions include region and cohort fixed effects. Regions are weighted by the number of first-year students with *Abitur*. Standard errors in parentheses allow for clustering at the regional level. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

◂ Main results

Robustness

Extensive margin robustness – College choice

Outcome: College enrollment			Group-by-year FE		Linear trends	
Independent variable:	Baseline (1)	State FE (2)	By GDP (3)	By size (4)	By region (5)	By state (6)
Local UR	-0.017***	-0.010***	-0.018***	-0.018***	-0.011	-0.004
	(0.003)	(0.003)	(0.003)	(0.003)	(0.006)	(0.003)
State UR	-0.019***	-0.020***	-0.021***	-0.020***	-0.013*	-0.016**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.007)	(0.007)
Youth UR	-0.017***	-0.010***	-0.018***	-0.018***	-0.004	-0.005
	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)
ln(local GDP p.c.)	0.246**	0.025	0.210*	0.327***	-0.180	0.009
	(0.112)	(0.028)	(0.114)	(0.118)	(0.119)	(0.027)
ln(state GDP p.c.)	0.119	0.224***	0.141	0.172	0.179	0.253***
	(0.205)	(0.059)	(0.204)	(0.214)	(0.442)	(0.045)

Enrollment (all high school graduates) – College choice

	Main	Gender		GDP per capita	
		Female	Male	$\geq$ median	$<$ median
Dependent variable:	(1)	(2)	(3)	(4)	(5)
Overall enrollment	-0.006	0.003	-0.015***	-0.012	-0.004
	(0.004)	(0.004)	(0.004)	(0.007)	(0.005)
	[14.08]	[14.43]	[13.75]	[15.18]	[12.32]
At university	-0.023***	-0.015***	-0.031***	-0.027***	-0.018***
(general skills)	(0.004)	(0.004)	(0.004)	(0.006)	(0.005)
	[8.85]	[9.92]	[7.84]	[9.49]	[7.82]
At other college	0.025***	0.044***	0.010	0.017	0.022***
(applied skills)	(0.006)	(0.006)	(0.006)	(0.019)	(0.006)
	[5.23]	[4.51]	[5.91]	[5.69]	[4.50]
No. regions	1,907	1,907	1,907	956	951
No. 18-19 y/o	35,944,843	17,445,535	18,499,308	22,171,790	13,773,053

Evidence from survey data (results)

Results: Postsecondary education

	College	Vocational Education	Neither or missing
	(1)	(2)	(3)
Panel A. SOEP (1998–2017)			
State UR	-0.007	0.009	-0.002
	(0.012)	(0.008)	(0.007)
Outcome mean	0.62	0.28	0.10
No. graduates	1,681	1,688	1,688
State and year FEs	Yes	Yes	Yes
Panel B. NEPS (1962–2007)			
State UR	-0.009	0.013**	-0.003
	(0.006)	(0.005)	(0.003)
Outcome mean	0.43	0.54	0.03
No. graduates	2,198	2,198	2,198
State and year FEs	Yes	Yes	Yes

back

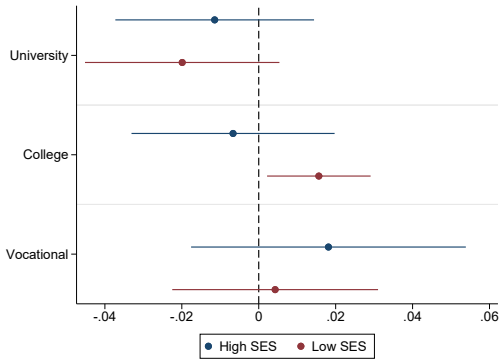
Mechanisms: Household Income

	Any college (1)	Vocational education (2)	Neither or missing (3)	University (4)	Other college (5)
Panel A. Net income at graduation					
Y_t (in 1,000 EUR)	0.021***	-0.021***	-0.000	0.016	0.001
	(0.007)	(0.007)	(0.004)	(0.017)	(0.012)
Panel B. ln(Income)					
$\ln(Y_t)$	0.075**	-0.071**	-0.004	0.055	0.008
	(0.027)	(0.027)	(0.015)	(0.054)	(0.032)
Panel C. Immediate change					
$\ln(Y_t)$-$\ln(Y_{t-1})$	0.046	-0.041	-0.006	0.061	-0.033
	(0.060)	(0.084)	(0.048)	(0.118)	(0.093)
Panel D. Deviation from trend					
$\ln(Y_t)$-$\ln(\hat{Y}_t)$	0.068	-0.082	0.015	0.016	0.046
	(0.052)	(0.073)	(0.045)	(0.066)	(0.036)
Outcome mean	0.62	0.31	0.08	0.54	0.11
No. graduates	887	887	887	785	785
State and year FEs	Yes	Yes	Yes	Yes	Yes
Baseline controls	Yes	Yes	Yes	Yes	Yes

back

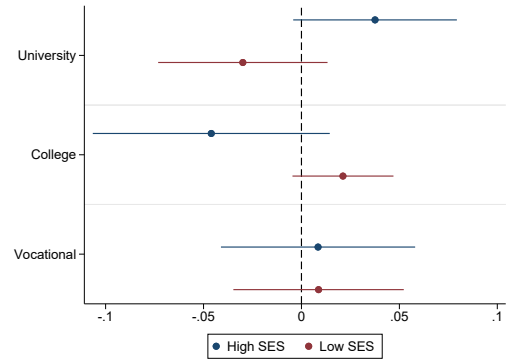
Heterogeneity: By SES

Unconditional



(bivariate)

Conditional



(gender, income, economic preferences)

back

Heterogeneity: Economic Preferences

	University		Other ollege		Vocational education	
	(1)	(2)	(3)	(4)	(5)	(6)
State UR	-0.006	-0.006	0.002	0.001	0.004	0.005
	(0.013)	(0.022)	(0.013)	(0.015)	(0.013)	(0.021)
...× Patience	0.009**	0.008**	-0.003	-0.002	-0.006*	-0.006**
	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)
...× Risk taking	-0.010**	-0.011**	0.003	0.004	0.007***	0.007**
	(0.003)	(0.004)	(0.003)	(0.004)	(0.002)	(0.003)
Outcome mean	0.59	0.57	0.10	0.11	0.31	0.32
No. graduates	964	755	964	755	964	755
State and year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Baseline controls	No	Yes	No	Yes	No	Yes

back

Heterogeneity and Economic Preferences (low SES)

	University		Other college		Vocational education	
	(1)	(2)	(3)	(4)	(5)	(6)
State UR	-0.028*	-0.025	0.017*	0.018*	0.010	0.007
	(0.016)	(0.022)	(0.009)	(0.010)	(0.014)	(0.019)
...× Patience	0.013***	0.013***	-0.003	-0.003	-0.009**	-0.010**
	(0.003)	(0.003)	(0.002)	(0.002)	(0.004)	(0.004)
...× Risk taking	-0.011**	-0.010**	0.001	0.001	0.007*	0.006*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)
Outcome mean	0.51	0.51	0.10	0.10	0.37	0.37
No. graduates	624	624	624	624	656	656
State and year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Baseline controls	No	Yes	No	Yes	No	Yes

back

Heterogeneity and Economic Preferences (high SES)

	University		Other college		Vocational education	
	(1)	(2)	(3)	(4)	(5)	(6)
State UR	0.040*	0.046**	-0.042*	-0.045*	0.000	-0.001
	(0.019)	(0.019)	(0.021)	(0.023)	(0.018)	(0.021)
...× Patience	0.008	0.008	-0.004	-0.004	-0.004	-0.004
	(0.005)	(0.005)	(0.003)	(0.003)	(0.003)	(0.004)
...× Risk taking	-0.008	-0.009	0.006	0.008*	0.003	0.002
	(0.007)	(0.007)	(0.004)	(0.004)	(0.003)	(0.003)
Outcome mean	0.73	0.73	0.09	0.09	0.14	0.14
No. graduates	301	285	301	285	336	320
State and year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Baseline controls	No	Yes	No	Yes	No	Yes

back