The European Commission's science and knowledge service

Joint Research Centre

European Commission

The connection of European regions by cross-regional M&A

Michele Aquaro and Giacomo Damioli (Joint Research Centre, European Commission)

Balazs Lengyel (Eötvös Loránd Research Network)

Innova Measure IV final Workshop

Private investments and regional cohesion and innovative performance

28/09/2020

European Commission

Object of the study

- Focus on the *connection of EU regions* through M&A
- Cross-regional M&A generate new geographic landscapes of production:
  - shift control from regions of targets to those of acquirers
  - promote knowledge transfer and diffusion across regions

Background - literature

- Geographical concentration of M&A activity (Zademach and Rodrigues-Pose 2009)
  - driven by economic agglomeration (GDP, population) and proximity
  - institutional factors play little role

- Increasing regional integration (McCarthy and Dolfsma 2015)
  - increasing distance between acquirers & targets, more targets in peripheral regions
  - positive role of the EU policy (introduction of the EMU and the euro, EU enlargement)

Background - policy

- Increasing divergence of EU regions challenges social cohesion, political stability and economic growth (Iammarino et al. 2019)

- Policies at stake related to process of integration of the EU:
  - Cohesion Policy: balanced regional development
  - European Research Area: creation of a common R&I area

Research question

- Do M&As contribute to the geographic connection of European regions into a unified business area?
- What regional characteristics help to connect locations?
- Are there differences between innovative and non-innovative M&A?

Data and methods

- Data: Zephyr, Orbis Intellectual Property, Eurostat Postcode Directory

- Sample: 39,346 cross-regional M&A 2003-2017, distinguished by:
  - acquirers' & targets' locations (NUTS 2 regions)
  - innovative (4,182) and non-innovative (35,164) M&A
    [innovative: 1+ patent applications in the previous 20 years]

- Methods: combination of network and regression techniques

Findings – innovative vs non-innovative M&A

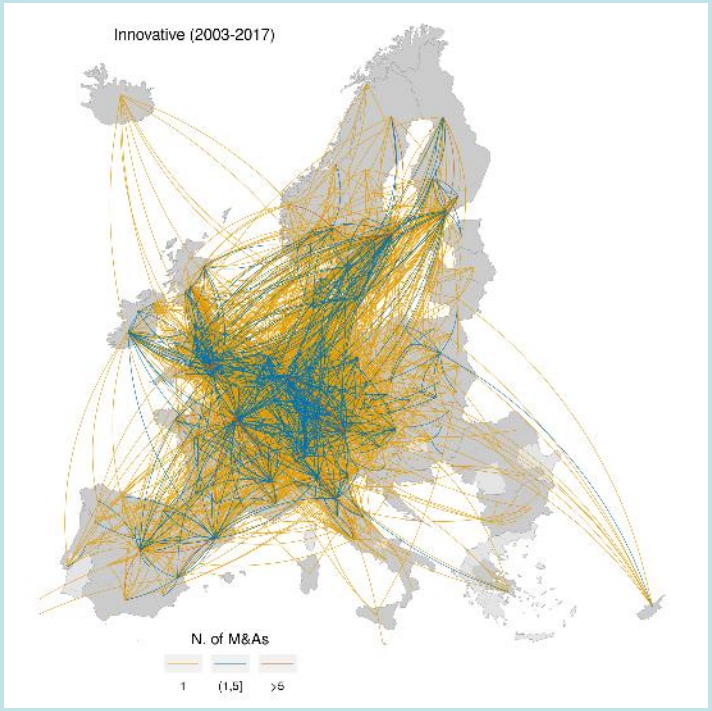
- Innovative M&A are more international
- Innovative international M&A connect more frequently the same region pairs
- Innovative M&A concentrates more into pairs of developed regions

	Innovative	Non-innovative
Foreign (deals)	50.5%	36.2%
Foreign (edges)	60.6%	66.0%
Acquirers and targets in more developed regions	88.3%	81.9%

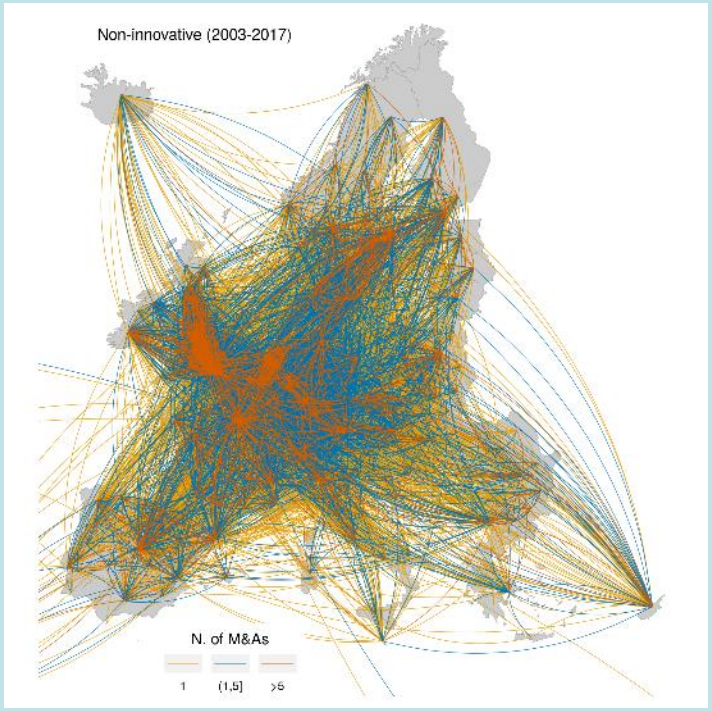
Findings – innovative vs non-innovative M&A

- The innovative network concentrates into pairs of regions in EU15 countries, the non-innovative one reaches regions of EU13 countries as well

Innovative



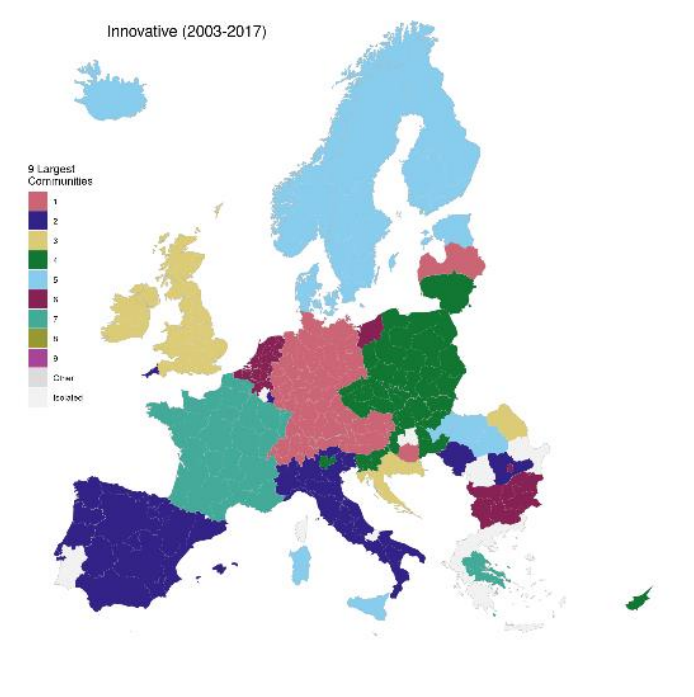
Non-innovative



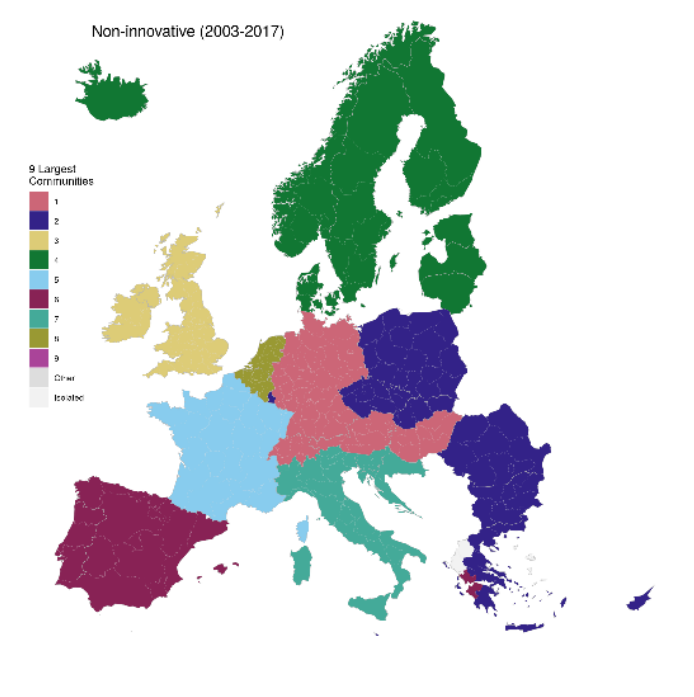
Findings – network communities

- Both the innovative and non-innovative networks are fragmented by country borders or into groups of neighboring countries

Innovative



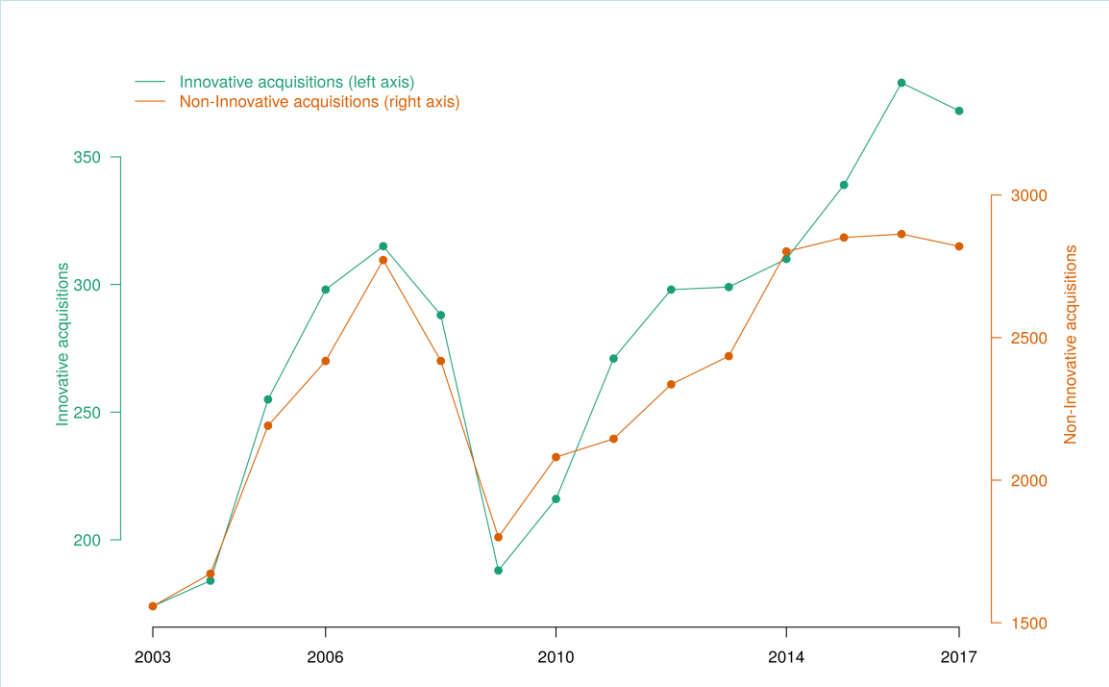
Non-innovative



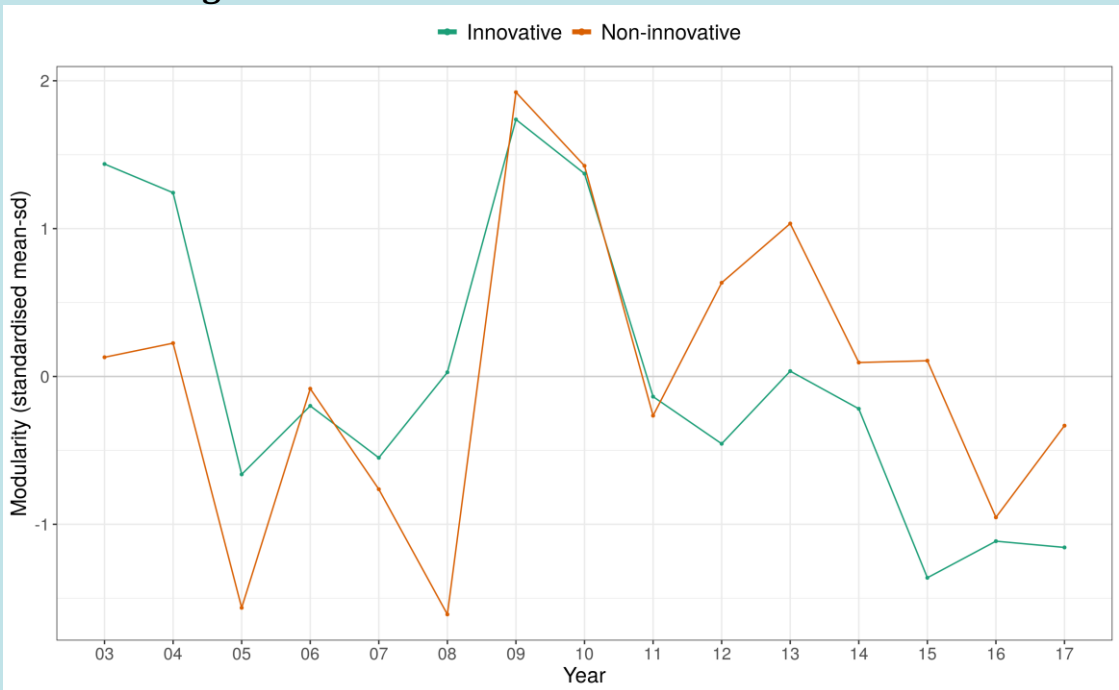
Findings – increasing communities' integration

- Network fragmentation decreases when M&A activity intensifies suggesting a positive contribution of M&A activity to the process of integration of European regions into unified economic and innovation areas

M&A activity (number of deals)

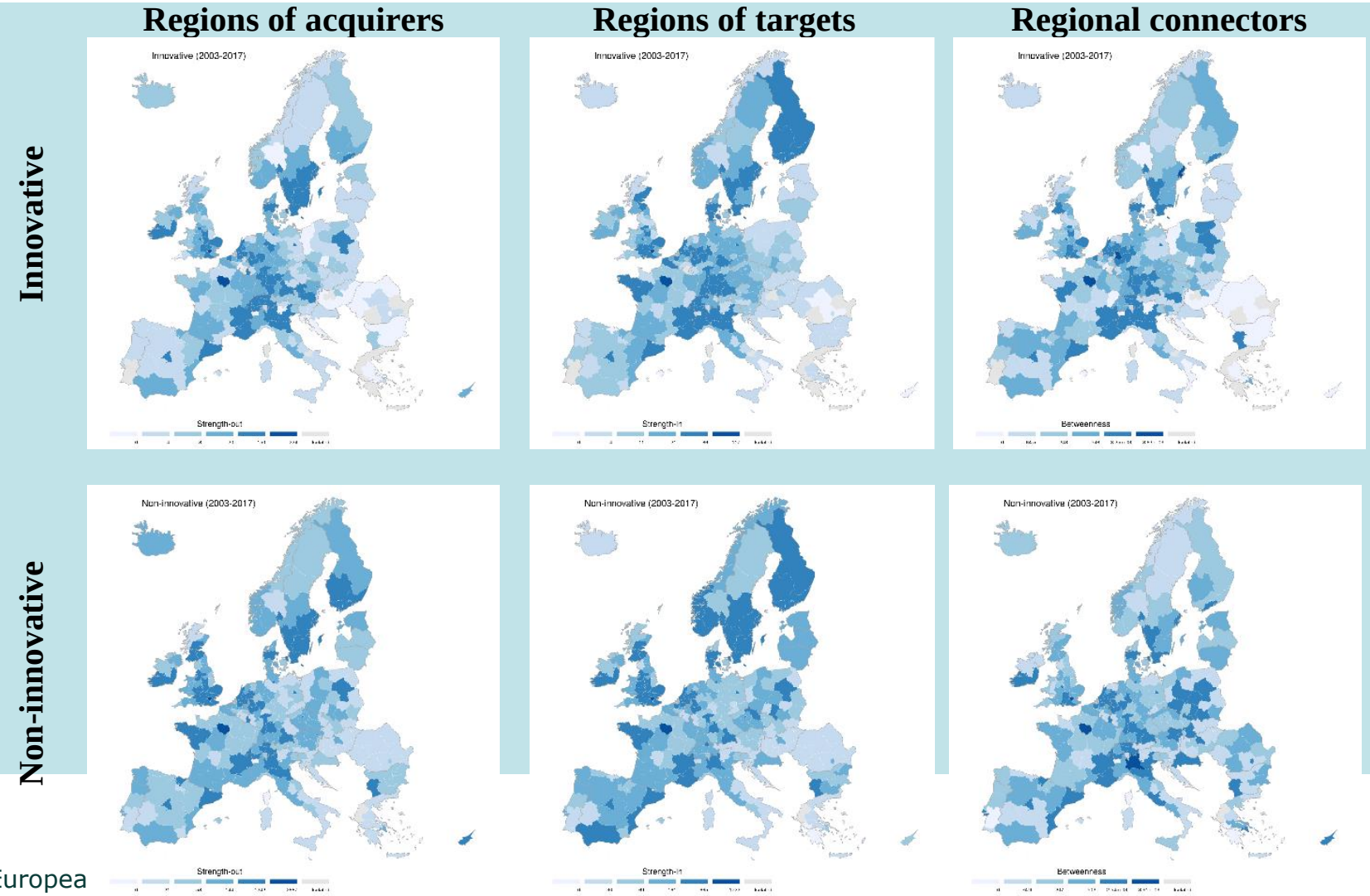


Network fragmentation into communites



European Commission

Findings – hub regions dominate the networks and bridge communities



European Commission

Findings – regions characteristics & M&A volumes (strength centrality)

	Origin regions (outward centrality)		Target regions (inward centrality)	
	Innovative	Non-innovative	Innovative	Non-innovative
Ln(population)	4.736***	28.336***	1.874**	17.216***
	(1.587)	(9.990)	(0.836)	(4.412)
Ln(per-capita GDP)	0.977***	13.942***	0.371	12.690***
	(0.339)	(2.804)	(0.292)	(3.000)
Intensity in R&D expenditure	-0.049	-0.448	0.159**	-0.365
	(0.063)	(0.431)	(0.072)	(0.332)
Workforce share of scientists and engineers	-0.042	-0.187	-0.042	0.191
	(0.027)	(0.147)	(0.025)	(0.136)
Population density	-0.000	-0.001	-0.000	-0.005
	(0.001)	(0.006)	(0.001)	(0.006)
Corporate tax rate	-0.003	-0.067	-0.022***	-0.109***
	(0.010)	(0.042)	(0.008)	(0.037)
Unemployment rate	-0.003	0.090*	0.004	0.147**
	(0.007)	(0.048)	(0.008)	(0.059)
Regional fixed effects	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes
N	4057	4057	4057	4057
Log-likelihood	-5722.488	-6133.100	-9220.665	-12399.492

Findings – hub regions characteristics, M&A connections

- High connector regions are characterized by large numbers of acquired and target companies

	Innovative network				Non-Innovative network							
	Extensive margin Pr(betweenness centrality > 0)		Intensive margin Ln(betweenness centrality)		Extensive margin Pr(betweenness centrality > 0)				Intensive margin Ln(betweenness centrality)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Inward degree centrality	0.804*** (0.053)		0.269*** (0.029)		0.396*** (0.034)				0.103*** (0.017)			
Outward degree centrality	0.951*** (0.071)		0.180*** (0.028)			0.852*** (0.078)				0.052*** (0.016)		
Inward strength centrality		0.700*** (0.047)		0.214*** (0.024)			0.192*** (0.033)				0.020** (0.009)	
Outward strength centrality		0.847*** (0.066)		0.147*** (0.027)				0.418*** (0.077)				0.009* (0.006)

Findings – hub regions characteristics, M&A connections

	Innovative network				Non-Innovative network							
	Extensive margin Pr(betweenness centrality > 0)		Intensive margin Ln(betweenness centrality)		Extensive margin Pr(betweenness centrality > 0)				Intensive margin Ln(betweenness centrality)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Ln(population)	0.229***	0.254***	0.054	0.081	0.645***	0.493***	0.787***	0.662***	0.752***	0.963***	1.123***	1.185***
	(0.075)	(0.075)	(0.116)	(0.118)	(0.079)	(0.082)	(0.095)	(0.095)	(0.078)	(0.085)	(0.089)	(0.083)
Ln(per-capita GDP)	0.374	0.378	0.482	0.507	1.038***	0.504**	1.213***	0.828***	1.325***	1.581***	1.886***	1.929***
	(0.288)	(0.283)	(0.304)	(0.316)	(0.248)	(0.232)	(0.259)	(0.248)	(0.190)	(0.213)	(0.218)	(0.231)
Intensity in R&D expenditure	-0.032	-0.033	0.086*	0.088*	0.077	0.065	0.080*	0.056	0.040	0.021	0.023	0.020
	(0.040)	(0.039)	(0.046)	(0.045)	(0.048)	(0.050)	(0.049)	(0.045)	(0.033)	(0.034)	(0.036)	(0.035)
Workforce share of scientists and engineers	0.009	0.012	-0.032	-0.026	-0.009	-0.032	0.001	-0.009	0.030	0.050*	0.062**	0.060**
	(0.031)	(0.029)	(0.037)	(0.038)	(0.041)	(0.044)	(0.040)	(0.040)	(0.028)	(0.027)	(0.028)	(0.028)
Population density	-0.000	-0.000	0.000	0.000	0.001***	0.000	0.001***	0.000*	-0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Unemployment rate	0.014	0.010	0.015	0.015	-0.030***	-0.022**	-0.030***	-0.022**	-0.004	-0.006	-0.008	-0.007
	(0.012)	(0.012)	(0.015)	(0.015)	(0.012)	(0.010)	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)

Conclusions

- Landscape of communities belonging to the same country or neighboring countries (incomplete EU integration):
  - characterised by intense local ties
  - dominated by hub regions that:
    - concentrate a large share of M&A activity
    - connect their community with other communities

- Important regional characteristics for spatial connection:
  - Agglomeration/size (pop) in both networks
  - R&D investments in the innovative network
  - Agglomeration/economic development (pc GDP) in the non-innovative network

When M&A activity intensifies communities are more connected, and *vice versa*

Key references

- Iammarino, S., Rodriguez-Pose, A. and Storper, M. (2019). Regional inequality in Europe: evidence, theory and policy implications. *Journal of Economic Geography* 19: 273–298.
- McCarthy, Killian J and Wilfred Dolfsma (2015). “The Euro and its impact on the number, size, performance and regional spread of European mergers and acquisitions”. *Regional Studies* 49.8, pp. 1407–1422.
- Rodríguez-Pose, A. and Zademach, H.M. (2003). Rising metropoli: The geography of mergers and acquisitions in Germany. *Urban Studies*, 40 (10): 1898–1923.
- Zademach, H.M., & Rodríguez-Pose, A. (2009). Cross-Border M&As and the Changing Economic Geography of Europe. *European Planning Studies* 17 (5): 765–789.

THANK YOU

Any questions?

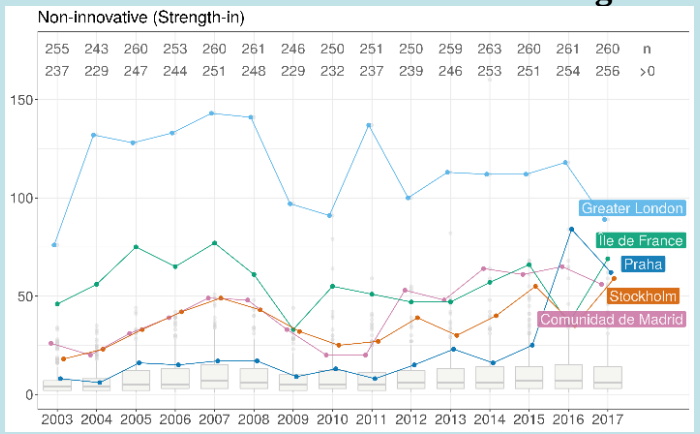
Welcome to email me at:
giacomo.damioli@ec.europa.eu

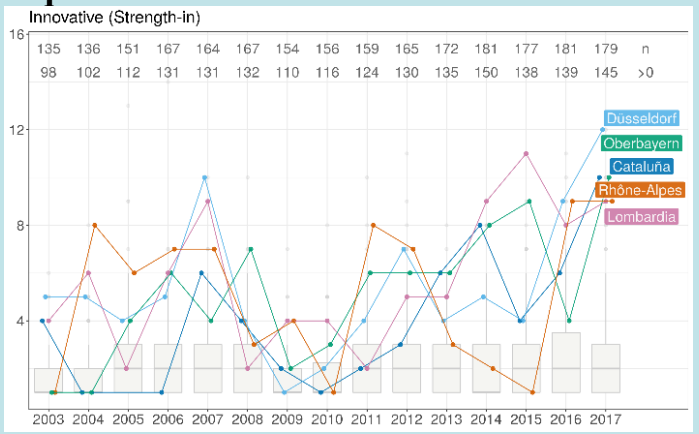
European Commission

Top5 regions by number of deals in 2017

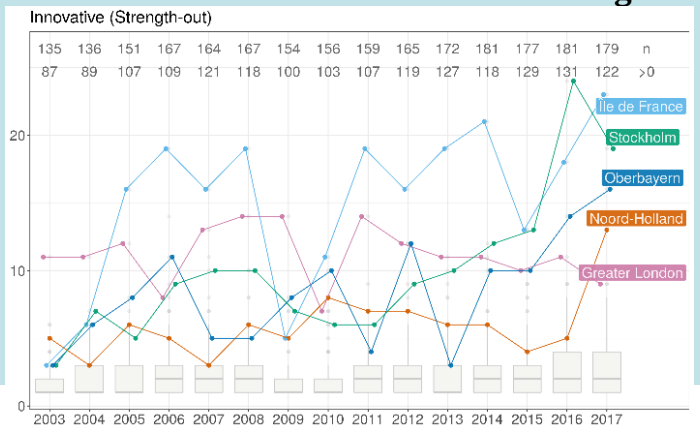
Innovative **Non-innovative**

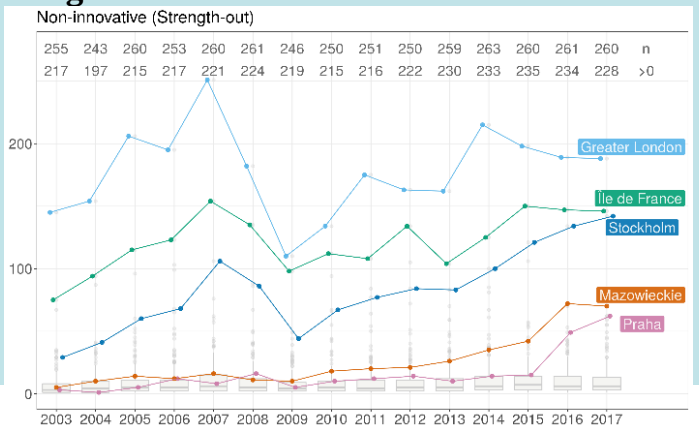
Regions of acquirers





Regions of targets

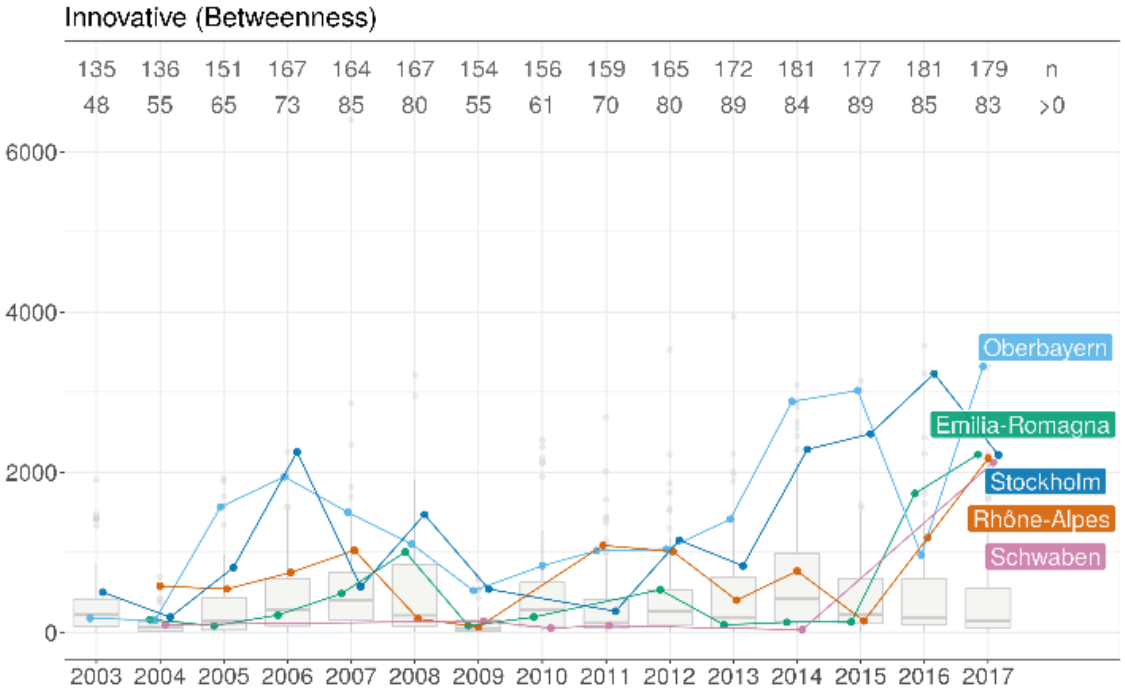




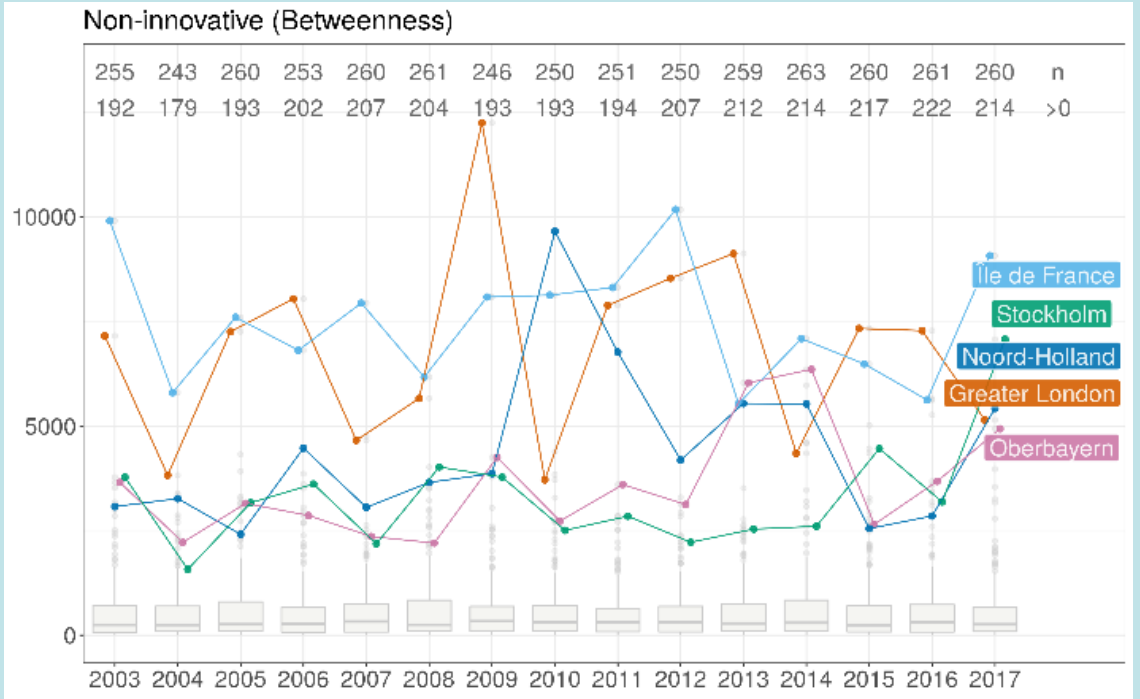
European Commission

Top 5 connectors regions in 2017

Innovative



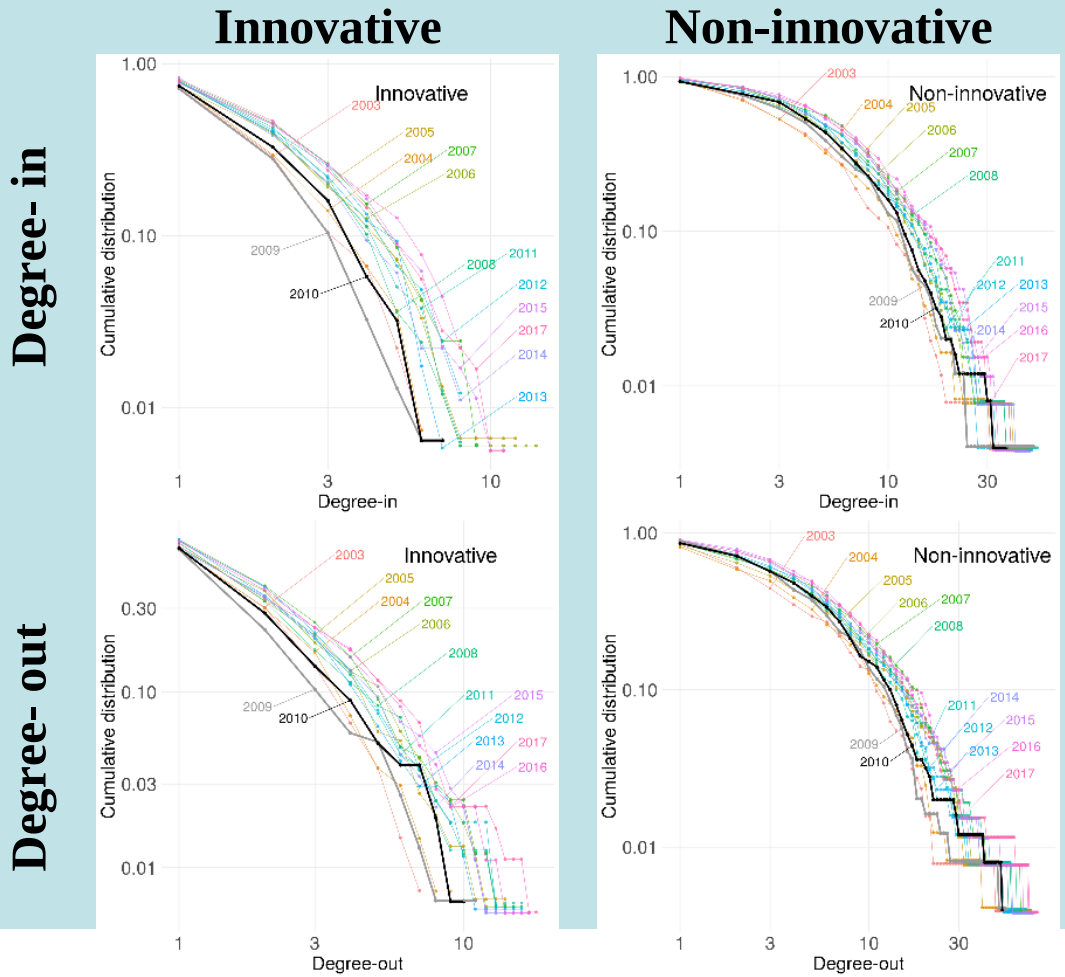
Non-innovative



European Commission

Degree distributions, log-log scale

(the y axis represents the probability of a given degree in the network)



European Commission

Top20 regions by number of innovative M&A, 2003-2017

Innovative

Regions of acquirers		Regions of targets	
Île de France	224	Greater London	117
Greater London	168	Île de France	93
Stockholm	150	Lombardia	86
Oberbayern	125	Düsseldorf	81
Helsinki-Uusimaa	91	Oberbayern	77
Noord-Holland	89	Rhône-Alpes	76
Düsseldorf	81	Köln	65
Lombardia	73	Stuttgart	62
Stuttgart	71	Cataluña	58
Berkshire, Buckinghamshire and Oxfordshire	66	Helsinki-Uusimaa	57
Zentralschweiz	65	Karlsruhe	56
Zürich	63	Darmstadt	56
Zuid-Holland	62	Berkshire, Buckinghamshire and Oxfordshire	53
Oslo og Akershus	62	Västsverige	51
Darmstadt	61	Espace Mittelland	49
Rhône-Alpes	60	Arnsberg	49
Southern and Eastern	57	Hovedstaden	47
Luxembourg	54	Stockholm	47
Comunidad de Madrid	53	Berlin	46
Sydsverige	52	Emilia-Romagna	45

Top20 regions by number of non-innovative M&A, 2003-2017

Non-innovative

Regions of acquirers		Regions of targets	
Greater London	2667	Greater London	1722
Île de France	1820	Île de France	841
Stockholm	1242	Noord-Holland	665
Helsinki-Uusimaa	1024	Comunidad de Madrid	633
Comunidad de Madrid	872	Cataluña	600
Noord-Holland	841	Berkshire, Buckinghamshire and Oxfordshire	557
Oslo og Akershus	673	Stockholm	550
Zuid-Holland	627	Greater Manchester	547
Berkshire, Buckinghamshire and Oxfordshire	578	Zuid-Holland	481
Oberbayern	462	Helsinki-Uusimaa	431
Greater Manchester	462	Mazowieckie	414
Utrecht	419	Surrey, East and West Sussex	407
West Midlands	406	Rhône-Alpes	400
Surrey, East and West Sussex	405	West Yorkshire	398
Cataluña	403	Lombardia	394
Lombardia	396	Noord-Brabant	385
Noord-Brabant	387	West Midlands	385
Hovedstaden	386	Västsverige	382
Rhône-Alpes	384	Oslo og Akershus	375
Mazowieckie	382	Oberbayern	359

Top20 connector regions, 2003-2017

Innovative

Düsseldorf	3629.90
Île de France	3570.59
Stockholm	3275.31
Greater London	3162.30
Oberbayern	3062.88
Helsinki-Uusimaa	2969.91
Stuttgart	2956.82
Noord-Holland	2846.00
Lombardia	2745.64
Zürich	2089.98
Cataluña	2084.46
Karlsruhe	1965.10
Comunidad de Madrid	1961.15
Noord-Brabant	1818.52
East Anglia	1804.78
Hovedstaden	1781.08
Rhône-Alpes	1757.27
Veneto	1720.12
Emilia-Romagna	1597.77
Mazowieckie	1313.93

Non-innovative

Île de France	3906.69
Lombardia	3179.83
Greater London	2875.61
Noord-Holland	2394.80
Wien	2046.72
Comunidad de Madrid	2026.22
A	1977.58
Zuid-Holland	1815.97
Hovedstaden	1789.07
Southern and Eastern	1689.03
Oberbayern	1626.62
Helsinki-Uusimaa	1518.53
Düsseldorf	1428.80
Közép-Magyarország	1329.51
Sydsverige	1312.89
Stuttgart	1234.02
Mazowieckie	1226.01
Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest	1191.41
Noord-Brabant	1190.53
Cataluña	1144.12