Supplementary material

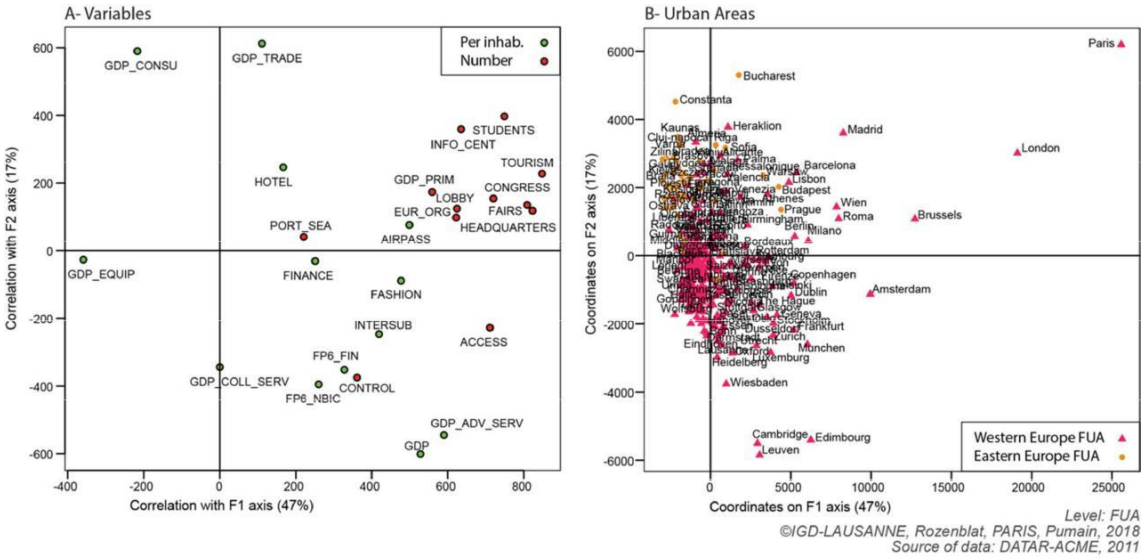
Appendix 1: Sources of indicators

We built the database in collaboration with partners involved in a project for the French DATAR (Halbert et al., 2012). D. Peteers at IGEAT-ULB defined the delineation and populations of these FUAs. The work is based on ESPON 4.1 2006 and ESPON FOCI 2010 updated in the ESPON Database 2011. Approximately 1,200 FUAs with more than 50,000 inhabitants were defined according to commuters at the LAU1 and LAU2 levels following three main steps: 1) Definition of Morphological Urban Areas (MUAs): according to *Corine Landcover* and aerial photos, these encompass municipalities with a continuous built area with the city centre and with a density above 650 inhab./km$_2$; 2) Delineation of surrounding FUAs, including all municipalities (LUA2) with more than 10% of their employment commuting to the MUA; 3) Consolidation of the FUAs: if FUAs are included in a larger FUA, they are included; if a municipality sends commuters to different FUAs, the higher percentage is selected.

The fields of the database on FUAs in Europe were prepared by the following partners:

- The regional economic context: built by the IGEAT- Free University of Brussels team (Christian Vandermotten), it takes into account the regional GDP per economic sector (NUTS3) (which is impossible to build at a strictly urban scale because of the lack of data at the municipality level);
- The accessibility and attractiveness of cities in terms of general accessibility by air and train (Alain L'Hostis from LVMT- IFSTTAR team in Lille) and air and port transport (built by UNIL Lausanne team for air and by Cesar Ducruet for ports [Géographie-Cités, Paris]);
- Economic centrality (based on the multinational firm network studies developed in UNIL Lausanne by C. Rozenblat and completed by P. Cicille (UMR ESPACE) for fairs and exhibitions);
- Cultural attractiveness: includes congresses (Union of International Associations), tourist attractions (source: Michelin Europe), hotel nights (P. Cicille [UMR ESPACE]), and fashion shops (C. Rozenblat [UNIL Lausanne] and IGEAT- Free University of Brussels B. Wayens);
- Situation in research space: general cooperation in FP6 by UNIL Lausanne C. Rozenblat and cooperation in NBIC sectors by M-N. Comin (Géographie-Cités, Paris); students in universities listed by P. Cicille (UMR ESPACE);
- Access to European institutions: European and international institutions, Information and documentation centre of EU, number of EU lobbyists estimated by P. Cicille (UMR ESPACE).

Supplementary Figure 1: First two axes of a Principal Component Analysis on 356 urban areas and 25 variables



Appendix 2: Detailed comments on map of Figure 3

In Western Europe, the largest cities and economic capitals are often above the regression line, meaning that they have a relative advantage in hosting international functions, all things being equal in terms of their size. Amsterdam, Paris, and London are the most diversified cities in Europe, especially Amsterdam, which has been mentioned for its large panel of international functions compared to its size – in connection with a specific tax policy (Rozenblat and Pumain, 1993; Rozenblat and Cicille, 2003). Moreover, many small specialised cities have a high relative advantage, including Leuven, Edinburg, Cambridge, Brussels, Heraclius, Nicosia, Geneva, Glasgow, Luxemburg, Oxford, and Trieste.

In contrast, some Western cities larger than one million inhabitants lack diversified functions. This group encompasses Sheffield, Newcastle, Liverpool, Cardiff, Leeds, and Nottingham in Great Britain and Saarbrucken, Bremen, and Stuttgart in Germany. This finding reveals two different national organisations. In Great Britain, most of the international functions are concentrated in London (with the exception of research and higher education, that are also present in small satellites of London). The Scottish cities of Glasgow and Edinburg have more independent development. In Germany, international functions are scattered in eleven cities (BBRS, 2011, p.106). Thus, in Germany, the large cities (with the exception of Dusseldorf, Munich, and Frankfurt) have a low relative concentration of international functions.

In Eastern Europe, most of national capitals, as Tallinn, Ljubljana, Bratislava, Prague, Riga, Vilnius, and Sofia, are in advanced stages compared to other cities. The geographical proximity

to the Western border can in some cases be an additional explanation. Other capitals, such as Budapest and Warsaw, have lower scores, although they belong to the most integrated Eastern countries. A few smaller cities have managed to integrate internationalisation in at least one sector, including Pecs in Hungary (the European capital of culture in 2010), Maribor in Slovenia, and Olsztyn in Poland for their tourist and cultural functions. Other Eastern European cities have attracted foreign investment, for instance the pharmaceutical industry in Iasi (Romania), the Electronic in Brno hosting ACER (IBM, Honeywell, and Siemens), the attractiveness of Poznan for automobile sector (Volkswagen, MAN) but also for electronics, IT, design, finance and accounting. All these plants of multinational firms in second tier Eastern European cities, reveal a progressing process of diffusion of internationalization that could bring other kinds of scientific and cultural functions.

Supplementary Table 1: Scaling exponents of original variables for cities of Western and Eastern Europe

Variable label	TOTAL				EAST				WEST			
	ß	STD(ß)	R^2	N	ß	STD(ß)	R^2	N	ß	STD(ß)	R^2	N
GDP	1.12	0.025	0.85	354	1.29	0.075	0.86	50	1.09	0.017	0.93	304
GDP_PRIM	0.5	0.049	0.23	357	0.33	0.099	0.16	53	0.52	0.053	0.24	304
GDP_EQUIP	1.06	0.044	0.61	357	1.16	0.084	0.79	53	1.03	0.04	0.68	304
GDP_CONSU	1.04	0.04	0.66	357	1.23	0.078	0.83	53	0.98	0.03	0.78	304
GDP_TRADE	1.19	0.03	0.76	357	1.47	0.08	0.86	53	1.12	0.025	0.87	304
GDP_ADV_SER	1.27	0.051	0.63	357	1.56	0.097	0.83	53	1.19	0.03	0.84	304
GDP_COLL_SERV	1.12	0.047	0.61	357	1.34	0.091	0.81	53	1.05	0.02	0.85	304
ACCESS	0.77	0.074	0.23	345	1.12	0.19	0.44	46	0.71	0.076	0.23	301
AIRPASS	2.09	0.16	0.42	225	2.15	0.32	0.57	34	2.08	0.185	0.4	191
PORT_SEA	0.61	0.17	0.07	157	1.41	0.55	0.44	8	0.61	0.18	0.07	149
HEADQUART	0.92	0.091	0.44	131	0.35	0.47	0.18	4	0.98	0.089	0.49	127
FINANCE	1.3	0.078	0.52	256	1.43	0.245	0.48	37	1.29	0.082	0.53	219
INTERSUB	1.33	0.053	0.66	317	1.51	0.143	0.76	36	1.32	0.057	0.66	281
CONTROL	-0.08	0.04	0.01	317	-0.08	0.13	0.01	36	0.12	0.034	0.04	281
FAIRS	0.67	0.112	0.28	91	0.42	0.41	0.004	11	0.69	0.118	0.3	80
CONGRESS	0.58	0.086	0.29	112	0.9	0.38	0.25	15	0.56	0.088	0.29	97
TOURISM	0.69	0.066	0.3	310	0.99	0.27	0.28	34	0.64	0.065	0.26	276
FASHION	1.08	0.064	0.51	278	0.78	0.305	0.21	22	1.16	0.063	0.57	256
HOTEL	1.02	0.058	0.47	348	0.81	0.174	0.29	53	1.04	0.06	0.5	295
FP6_FIN	1.55	0.09	0.44	351	1.73	0.212	0.56	52	1.51	0.1	0.42	299
FP6_NBIC	1.18	0.077	0.48	254	1.65	0.23	0.61	34	1.12	0.08	0.47	220
STUDENTS	0.99	0.055	0.47	353	0.87	0.17	0.33	53	1.02	0.05	0.54	300
EUR_ORG	0.33	0.118	0.09	69	0.16	0.4	0.26	5	0.35	0.124	0.09	64
INFO_CENT	0.36	0.033	0.32	259	0.43	0.085	0.35	46	0.35	0.035	0.31	213
LOBBY	1.02	0.07	0.46	249	1	0.18	0.51	30	1.02	0.075	0.46	219

Source of data : DATAR ACME, 2011
ß=scaling exponent ; STD(ß)= standard error on ß; N = number of FUAs in the sample for each variable