NIFU

Nordic Institute for Studies in
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Factors influencing the scientific productivity of university departments and research institutes

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Introduction

- This study investigates how the scientific publication productivity (fractionalized counts) varies at Norwegian university departments and research institutes.
- The purpose is to analyze factors that may explain some of this variation.
- The study will also examines if there are differences in the productivity by department size and if evidence of a so-called “critical mass” effect can be identified.
- The study will seek to find trends in our data rather than effects of each of the factors
- We will focus on overall trends, rather than revealing productivity results for specific departments and universities

Previous studies

- The effect of size on research performance and productivity has mainly been studied at research group level
  - Varying results. Lack of coherent findings
- Fewer studies have examined the effect of department size and research performance
  - E.g. Kyvik (1995), Blackburn et al 1978
  - Small or no significant relationship between department size and scientific productivity
  - Survey data revealed that researchers at small and medium sized departments were more content than at large departments.
- We will reassess the question drawing on
  - Norwegian register data (Cristin):
  - Large database
  - High quality data

Introduction

- We assume that there is a relationship between research input R&D workyears/-expenditures and research output (publications)
- Inputdata from 2011 -> Publication output in 2013
- Will the composition of the reseach personell matter?
  - The share of professors
  - The share of associated professors
  - The share of post doc
  - The share of Ph.D-students?
- Will the gender balance matter?
- The density of awarded Ph.Ds

Will the composition of the research funding matter?

- The share of public/core funding
- The share of Research council funding
- The share of Industry funding
- The share of Private funding
- The share of Foreign funding

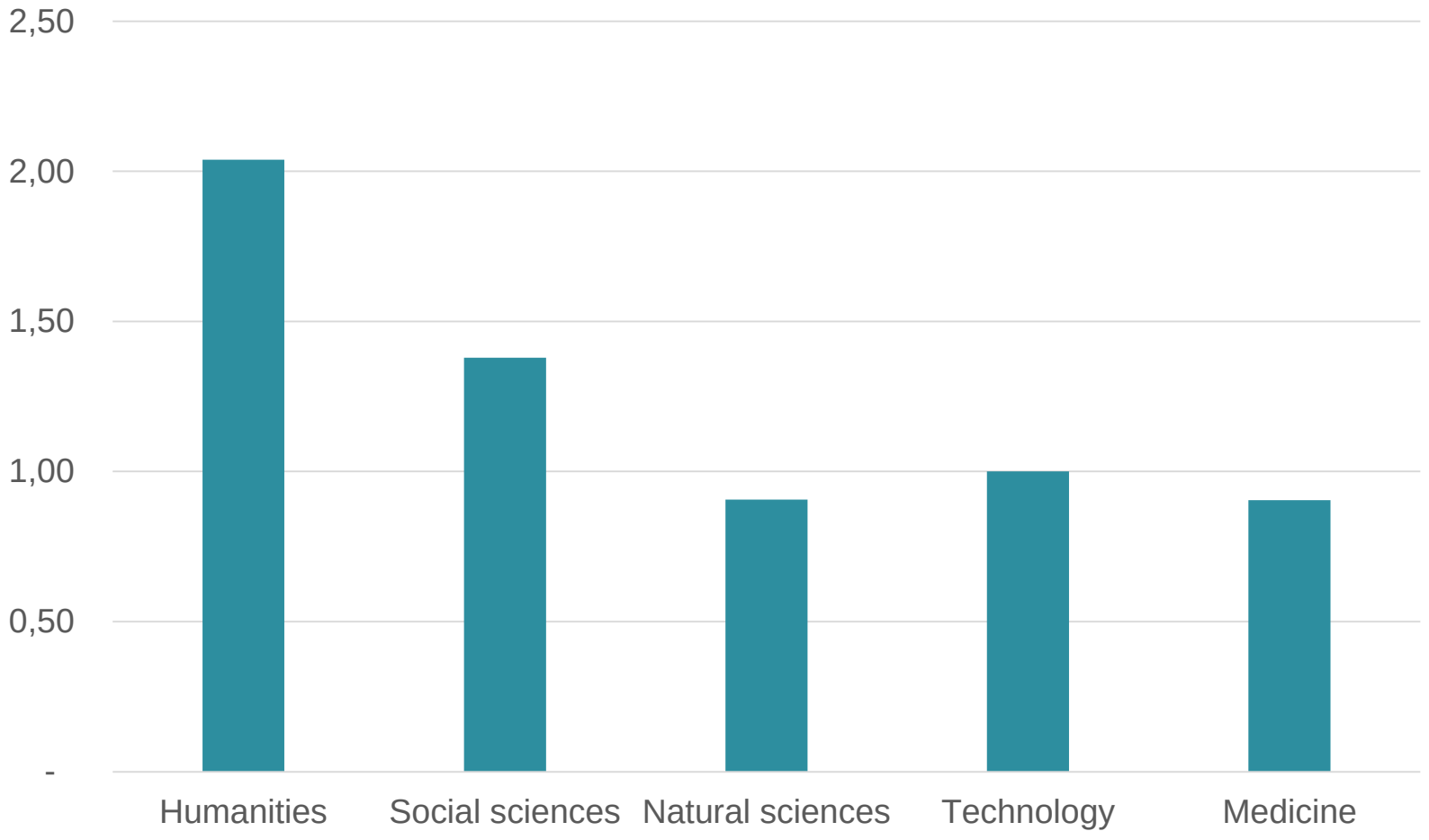
Data and methods

- Research Personell Register contains individual charcteristics for all scientific personell per department in Universities and Research Instituttes in Norway (NIFU)
  - Name, age, gender, position, education, affiliation
  - Updated annually
- National R&D expenditures by department and by source of funds (NIFU)
- Publication output is fractionalized counts per departments in 2013 by departments and researh institutes (CRIStin)
  - Output is the sum of publications by department/research institute
  - Output is publications per workyear by department/research institute

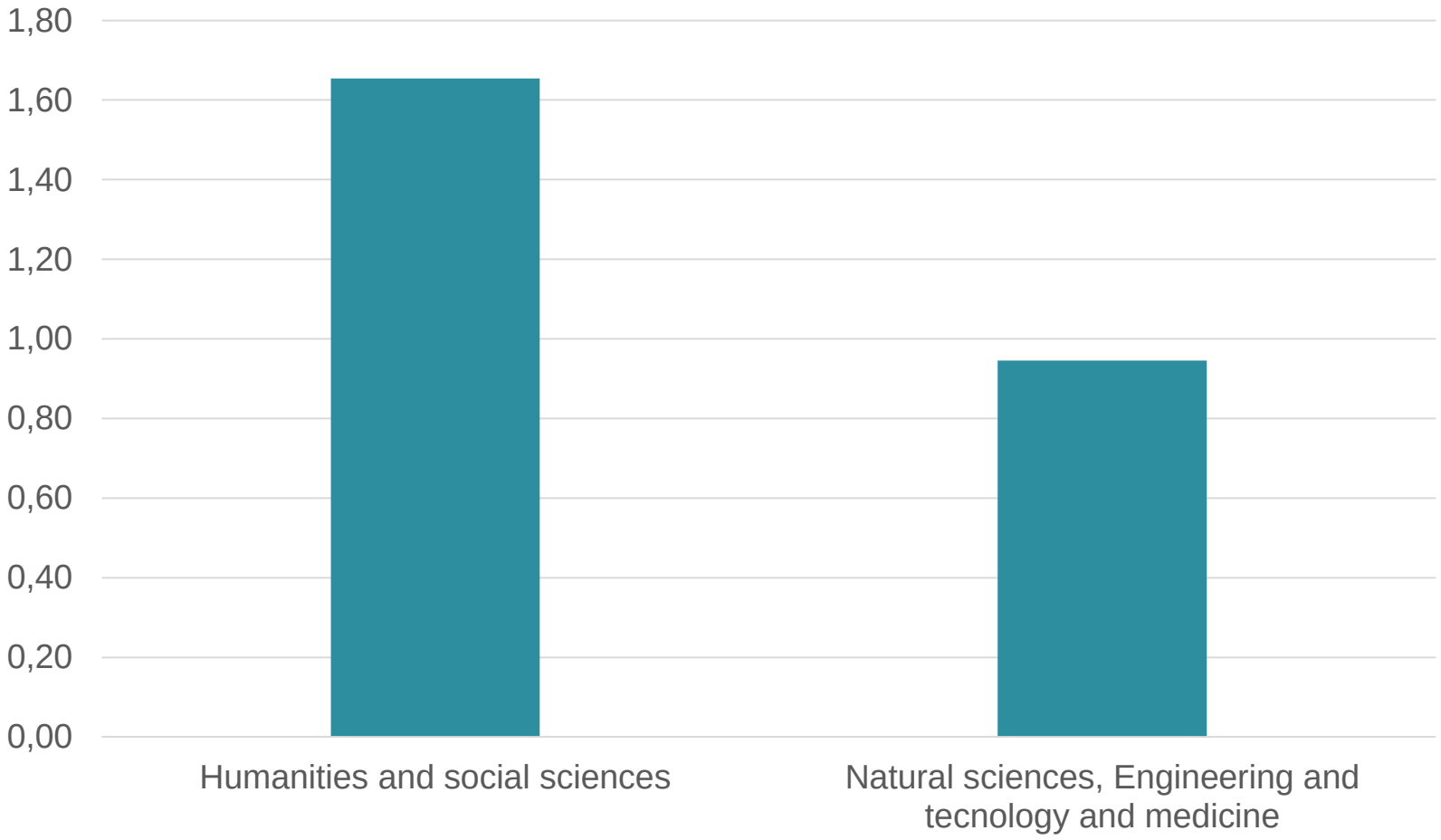
Data

Type of institutions	No. of departments	R&D work years	Publication output	Average number of publication outputs per R&D work years
University departments	188	6 090	8 358	1,37
Research institutes	48	3 590	1 824	0,51

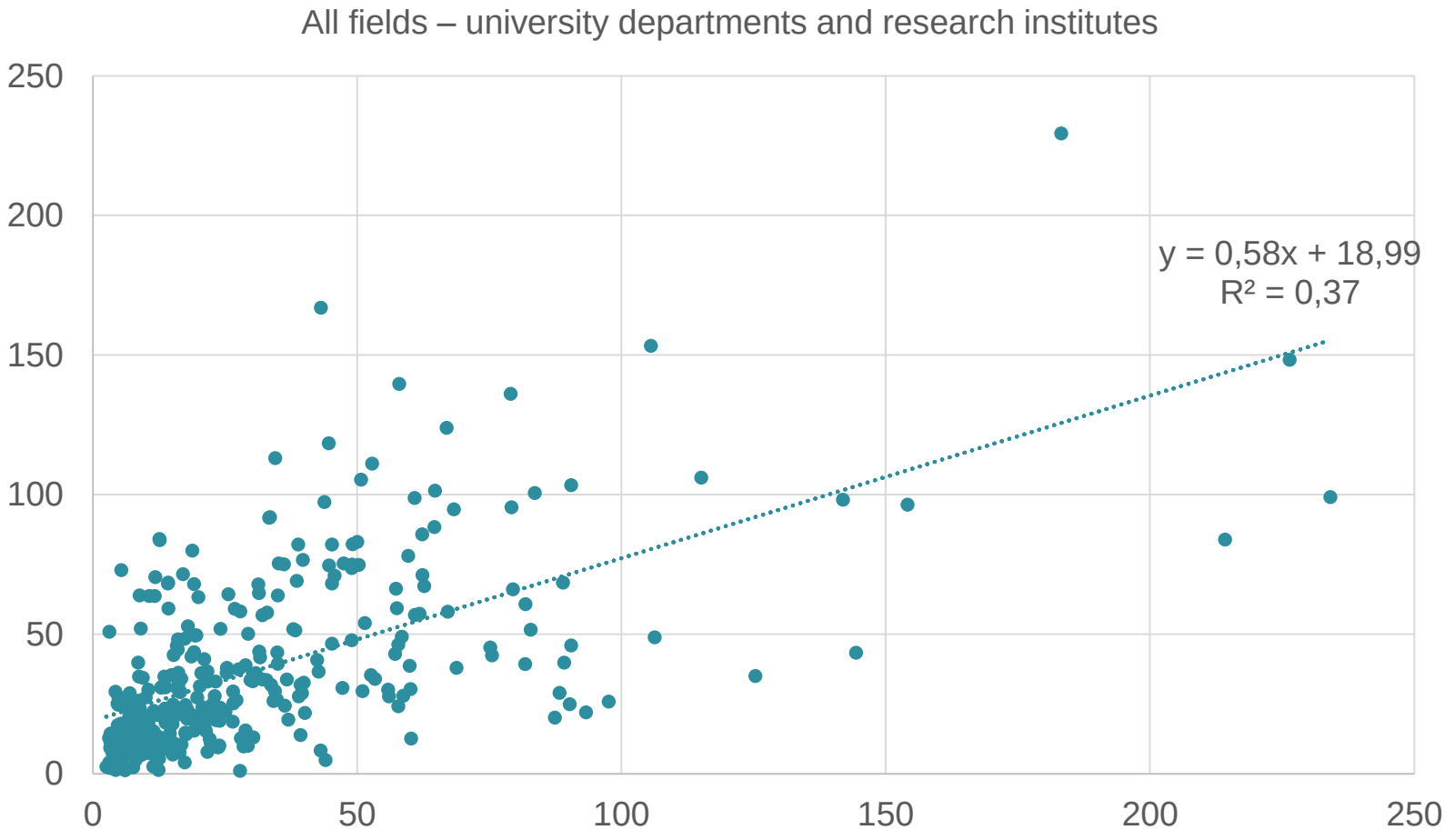
Results - Average numbers of publication output per R&D work year by fields



Results - Merge the fields of sciences to two groups (H&S and STEM)

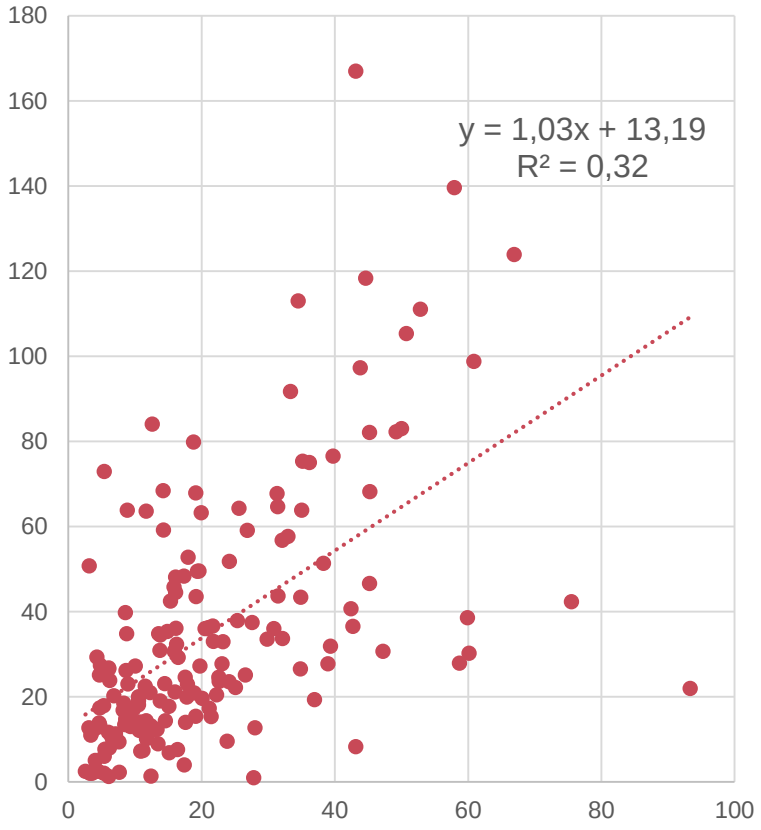


Results -The relationship between R&D workyear and publications

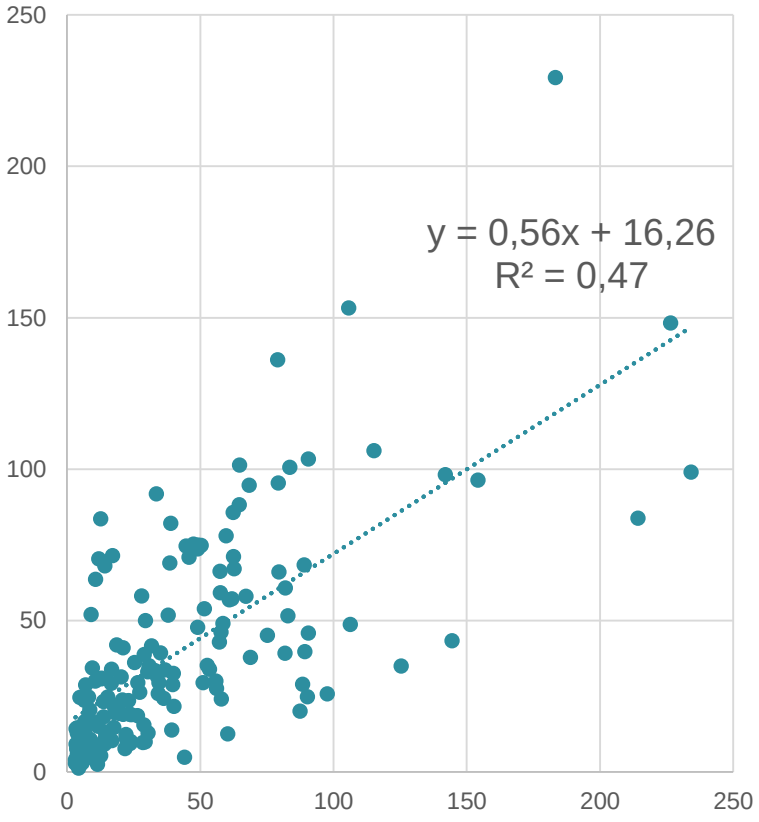


Results -The relationship between R&D workyear and publications – University departments and research institutes

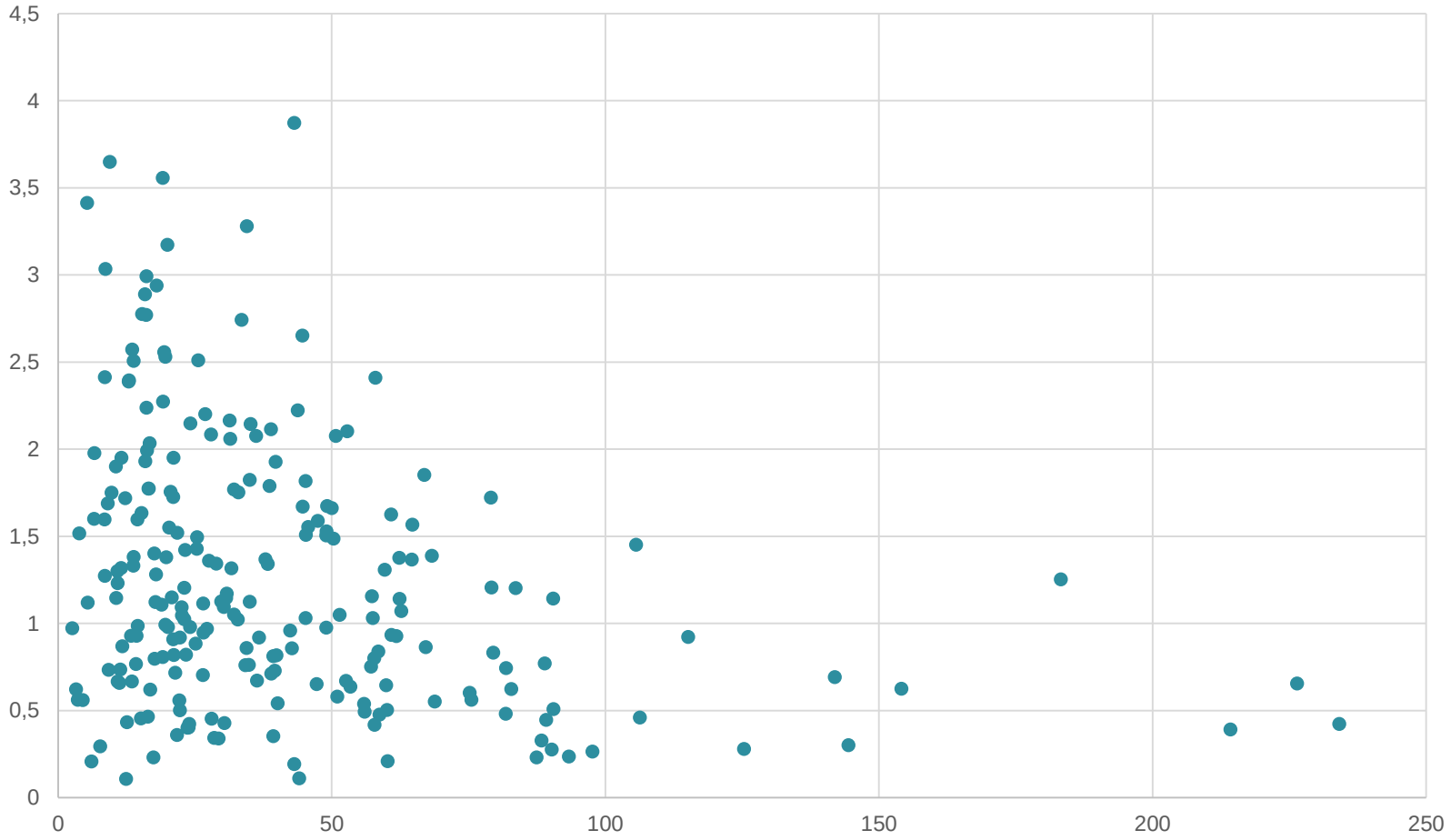
Humanities and social sciences



Natural sciences, Engineering & technology and medicine

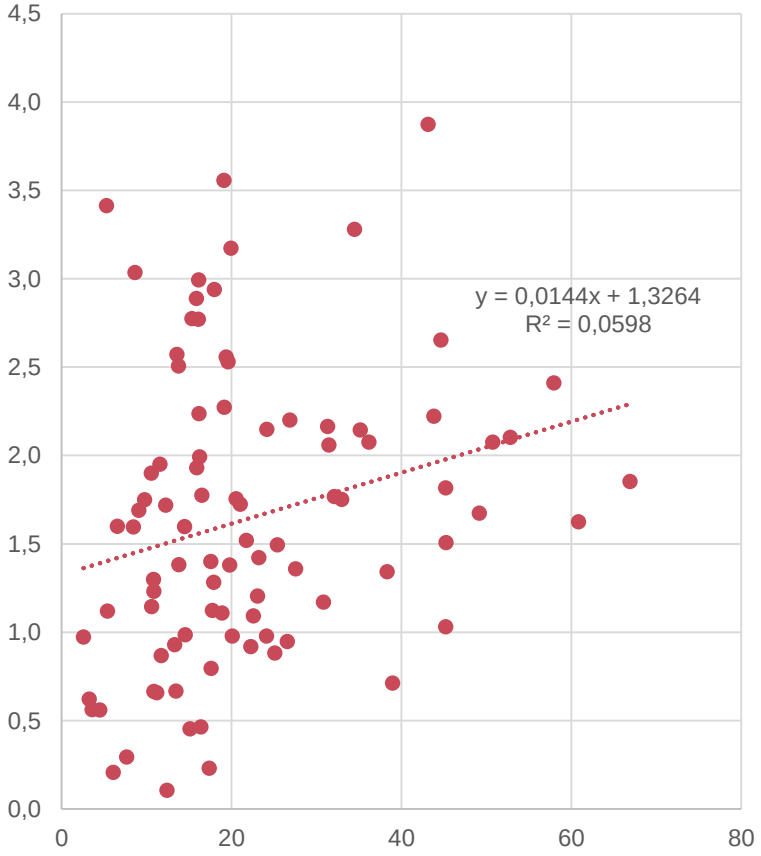


The relationship between R&D workyear and publications by R&D workyear – does size matters ? – all fields both sectors

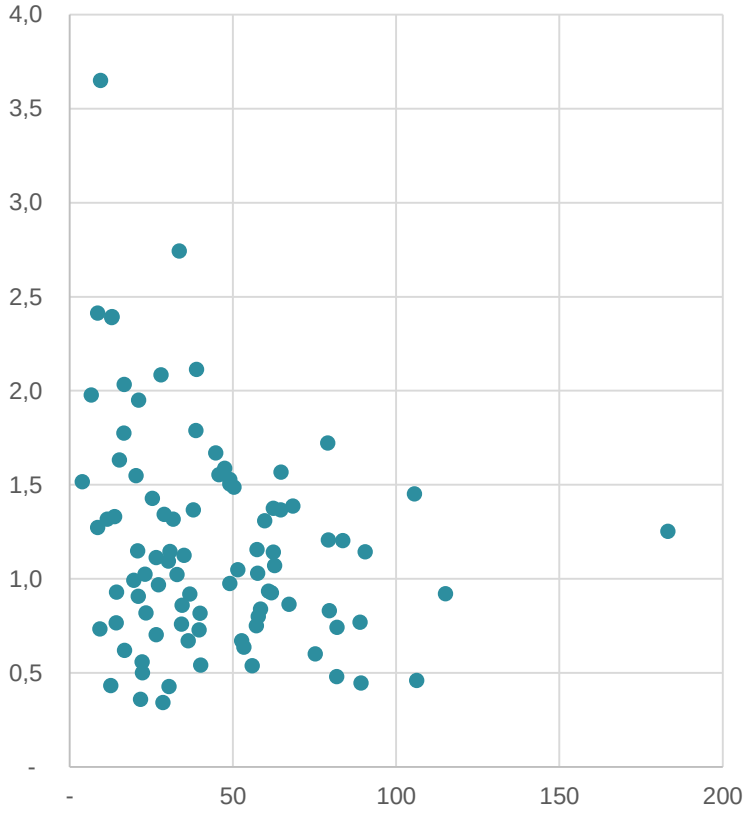


The relationship between R&D workyear and publications per R&D workyear – does size matters ? – University departments

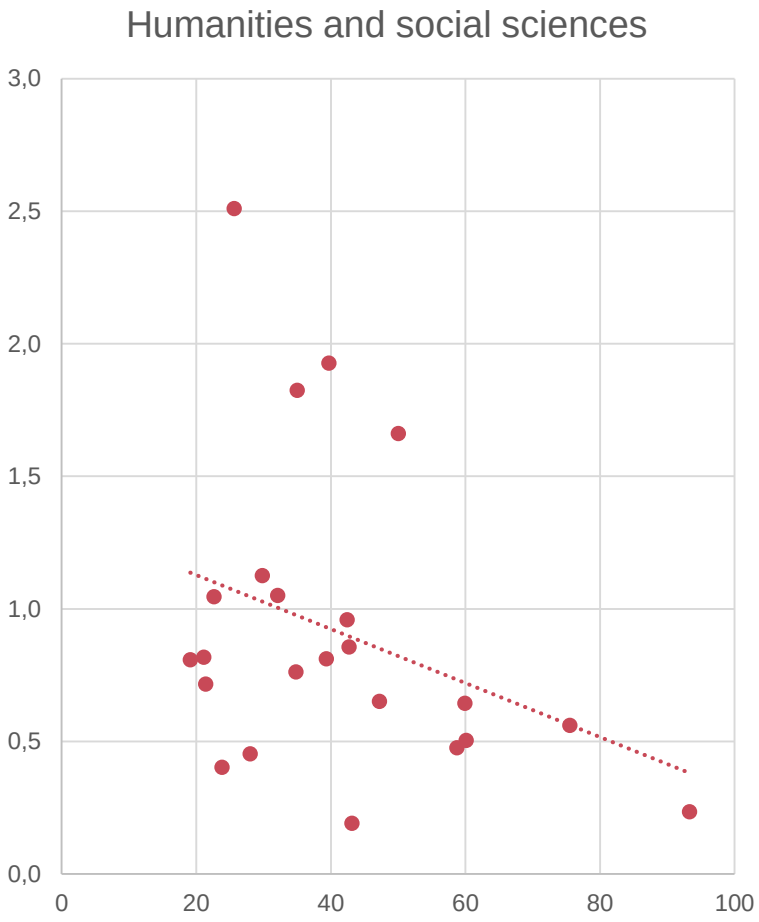
Humanities and social sciences

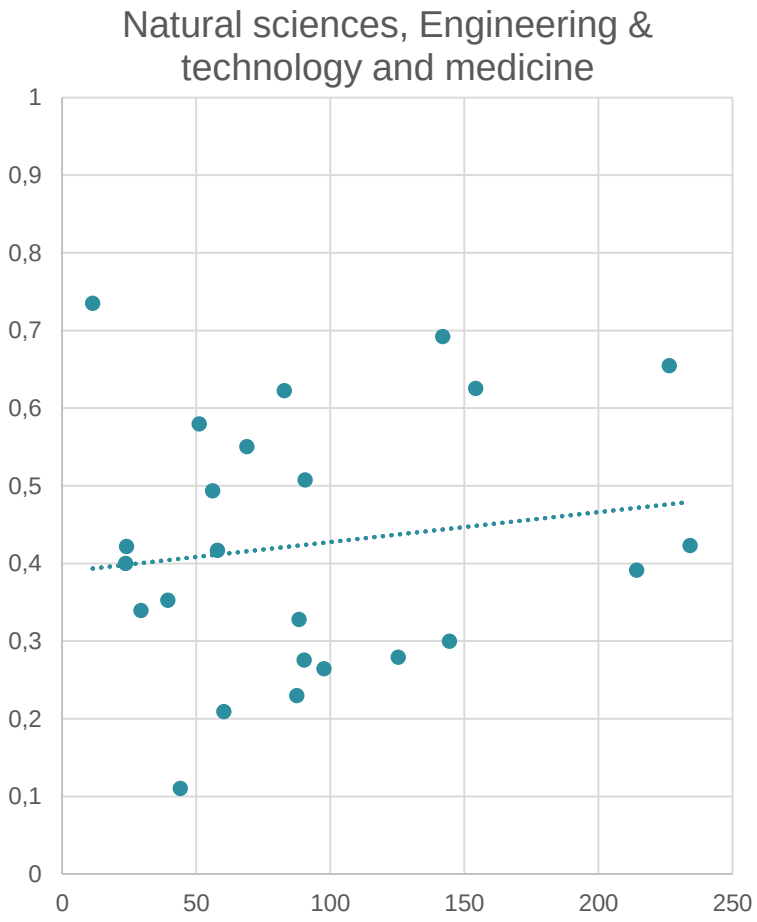


Natural sciences, Engineering & technology and medicine

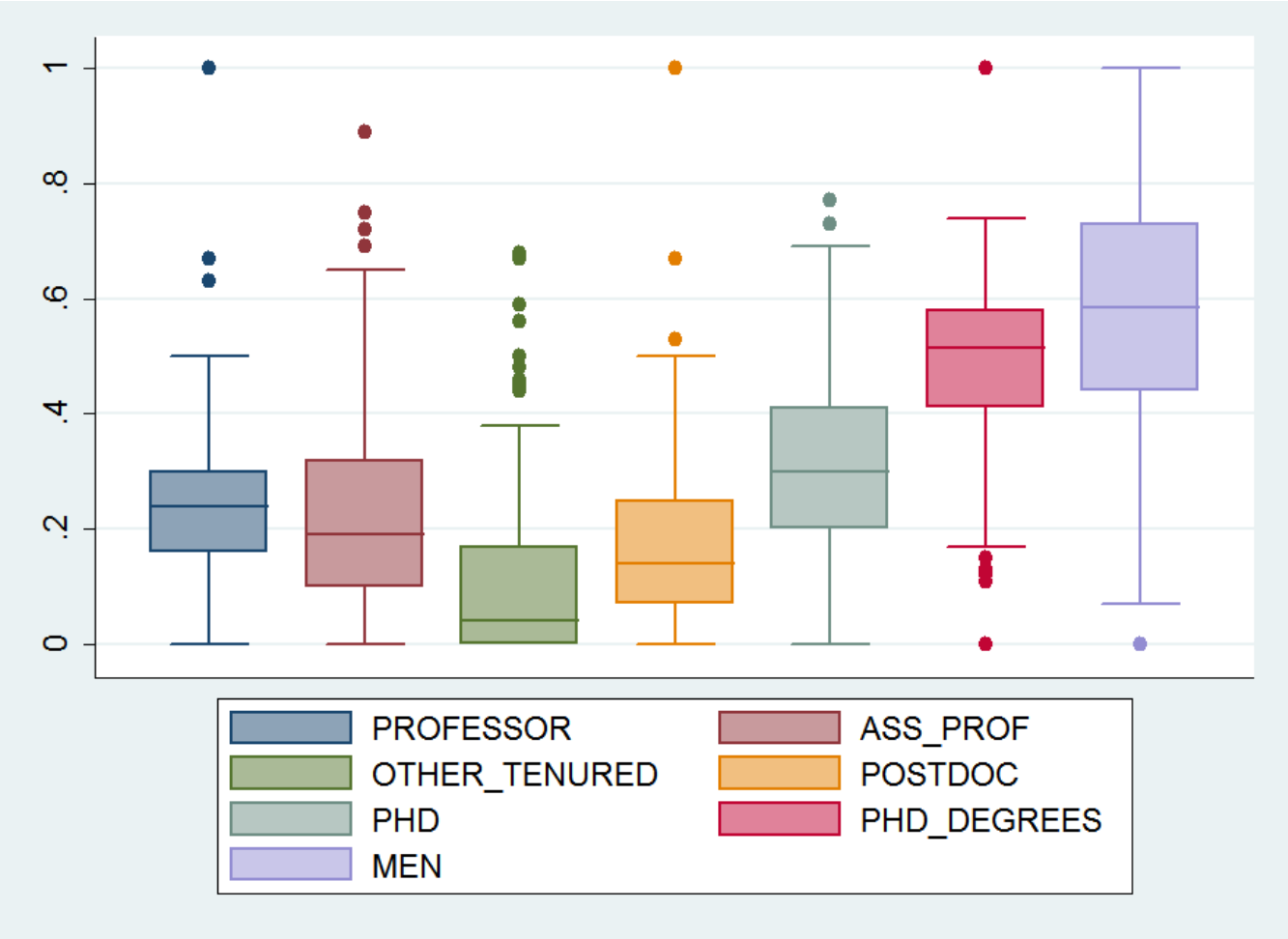


The relationship between R&D workyear and publications per R&D workyear – does size matters ? – Research institutes

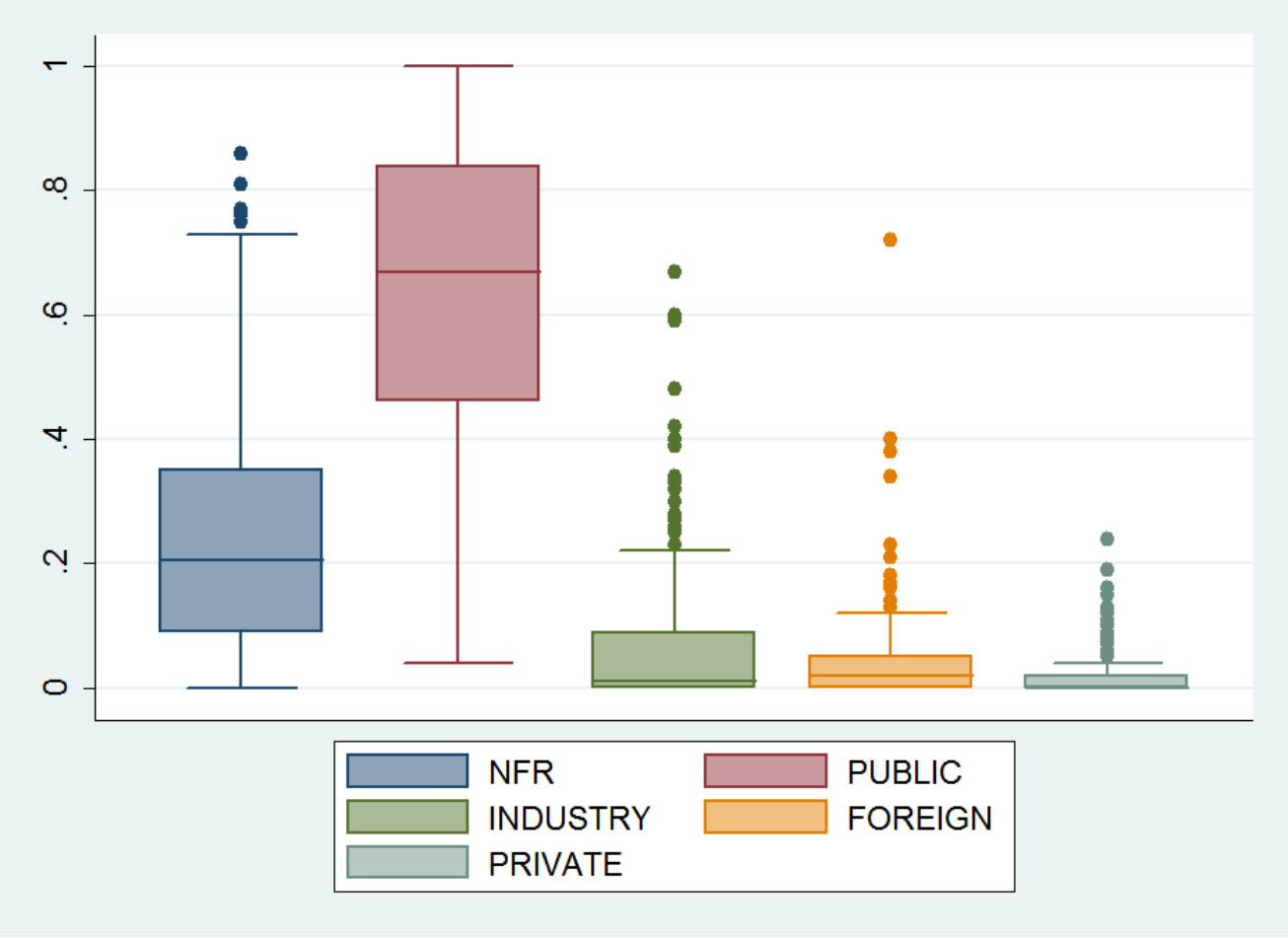




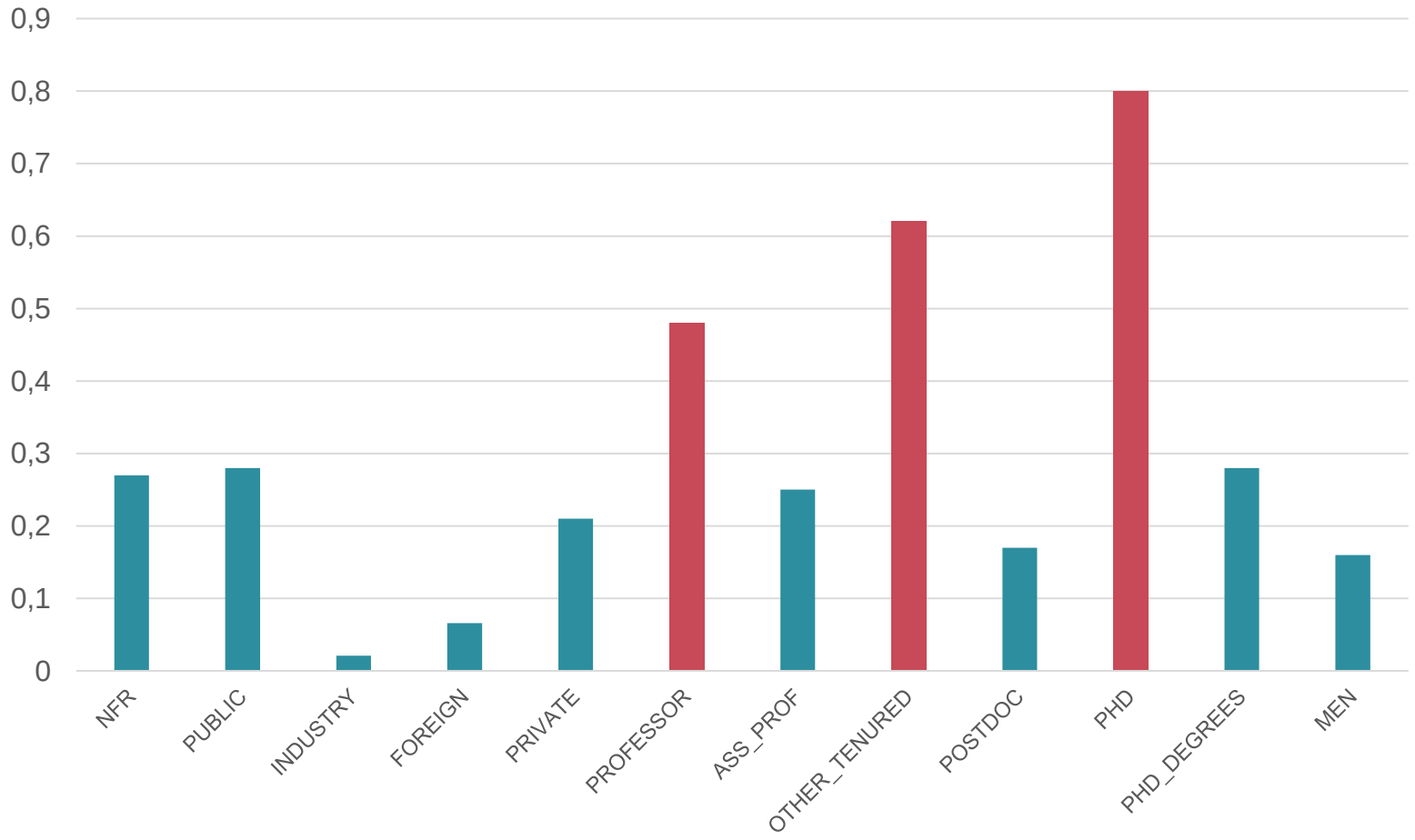
Results – distribution of composition by personnel, PhD-degrees and gender



Results – distribution of source of funds

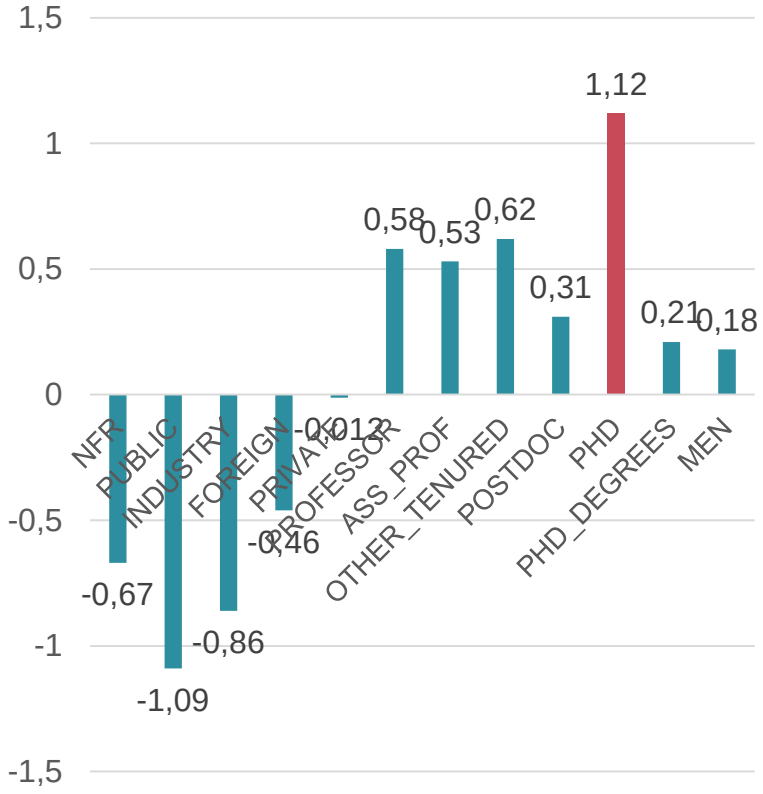


Regression results – all fields (R-squared = 0,27), beta-coefficients



Regression results, social sciences and humanities

Beta-coefficients

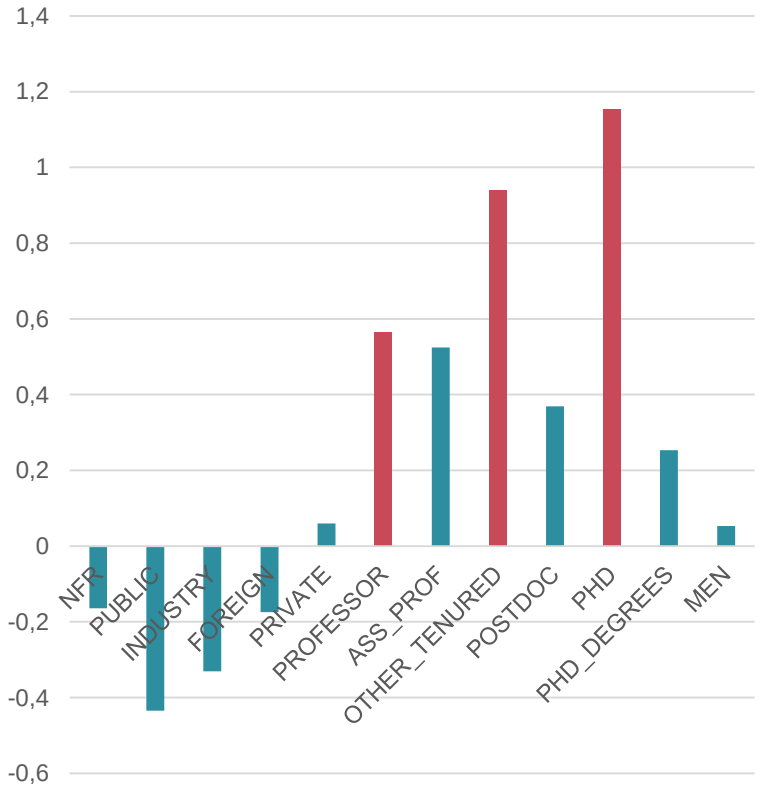


Regression summary

- R-squared = 0,29
- The share of Ph.D-students is the most important and only significant variable
- None of the source of funds variables are significant

Regression results, STEM-fields

Beta-coefficients



Regression summary

- R-squared = 0,28
- The share of PhD-students is the mot important variable.
- But Professors and other tenured personnel is also significant

Preliminar conclusions

- Our analysis indicates that a high share of professors and Ph.D-students can be associated to a high publication output on a department level
  - On a individual level, it has been shown that professors publish more than the rest of the personnel, while Ph.D-students publish the least
- The gender balance of the departments are not important
  - At the individual level, studies has shown that men tend to publish more than women
- The source of funds are not important.
  - A high share of funds from the research council would expect a high publication outout since basic research is funded by this source

Preliminar conclusions

- We assumed a time lag of 2 years from input to output.
  - This can vary from publication to publication and there is not one correct answer for which time lag to choose.
- Our data consists of only one set of input/output-data
  - For more observations we should ideally have more sets or used average values for both input and outputs, which would also reduse the time lag problem
- Most of the university departments are financed quite equally
  - The source of funds do not have a large variation from department to department
- Out data indicates that there is not a critical mass effect
  - If any, it is preferable to be a small or medium department than a large one
- The units of investigation should ideally have been research groups within departments. However we don’t have data at this level.

Thank you for your attention!

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Remember, this is a preliminary study

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