



ANALYSIS OF 'KNOWLEDGE TRIANGLE' USING NATIONAL-LEVEL UNIVERSITY DATA

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Rationale

Develop new **country-level indicators** of role of higher education institutions in research, innovation and education => core theme of the Knowledge Triangle project

Forerunner to further granular econometric analysis => What associations hold at a national level and warrant further investigation at the micro-level?



Project Overview and Steps

Empirical evidence supporting the TIP/CSTP Knowledge Triangle project, specifically supporting the case studies

Steps foreseen for this activity until December

1. Characterise the distribution of education, research and innovation performance across institutions (December TIP document)
2. Obtain country indicators and associate them with education, industry and innovation performance (today's presentation)
3. Econometric analysis of HEI characteristics and impacts (for December TIP)



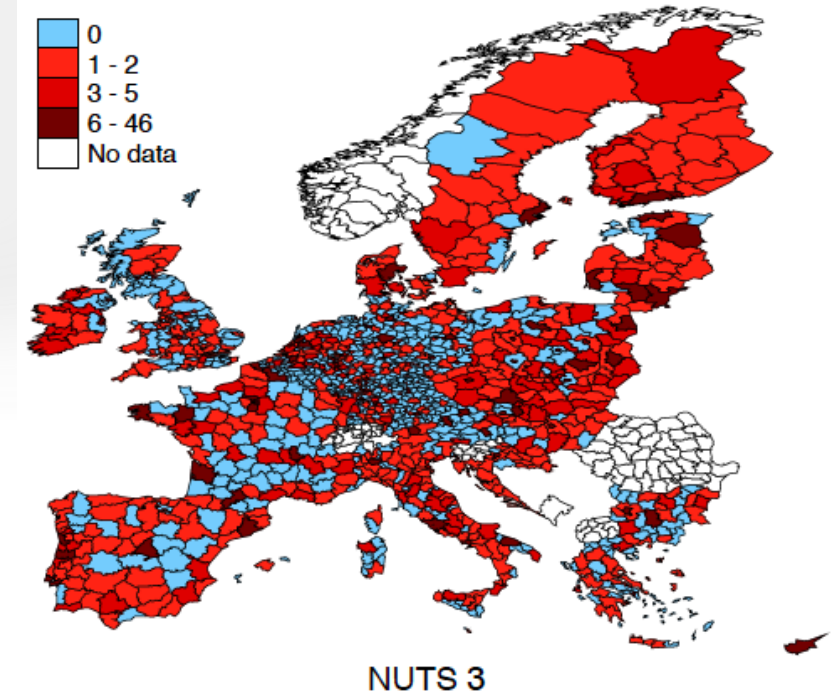
Develop national-level data source for European countries from ETER database

University	Country	v1	v2	v3	...
Universität Linz	Austria	97	51	56	
Universität Wien	Austria	74	33	29	
Fachhochschule Kärnten	Austria	35	85	94	
Vrije Universiteit Brussel	Belgium	72	65	30	
Universiteit Gent	Belgium	32	85	72	
University of New York in Prague	Czech Republic	50	79	85	
Masaryk University	Czech Republic	61	49	39	
University College Lillebælt	Denmark	81	56	74	
Aarhus Universitet	Denmark	36	93	46	
...					



Country	v1?	mean(v2)	mean(v3)	...
Austria	1	69	56	
Belgium	0	52	75	
Czech Republic	1	56	64	
Denmark	0	59	75	
...				

Number of universities





Indicators (examples)

ETER-derived

- Total number of students
- Number/proportion students in STEM
- Leiden-ranked universities
- Average students per university
- Share of enrolment among largest HEIs
- Fraction of HEIs that are universities vs. universities of applied sciences, public v. private etc.

OECD STI and EDU indicators

- % HERD financed by industry
- Total and top-cited SCOPUS publications
- Average problem-solving skills of tertiary graduates (PIAAC)
- Earnings premium of tertiary graduates

Other contextual

- GDP
- Population
- % national value-added from manufacturing

Additional combined indicators



3 Questions for Exploration

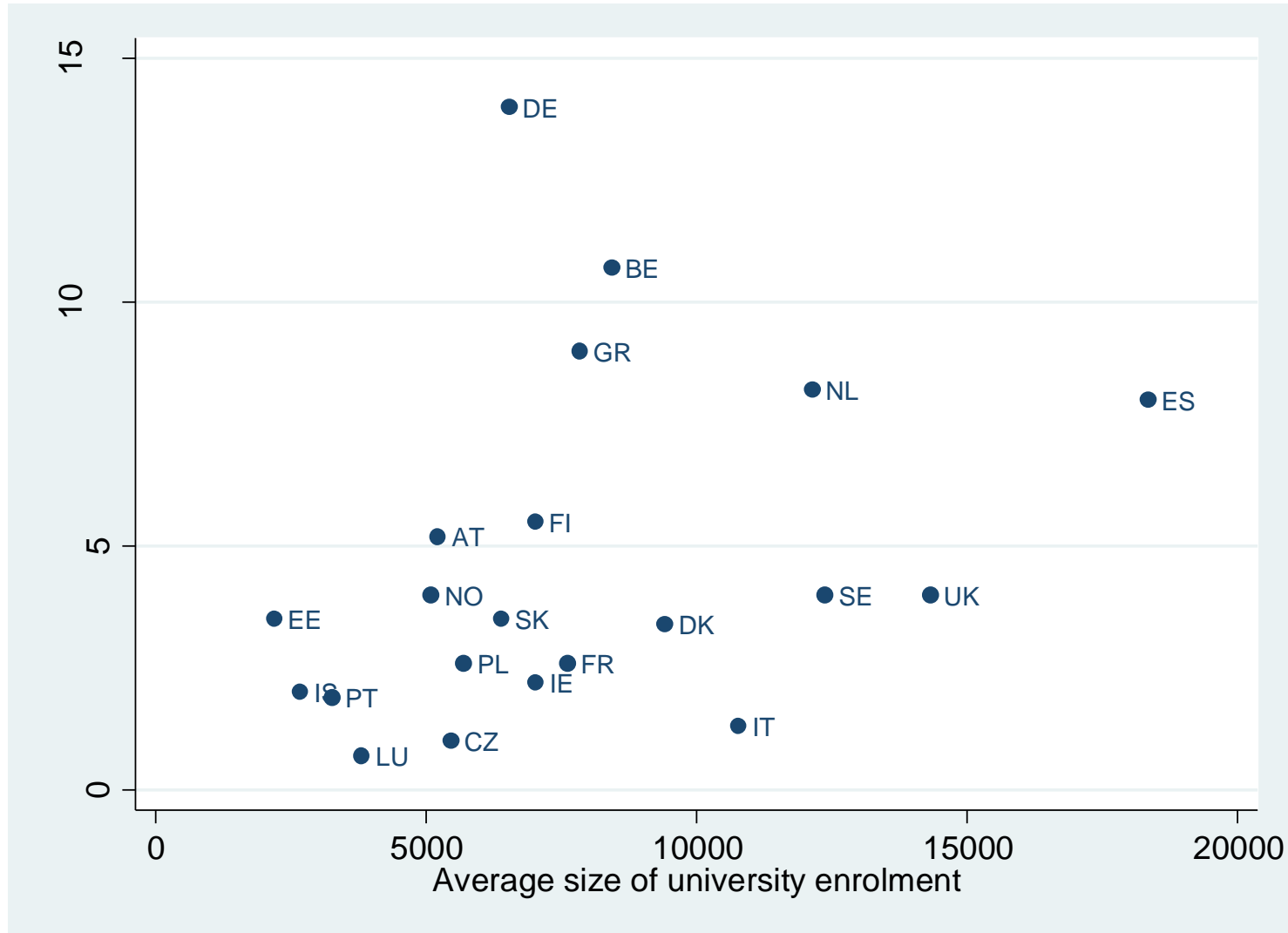
1. How are national HEI characteristics associated with HERD financed by industry?
2. How is the HEI structure related to education, research and innovation performance?
3. Are education outcomes related to research and innovation activities?



1. HOW ARE NATIONAL HEI CHARACTERISTICS ASSOCIATED WITH HERD FINANCED BY INDUSTRY?

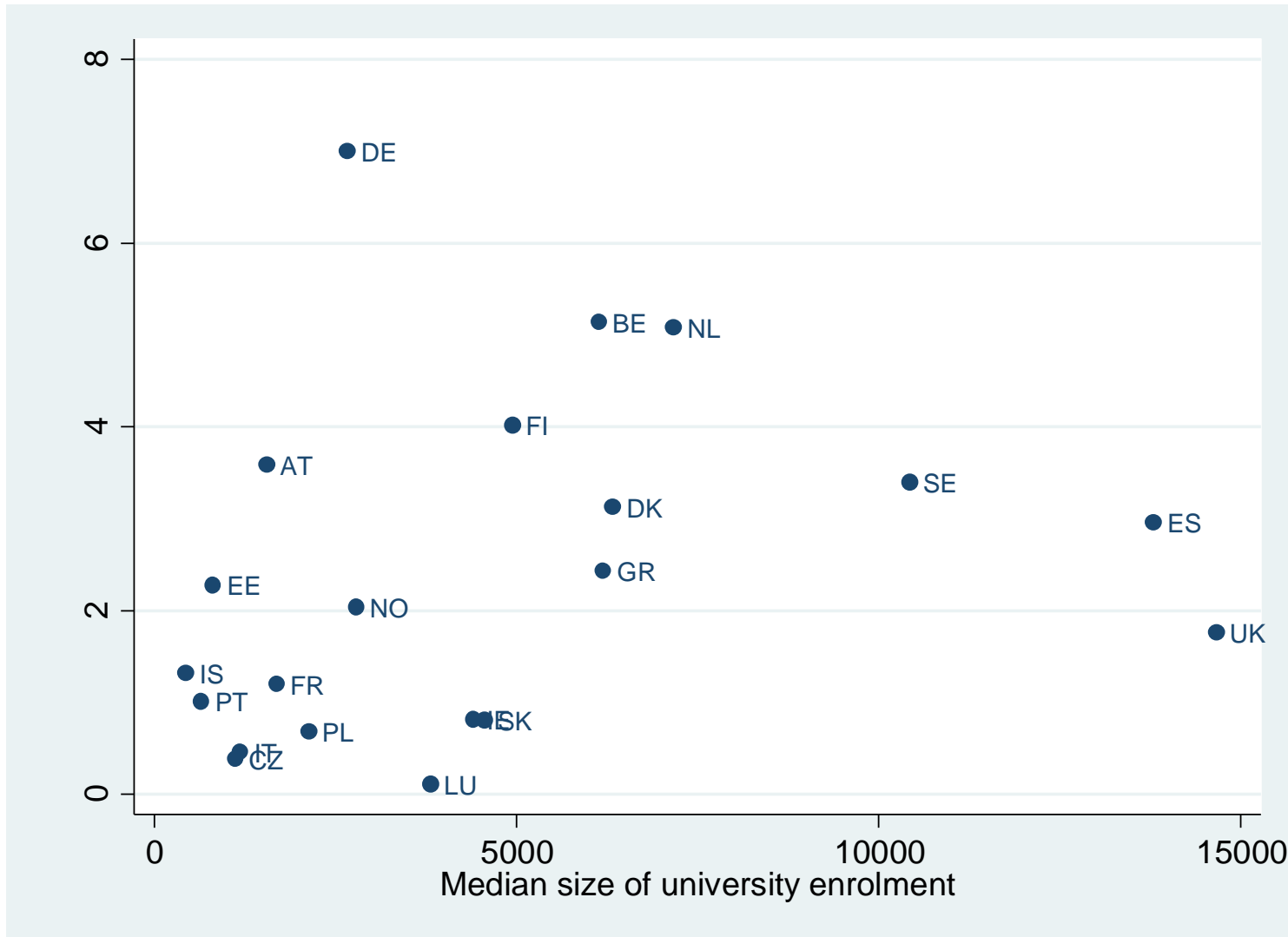


Average size and industry-financed HERD? (1)



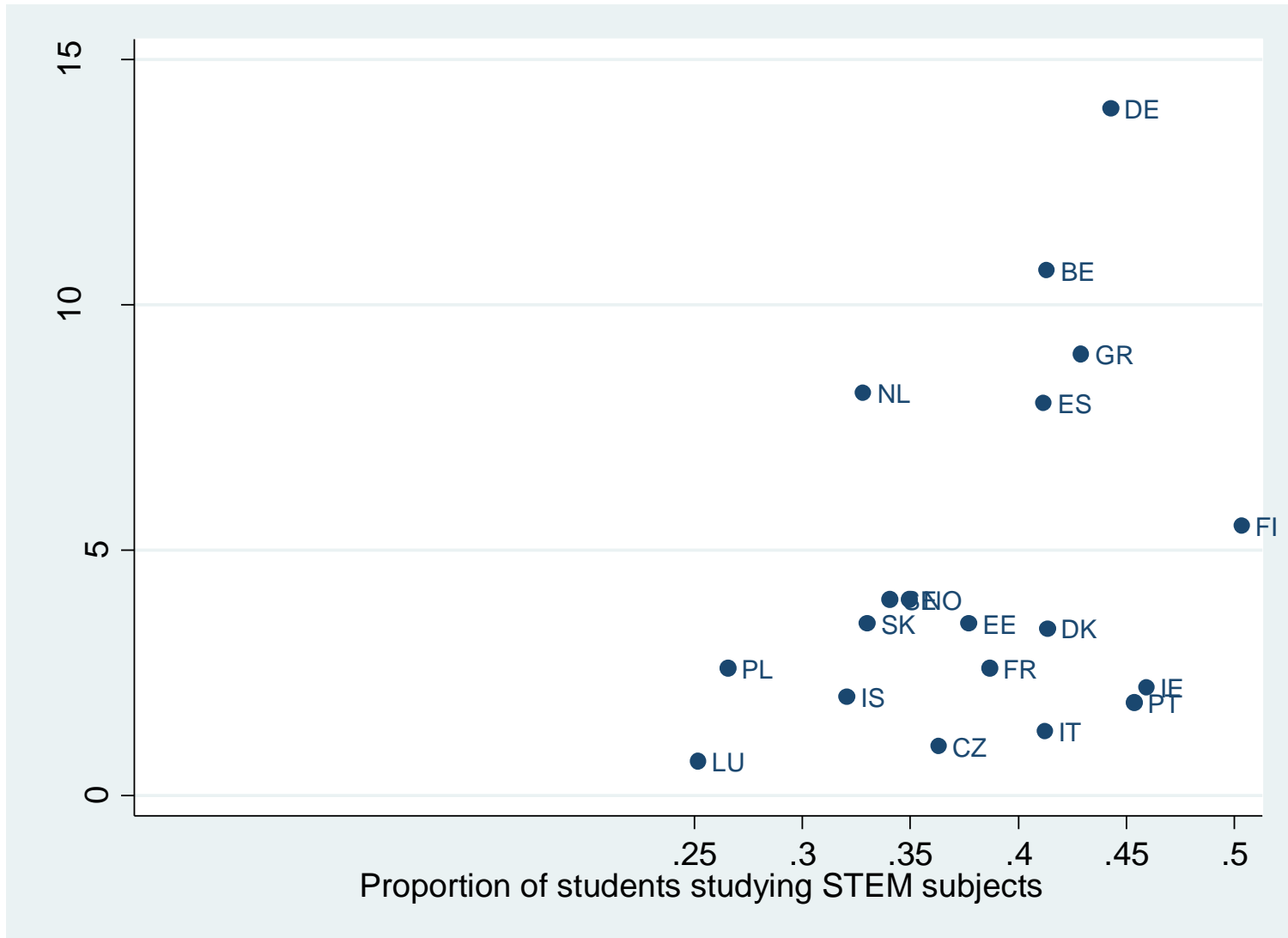


Average size and industry-financed HERD? (2)





STEM education and HERD

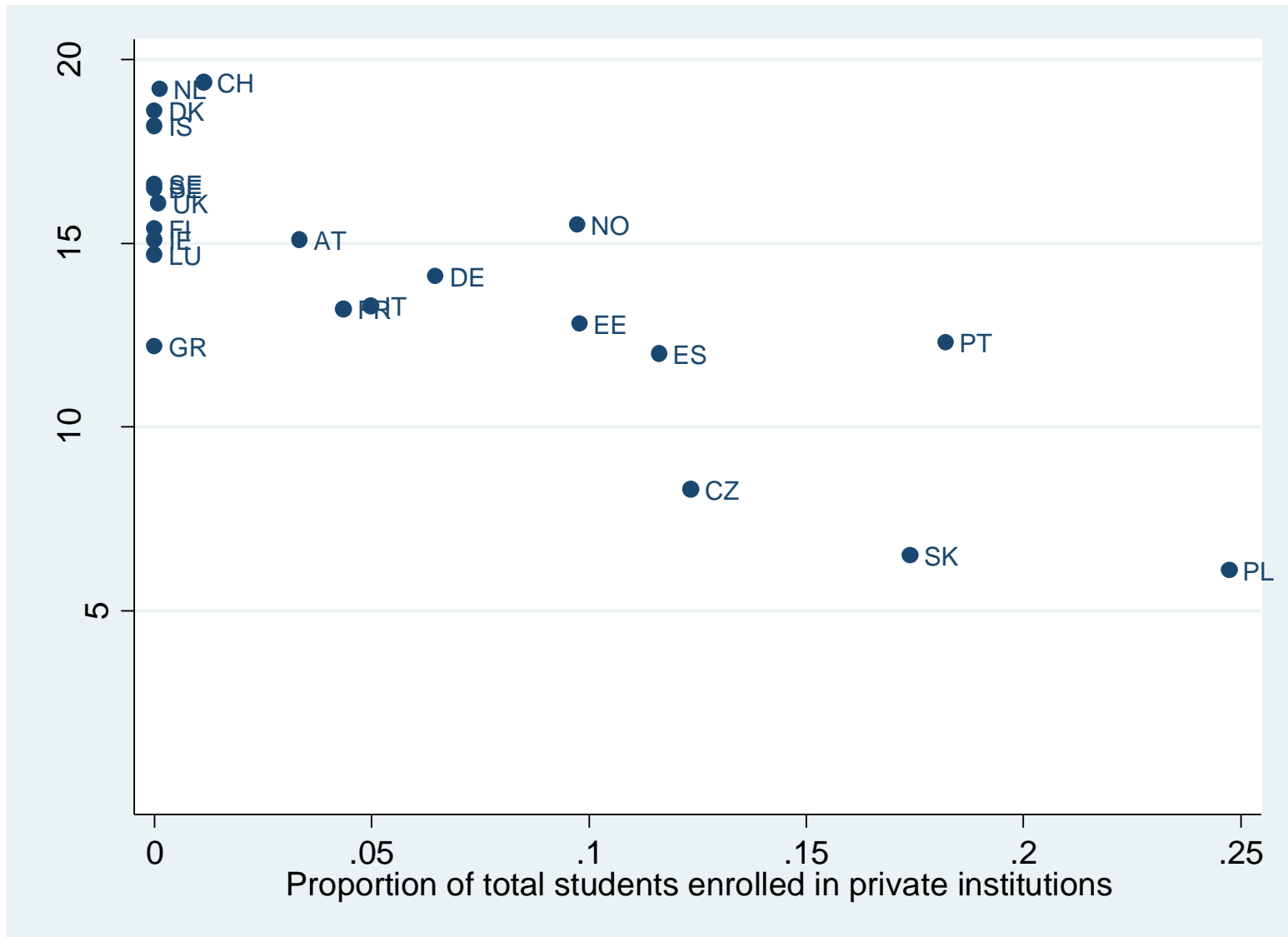




2. HOW IS THE HEI STRUCTURE RELATED TO EDUCATION, RESEARCH AND INNOVATION PERFORMANCE?

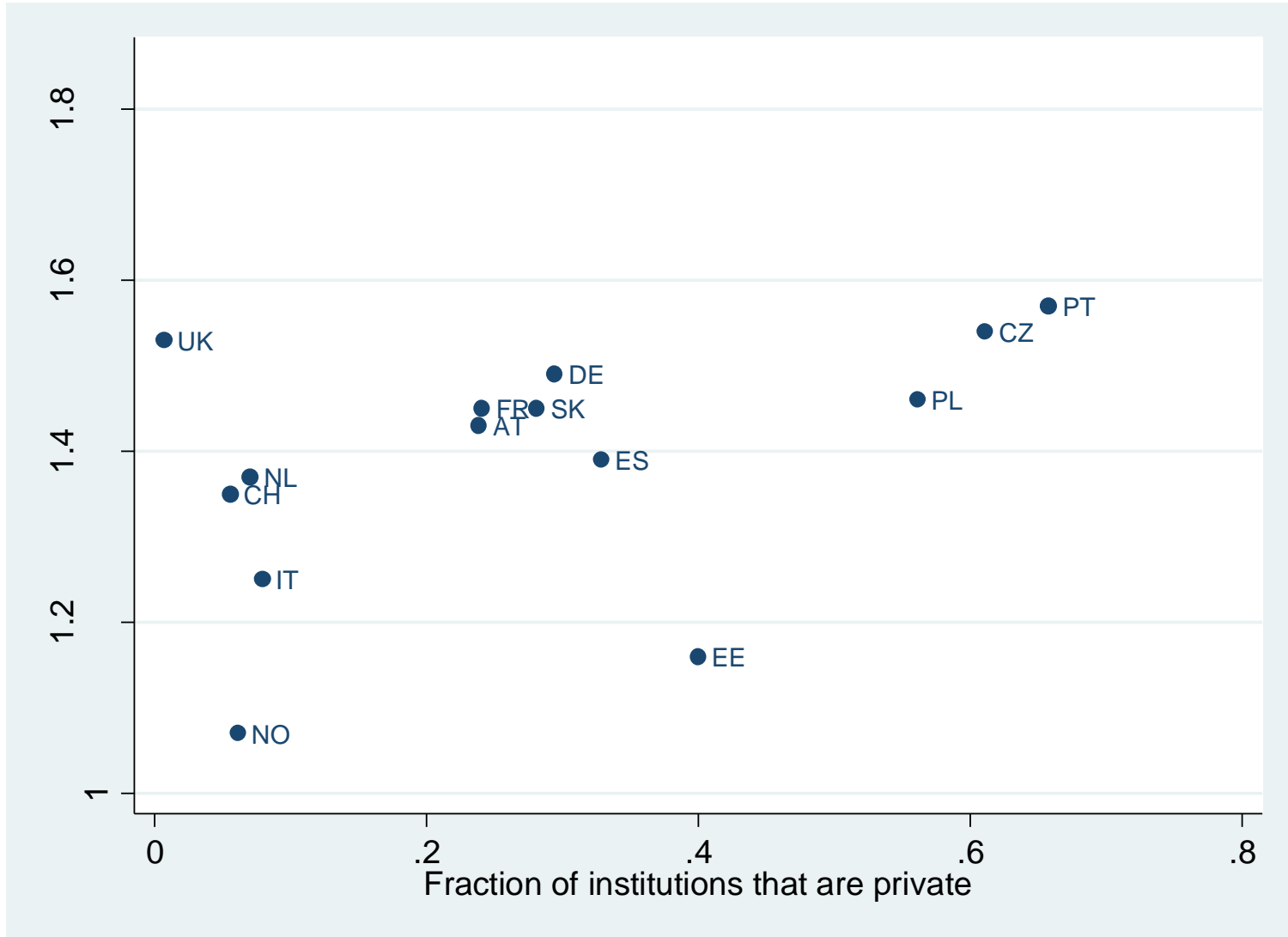


Potential negative association between fraction of privately-educated students and top-cited publications



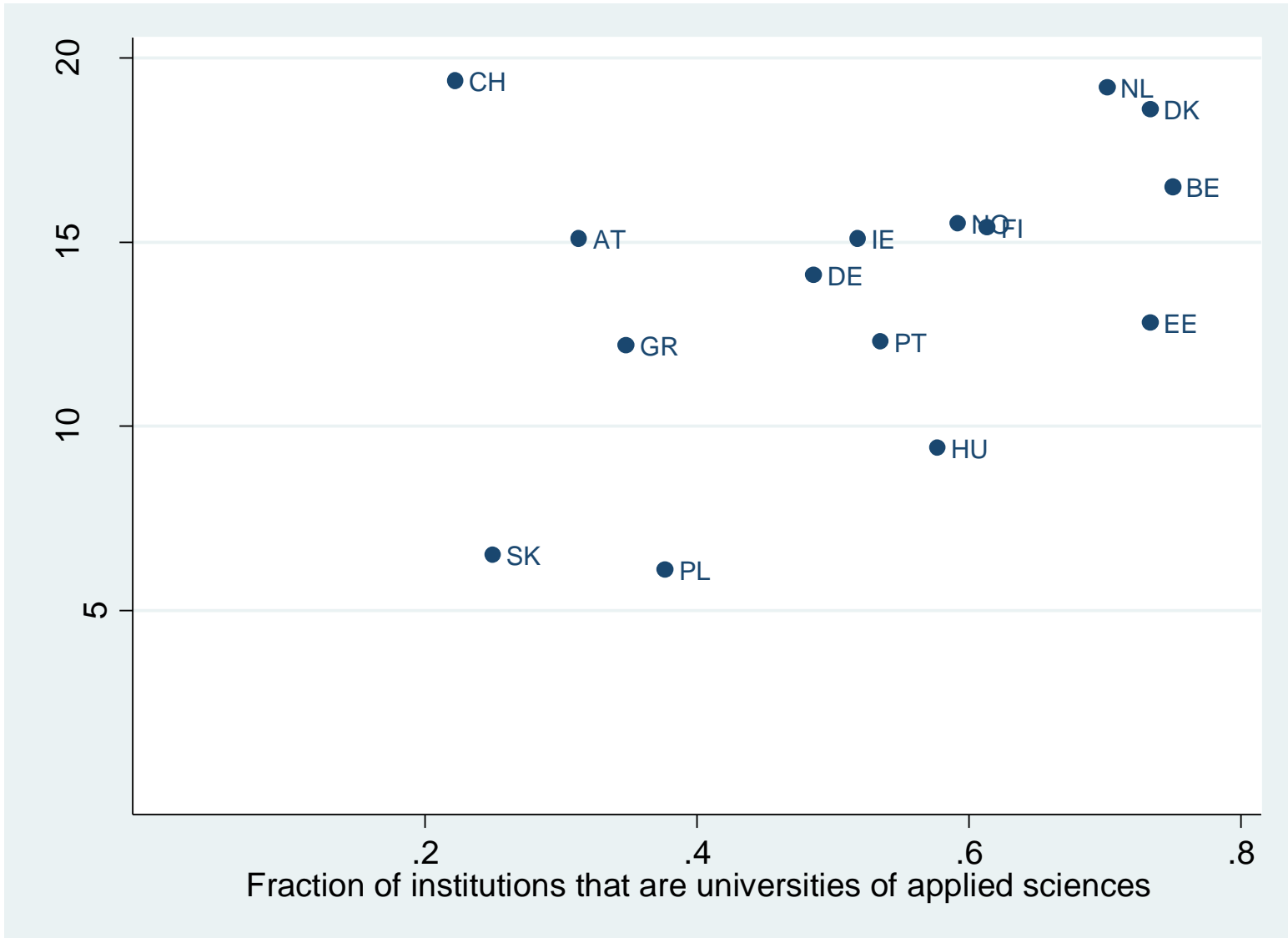


Potential positive association between fraction of private institutions and graduate premium





Role of universities of applied sciences?

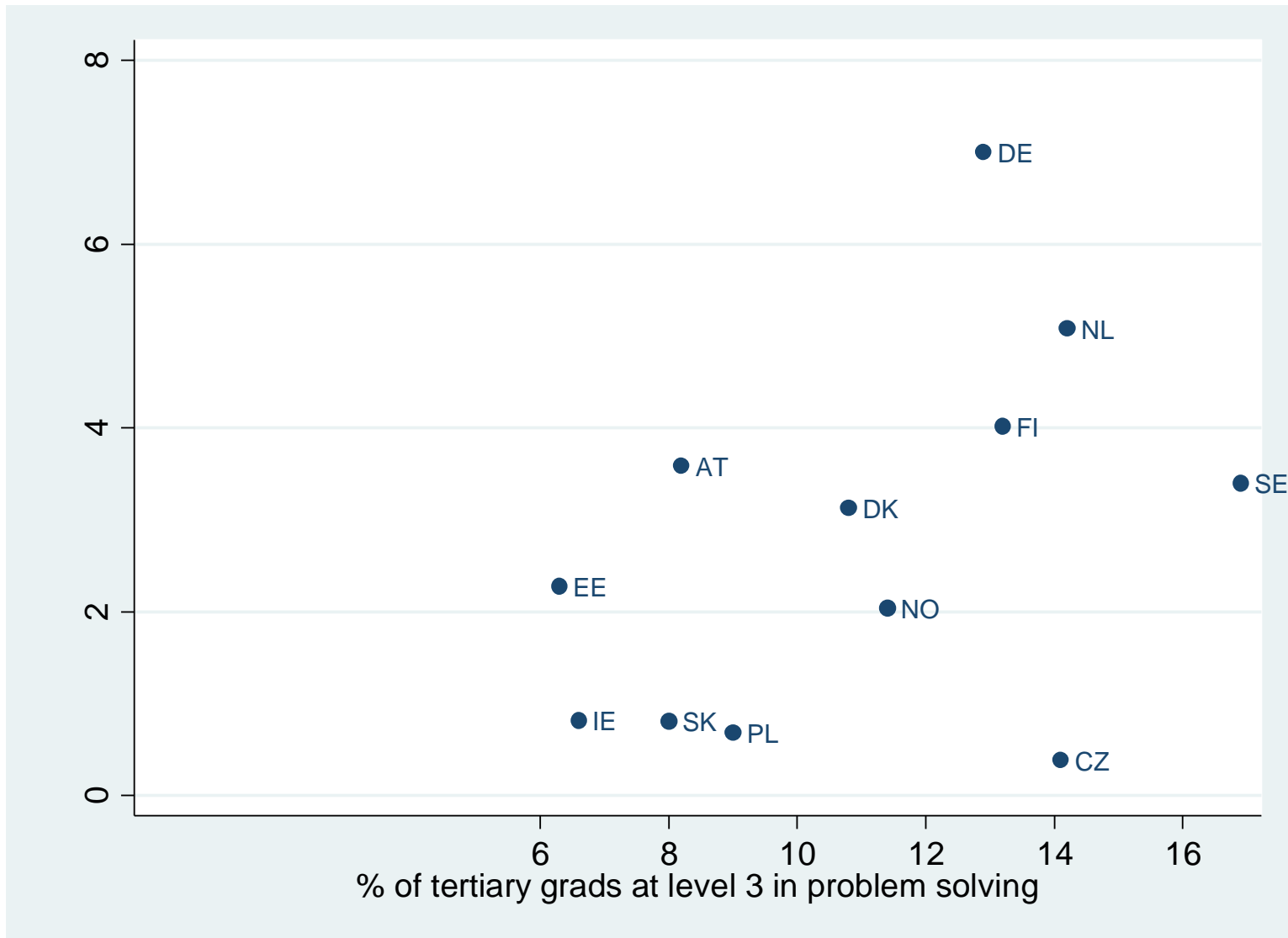




3. ARE EDUCATION OUTCOMES RELATED TO RESEARCH AND INNOVATION ACTIVITIES?

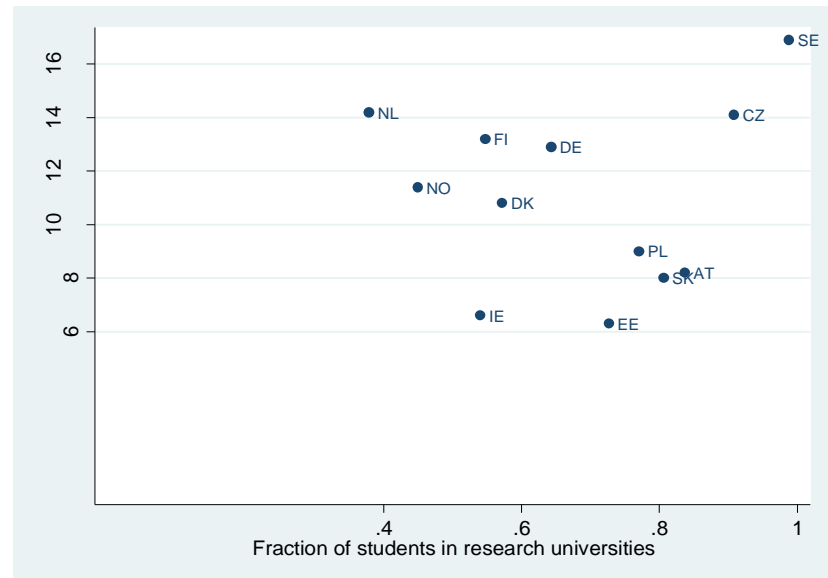
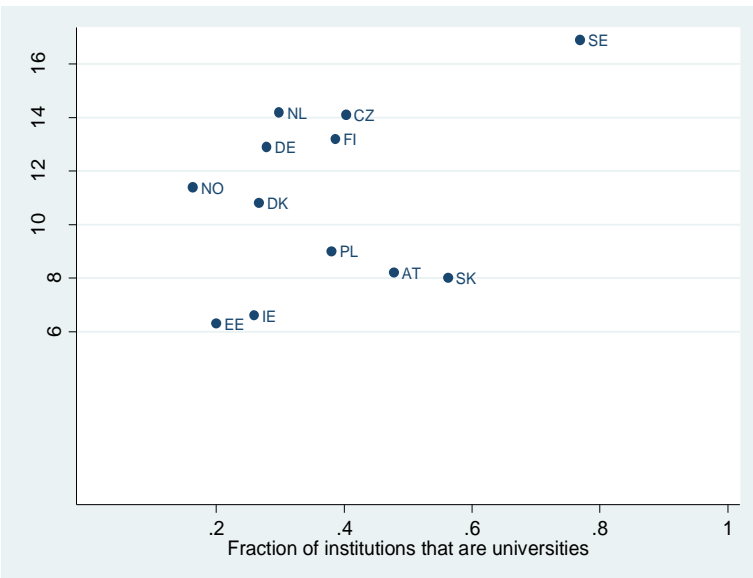
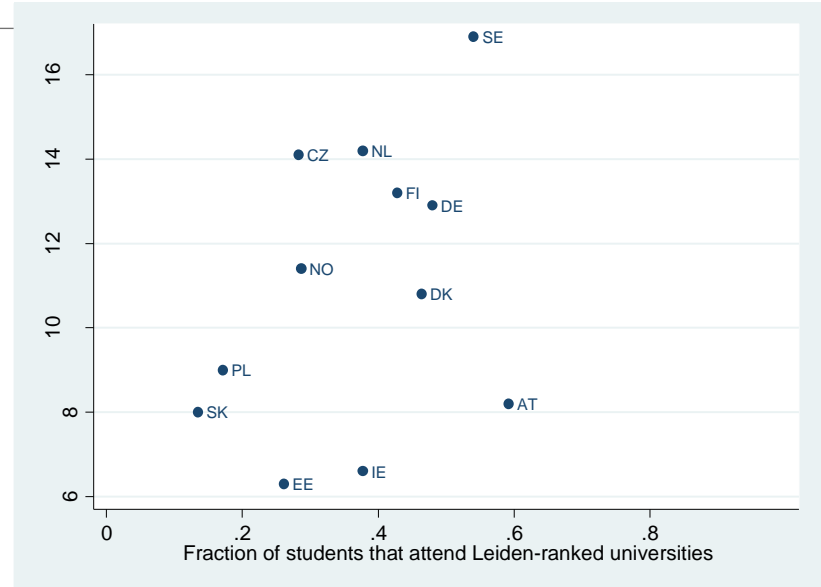
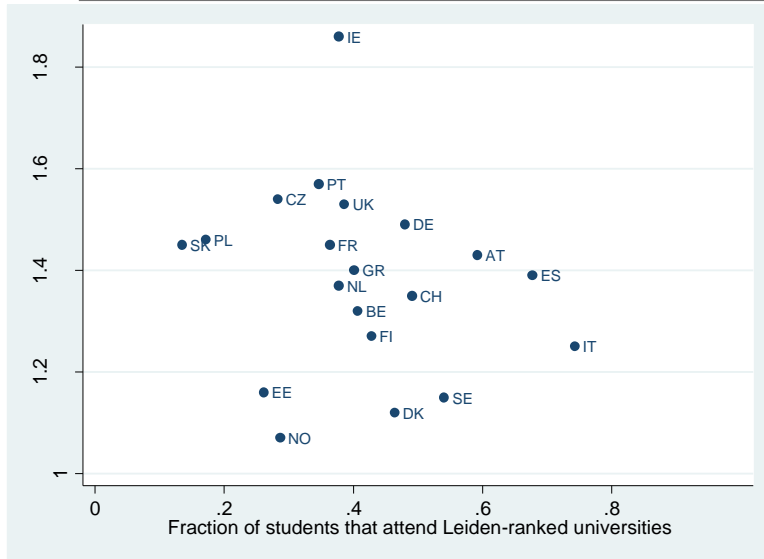


Not a strong association between business funding of HERD and education outcomes





Research quality & research universities are not related to education outcomes either





Conclusions

The conclusions are only suggestive at this point but raise interesting question regarding diverse university systems' impacts on innovation

Further work will follow up with more thorough econometric analysis to isolate how distinct characteristics affect outcomes in different regional contexts