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Concentration Processes and its Effects on Research Performance

Evidence from European Public Sector Research Organisations

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Overview

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Background and motivation



Public sector concentration processes in Europe

- Public sector research landscape in Europe has undergone comprehensive changes over the last twenty years (Aula & Tienari, 2011)
- Growing internationalisation, drive for quality, rising importance of research and innovation, reliance on external (often private) sources of finance, privatization of former publicly administered institutions, etc.
→ places universities and public research organisations (PSROs) in a global competition
- Induced many reform processes, amongst others the initiation of mergers and take-overs (both, top-down governmental and institutionally driven)
 - to enable PSROs to gain critical mass and rationalise the use of resources and
 - to consolidate the regional/national research system

Characteristics of successful mergers and take-overs

- Most frequently cited rationales (Pruvot et al., 2015)
 - increased quality in research and teaching activities
 - realisation of economic gains (elimination of redundancies)
 - strengthening the position through increased competitiveness or a stronger position in relation to funders (becoming “world-class”)
 - geographical drivers (small and wide spread institutions)
- Empirically observed determinants
 - geographical proximity (Skodvin, 1999)
 - similar initial reputation (Hidalgo-Hidalgo & Valera, 2016)
 - similar historical contexts and path dependencies (Geschwind et al., 2016)
 - key actors (formal top leaders, informal brokers, change agents) (Geschwind et al., 2016)
 - external stakeholders involved (Stensaker et al., 2016)

Objectives of this study

- Literature on firm mergers & acquisitions and their effects on innovative performance and R&D activities is quite extensive (see Graebner et al., 2017)
- Systematic approaches to analyse rationales and outcomes of PSROs' mergers and take-overs are still scarce (exceptions Pruvot et al., 2015; Geschwind et al., 2016)
- The aims of this study are therefore
 - to give a *comprehensive overview* on concentration processes in Europe and
 - to analyse the link between the *aims* and *rationales* of mergers and take-overs, and the *research activities* of the involved PSROs
- We use a
 - novel data set on concentration processes in the HE and public research landscape in Europe along with an
 - in-depth long-term country analysis regarding the undergone concentration processes in the public research landscape
- in order to
 - develop a typology of concentration processes along different dimensions and to
 - identify possible determinants of successful mergers and take-overs.

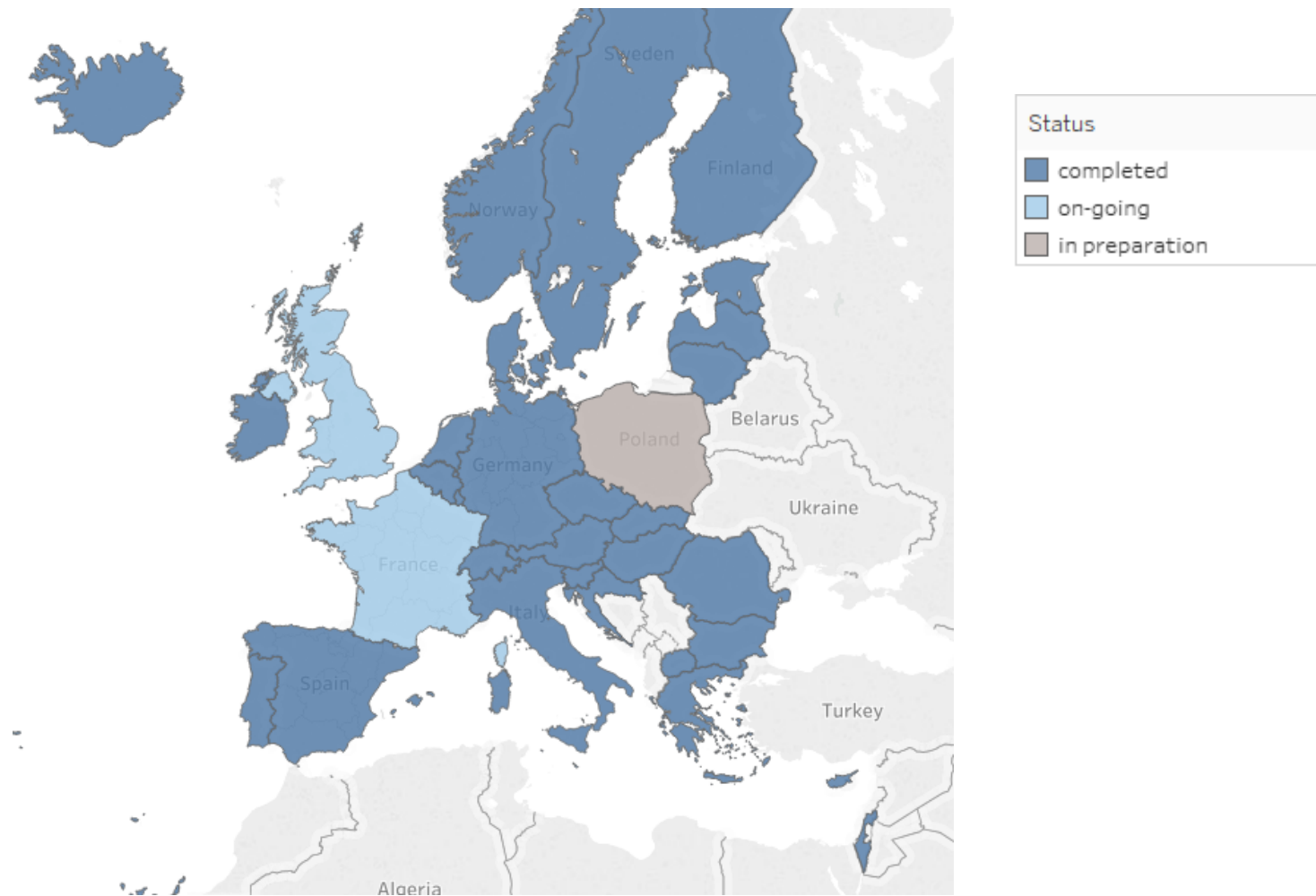
Data and methodological approach



Empirical basis I: OrgReg

- Analysis is based on data recorded in the Register of research and higher education organisations (OrgReg) a central facility within RISIS (risis.eu)
- We traced demographic events of public sector research organisations since 2000 in Europe and distinguished between different types of demographic events:
 - *mergers* of at least two entities creating a new legal entity,
 - *take-overs*, where an entity was absorbed by an existent entity,
 - *splits* of an existing entity into two or more independent entities, and
 - *spin-outs* of a section of an entity to create a new, separated entity.
- At the moment, OrgReg covers 292 demographic events for the time period between 2000 and 2016, whereof 158 events are take-overs, 113 mergers, 16 spin-outs and five splits.

Coverage of countries: Current status



Empirical basis II: EUPRO

- The European Framework Programmes (EU FP) have been conceived as one of the main instruments of European research policy to foster economic competitiveness and to stimulate knowledge diffusion across European countries
- EUPRO comprises systematic and cleaned information on more than 100,000 collaborative research projects from FP1 to H2020 and more than 80,000 participating organisations
- The institutions involved in the mergers and take-overs included in OrgReg have been matched with data on participations in EU FP from the EUPRO database to use the number of participations as a proxy for their *research capacity*

Typology of concentration processes

- Concentration processes are diverse in different aspects, e.g., with respect to their scope, the geographical and institutional dimension
- Thus, the were structured observed concentration processes along the following dimensions:
 - *type and scope* of concentration process: system-wide restructuring process with strong political involvement or primarily local institutional context
 - *geographical proximity*: centralisation of widely spread organisations or consolidation of geographically close organisations
 - *type of organisations* involved (HEI, PRO, etc.): similar or complementary
 - *research capacity* of organisations involved: agglomeration of research intensive organisations or absorption of small entities

Analysis of the effects of concentration processes

- For the analysis of the effects of concentration processes we focus on 96 mergers and 129 take-overs between 2000 and 2013.
- We presume five years as the period after which a merger becomes effective. Thus, we only include events up to the year 2013, since research output effects might not become entirely apparent after that.
- The effects before and after the event are assessed in two steps:
 - *first*, the preceding (parents) and the subsequent organisations (children) are assigned to a distinct event.
 - *second*, the participations in projects within a five year interval before and after the event year (excluding the actual year of merger) are averaged.

Preliminary findings (I)

Descriptive overview of events based on typology

Type and scope of events

Geographical proximity

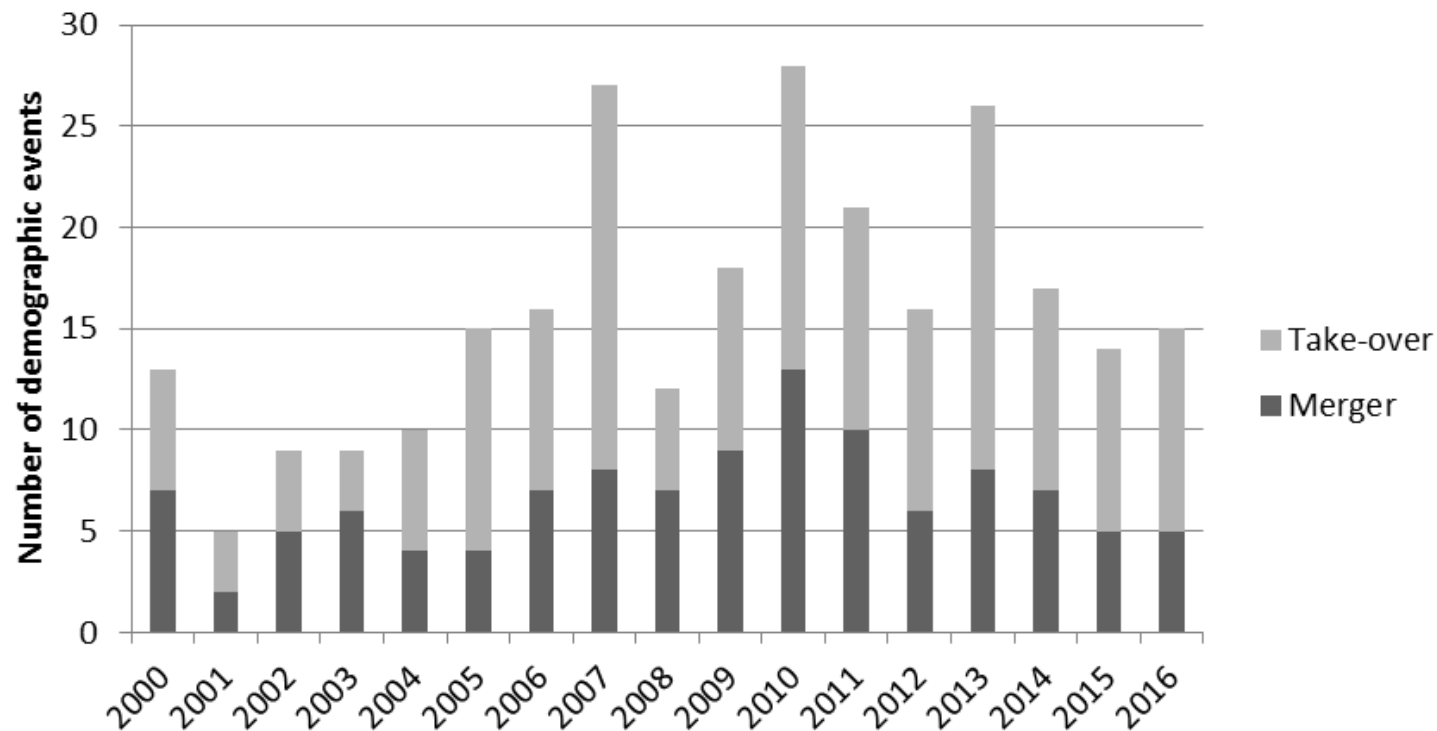
Type of organisations

Research capacity



Demographic events since 2000

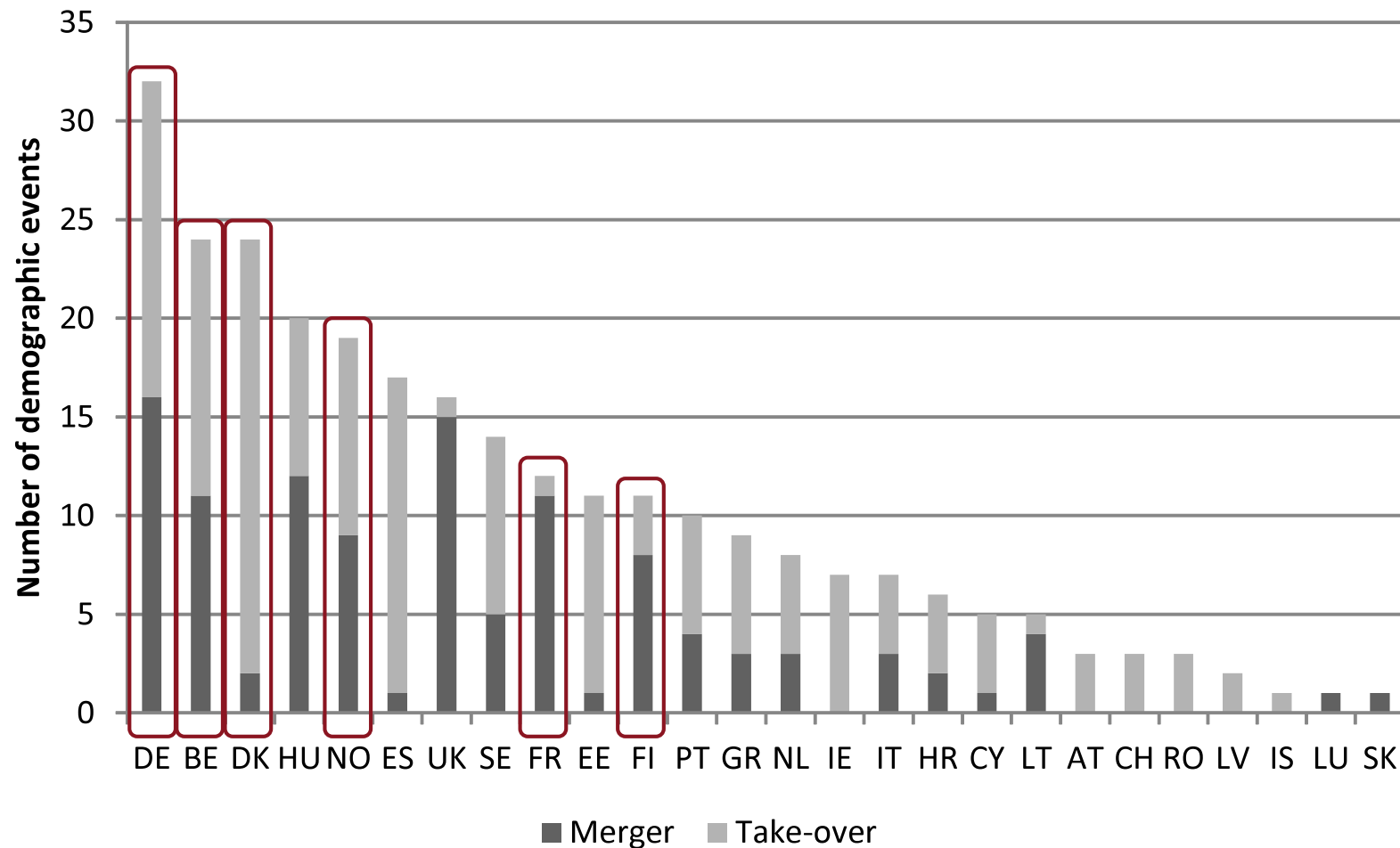
- 113 mergers and 158 take-over distributed over 27 countries between 2000 and 2016



Type and scope of events in European countries (I)

- Large differences regarding number and type of concentration processes in different countries
- We may distinguish between mergers and take-overs,
 - i. connected to a *system-wide* restructuring process of the public sector research landscape, induced by public authorities as a response to perceived deficiencies in existing research systems (e.g., in Denmark and France),
 - ii. *incidental* concentration processes, in a primarily local context, initiated by HEIs and PROs themselves to improve their strategic position in the public sector research market (e.g. in Germany and Norway), and
 - iii. a *mixture* of incidental and system-wide events intending to stimulate mergers of autonomous HEIs (e.g., in Belgium and Finland).

Type and scope of events in European countries (II)

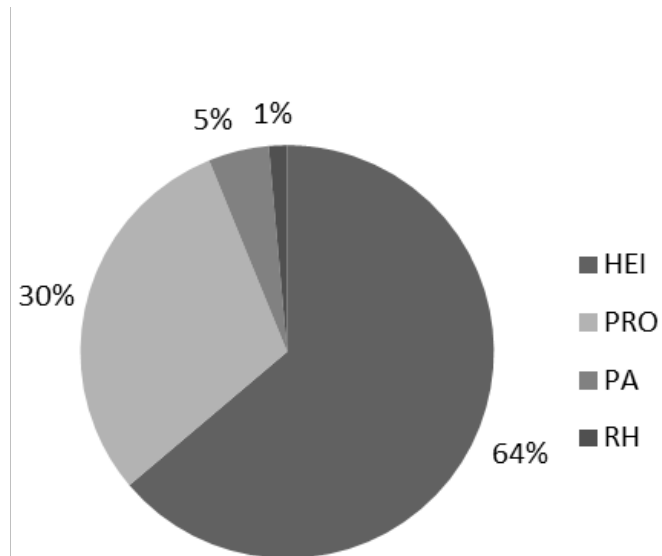


Geographical proximity in concentration processes (I)

- We also considered the geographical dimension and investigated whether demographic processes took place within or across regions.
 - *within the region*: all organisations involved in the concentration process are situated in the same NUTS2 region
 - *across regions*: organisations belong to different NUTS2 regions.
 - *partially within the region*: mergers, in which the parent organisations are situated in different NUTS2 regions, but the newly created organisation is situated in the same NUTS2 region as one of the parent organisations

Type of dimension	Merger		Take-over	
	<i>counts</i>	<i>share</i>	<i>counts</i>	<i>share</i>
within the region	83	73%	121	77%
partially within the region	27	24%	-	-
across regions	3	3%	37	23%
Total	113	100%	158	100%

Type of organisations involved (I)



- 633 public sector research organisations
 - 404 higher education institutions (HEI)
 - 190 public research organizations (PRO)
 - 30 public administration research (PA)
 - 9 research hospitals (RH)

Type of organisations involved (II)

PSRO types involved	Merger		Take-over	
	<i>counts</i>	<i>share</i>	<i>counts</i>	<i>share</i>
HEI	69	61%	93	59%
PRO	27	24%	31	20%
PRO+HEI	4	4%	24	15%
PA	7	6%	2	1%
PA+HEI	-	-	1	1%
PA+PRO	1	1%	5	3%
RH	3	3%	1	1%
OTH+HEI	2	2%	-	-
OTH+PRO	-	-	1	1%
Total	113	100%	158	100%

Abbreviations: PSRO... Public sector research organisation; HEI... Higher education institution; PRO... Public research organisation; PA... Public administration research organisation; RH... Research hospitals; OTH... Others

Research capacity of organisations involved (I)

Type of research capacity	Merger		Take-over	
	<i>counts</i>	<i>share</i>	<i>counts</i>	<i>share</i>
no / no	23	20%	34	22%
no / very low	33	29%	24	15%
no / low	-	-	5	3%
no / high	-	-	4	3%
no / very high	-	-	3	2%
very low / low	-	-	4	3%
very low / very low	50	44%	38	24%
very low / low	5	4%	14	9%
very low / high	-	-	19	12%
very low / very high	-	-	9	6%
low / very low	-	-	1	1%
low / high	1	1%	2	1%
low/ very high	1	1%	-	-
high / very high	-	-	1	1%
Total	113	100%	158	100%

Abbreviations: no... 0 participations; very low... 1 to 24 participations; low... 25 to 49 participations; high... 50 to 99 participations; very high... more than 100 participations

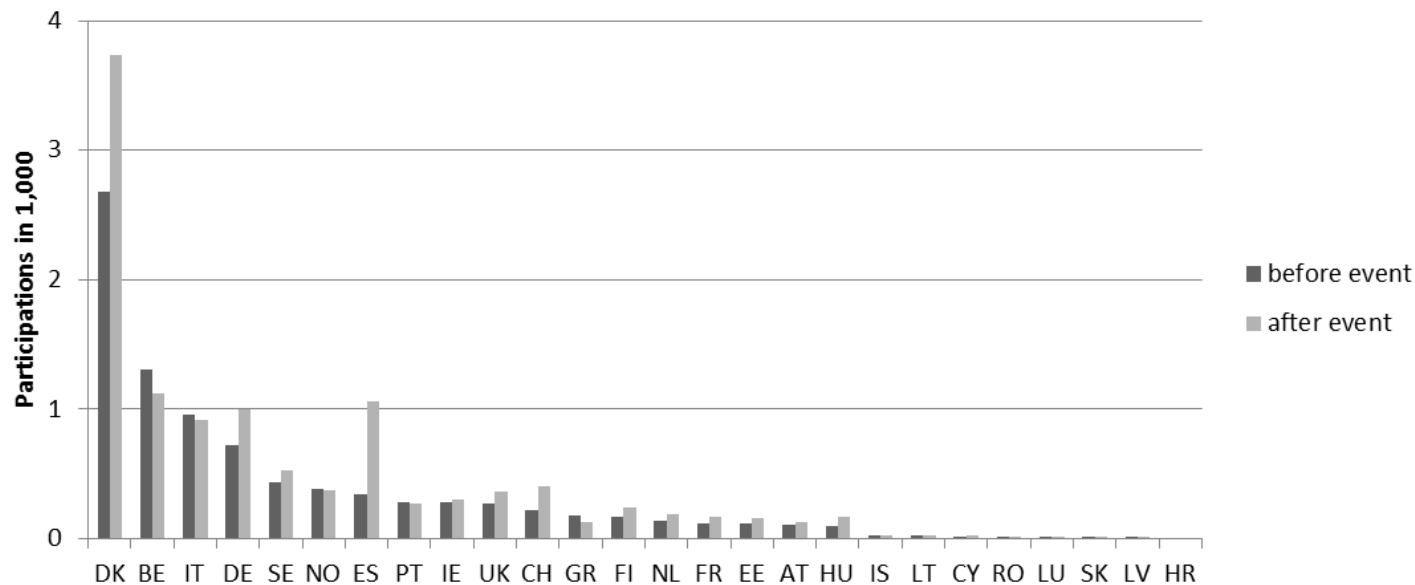
Preliminary findings (II)

Effects of concentration processes



Effects of concentration processes on the country level

- The analysis reveals a huge variety of the growth rates across countries
- Large differences in growth rates resulting from
 - (1) varying participation numbers of countries and/or
 - (2) large differences in the size of the engaged organisations



Countries with *system-wide* restructuring processes

- Denmark:
 - increased number of participations (39%)
 - each event under consideration shows growing numbers of participations
 - high growth rates after events dealing with the integration of PROs in HEIs (*Universities of Aalborg and Aarhus, Technical University of Denmark and University of Copenhagen*)
- France:
 - increased number of participations (41%), but effects are more diverse
 - strongly increased participation after the foundation of the *Universities of Aix-Marseille* (+167%) and *Lorraine* (+110%)
 - only slight increased participation after merger of *University of Strasbourg* (15%)
 - decreased participations after the mergers into *University of Nancy* (-62%)

Countries with *incidental* concentration processes

- Germany
 - increased number of participations (38%)
 - increased participations after the merger of the *University of Duisburg-Essen* (+76%) and *Karlsruhe Institute of Technology* as part of the “Excellence Initiative” after 2009 (+66%)
 - stagnation or decline of participation numbers after of the three governmental institutions owned by the *Ministry of Food and Agriculture*
- Norway
 - Decreased number of participations (-3%)
 - only single events which mainly concerned university colleges with only sporadically participations in the EU FPs
 - increased participation is noticeable after the PRO merger of *Nofima* (Norwegian Institute of Food, Fisheries and Aquaculture) in 2009 (+61%)

Mixtures of system-wide & incidental concentration processes

- Belgium
 - Decreased number of participations (-14%)
 - only 55% of organisations participated in EU FPs
 - Very strong increase after the merger of the *University of Antwerp* (+267%), also strong increase for *Université de Mons* (+96%)
 - participation numbers declined considerably after take-over of *Gembloux Agro-Bio Tech* by the *University of Liège* (-38%) and the integration of *FUCAM* by the *University of Louvain* (-13%)
- Finland
 - Increased participation numbers (38%)
 - strong increase of participation numbers of *Aalto University* (126%) and of the *University of Eastern Finland* (64%)
 - participation numbers decreased after the PRO merger of the National Institute for Health and Welfare (-69%)

Concluding remarks and outlook



Concluding remarks (I)

- The aim of this study was to analyse the effects of mergers and take-overs on research activities in terms of project participation in EU FP within five years after the event
- Concentration processes are characterised by a huge heterogeneity regarding the *type and scope of concentration processes*, the *geographical proximity* as well as the *type and research capacity* (size) of organisations involved
- We therefore developed
 - in a first step a *typology of concentration processes* along these dimensions and
 - analysed in a second step the *effects on the EU FP research activities* of the resulting institutions
- The analysis was based on a novel data set comprising data on concentration processes between 2000 and 2016 in 27 countries and EU FP data on projects between 1995 and 2018

Concluding remarks (II)

- The study provides for the first time a comprehensive quantitative overview on the characteristics of concentration processes in Europe between 2000 and 2016 and reveals the following results:
 - Demographic events in the early 2000s were limited to a few countries as an outcome of policy processes and
 - Concentration processes were more diffused in the later 2000s due to gained autonomy of universities
 - Countries show considerable differences regarding number, type and scope of concentration processes (merger / take-over; system-wide / incidental)

Concluding remarks (II)

- Concentration processes occur most often within the same region, take-overs to an even higher degree (77%) than mergers (74%)
- Concentration processes affect in nearly all cases organisations of similar type, mergers to a higher degree (94%) than take-overs (80%)
- Most concentration processes concern small organisations with no or very low research capacity; again, the organisations are of similar type in mergers to a higher degree (98%) than in take-overs (71%)
- We also categorised countries according to the involvement of public authorities (system-wide, incidental/local and a mixture of both), but no compelling pattern regarding the effects on the quantity of research activities are identifiable due to the heterogeneous character of events and organisations

Outlook

- Completion of the dataset for the remaining European countries (United Kingdom, France, Poland)
- Enhancement of the typology by also considering
 - the institutional profile of organisations involved (comprehensive universities or specialised universities) and
 - publications and citations as proxies for research activities and international visibility
- Further analysis on the concentration effects with respect to our developed typology – descriptive as well as within a regression framework – in order
 - to identify determinants of successful PSRO mergers and take overs and
 - to assess the impact of concentration processes on the subsequent research activities and performance of the newly formed institution