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Influence of the academic drift and subject specialisation on the participation of Universities of Applied Sciences in EU research projects

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Research Domain: International contexts and perspectives (ICP)

Abstract: The development of research activities in University of Applied Sciences (UAS) has often been associated to the term "academic drift", which implies an attempt to replicate the model of Universities towards the establishment of a unitary higher education system, as it happened to the polytechnics in the United Kingdom in 1992. In most European countries, however, UASs adopted characteristics of Universities, but kept a certain degree of differentiation, e.g. research missions towards applied sciences and/or regional innovation.

The present work investigates how UASs' heterogeneity is reflected in their participation in Horizon 2020, the eighth European Framework Program for Research (EU-FP). We analyse UASs' and ex-UASs' participation at the organizational level, considering their proximity to the University model (University status, availability of PhD programs), their research and innovation output (prior experience in EU-FPs, publications, and patents), education intensity, and subject specialization (STEM vs. Social Sciences and Humanities).

Paper: Introduction

UASs represent an important component of European higher education. While created as teaching-only institutions, in the course of time, several UASs have acquired an official mandate to conduct research. A scholarly debate has emerged on whether developing research means that UASs are becoming increasingly similar to traditional universities ("academic drift") or whether UASs are developing a specific mission, oriented towards applied research and regional development (Burgess 1972; Neave 1979; Lepori & Kyvik 2010). Comparative research has shown important cross-country differences in this respect (Kyvik & Lepori 2010; Vossensteyn & De Weert 2013).

Through the provision of grants from basic to applied research, EU-FPs are the main drivers in the development of the European research and innovation areas. Due to their close ties to regional innovation and industry, UASs can highly contribute to the EU-FPs' objectives and the establishment of a European innovation area.

This paper aims at investigating how UASs' heterogeneity is reflected in their participation in EU-FP projects. Literature on EU-FP participation indicates that project acquisition significantly relies on scientific reputation and network mechanisms (Lepori et al. 2015). Some scholars highlight the existence of “closed clubs” of research institutions that accumulate EU funding at the expense of more peripheral and less reputed institutions (Enger 2018).

The scope of this paper is twofold. We firstly intend to verify whether the UASs with more participations are the ones that are closer to the model of traditional universities, notably considering ex-UASs that acquired the University status and UASs that can deliver PhD degrees. Secondly, we investigate the influence of UASs’ subject-orientation on EU-FP participation, particularly between STEM- and SSH-oriented UASs.

Methodology

Since we expect variations across the types of EU projects, we consider participation in different H2020 funding schemes covering the whole spectrum from fundamental to applied research, namely the European Research Council grants and Marie Skłodowska-Curie Actions (ERC & MSCAs), Research and Innovation Actions (RIAs) and Innovation Actions (IAs).

To measure and identify patterns in UAS EU-FPs participation, we use a set of potential explanatory variables (cf. Table 1).

The final sample includes a total of 391 UASs and ex-UASs in ten different countries, of which 21 are located in Austria, 16 in Belgium’s Flemish region, eight in Switzerland, 187 in Germany, 24 in Finland, 14 in Ireland, 37 in the Netherlands, 13 in Norway (including three ex-UAS), 48 in Portugal, and 23 ex-polytechnics in the UK.

Since our dependent variables are count variables that follow a negative binomial distribution, we use the negative binomial regression method. To better account for patterns among current UAS, we distinguish the “Full model” which includes ex-UASs, and the “UAS model” which only covers UASs. Since “Reputation” is highly correlated with “FPexp” (0.60), we avoid including both variables in the same model and perform two separate regressions, as the results may differ depending on which of these two variables we consider.

Results

Figure 1 shows that there is a rather high divergence according to countries, in terms of levels of UAS participation in EU-FPs. We observe that UK ex-UASs have the highest levels of participation in the ERC and MSCA schemes, while Switzerland is the country with the most UAS participations in RIAs and IAs. German, Portuguese, Dutch and Flemish UASs have rather low levels of participation.

The negative binomial regressions show different patterns according to the project types and regression models (Table 2). Previous EU-FP experience is however highly correlated with participation in all three project types. Expectedly, UASs’ integration to EU-FP networks is, therefore, a major factor for EU-FP participation. Another variable with constantly significant p-values is “education intensity” which is negatively correlated with participation in all project types and independently of the model. We suggest that academic staff in UASs with high levels of education intensity have less time to allocate for research activities.

We did find statistically relevant evidence on the effect of academic drift on participation in ERC-MSCA and RIAs, where ex-UASs and UASs with PhD programs tend to acquire more project participations. These funding schemes typically support basic research and/or the exploration of the feasibility of new or improved solutions. MSCAs are also targeting primarily PhD-awarding institutions.

STEM intensity is found to be highly correlated with UASs' participation in RIAs. This may either reflect an orientation of RIAs towards natural and technical disciplines or the choice of EU consortia to opt for other types of institutions to cover SSH activities.

References: Table 1: List of variables

Variables	Definition	Source
Dependent variables		
ERC-MSCA	Number of European Research Council (ERC) grants and Marie Sklodowska-Curie Actions (MSCA) projects acquired from 2014 to June 2020	CORDIS
RIA	Number of H2020 Research and Innovation Actions (RIA) acquired from 2014 to June 2020	CORDIS
IA	Number of H2020 Innovation Actions (IA) acquired from 2014 to June 2020	CORDIS
UAS organizational characteristics		
Size	Number of academic staff in FTEs (2016)	ETER
PhD-award	Dummy variable equals 1 if the UAS awards PhD degrees or 0 otherwise	ETER
Uni status	Dummy variable equals 1 if the UAS has the university status or 0 otherwise	ETER
STEM orient.	Number of ISCED 5-7 students in Health, Natural sciences, ICT and Engineering, divided by total number of students enrolled at ISCED 5-7 (2016)	ETER
STEM size	Number of students enrolled at ISCED 5-7 in Health, Natural sciences, ICT and Engineering, divided by Size (2016)	ETER
Education intensity	Total graduates ISCED 5-7, divided by Size (2016)	ETER
UAS research outcomes		
FPexp	Number of EU-FP projects from FP1 to FP7, divided by Size	EUPRO, ETER
Reputation	Number of publications belonging to the Top 10% of their field, divided by Size (2016)	CWTS, ETER
Patents	Number of priority patents, divided by Size (2010-2014)	RISIS Patent, ETER

Figure 1: UAS participation in H2020 according to countries

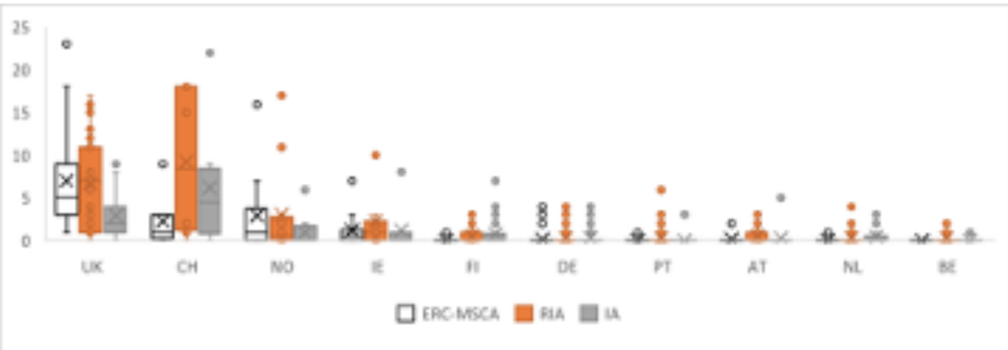

Table 2: Negative binomial regressions for UASs and ex-UASs in ERC-MSCA, RIA and IA within the full model (N=350) and the UAS model (N=325). Correlation significant at the 0.001 (***), 0.01 (**) and 0.05 (*) levels

	ERC-MSCA							
	Full (FPexp)		Full (Rep)		UAS (FPexp)		UAS (Rep)	
	Coefficient	Robust SE	Coefficient	Robust SE	Coefficient	Robust SE	Coefficient	Robust SE
Uni status	3.163***	0.417	3.271***	0.403				
PhD-Award	1.590***	0.371	1.656***	0.345	1.582***	0.472	1.542**	0.488
FPexp	19.988**	6.500			45.310***	13.357		
Reputation			16.553**	5.823			35.774*	15.849
Patents	1.290	10.323	4.767	8.943	- 8.503	15.689	1.351	13.469
Edu. Intensity	- 0.188***	0.046	- 0.156***	0.042	- 0.188**	0.064	- 0.199**	0.066
STEM orient.	2.034*	0.834	2.022*	0.801	2.387*	1.078	2.823*	1.118
STEM size	- 0.059	0.031	- 0.058	0.030	-0.058	0.038	-0.081*	0.041
_cons	- 1.380***	0.298	- 1.395***	0.291	- 1.731***	0.388	-1.486***	0.377
Prob > chi2	0.000		0.000		0.000		0.000	
R-squared	0.280		0.274		0.189		0.163	

	RIA							
	Full (FPexp)		Full (Rep)		UAS (FPexp)		UAS (Rep)	
	Coefficient	Robust SE	Coefficient	Robust SE	Coefficient	Robust SE	Coefficient	Robust SE
Uni status	0.986*	0.482	2.064***	0.507				
PhD-Award	1.159**	0.407	1.333**	0.442	1.175**	0.457	1.145*	0.532
FPexp	38.892***	7.816			54.650***	12.123		
Reputation			21.228	9.604			50.721*	22.906
Patents	- 16.468	11.832	- 9.442	11.591	- 19.686	14.594	- 8.606	13.781
Edu. Intensity	- 0.112***	0.026	- 0.101***	0.026	- 0.113***	0.029	- 0.104***	0.029
STEM orient.	2.297**	0.791	3.001***	0.884	2.361**	0.891	2.971**	1.001
STEM size	-0.040	0.026	- 0.079**	0.029	- 0.032	0.028	- 0.072*	0.033
_cons	- 0.804**	0.255	- 0.482	0.259	- 1.015***	0.294	- 0.683*	0.309
Prob > chi2	0.000		0.000		0.000		0.000	
R-squared	0.159		0.127		0.127		0.091	

	IA							
	Full (FPexp)		Full (Rep)		UAS (FPexp)		UAS (Rep)	
	Coefficient	Robust SE	Coefficient	Robust SE	Coefficient	Robust SE	Coefficient	Robust SE
Uni status	- 0.128	0.543	1.750**	0.621				
PhD-Award	- 0.116	0.581	0.630	0.000	- 0.149	0.668	0.485	0.735
FPexp	47.834***	8.844			64.875***	13.950		
Reputation			10.052	11.480			40.665	29.982
Patents	- 2.795	10.242	3.508	11.098	- 7.122	12.638	2.612	13.138
Edu. Intensity	- 0.107***	0.031	- 0.086**	0.029	- 0.112**	0.036	- 0.089**	0.034
STEM orient.	1.357	0.866	2.234*	1.031	1.509	1.011	2.198	1.227
STEM size	- 0.003	0.026	- 0.039	0.299	- 0.001	0.029	- 0.037	0.035
_cons	- 1.301***	0.301	- 0.829*	0.334	- 1.487***	0.349	- 0.977*	0.412
Prob > chi2	0.000		0.000		0.000		0.000	
R-squared	0.137		0.072		0.122		0.051	

References

- Brennan, J. & Williams, R. (2008). Higher Education Outside the Universities: The UK case. In J.S. Taylor et al. (Eds.), *Non-University Higher Education in Europe*. Springer Netherlands.
- Breschi, S. & Cusmano, L. (2004). Unveiling the texture of a European Research Area: emergence of oligarchic networks under EU Framework Programs. *International Journal of Technology Management,* 27(8): 747-772.
- Burgess, T. (1972) The Shape of Higher Education, London: Cornmarket Press.
- Christensen, S. & Newberry, B. (2015). The Role of Research in Academic Drift Processes in European and American Professional Engineering Education Outside the Universities. In: Christensen, S. et al. (eds) *International Perspectives on Engineering Education. Philosophy of Engineering and Technology*, vol 20. Springer, Cham.
- De Boer, H.F. (2016). The Netherlands - Strengthening research in Universities of Applied Sciences. Luxembourg: Publications Office of the European Union.
- De Weert, E. & Beerkens-Soo, M. (2009). *Research at Universities of Applied Sciences in Europe, Conditions, Achievements and Perspectives, On the initiative of the European Network for Universities of Applied Sciences*. European Network for Universities of Applied Sciences (UAS).
- Dinges, M., Gassler, H., Elixmann, D., Marcus, S., Gries, C-I. (2013). *SMEs participation under Horizon 2020: Study*. Directorate-General for Internal Policies of the Union, European Parliament.
- Dunkel, T. & Le Mouillour, I. (2008). "Through the Looking-Glass". Diversification and differentiation in vocational education and training and higher education, In: Descy, P. & Tessaring, M. *Modernising education and training: fourth report on vocational training research in Europe: background report*. Luxembourg: Office for Official Publications of the European Communities.
- Elken, M. & Frølich, N. (2016). Pulling the Plug in a Bathtub: The Big Consequences of a Small Change in Norwegian Higher Education. In: De Boer et al. *Policy Analysis of Structural Reforms in Higher Education*. Palgrave Studies in Global Higher Education. Palgrave Macmillan, Cham.
- Enger, S.G. (2018). Closed clubs: Network centrality and participation in Horizon 2020. *Science and Public Policy*, 45(6): 884-896.

- European Association of Institutions in Higher Education (EURASHE) & Harmonising Approaches to Professional Higher Education in Europe (HAPHE) (2014). Professional Higher Education in Europe: Characteristics, Practice examples and National differences.
- Gardner, W., Mulvey, E. P., & Shaw, E. C. (1995). Regression analyses of counts and rates: Poisson, overdispersed Poisson, and negative binomial models. *Psychological Bulletin, 118*(3): 392–404.
- Geuna, A. (1996). The participation of higher education institutions in European Union Framework Programs. *Science and Public Policy*, 23(5): 287-296.
- Heggen, K., Karseth, B. and Kyvik, S. (2010). The Relevance of Research for the Improvement of Education and Professional Practice', in S. Kyvik and B. Lepori (eds.) *The Research Mission of Higher Education Institutions Outside the University Sector*, Dordrecht: Springer.
- Highman, L. (2020). Irish technological universities and the binary divide: a qualitative study. *Higher Education* 79: 637–656.
- Jongbloed, B. (2010). The Regional Relevance of Research in Universities of Applied Sciences. In S. Kyvik, & B. Lepori (Eds.), *The Research Mission of Higher Education Institutions outside the University Sector: striving for differentiation* (pp. 25-44). Dordrecht: Springer.
- Kleger, N. (2016). Positioning Swiss Universities of Applied Sciences in the European research and innovation landscape, SwissCore, Brussels, June 2016.
- K4I Forum in the European Parliament (2021). European Innovation Area Manifesto.
- Kyvik, S. (2004). Structural changes in higher education systems in Western Europe. *Higher Education in Europe*. Vol. 29, Issue 3.
- Kyvik, S. & Lepori, B. (Eds.) (2010). The Research Mission of Higher Education Institutions outside the University Sector. Dordrecht: Springer.
- Laurens, P., Le Bas, C., Schoen, A., Villard, L. & Larédo, P. (2015). The rate and motives of the internationalisation of large firm R&D (1994–2005): Towards a turning point? *Research Policy, 44(3)*: 765-776.
- Leifgen, H. & Burkhart, S. (2019). Internationalisation of universities of applied sciences. DAAD Working Paper.
- Lepori, B. (2008) 'Research in non-university higher education institutions. The case of the Swiss universities of applied sciences', *Higher Education* 56(1): 45–58.
- Lepori, B., Huisman, J., Seeber, M. (2014). Convergence and differentiation processes in Swiss higher education: An empirical analysis. *Studies in Higher Education* 39(2): 197–218.
- Lepori, B. & Kyvik, S. (2010). Sitting in the Middle: Tensions and Dynamics of Research in UASs. In S. Kyvik, & B. Lepori (Eds.), *The Research Mission of Higher Education Institutions outside the University Sector: striving for differentiation* (pp. 237-255). Dordrecht: Springer.
- Lepori, B., Veglio, V., Heller-Schuh, B., Scherngell, T., Barber, M. (2015). Participations to European Framework Programs of higher education institutions and their association with organizational characteristics. *Scientometrics*, vol. 105(3): 2149-2178.
- Neave, G. (1979). Academic drift: Some views from Europe, *Studies in Higher Ed.* 4: 143–159.
- OECD (1998). *Redefining tertiary education*. Paris: OECD.
- Paier, M. & Scherngell, T. (2011). Determinants of collaboration in European R&D networks: empirical evidence from a discrete choice model. *Industry and Innovation*, 18(1): 89-104.
- Teichler, U. (2008). The End of Alternatives to Universities or New Opportunities? in J.S. Taylor, J.B Ferreira, M.L. Machado and R. Santiago (eds.) *Non-University Higher Education in Europe* (pp. 1–13), Dordrecht: Springer.
- UAS4Europe (2018). Position paper on Horizon Europe. Brussels, 25 September 2018.
- Vossensteyn, H. & De Weert, E. (2013). Trends in Universities of Applied Sciences in Europe. In File, J. et al. (ed.), *Policy Challenges for the Portuguese Polytechnic Sector*. Twente: CHEPS.
- Waltman, L., Calero-Medina, C., Kosten, J., Noyons, E., Tijssen, R.J.W., van Eck, N.J., van Leeuwen, T.N., van Raan, A.F.J., Visser, M.S., Wouters, P. (2012). The Leiden Ranking 2011/2012: Data collection, indicators, and interpretation. *Journal of the American society*

for information science and technology 63.12: 2419-2432.
- Wanzenboeck, I., Lata, R., Ince, D. (2020). Proposal success in Horizon 2020: A study of the influence of consortium characteristics. *Quantitative Science Studies*. Advance Publication.