

Sizing up changing researcher mobility patterns

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Eric J. Iversen

NIFU (Norway)

Nordic Institute for Studies in Innovation, Research and Education



Overview

- ❑ Background
- ❑ Researcher Mobility and Researcher Careers
- ❑ Approaches and data-sources
- ❑ Some preliminary findings (for Norway)

Different forms of researcher mobility

International Mobility: across national and regional borders (e.g. Nordic, EU)

- ▶ Work for a foreign university
- ▶ Sabbatical or long research visits

Sector Mobility: across sectoral borders

- ▶ particularly between academia and industry (also with PROs)
- ▶ Career Mobility
- ▶ Task /function mobility

Some headline issues

An investment or cost (for whom) ?

- Does mobility contribute to the career **development** of the researcher?
 - In all fields, under what circumstances etc?
 - What are the effects on publication, patenting, collaboration, etc?
- Does mobility **enhance productivity** of the hosting faculty(or economy)?
 - under what circumstances etc?

Patterns and Directions of Researcher Mobility

Some Context



Background

- ❑ Historic focus (Brain Drain 1960s, Oecd Canberra, 1995)
- ❑ (Re)Current national and regional focus at a time of increasing **internationalization**
- ❑ Europe's increasing pursuit of a single '**research area**'
- ❑ Changing dynamics of **some scientific disciplines**
- ❑ New focus on **grand challenges** and emerging topics

Effects at different levels: mobility

- ❑ Affects changes in economy as well as the social and political dynamics
- ❑ Central to the dynamics between science and labor-market
- ❑ Important in connecting academic workforce with the international pool of researchers
- ❑ (Increasingly) important to the development and career of the individual researcher

Determinants levels: career

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▶ Individual determinants

- ▶ Reputation Effects (e.g. Merton)
- ▶ Age and Gender (e.g. Stephan et al)
- ▶ Fixed effects of individual researcher
- ▶ Social networks (e.g. Bozeman)

▶ Institutional arrangements

- ▶ Incentive schemes (e.g. Godin) and Funding environment (e.g. Graham & Diamond)
- ▶ Laboratory effects of scientific productivity (e.g. Branco et al,)
- ▶ Position duration and productivity (e.g Turner & Mairesse) and job security (Cruz-Castro, Sanz-Menendez)
- ▶ Labor market dynamics and scientific productivity (Holley)

▶ National/geographical structures

- ▶ The academic workforce and the larger national labor market (vis-à-vis PROs)
- ▶ Labor market dynamics including segmentation by demographic groups (Holley)
- ▶ Recruitment temporal (stops and go) (Lissoni et al)

Potential push and pull factors

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- Access to research facilities
- Access to financial support
- Transparent systems of recruitment and promotion/advancement
- Possibility to **work with given scientists/ research team**
- The researcher's own expectations (personal factors)

Apparent barriers

- **Regulative obstacles**
- Staffing practices
- Economic obstacles
- **Cultural barriers**
- IPR rules and practices

A European policy priority

- ❑ Recruitment and mobility seen as key to realize **European Research Area**
- ❑ Expected effects on knowledge development & on the wider economy
- ❑ The EU has launched a raft of strategies and instruments:
 - EC (2001) A Mobility Strategy for the European Research Area
 - EC (2005) European Charter for Researchers and a Code of Conduct for the Recruitment of Researchers
 - EC (2006) Mobility of Researchers between Academia and Industry - 12 Practical Recommendations;
 - EC (2008) Better careers and more mobility: a European partnership for researchers;
 - EC (2010) Europe 2020. A strategy for smart, sustainable and inclusive growth;
 - EC,(2010) Innovation Union;
 - EC (2012) A reinforced European Research Area Partnership for Excellence and Growth.

A Nordic policy priority

- ❑ Active in the European Partnership initiative for researchers
- ❑ Signatories of the European Charter and Code
- ❑ EUROHORC " Money FOLLOWS researchers " principle
- ❑ Research posted on EURAXESS portal
- ❑ **Tax breaks for foreign researchers**
- ❑ Special mobility programs for foreign researchers to remain in the host country

A Norwegian policy priority

‘A main direct mechanism for exchange of research-based knowledge’ (White Paper 2012-2013)

➤ **Perception:**

- Researchers in Norway are relatively static
- An increasing number of foreign researchers in early stage positions

➤ **Ambition:** The government wants to better facilitate researcher mobility

- Increase knowledge exchange via **shorter term positions** (!)
- Complement EU policy measures: e.g. top-up financing of outbound mobility

Patterns and Directions of Researcher Mobility

Empirical lenses



Project Background

2014-2020: RISIS (EU) Infrastructure: WP accessibility to survey data (MORE)

- Scope: Europe and selected countries

2014: Researcher Mobility and the Research Barometer, Ministry of Education & Research

- Scope: Norway

Data approach: Registry data

2013: Nordic Crossing: Mobility of Researchers and Knowledge Transfer in the Nordic Region (NordForsk).

- Scope: Nordic countries.

Data approach: CV data and survey results

2012: SIM ReC: 2011-2012: Study on international mobility and researchers' career development (IPTS)

- Scope: 10 EU Countries + Norway

Data approach: Survey

Data resources

Registry (administrative) data:

- The **Researcher-Personnel Register** (NIFU) x **Employment** Data (Statistics Norway)

Survey data:

- **SIM ReC dataset (International Mobility and Researchers' Career development)**
 - extended to Norway (2013)

Supplemental data and links:

CV data (2013)

Bibliometric and Patent data (linked to authors or inventors)

Dataset	Source	Type	Timeframe	Coverage
Employment Data	Statistics Norway	Registry	2000-2012: Annual	All Norwegian Employees
Norwegian Research Personnel	NIFU	Registry	2000-2012: Annual*	Researchers in R&D Performing sectors
National R&D statistics for the academic and research-institute sectors	NIFU	Registry	2000-2012: Biennial	Institutions in R&D Performing sectors
Mobility and Career Development Survey (SIM_ReC)	NIFU	11 Country Survey + (Norway)	2000-2011: executed in 2012 (2013)	University Sector (Sample)
“Current Research Information System In Norway”	CRISTin	CV	Annual (2013)	Researchers at the largest Universities

Issues and lenses

How much mobility is there between sectors?

- The Researcher-Personnel Register (NIFU)

What patterns of international mobility are observed?

- SIM ReC dataset and The Researcher-Personnel Register

Which researchers engage in short-term visits abroad?

- SIM ReC dataset and/or CV data (2013)

Combining survey and registry

Survey provides subjective information that complements registry

Registry provides information to address selection + non-response biases

A combined lense on mobility within the country (sector) and outside (international)

Linkable to other data (e.g. bibliometrics)

The effect of other factors on promotion probability, e.g.

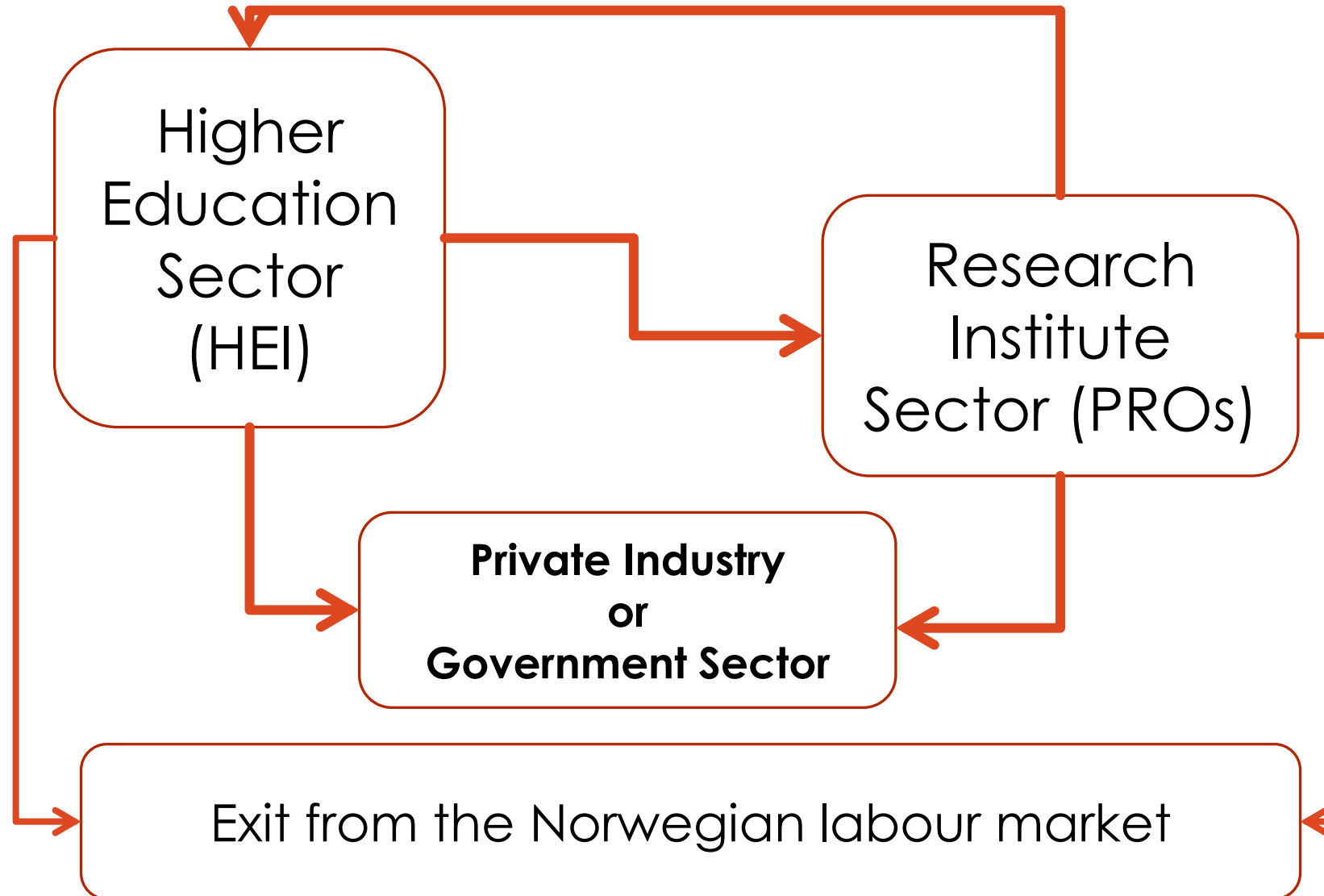
- multidisciplinary (a range of details on education)
- Life-cycle and family factors
- earlier job changes (e.g. across sectors)
- past and current job-characteristics (including wage & reported work-environment)

Patterns and Directions of Researcher Mobility

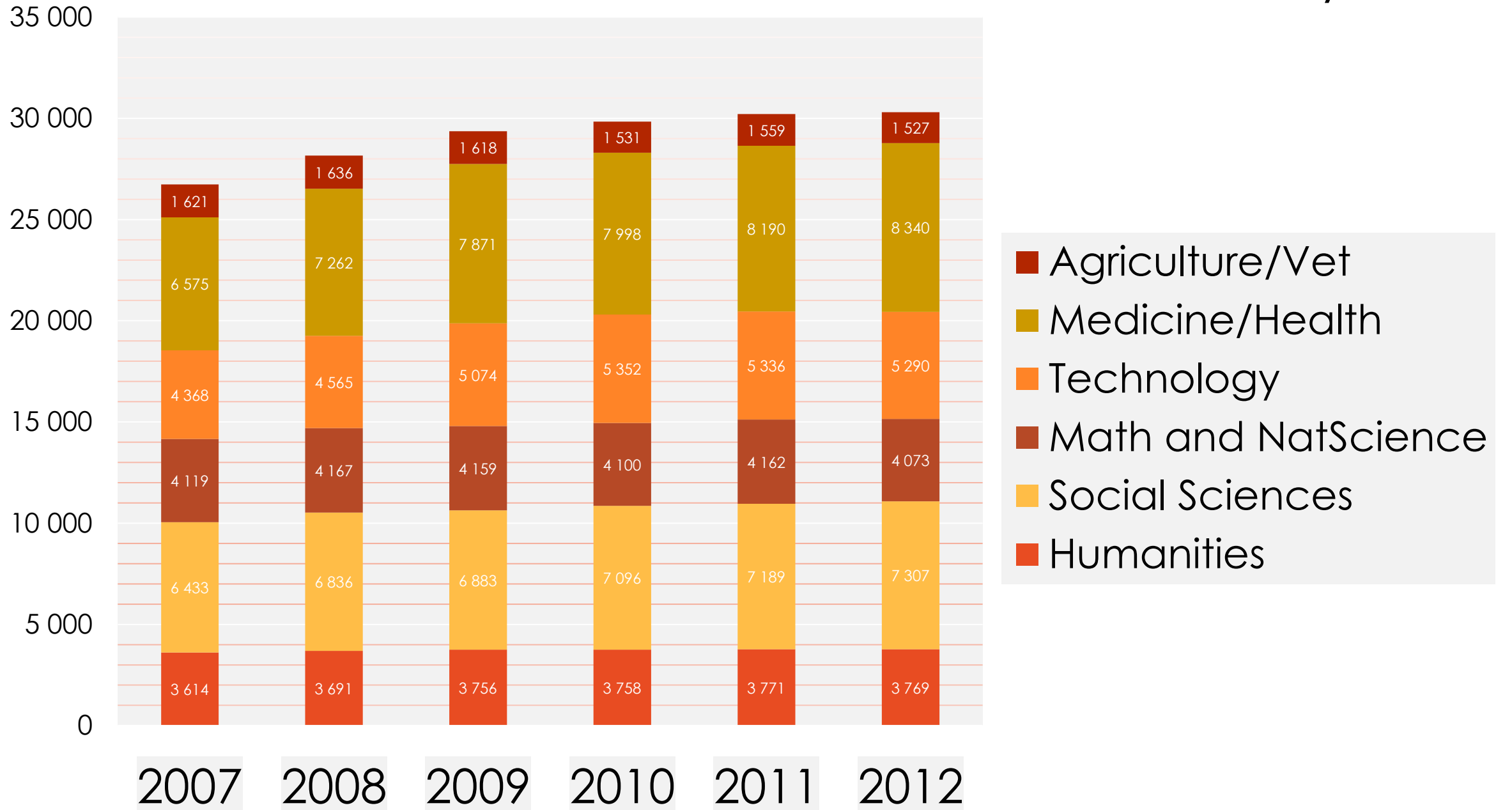
Registry data



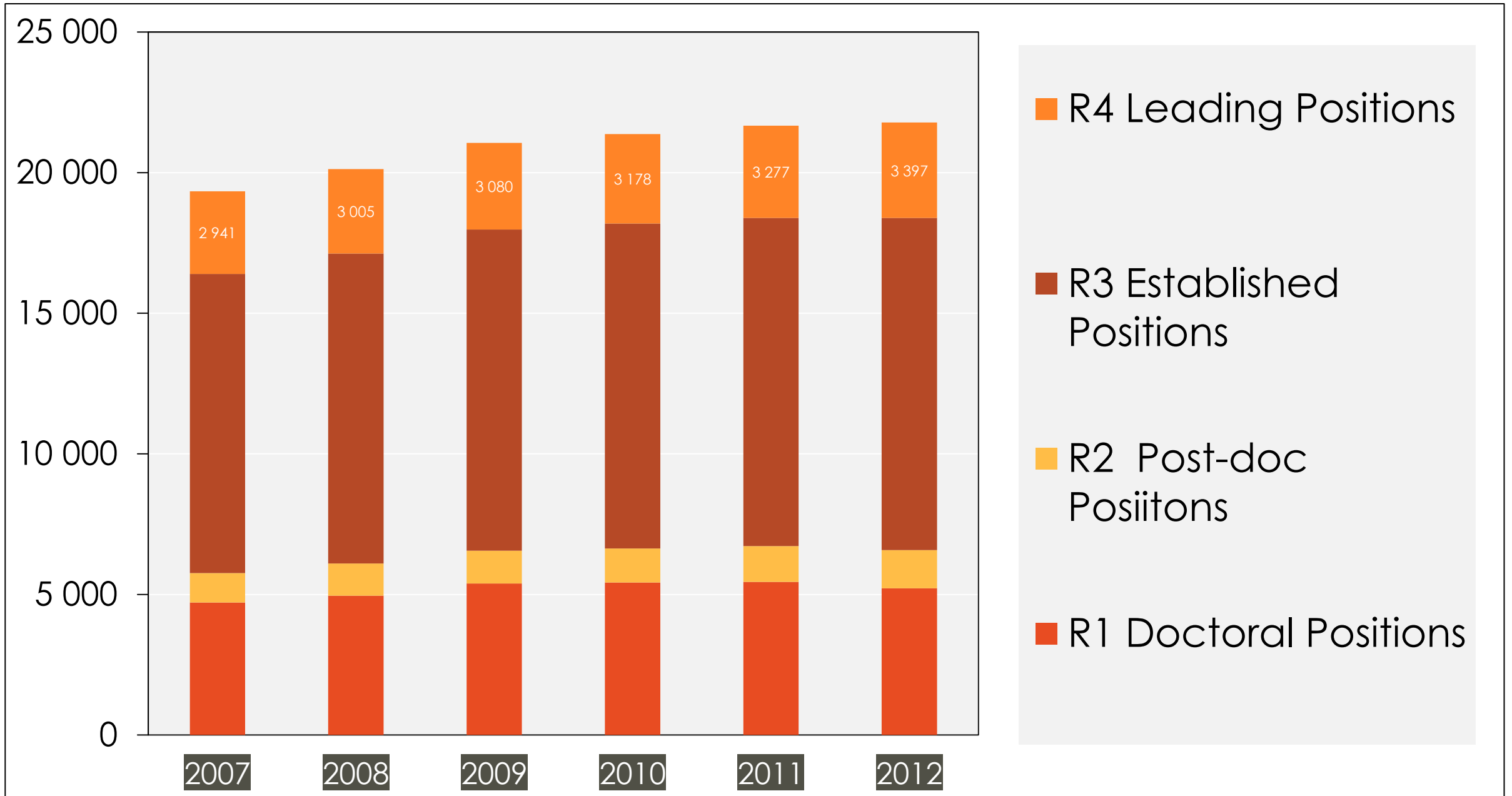
Sector mobility



Researchers by field



University researchers by seniority

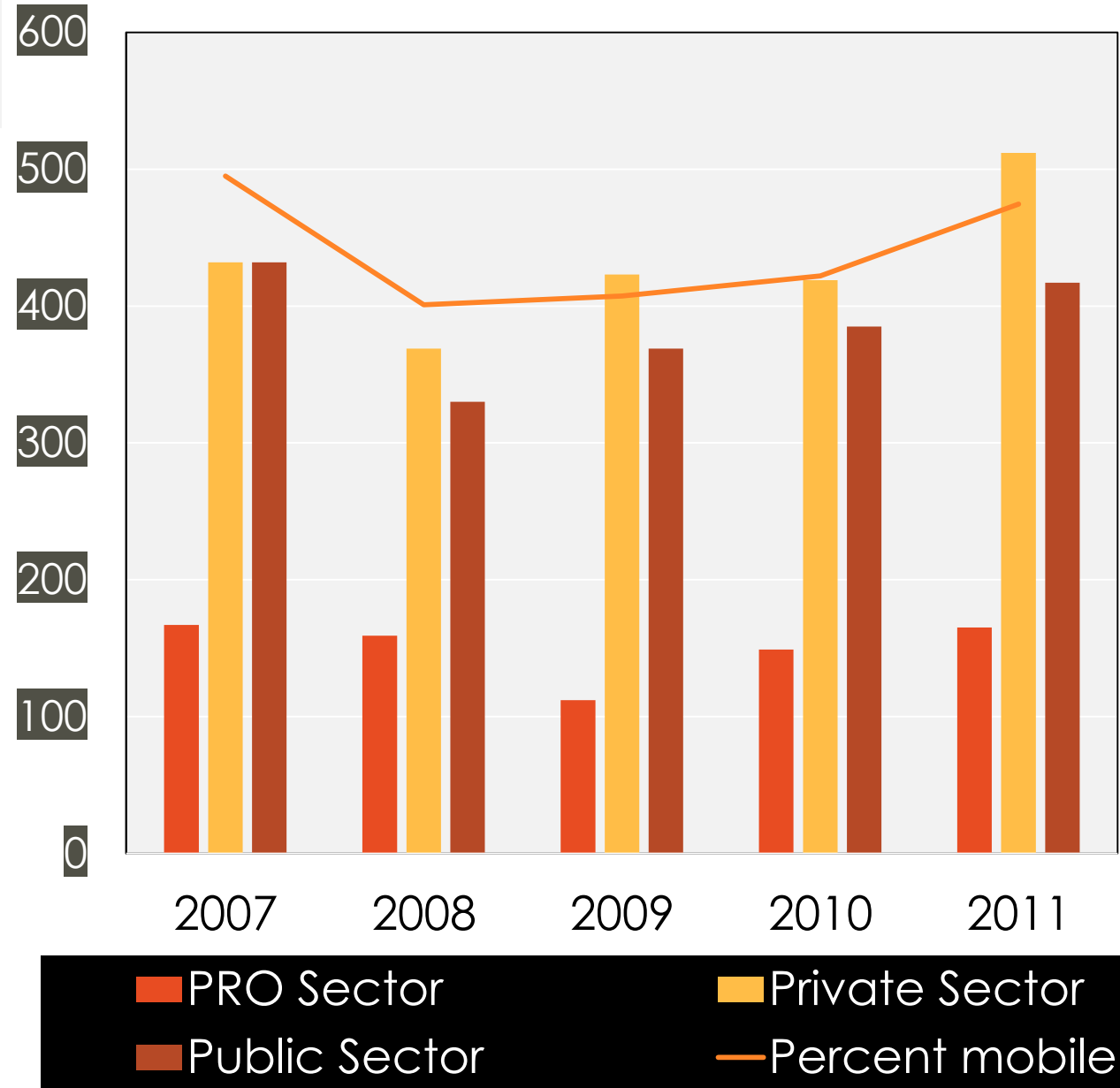


Mobility out of University Sector

20.000 Researchers in University Sector

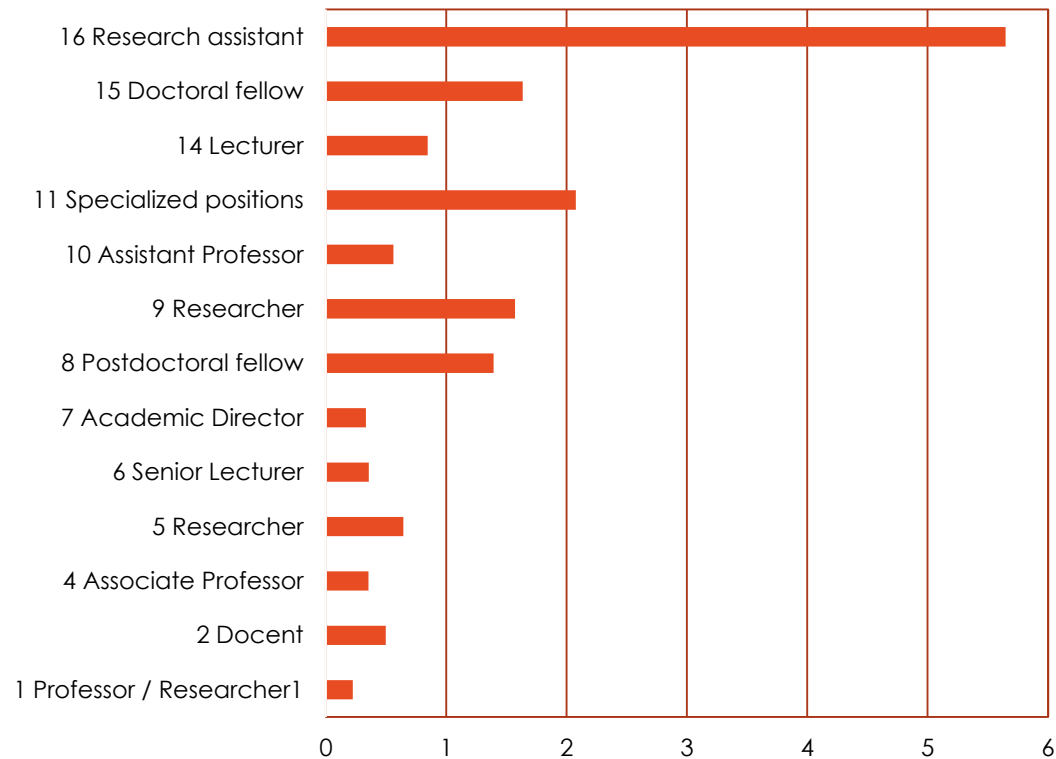
Net annual growth of ca. 2.2 % since 2007

Annual outflow to other sectors of ca. 5 %

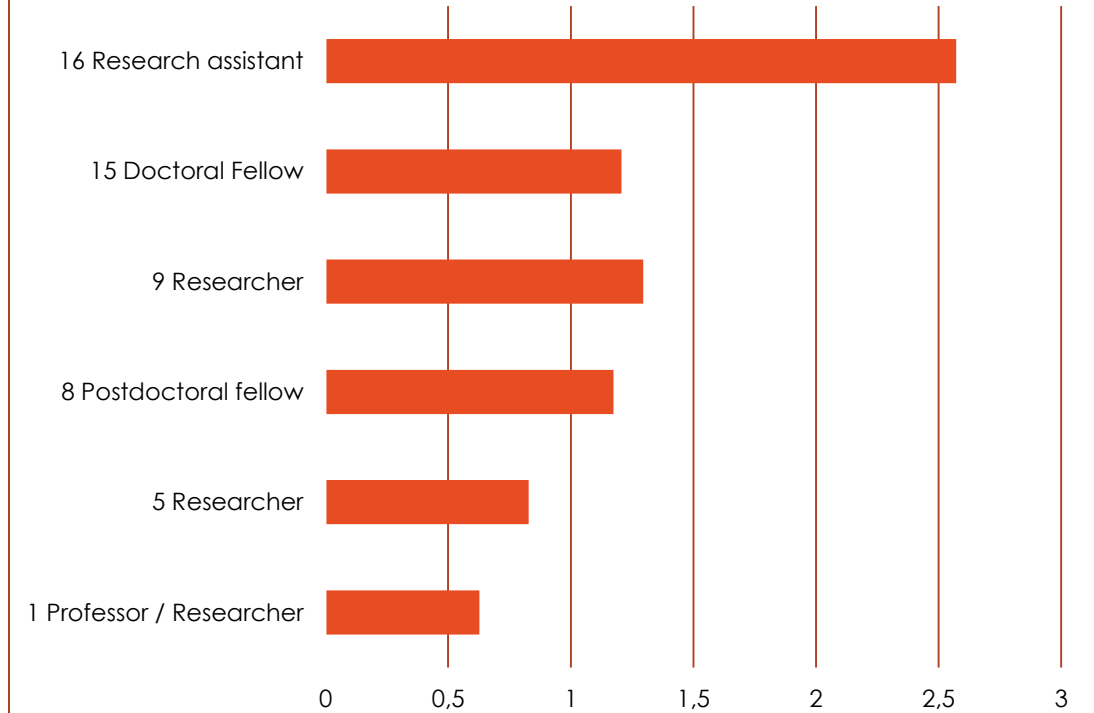


Indications of sector mobility by position: 2007-2012

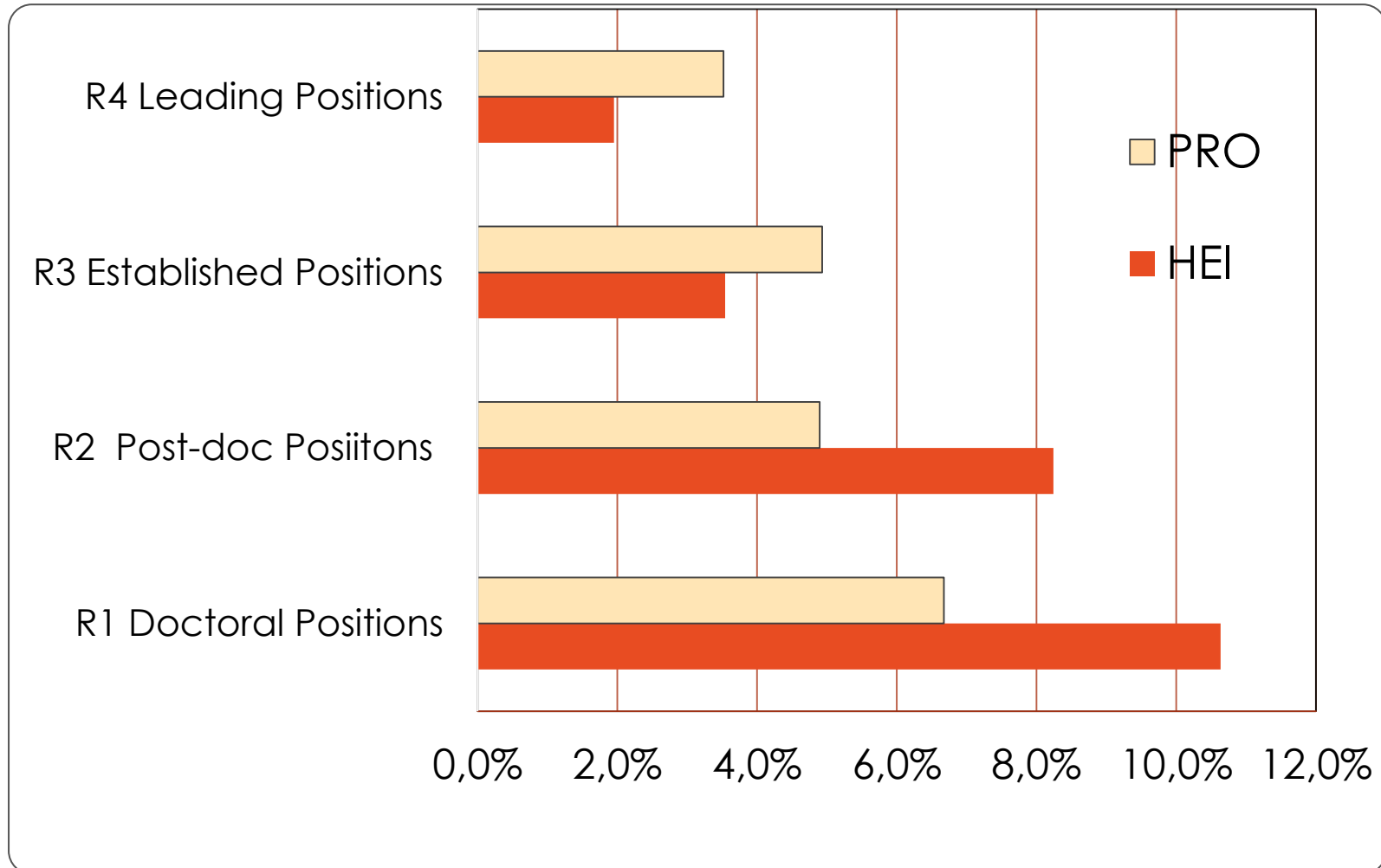
Propensity to move out of the university sector by position: 1 is expected



Propensity to move out of the PRO sector by position: 1 is expected

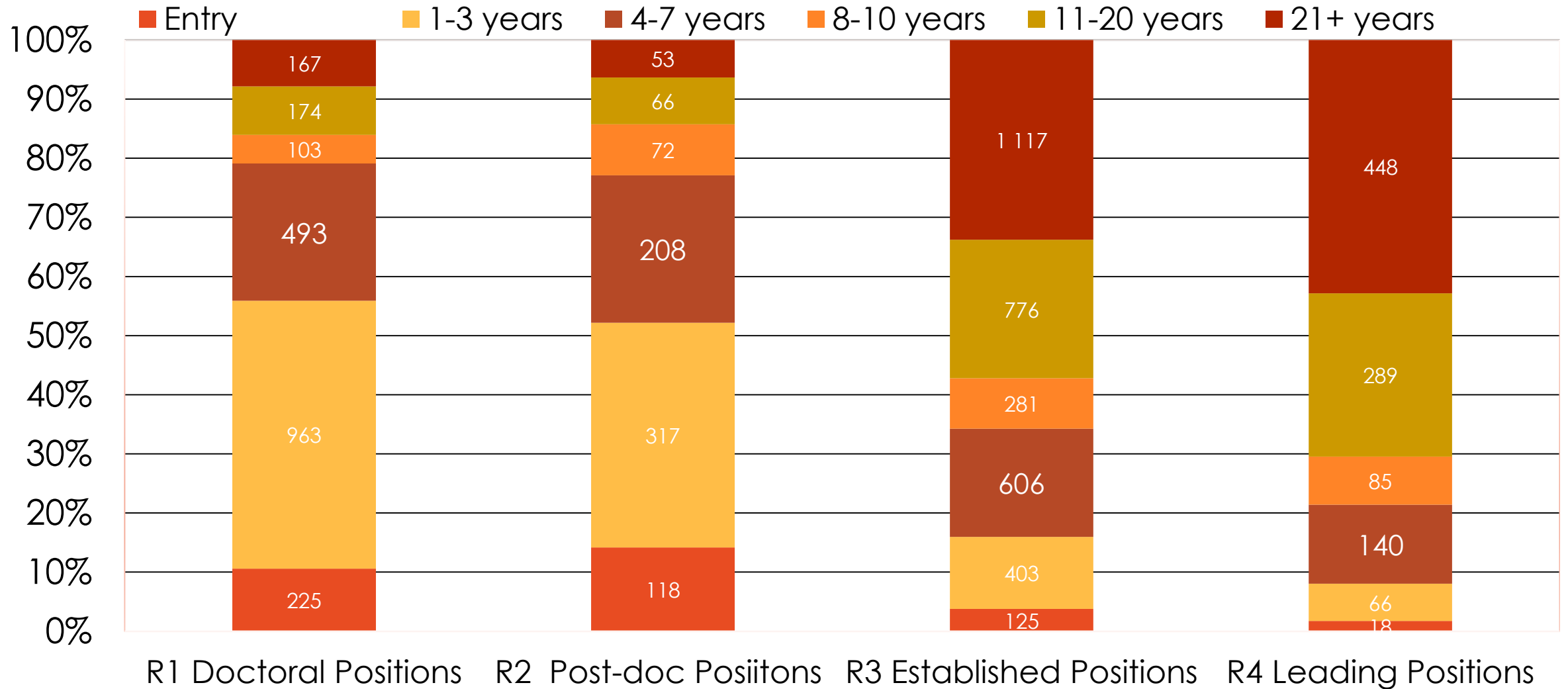


Share of researchers who changed sectors in 2012



- Higher outflows from universities at earlier stages
- Higher outflows from institutes at later stages

Foreigners in Norwegian research at different career-stages by duration of residency



Some preliminary indications

Sector mobile by position (xtlogit)

dv_sektor	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
Aar	1.653874	.1757792	9.41	0.000	1.309353	1.998395
sektor_simple	-.8963202	.1899125	-4.72	0.000	-1.268542	-.5240985
fagomraade	-.0005479	.0009088	-0.60	0.547	-.0023291	.0012334
doktorate	-.5121747	.2363989	-2.17	0.030	-.9755081	-.0488413
stillingskode_grov						
2 Dosent	-12.99479	775.7942	-0.02	0.987	-1533.523	1507.534
4 Førsteamanuensis	-1.309946	.5344292	-2.45	0.014	-2.357408	-.2624844
5 Forsker II	.7445821	.3988162	1.87	0.062	-.0370832	1.526247
6 Førstelektor	1.026099	1.272656	0.81	0.420	-1.46826	3.520458
7 Faglig leder	-1.716781	1.076857	-1.59	0.111	-3.827381	.3938192
8 Postdoktor	1.840627	.4320086	4.26	0.000	.9939059	2.687348
9 Forsker III	2.523969	.4822226	5.23	0.000	1.57883	3.469108
10 Amanuensis	0	(empty)				
11 Spesialstillinger	0	(empty)				
14 Univ.- og høyskolelektor	2.14045	.6731962	3.18	0.001	.8210099	3.459891
15 Doktorgradsstip.	2.382031	.5065242	4.70	0.000	1.389262	3.3748
16 Vit.ass	3.817202	.6814006	5.60	0.000	2.481681	5.152723
age2	-.014815	.0021309	-6.95	0.000	-.0189915	-.0106385
residency						
1-3 years	.5011138	.2500985	2.00	0.045	.0109298	.9912977
4-7 years	.3572495	.3344192	1.07	0.285	-.2982001	1.012699
8-10 years	-.072925	.4520933	-0.16	0.872	-.9590116	.8131616
11-20 years	-.1689589	.5985198	-0.28	0.778	-1.342036	1.004118
21+ years	-.1283972	.7689252	-0.17	0.867	-1.635463	1.378668
kjønn	0	(omitted)				

Wage (ln 2011) by field and previous sector (areg)

Linear regression, absorbing indicators

Number of obs = 20204
 F(14, 20176) = 146.46
 Prob > F = 0.0000
 R-squared = 0.3124
 Adj R-squared = 0.3115
 Root MSE = 0.4510

ln_wage	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
sekt_minlår						
Institutt-sektor	.0552193	.0186079	2.97	0.003	.0187462	.0916924
Privatsektor	-.3558117	.0216586	-16.43	0.000	-.3982644	-.313359
Offentligsektor	-.3552039	.0177957	-19.96	0.000	-.390085	-.3203229
lærested_agg	.0005395	.0009786	0.55	0.581	-.0013786	.0024576
fagomraade						
200 Samfunnsvitenskap	.118874	.0095614	12.43	0.000	.1001329	.1376151
400 Matematikk og naturvitenskap	.1031996	.0111312	9.27	0.000	.0813814	.1250177
500 Teknologi	.1802725	.0107374	16.79	0.000	.1592264	.2013187
900 Landbruk/fisk/veterinær	.0331364	.0150727	2.20	0.028	.0035927	.0626801
aldersgruppe						
50-59(per 2010)	.0777715	.0109069	7.13	0.000	.056393	.09915
40-49(per 2010)	.0225184	.0112347	2.00	0.045	.0004974	.0445393
30-39(per 2010)	-.1439953	.0123379	-11.67	0.000	-.1681785	-.119812
20-29(per 2010)	-.2019241	.0161559	-12.50	0.000	-.2335909	-.1702572
doktorate	.018822	.0090139	2.09	0.037	.001154	.03649
kjønn	.0921169	.0068619	13.42	0.000	.0786669	.1055668
_cons	12.94286	.0131649	983.14	0.000	12.91706	12.96867
stillingskode_grov	F(13, 20176) =	117.044	0.000		(14 categories)	

Patterns and Directions of Researcher Mobility

Survey data



The survey lens

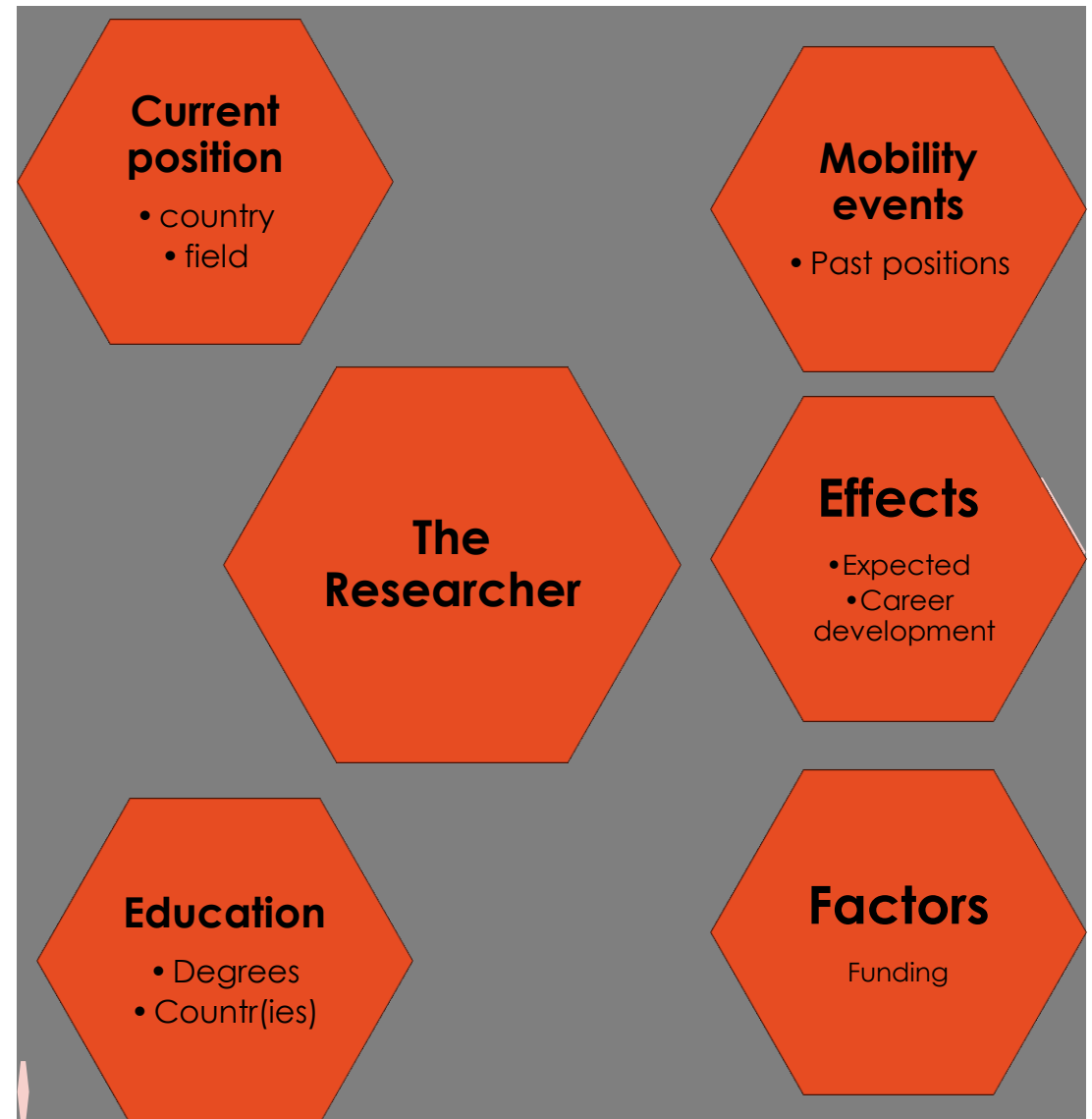
The **researcher** (country of birth, citizenship(s), gender, age, children)

Mobility events (up to five mobility events, countr(ies), duration, type)

Assessment of mobility among mobile as distinct from non-mobile researchers:

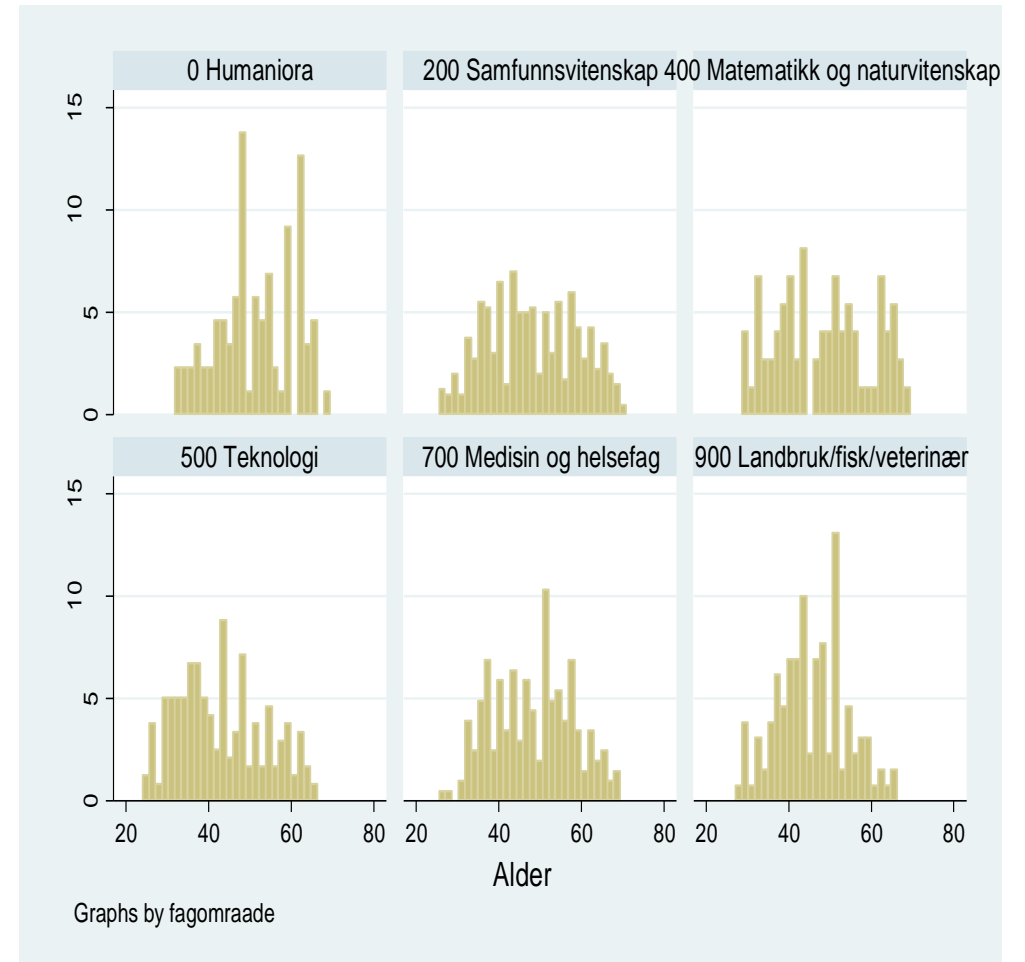
Design: Field of Science and Sector (PPS sample)

Response: 21%



Responses (n=1133)

Sample by FoS and Seniority



Initial exploration

Linear regression, absorbing indicators

Number of obs = 704
 F(14, 678) = 8.15
 Prob > F = 0.0000
 R-squared = 0.1865
 Adj R-squared = 0.1565
 Root MSE = 0.5920

Linear regression, absorbing indicators

Number of obs = 254
 F(19, 229) = 3.76
 Prob > F = 0.0000
 R-squared = 0.2840
 Adj R-squared = 0.2089
 Root MSE = 0.6242

Mobility1	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
fagomraade_ny						
Medical Sciences and Agri..	.0998722	.0936769	1.07	0.287	-.0840595	.2838039
Social Sciences and Human..	-.1582317	.0900565	-1.76	0.079	-.3350548	.0185914
Mobility2	.0519441	.0973128	0.53	0.594	-.1391265	.2430147
Mobility3	.3207225	.0521595	6.15	0.000	.218309	.423136
laerestedstype	.0342434	.0249187	1.37	0.170	-.0146837	.0831705
Fag	-.0001503	.0002599	-0.58	0.563	-.0006607	.0003601
age2	-.0001369	.0000337	-4.07	0.000	-.000203	-.0000708
gender	.0823349	.0485782	1.69	0.091	-.0130468	.1777167
phd_tidspunkt	-.0909283	.0134299	-6.77	0.000	-.1172975	-.064559
family#kids						
Single#kids under 15	-.0078499	.1518625	-0.05	0.959	-.3060273	.2903275
Single#kids over 15	.4360615	.2736846	1.59	0.112	-.1013097	.9734328
Not single#No kids	-.0174178	.076384	-0.23	0.820	-.1673954	.1325597
Not single#kids under 15	-.0914686	.0740873	-1.23	0.217	-.2369367	.0539994
Not single#kids over 15	-.0631846	.1210461	-0.52	0.602	-.3008548	.1744856
_cons	1.550588	.2055446	7.54	0.000	1.147007	1.954168
stillingskode_grov	F(11, 678) =		4.993	0.000	(12 categories)	

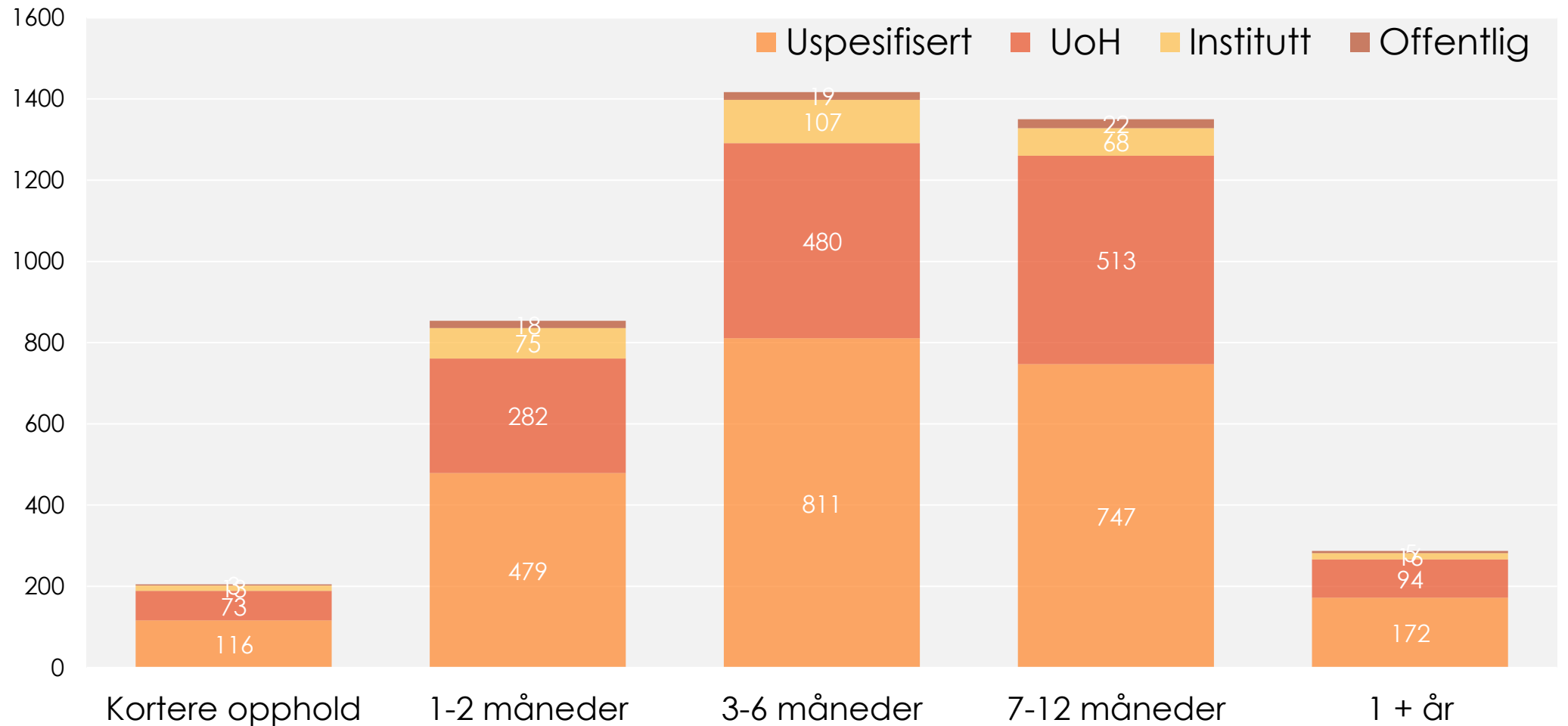
Mobility1	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
fagomraade						
500 Teknologi	.1722318	.1918505	0.90	0.370	-.2057861	.5502496
700 Medisin og hel..	.1706691	.2288823	0.75	0.457	-.2803155	.6216536
900 Landbruk/fisk/..	.2585393	.2519107	1.03	0.306	-.2378198	.7548984
Alder	.0805786	.0899918	0.90	0.372	-.0967391	.2578964
gender	.1777014	.0916086	1.94	0.054	-.0028021	.3582048
career_stage						
R2 Postdoc	-.69953	.3966661	-1.76	0.079	-1.481112	.0820519
R3 Fastestillinger	-1.198438	.3802987	-3.15	0.002	-1.94777	-.449106
R4 ProfI/ForskerI	-1.927111	.5226506	-3.69	0.000	-2.95693	-.8972924
Institutt_sample	.0063448	.0063743	1.00	0.321	-.006215	.0189045
stillingskode_grov						
Q21_2_1	-.087819	.0404402	-2.17	0.031	-.1675015	-.0081365
Q21_3_1	.0754975	.090539	0.83	0.405	-.1028984	.2538934
Q21_4_1	-.0556876	.0806713	-0.69	0.491	-.2146406	.1032654
Q21_5_1	-.080621	.0750852	-1.07	0.284	-.2285672	.0673251
Q21_6_1	-.224652	.0602922	-3.73	0.000	-.3434503	-.1058537
Q21_7_1	.1045745	.0631468	1.66	0.099	-.0198486	.2289976
Q24	-.1009723	.0905994	-1.11	0.266	-.2794872	.0775426
family	-.059862	.1105601	-0.54	0.589	-.2777071	.157983
kids	-.0497544	.0747908	-0.67	0.507	-.1971205	.0976118
_cons	5.078566	.7894325	6.43	0.000	3.523087	6.634046
phd_tidspunkt	F(5, 229) =		9.022	0.000	(6 categories)	

Patterns and Directions of Researcher Mobility

CV data



Shorter research visits registered in CVs



Paths forward

- ❑ The relationship of mobility & recruitment
- ❑ The effect of recruitment and of mobility on scientific production

eric@nifu.no