DOES EXPOSURE TO ECONOMICS BRING NEW MAJORS TO THE FIELD?

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Motivation

- College majors have a large impact on labor market outcomes

  (Altonji, Blom, and Meghir 2012; Arcidiacono 2004; Grogger and Eide 1995; Hamermesh and Donald 2008; James et al. 1989; Hastings, Neilson, and Zimmerman 2013; Kirkeboen, Leuven, and Mogstad 2015)

- Tastes and abilities are important determinants of major choices

  (Montmarquette, Cannings, and Mahseredjian 2002; Stinebrickner and Stinebrickner 2014; Zafar 2011; Zafar 2013)

- Students have imperfect knowledge about their major specific tastes and abilities

  (Stinebrickner and Stinebrickner 2014; Zafar 2011; Zafar 2013)

Motivation

- Exposure to different fields (via coursework) may help students learn about the field as well as their tastes and abilities

  (Stinebrickner and Stinebrickner 2014; Zafar 2011)

- Implications for curriculum design
  - early or late specialization

- Usually no exogenous variation in exposure
  - students self-select into courses that interest them

Research question

- Can “forced” exposure to academic fields affect major choice?
- Which content matters?
- (Can the matching between majors and students be improved?)

This paper – a natural experiment

- Coursework for first-year students is almost identical at the University of St. Gallen
- Besides coursework, first-year curriculum involves a first-year paper in business, economics, or law
- Students state preferences over field, but business is oversubscribed
- Algorithm used to solve oversubscription problem results in quasi-random assignment to field and topic

Contribution and results

- Identification of causal effect of exposure to academic field on subsequent major choice
- Preview of results
  - Writing in economics raises probability of majoring in economics by 2.7 percentage points
  - Similar for law
  - Economics result driven by men; law result driven by women
  - Effect driven by *non-typical* economics topics, which convey new information

Institutional setting – University of St. Gallen

USG offers undergraduate degrees in five fields:

Major	% enrolled in major
Business	61.7
Economics	15.3
Law	5.4
International Affairs	13.7
Law & Economics	7.7

Note: Distribution of majors of students that completed first year in first attempt. Shares don't add up to 100% as some students are enrolled in two majors.

Data

- Administrative data on
  - major choice
  - coursework
  - student demographics
  - stated preferences regarding paper field
  - assigned field and topic (title) of first-year paper
  - for entering cohorts 2002-2012
- Focus on "regular" students
  - about 9,200 students

First-year curriculum

- First-year coursework is almost identical for all students
  - One course per semester in each of three core fields: business, economics, and law
  - Students enroll in single discussion section
    - 30-35 students, staffed by one TA from each core field, meets Fridays, field rotates week-to-week
- First-year paper in one core field
- Students choose major at the end of 1st year

The first-year paper

- Main purpose: Introduction to academic writing
  - purpose is not exposure to academic fields
- Topics are set, and student's work is supervised and graded by one TA from discussion section
- Timeline
  - Students state preferences over paper fields in November
  - Assignment of field and topic in December
  - Paper is due in April
  - Students learn grade in September (after they had to declare a major)

The first-year paper: examples of topics

- **Business**
  - *What chances and challenges does crowd-sourcing provide for the innovation management of SME?*
  - *Intrinsic motivation and creative work – why money is not sufficient*
- **Economics**
  - *The comeback of gold: why the financial crisis fuels the price of gold*
  - *Foreigners take our jobs!? Discuss the effect of immigration on the labor market in Switzerland. Who are the winners and losers of immigration?*
- **Law**
  - *Prohibition of alcohol in soccer stadiums: Who has subject-matter jurisdiction to issue a ban on the consumption of alcohol in stadiums? Is such a ban in the public interest and is it proportionate?*
  - *Is the ban of political posters on public ground legal?*

Assignment to field

- Students submit a preference ranking
  - e.g., 1 business, 2 economics, 3 law
- One-third of students within each discussion section is assigned to each field
- Business is usually oversubscribed
- Assignment to field depends on
  - distribution of preferences within section and
  - student's priority within section

Example assignment mechanism

Student	Preference ranking	1 round	2 round	3 round
1	Business, Economics, Law			
2	Business, Law, Economics			
3	Economics, Business, Law			
4	No preferences stated			
5	Business, Economics, Law			
6	Law, Business, Economics			

Example assignment mechanism

Student	Preference ranking	1 round	2 round	3 round
1	Business, Economics, Law	Business		
2	Business, Law, Economics			
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3	Economics, Business, Law	Economics		
4	No preferences stated			Law
5	Business, Economics, Law		Economics	
6	Law, Business, Economics	Law		

Student's priority within section

- Bids for section times are time-stamped; most fall within short period during orientation week
- Priority for assignment to the paper is in inverse order of the time stamp
- Neither students nor university officials know they assignment mechanism
  - We only found out when inspecting the source-code of the assignment software
- Balance tests suggest that assignment mechanism is effectively random

Distribution of preferences and assignments

Preference ranking		Assigned field of first-year paper					
		Business	Economics	Law	Total	Share (%)	Share 1st choice (%)
1	Business, Economics, Law	2,461	533	235	3,229	34.9	76.2
2	Business, Law, Economics	774	0	231	1,005	10.9	77.0
3	Economics, Business, Law	21	1,999	40	2,060	22.3	97.0
4	Economics, Law, Business	0	290	14	304	3.3	95.4
5	Law, Business, Economics	2	0	725	727	7.9	99.7
6	Law, Economics, Business	1	0	366	367	4.0	99.7
7	No preferences stated	42	351	1,164	1,557	16.8	-
	Total	3,301	3,173	2,775	9,249	100.00	-

Balance: student characteristics by assignment to field

Variable	Assigned field for first-year paper:				
	Business	Economics	Law	Total	p-value
Student characteristics					
Female (0/1)	0.27	0.26	0.24	0.26	0.62
Age (years)	20.17	20.20	20.17	20.18	0.92
Foreign national (0/1)	0.27	0.26	0.25	0.27	0.72
Entry exam (0/1)	0.21	0.20	0.20	0.21	0.92
High school degree from					
Canton St. Gallen (0/1)	0.14	0.15	0.14	0.14	0.92
Canton Zuerich (0/1)	0.17	0.16	0.14	0.16	0.60
O. German speaking canton (0/1)	0.42	0.44	0.47	0.43	0.24
Non-German speaking canton (0/1)	0.02	0.02	0.01	0.02	0.12
Non-Swiss institution (0/1)	0.25	0.23	0.24	0.25	0.67
German mother tongue (1/0)	0.95	0.96	0.97	0.96	0.58
Law track (0/1)	0.01	0.01	0.02	0.01	0.50
Contributed to student aid fund (0/1)	0.08	0.08	0.07	0.08	0.85

Balance: section characteristics by assignment to field (cont.)

Variable	Assigned field for first-year paper:				
	Business	Economics	Law	Total	p-value
Discussion section characteristics					
Morning session (0/1)	0.45	0.46	0.44	0.45	0.94
Afternoon session (0/1)	0.32	0.35	0.36	0.33	0.52
Evening session (0/1)	0.22	0.19	0.20	0.22	0.33
First semester teaching assistant (TA) characteristics					
Female business TA (0/1)	0.44	0.44	0.37	0.43	0.35
Female economics TA (0/1)	0.08	0.09	0.05	0.08	0.25
Female law TA (0/1)	0.18	0.19	0.17	0.18	0.90
Experienced business TA (0/1)	0.89	0.90	0.91	0.89	0.77
Experienced economics TA (0/1)	0.87	0.88	0.76	0.86	0.02
Experienced law TA (0/1)	0.96	0.96	0.94	0.96	0.80

Empirical specification

$$major_i = \beta_0 + \beta_1 * field\_econ_i + \beta_2 * field\_law_i + e_i$$

- $major_i$: dummy indicating whether student i chose that major after the first year
- $field\_econ_i$ and $field\_law_i$: dummies indicating the field of i's first-year paper (business is the excluded category)
- β_1 and β_2: changes in the probability of starting a particular major

Naïve estimates based on full sample

	Major					
	Business	Economics	Law	Int. Affairs	Law and Economics	Failed
Econ. Paper	-0.142***	0.135***	0.001	0.059***	-0.003	-0.026**
	(0.013)	(0.008)	(0.002)	(0.007)	(0.005)	(0.013)
Law paper	-0.263***	0.005	0.078***	0.016**	0.043***	0.117***
	(0.012)	(0.006)	(0.006)	(0.007)	(0.006)	(0.013)
N	9249	9249	9249	9249	9249	9249

Note: Sample includes all regular first year students in the cohorts 2002-2012. Values in () are robust standard errors clustered at the discussion section level. Statistical significance is indicated as * 0.1 ** 0.05 *** 0.01. Dependent variables are binary indicators that take 1 if a student started the respective major after the first year or failed the first year, or 0 otherwise.

Main estimates: identification via quasi-random assignment

	Major					
	Business	Economics	Law	Int. Affairs	Law and Economics	Failed
			Panel 1: without covariates			
Econ. paper	-0.001	0.027**	0.003	0.001	0.008	-0.023
	(0.024)	(0.013)	(0.004)	(0.011)	(0.008)	(0.023)
Law paper	0.053	0.011	0.016*	-0.019	0.001	-0.056*
	(0.035)	(0.017)	(0.009)	(0.013)	(0.010)	(0.033)
			Panel 2: with covariates			
Econ. paper	-0.002	0.029**	0.003	0.002	0.007	-0.022
	(0.024)	(0.013)	(0.003)	(0.011)	(0.008)	(0.023)
Law paper	0.053	0.011	0.013*	-0.018	-0.000	-0.052
	(0.033)	(0.017)	(0.007)	(0.013)	(0.011)	(0.032)
Mean of dep.	0.55	0.06	0.01	0.06	0.03	0.32
N	3229	3229	3229	3229	3229	3229

Note: Robust standard errors clustered at the group level. *, **, *** correspond to 10%, 5%, and 1% significance level. Dependent variables are binary indicators that take 1 if student started respective major or failed first year.

Results – effect on grades

	Missing grade	Business	Economics	Law
	First semester core grades			
Econ. paper	-0.001	0.091*	0.115**	0.067
	(0.008)	(0.046)	(0.046)	(0.049)
Law paper	-0.018	0.133**	0.048	0.090
	(0.008)	(0.067)	(0.069)	(0.060)
N	3229	3160	3158	3167
	Second semester core grades			
Econ. paper	0.002	0.002	0.114**	0.067
	(0.021)	(0.050)	(0.050)	(0.051)
Law paper	-0.018	0.151**	0.018	0.102
	(0.026)	(0.070)	(0.076)	(0.068)
N	3229	2675	2677	2669

Note: Values in () are robust standard errors clustered at the group level. *, **, *** correspond to 10%, 5%, and 1% significance level. Dependent variables are standardized grades (mean 0, standard deviation 1) in the core courses in the first two semesters. 'Missing grade' is a binary indicator that takes 1 if the students missed one of the three core exams in the respective semester.

Results – major choice cond. on grades

	Major					
	Business	Economics	Law	Int. Affairs	Law and Economics	Failed
Econ. paper	-0.014	0.022*	0.002	0.000	0.007	-0.007
	(0.020)	(0.013)	(0.004)	(0.011)	(0.008)	(0.014)
Law paper	0.023	0.004	0.016*	-0.022*	-0.000	-0.019
	(0.027)	(0.017)	(0.009)	(0.013)	(0.011)	(0.020)
N	3229	3229	3229	3229	3229	3229

Note: Values in () are robust standard errors clustered at the group level. *, **, *** correspond to 10%, 5%, and 1% significance level. Dependent variables are binary indicators that take 1 if student started respective major after first year of failed first year, or 0 otherwise. All specifications condition on mean standardized grades in the three core fields in the first and second semester. We impute missing values with the mean and add dummies for missing grades in the first and second semester.

Robustness

Results are robust to the inclusion of:

- TA fixed effects
- Distribution of preferences within section

Effect heterogeneity by student sex

	Major					
	Business	Economics	Law	Int. Affairs	Law and Economics	Failed
			Panel 1: female students			
Econ. paper	0.011	0.016	0.008	-0.025	-0.000	-0.008
	(0.048)	(0.022)	(0.010)	(0.025)	(0.015)	(0.046)
Law paper	0.065	0.005	0.047*	-0.029	-0.011	-0.061
	(0.080)	(0.031)	(0.029)	(0.031)	(0.018)	(0.073)
N	849	849	849	849	849	849
			Panel 2: male students			
Econ. paper	-0.006	0.032**	0.001	0.011	0.010	-0.027
	(0.027)	(0.015)	(0.004)	(0.013)	(0.010)	(0.024)
Law paper	0.046	0.012	0.007	-0.014	0.005	-0.052
	(0.038)	(0.018)	(0.008)	(0.014)	(0.013)	(0.036)
N	2380	2380	2380	2380	2380	2380

Note: Values in () are robust standard errors clustered at the group level. *, **, *** correspond to 10%, 5%, and 1% significance level. Dependent variables are binary indicators that take 1 if student started respective major after first year of failed first year, or 0 otherwise.

What explains these results?

- Exploit variation in topics (not only fields)
- Similar quasi-random assignment to topics
- Identify effect of topic characteristics
- Investigate variation in characteristics between fields as potential mechanisms

- Work in progress!

Non-*typical* economics topics provide more new information

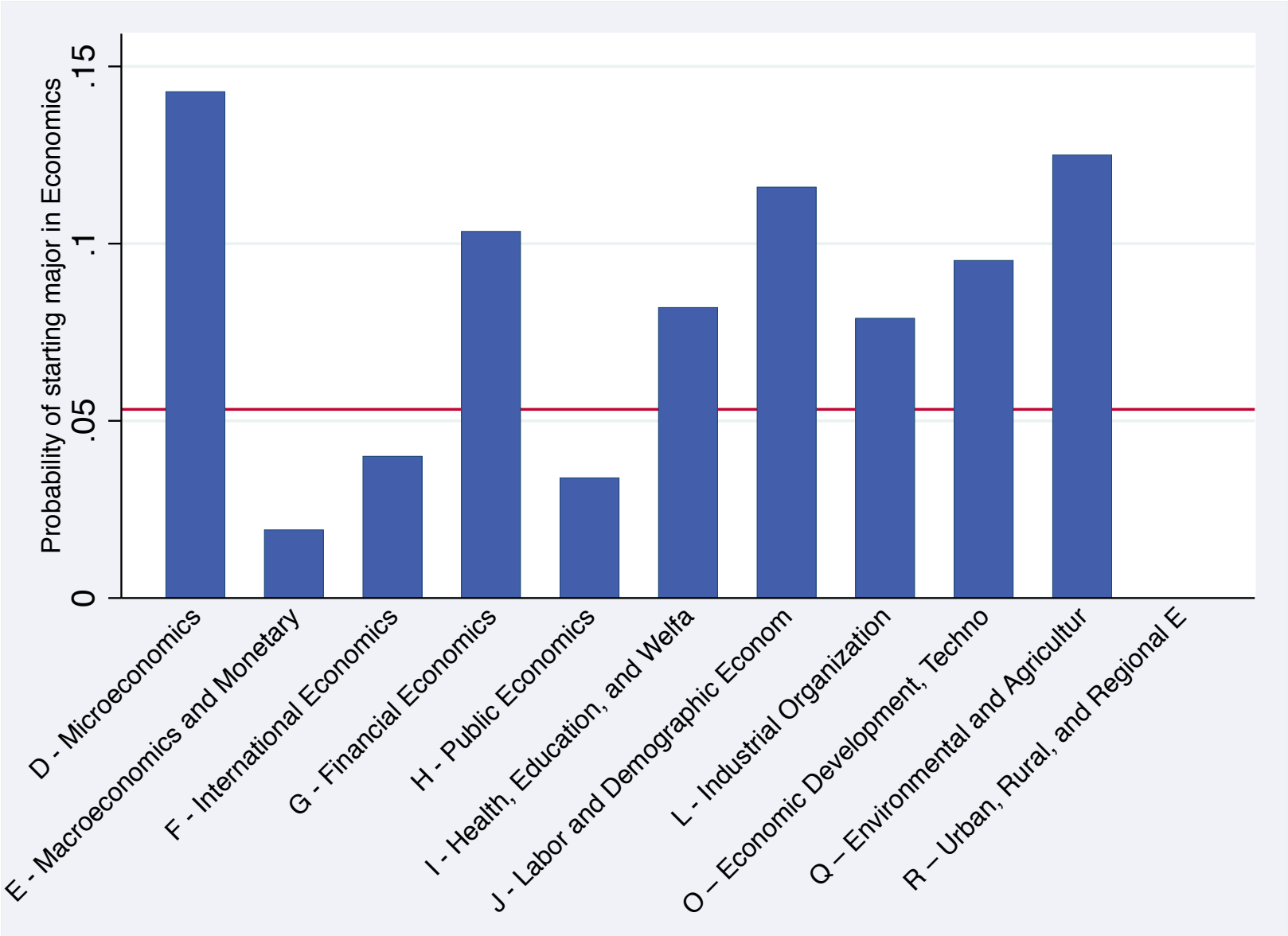
- *Define typical* topic: 1 if title contains…
  - *GDP, economic growth, exchange rate, monetary policy, central bank, business cycle, inflation, taxes, trade, national economy, competition*

Non-*typicial* economics topics provide more new information

- *Define typical* topic: 1 if title contains…
  - *GDP, economic growth, exchange rate, monetary policy, central bank, business cycle, inflation, taxes, trade, national economy, competition*

	Start major in economics (0/1)		
	(1)	(2)	(3)
Econ. paper	0.040***	0.041***	-
	(0.015)	(0.015)	
Typical econ.	-0.071***	-0.076***	-0.050*
topic	(0.021)	(0.022)	(0.027)
Covariates		X	
Tutor FE			X
N	2020	2020	2020

Probability to start major in economics by JEL



How are topics perceived by students?

- Survey among current students in St. Gallen (fall 2015)
  - Students rate topics along certain dimensions
- Dimensions for rating
  - Social relevance
    (Goldin, 2013; Nilsson, 2015)
  - Required math skills, complexity
    (Arcidiacono, 2012; Stinebrickner and Stinebricker; 2013)
  - Earnings prospects
    (Zafar, 2013)
  - Competitiveness of work environment
  - *Enjoy working on it*
    (Zafar, 2013)

Rating of topics by field

All	Nr. of Topics	Nr. of Ratings	Utility	Social relevance	Math	High income	Competitive
Business	1396	11749	0.32	-0.01	0.03	0.20	0.21
Law	845	6907	-0.71	-0.40	-1.12	-0.03	-0.08
Economics	1303	11169	0.12	0.27	0.69	-0.19	-0.18
Total	3544	29825	0.00	0.00	0.00	0.00	0.00
				Female			
Business	1396	4454	0.28	0.03	0.04	0.12	0.12
Law	845	2727	-0.41	-0.30	-0.90	-0.02	-0.04
Economics	1303	4201	-0.03	0.16	0.54	-0.11	-0.11
Total	3544	11382	0.00	0.00	0.00	0.00	0.00
				Male			
Business	1396	7295	0.21	-0.05	0.01	0.17	0.20
Law	845	4180	-0.62	-0.32	-1.03	-0.03	-0.08
Economics	1303	6968	0.18	0.26	0.66	-0.17	-0.16
Total	3544	18443	0.00	0.00	0.00	0.00	0.00

Correlations between dimensions

		Enjoy	Social relevance	Math	Income	Competitive
	Enjoy	1				
	Social rel.	0.47	1			
	Math	0.37	0.28	1		
	Income	0.32	0.01	0.26	1	
	Competitive	0.21	-0.12	0.28	0.65	1
Male	Enjoy	1				
	Social rel.	0.44	1			
	Math	0.43	0.29	1		
	Income	0.35	0.05	0.25	1	
	Competitive	0.25	-0.06	0.24	0.56	1
Female	Enjoy	1				
	Social rel.	0.48	1			
	Math	0.13	0.19	1		
	Income	0.17	0.10	0.25	1	
	Competitive	0.07	-0.05	0.25	0.49	1

Conclusions

- Economics paper raises the probability of majoring in economics by 2.7%-points (18% of economics majors)
  - Non-typical topics have larger effect
- Law paper raises the probability of majoring in law by 1.6%-points (30% of law majors)
- Exposure not the answer why relatively few women study economics
  - Fields are perceived differently by male and female students

Thank you

Probability to start major in economics by JEL
(students with a preference for economics)