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Sizing-up changing researcher mobility patterns in Norway using a combined data approach

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Introduction

1. Research careers are changing, e.g. at the frontier between academia and industry.

2. New tools are needed to keep up with and to analyze salient dimensions of these changes

3. Combining register (administrative) data with periodic surveys offers a robust way to study the changing landscape and what it means

4. We demonstrate such an approach using Norwegian data

Conceiving of research careers

1. Contract between society and scientific community

2. This contract is changing in important ways

3. Research organized into research careers (see Canibano et al for a review)
    a. 'series of jobs'
    b. 'evolving sequence of work experiences'
    c. 'series of interconnected work situations'
        -cognitive career (status)
        -peer community career (r1-r4)
        -organizational career (sequence of one or more employer(sector))

Challenges

1. (whilst) research and its organization is changing fundamentally

2. (whilst) tracking changes in organization is key to understanding changes in Research itself

3. How can evidence-based policymaking track/understand changing configurations of the complex underlying relationships (human and organizational capital)

    -how to think about career ‘progress/promotion/positions

    -how to plan for changing needs re human capital

    -how to understand the role of 'organizational capital‘

Baseline

- Not open data (rather, well curated linked datasets)
- Looks back on a study for the Ministry;
- Looks forward towards laying the groundwork for a monitoring system in Norway

General objective

- It is possible to combine sensitive data in a responsible way to construct indicators to study (emergent) trends
- This exercise can provide basis for evidence-based policy-making in difficult areas

Section 2

Data resources and design

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The data

- We use a Norwegian individual-level register data set based on two data sources: data from NIFU's Register of Research Personnel (RRP) and matched employer–employee register data.
- This is a balanced panel data set with a total of 270,000 (?) observations: 6 years (2007-2012) X 46.200 (?) unique persons.
- The RRP covers researchers and university graduates who participate in R&D at Norwegian higher education institutions, research institutes and university hospitals.
- The RRP is based on regular reports provided by the institution administration to NIFU.
- Only research personnel working in positions of 40% or more are included in the RRP.

labour market status

There are five possible categories of labour market status in each year:

1) Employed in the higher education sector.
2) Employed in the institute sector.
3) Employed in the private sector in Norway, but not in the higher education sector or the institute sector.
4) Employed in the public sector in Norway, but not in the higher education sector or the institute sector.
5) Not employed in Norway.

Information about industrial sector (NACE codes) is used in order to differentiate between status 3 and 4.

The combined lens

1. Register data provides a panel of reliable individual data

    + career development over time across sectors/employer

    - limited to positions in Norway, simplifies dual positions, other restrictions

2. Surveys provides a snapshot of rich individual subjective data

    + add meaningful individual factors (e.g. children), indicate collective indications of motivations/challenges,

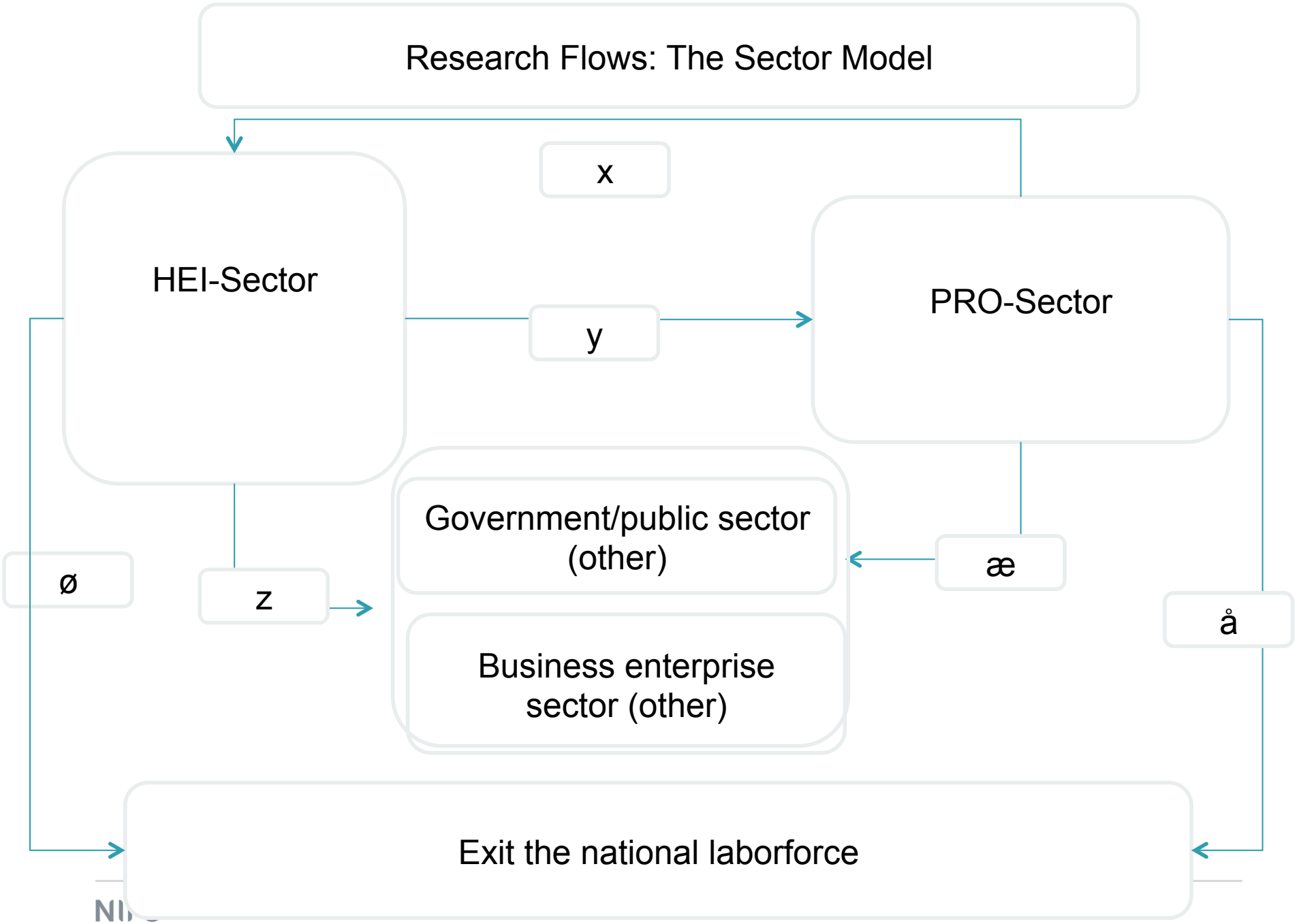
    -not alone efficient to reliably sum up changes across populations (eg. international mobility)

3. The combination of linked registers with a periodic survey complement each other

    + strengths of each approach

    ++ better calibration of survey results (to counter non-response bias)

    - special care to deal with confidentiality questions and consistency across datasets.


Research Flows: The Sector Model
x
HEI-Sector
y
PRO-Sector
Government/public sector (other)
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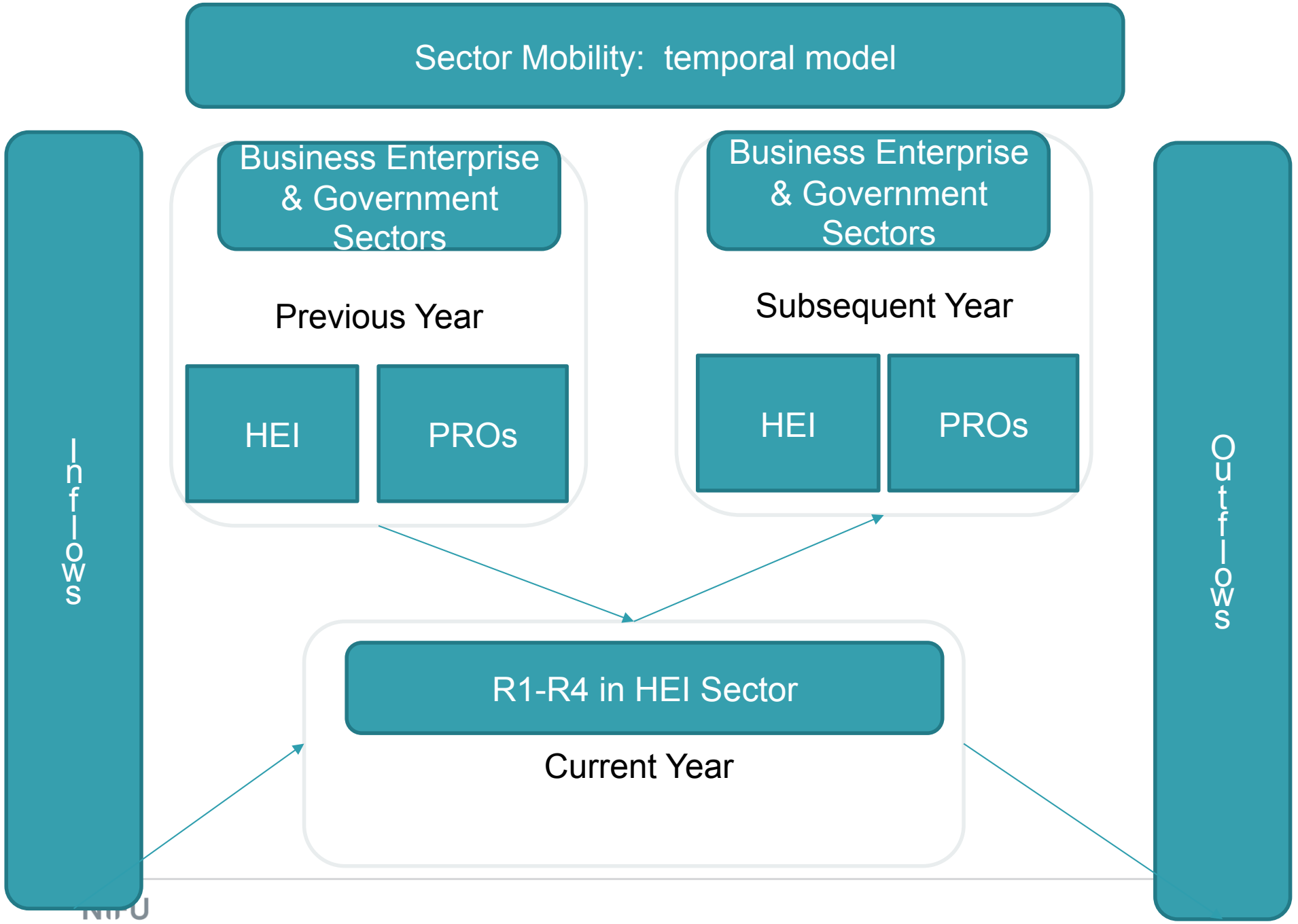
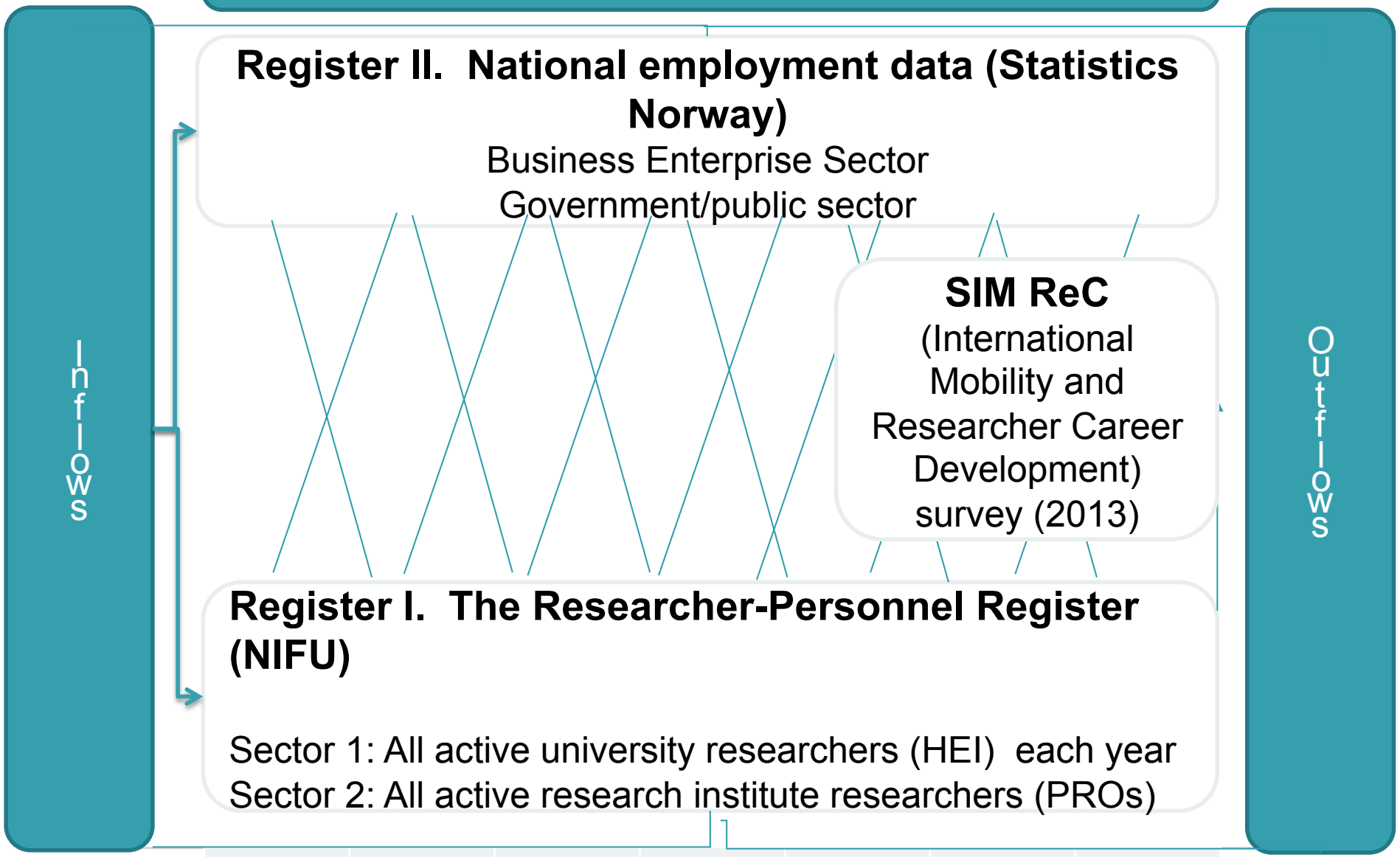
Business enterprise sector (other)
Exit the national laborforce


Sector Mobility: temporal model
Inflows
Business Enterprise & Government Sectors
Previous Year
HEI
PROs
Business Enterprise & Government Sectors
Subsequent Year
HEI
PROs
Outflows
R1-R4 in HEI Sector
Current Year

Data resources and design



Section 3

Analytic stages and preliminary results

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Focal area: Systemic change at the frontier between academia and industry

1. the changeable frontier between academia and industry a perennial (and increasingly important) focus
2. the interaction between the organizational capital and human capital can lead to a range of different output (students, patents, papers, spin-offs) that are of varying relevance (value) for academia and for industry.
3. Vector(s) of studies
    a. university-industry relations in historic view (e.g. Mowery & Ziedonis, 2002)
    b. (re) focus on technology transfer (e.g. Cohen et al, 1998)
    c. sector mobility (e.g. Edler et al, 2008)
    d. increasing array of organizational structures for cross-sector collaboration of
        - More formalized research alliances (see Bozeman & Boardman, 2014) or
        - less formalized research alliances (Ponomariov et al, 2008)
    e. 'Industrial involvement scale' (Bozeman & Gaughan, 2007)

Stage 1. Sector Mobility: Flows into, out of, and between the Research Sector (HEI and PRO)

Question(s): What are the general parameters of the research population in Norwegian HEIs and PROs* and how are they changing?

1. Compile full-panel of researchers* employed in Norway during the period (2007-2012).

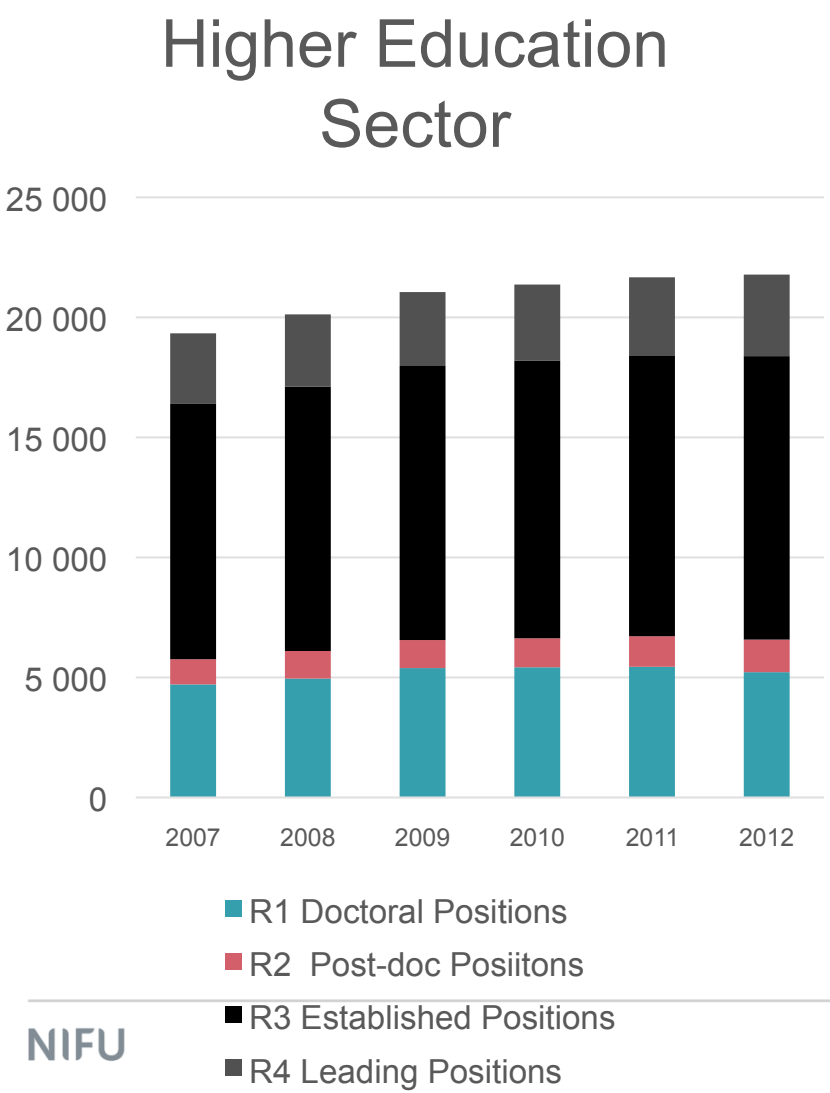
2. Account for general parameters of the research population in Norwegian HEIs and PROs*

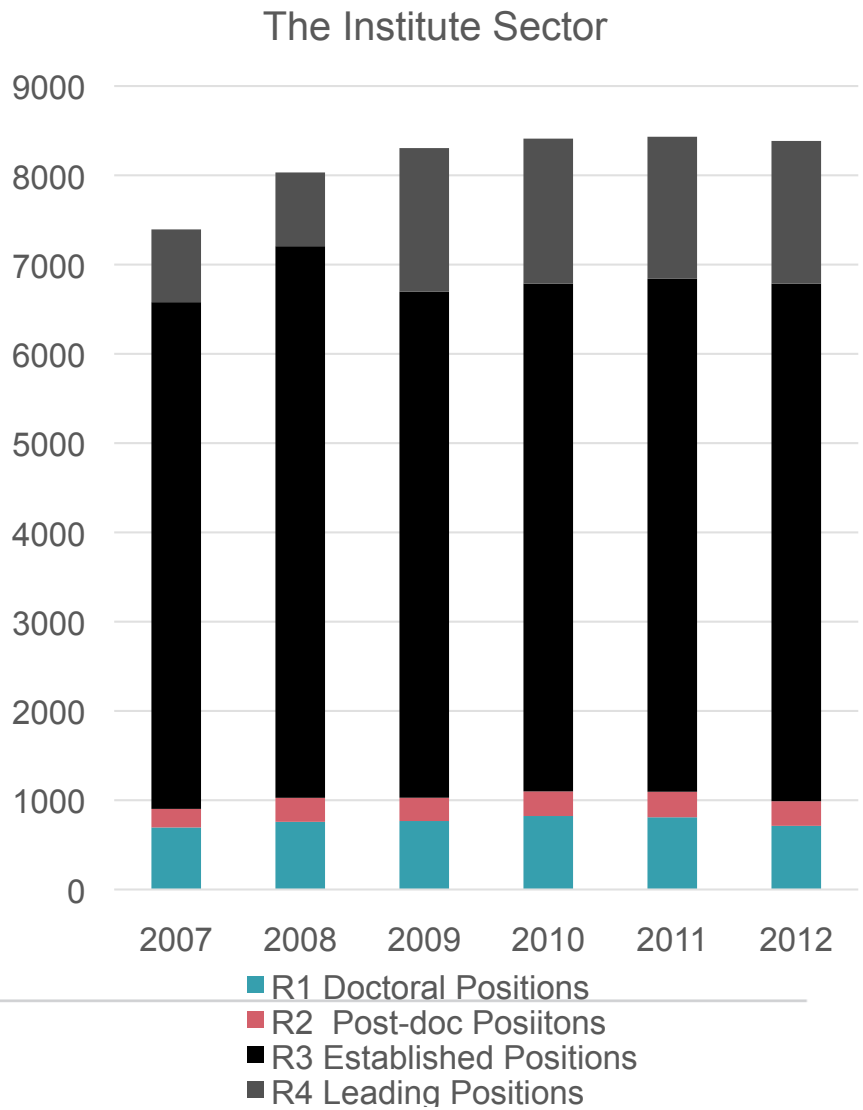
3. Describe the ways in which they are changing

    - composition of positions by field of science
    - composition of positions by research
    - prevalence of foreign (educated) researchers

4. Map inflows and outflows from the 'research sector' to the rest of the economy using concurrent national employment data.

Population of the research sectors by year and level of seniority





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Inflows to the HEI sector (R1-R4) by delivering sector

	HEI Sector		Inflows by delivering sector			Total
	Roll-over	Total inflow	PROs	Other Sector	Inactive	
2008	16588	940	184	2383		20 095
2009	17597	977	163	2082	218	21 037
2010	18378	895	132	1710	223	21 338
2011	18436	922	144	1837	312	21 651
2012	18468	986	165	1879	275	21 773
Total	89 467	24 056	788	9891	1028	125 230

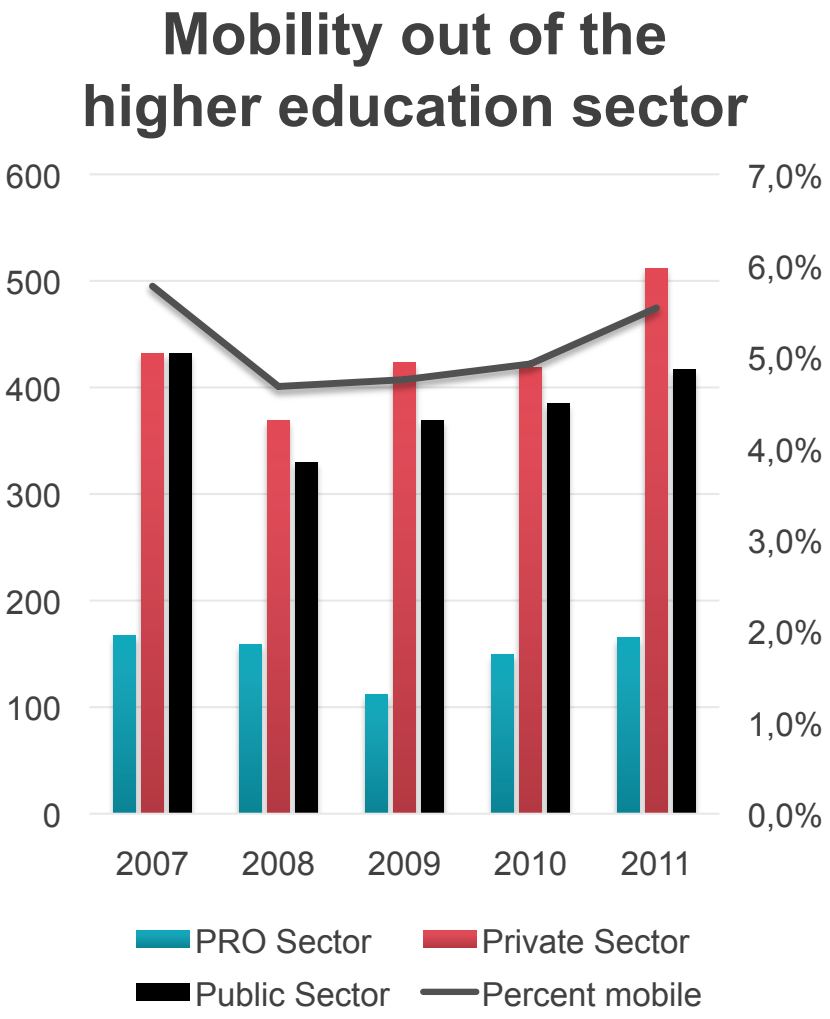
HEI Researcher by share of foreigners and position

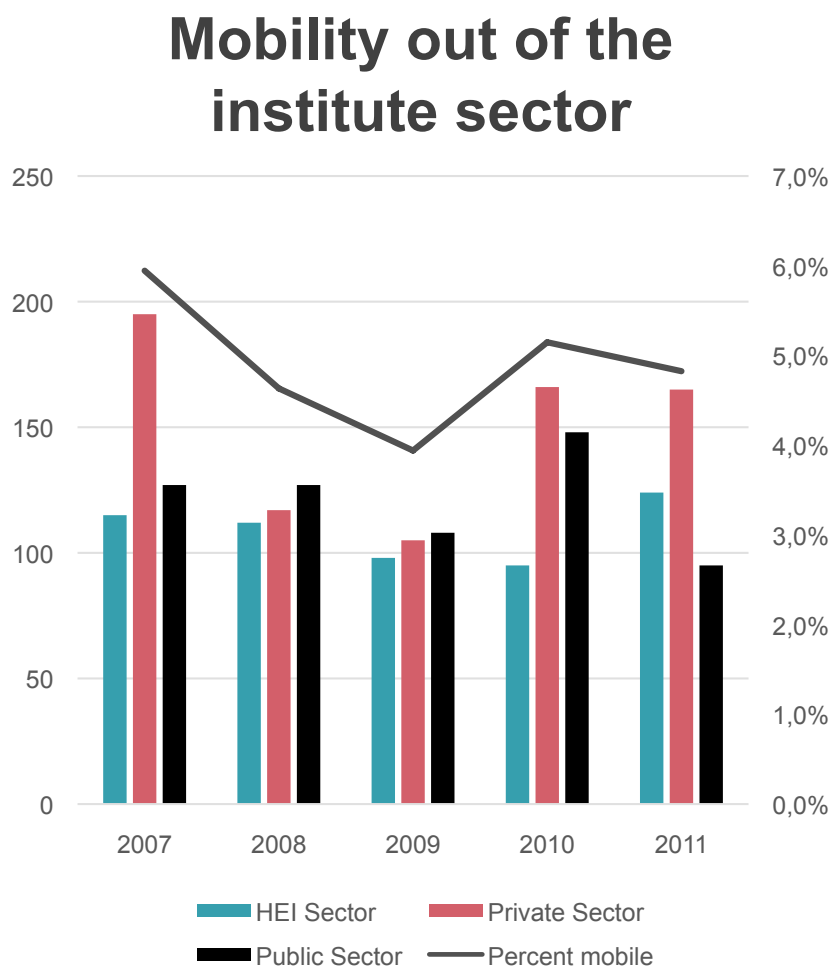
Aar	EU Taskforce Career Stages R1 Rekruttering	R2 Postdoc	R3 Fastestillinger	R4 Profl/ Forskerl
2007	0,22	0,40	0,10	0,16	0,15
2008	0,26	0,45	0,11	0,16	0,17
2009	0,30	0,46	0,11	0,16	0,19
2010	0,32	0,45	0,12	0,17	0,20
2011	0,32	0,45	0,13	0,17	0,20
2012	0,33	0,48	0,13	0,17	0,21
Total	0,30	0,45	0,12	0,16	0,19

Position progess: relative to 2011

karr_pluss1år	EU Taskforce Career Stages			
	R1 Rekrutter	R2 Postdoc	R3 Fastestil	R4 ProfI/For
R1 Rekruttering	3,777	1	150	
R2 Postdoc	103	845	98	
R3 Fastestilling	395	196	9,837	42
R4 ProfI/Forsker	1	9	256	3,030
Total	4,276	1,051	10,341	3,072

Outflows from HEI





Stage 2. Sectoral mobility and career progression

Question(s): What is the extent of inter-sector flow over time? What factors does sector-mobility build on? How does sectoral mobility affect career progression/development?

1. our focal case: monitoring career change at the frontier between academia and industry

2. Panel Models are used to estimate the probability that the researcher changes sectors in a subsequent year used panel information

3. *Estimate the effect of previous experience in other sector on measures of reward (wage increase) and promotion

Stage 3. What relation to sectoral mobility have on career development

Questions: What is the extent of researchers who enter (recruitment) or exit the labor-market (through international mobility or other mechanism)? How to identify internationally mobile researchers?

1. Use the dataset from Stage 1 to conduct a survey at the end of the period (2013) to gather information about sector and international mobility and factors that affect (drive it)
2. Analyze the results of the survey in light of Stages 1 and 2.
    a. Use information in previous stages to account for non-response bias and other missing information.
    b. Using survey results (eg. motivations for mobility), analyse the relationship between mobility and career development)

Intersectoral mobility patterns among researchers within the higher education sector in Norway

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Further specification

- We examine intersectoral mobility patterns among all persons who are registered as researchers.
- The persons included in the data set are either registered in the higher education sector or the institute sector in at least one of the years in the time period (2007-2012).
- The higher education sector corresponds to the OECD's higher education sector.
- The institute sector includes business-oriented research institutes and also covers the OECD's government sector and the private non-profit sector.
- The higher education sector covers universities, specialised university institutions and university colleges, as well as university hospitals.

HEI Researcher by share of foreigners and position

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The descriptive analysis

- In the descriptive analysis we examine intersectoral mobility patterns in the period 2007-2012 among persons who are registered as researchers in the higher education sector in 2007.
- For the period 2007-2008, we examine the transitions among this group of researchers from the higher education sector to the institute sector, the private sector in Norway, the public sector in Norway and the status of being ‘not employed in Norway’.
- For the period 2008-2009, 2009-2010, 2010-2011 and 2011-2012, we will also examine the transitions among this group of researchers from the institute sector, the private sector in Norway, the public sector in Norway and the status of being ‘not employed in Norway’ to the higher education sector.