Exploring external urban relational processes: inter-city financial flows complementing global city-regions

Article

Supplemental Material

Online Appendix 1: List of OECD Cities in our Sample

Note: Global cities are OECD cities in the GaWC Global city list. Regional cities are the OECD cities not in GaWC list.

City Name	Country	City	Country	City Name	Country	City	Country	City Name	Country
Alpha + Beta Global Cities									
Vienna	AT	Sydney	AU	Melbourne	AU	Brussels	BE	Toronto	CA
Montreal	CA	Vancouver	CA	Munich	DE	Berlin	DE	Hamburg	DE
Frankfurt	DE	Budapest	HU	Milan	IT	Rome	IT	Tokyo	JP
Mexico City	MX	London	GB	Manchester	GB	Dusseldorf	DE	Paris	FR
Amsterdam	NL	Oslo	NO	Stockholm	SE	New York	US	Los Angeles	US
Washington	US	Chicago	US	San Francisco	US	Houston	US	Dallas	US
Boston	US	Atlanta	US	Miami	US	Seattle	US		
Gamma + Sufficiency + High Sufficiency Global Cities									
Belfast	GB	Southampton	GB	Turin	IT	Bologna	IT	Monterrey	MX
Guadalajara	MX	Rotterdam	NL	The Hague	NL	Utrecht	NL	Gothenburg	SE
Malmo	SE	Philadelphia	US	Detroit	US	Minneapolis	US	Phoenix	US
San Diego	US	Denver	US	Portland	US	Indianapolis	US	Columbus	US
Sacramento	US	Charlotte	US	Las Vegas	US	Hartford	US	New Orleans	US
Richmond	US	Perth	AU	Brisbane	AU	Adelaide	AU	Newcastle	AU
Antwerp	BE	Calgary	CA	Edmonton	CA	Ottawa	CA	Winnipeg	CA
Hamilton	CA	Stuttgart	DE	Cologne	DE	Nuremberg	DE	Dresden	DE
Leipzig	DE	Helsinki	FI	Lyon	FR	Marseille	FR	Lille	FR
Bordeaux	FR	Strasbourg	FR	Leeds	GB	Glasgow	GB	Bristol	GB
Edinburgh	GB	Liverpool	GB	Nottingham	GB				
Other Global Cities									
Linz	AT	Liege	BE	Mannheim	DE	Bonn	DE	Quebec	CA
Mainz	DE	Grenoble	FR	Sheffield	GB	Cardiff	GB	Naples	IT
Genoa	IT	Palermo	IT	Venice	IT	Tijuana	MX	Bergen	NO
Regional Cities									
Graz	AT	Rouen	FR	Mito	JP	Orange	US	Lehigh	US
Salzburg	AT	Montpellier	FR	Oita	JP	Austin	US	Onondaga	US
Gold Coast	AU	Newcastle Upon Tyne	GB	Toyama	JP	Austin	US	Charleston	US
Gent	BE	Leicester	GB	Himeji	JP	Milwaukee	US	Lucas	US
Kitchener	CA	Oxford	GB	Numazu	JP	San Antonio	US	Sedgwick	US
Ruhr	DE	Coventry	GB	Kagoshima	JP	Salt Lake	US	Pulaski	US
Hanover	DE	Reading	GB	Fukui	JP	Pittsburgh	US	Ada	US
Bremen	DE	Portsmouth	GB	Matsuyama	JP	Davidson	US	Guilford	US
Wolfsburg	DE	Cheshire	GB	Kofu	JP	Memphis	US	Sarasota	US
Karlsruhe	DE	Florence	IT	Takamatsu	JP	Jacksonville	US	Hampden	US
Saarbrucken	DE	Padua	IT	Nagano	JP	Oklahoma	US	Summit	US
Heidelberg	DE	Verona	IT	Tokushima	JP	Virginia	US	Sonoma	US
Muenster	DE	Brescia	IT	Nagasaki	JP	Wake	US	San Joaquin	US
Augsburg	DE	Bari	IT	Wakayama	JP	Tampa	US	Lee	US
Ingolstadt	DE	Higashiosaka	JP	Fujieda	JP	Tulsa	US	Santa Barbara	US
Freiburg	DE	Toyota	JP	Koriyama	JP	Albany	US	Washoe	US
Kiel	DE	Fukuoka	JP	Queretaro	MX	East Baton Rouge	US	Newport News	US
Ulm	DE	Sapporo	JP	Puebla	MX	Providence	US	Boulder	US
Aachen	DE	Kurashiki	JP	Centro	MX	Ventura	US	Fayette	US
Wurzburg	DE	Hiroshima	JP	Toluca	MX	Polk	US	Forsyth	US

Darmstadt	DE	Sendai	JP	Torreon	MX	Albuquerque	US	Monterey	US
Osnabruck	DE	Kitakyushu	JP	Leon	MX	Fresno	US	Nueces	US
Kassel	DE	Yokkaichi	JP	Eindhoven	NL	Pima	US	Spokane	US
Offenburg	DE	Hamamatsu	JP	Groningen	NL	Dane	US	Knox	US
Tallinn	EE	Takasaki	JP	Porto	PT	Richland	US	Greenville	US
Toulouse	FR	Utsunomiya	JP	St. Louis	US	Kent	US	Brevard	US
Nantes	FR	Naha	JP	New Haven	US	Worcester	US	Scott	US
Nice	FR	Toyohashi	JP	Cuyahoga	US	Kern	US	Dauphin	US
Rennes	FR	Niigata	JP	Cincinnati	US				

Online Appendix 2: Gravity Model for the Capital Flows among Global Cities

*Note: This table reports the gravity-type model where the dependent variable is the average FDI flows between 103 global OECD cities from 2003 to 2018. The Newey-West robust standard error is in brackets. ***, ** and * stands for significant at 1%, 5% and 10% significance level.*

	Model A1: All Sectors	Model A1: Excluding Service Sector
constant	-40.6240***	-26.6444***
	(6.4973)	(6.9074)
APS Connectivity	1.7789***	1.5715***
	(0.1585)	(0.2325)
Same Legal System	0.0897	0.2988
	(0.2734)	(0.3673)
Geographic Distance	-0.3822***	-0.6323***
	(0.1022)	(0.1776)
GDP_growth_ destination	-0.6646	-1.4052
	(0.6005)	(0.8615)
GDP_growth_ source	0.2652	0.3543
	(0.2459)	(0.2958)
GDP_share_ destination	-0.0631	0.4064***
	(0.1431)	(0.1432)
GDP_share_ source	0.3525***	0.5751***
	(0.0716)	(0.1131)
income_ destination	1.4946**	2.3273***
	(0.6666)	(0.9186)
income_ source	2.0282***	0.8112*
	(0.3792)	(0.4378)
Pop_density_ destination	-0.2903	-1.084***
	(0.2199)	(0.3491)
Pop_density _ source	0.3186	0.0719
	(0.1953)	(0.3482)
Country Dummies_destination	Yes	Yes
Country Dummies_source	Yes	Yes
No. of Observations (Pair of Cities)	9328	9328
Pearson Statistic	56	201
Overdispersion Test	1.63	3.45
	(2.39)	(26.65)
Park Test	[1.8865;1.9133]	[1.9224;1.9484]

Online Appendix 3: Gravity Model for the Investment Flows among Global and Regional Cities with Different Distance Definitions

*Note: This table reports the gravity model where the dependent variable is the average FDI flows between the 247 OECD cities from 2003 to 2018. The Newey-West robust standard error is in brackets. Only the coefficients of the distance related variables are reported in the Table. Complete regression results are available upon request from the authors. ***, ** and * stands for significant at 1%, 5% and 10% significance level.*

	Model A2: All Sector	Model A2: Excluding Service Sector
	Panel A: Driving Time < 6 Hour	
APS Connectivity	0.9622***	0.9794***
	(0.0846)	(0.1842)
Flows to nearby global cities_regaionl cities	0.1078***	0.0937**
	(0.0419)	(0.0439)
Flows to nearby regional cities_regional cities	-0.0010	-0.0391
	(0.0408)	(0.0455)
Flows to nearby global cities_global cities	0.0198	0.0235
	(0.0198)	(0.0385)
Flows to nearby regional cities_global cities	-0.0135	-0.0394
	(0.0222)	(0.0401)
Control Variables	Yes	Yes
Country Dummies	Yes	Yes
Observation	50568	50568
Pearson Statistic	195	439
Overdispersion Test	2.98	8.93
Park Test	[1.9771;1.9848]	[1.9897;1.9969]
	Panel B: Driving Distance < 600 km	
APS Connectivity	0.6719***	0.9727***
	(0.0899)	(0.3400)
Flows to nearby global cities_regaionl cities	0.1015***	0.0491
	(0.0246)	(0.0522)
Flows to nearby regional cities_regional cities	-0.0141	-0.0081
	(0.0262)	(0.0310)
Flows to nearby global cities_global cities	0.0256	0.0299
	(0.0205)	(0.0517)
Flows to nearby regional cities_global cities	-0.0114	-0.0271
	(0.0252)	(0.0723)
Control Variables	Yes	Yes
Country Dummies	Yes	Yes
Observation	50568	50568
Pearson Statistic	107	181
Overdispersion Test	2.46	6.31
	(18.26)	(53.84)
Park Test	[1.9809;1.9881]	[1.9737;1.9845]

Online Appendix 4: Correlation Coefficeint between Variables

	FDI flow	FDI flowx.ex Service	Global City FDI	Regional City FDI	APS	Law	Geo.Distance	GDP_growth_D	GDP_growth_ S	GDP_share_ D	GDPshare _ S	income_ D	income_ S	Pop_density_D	Pop_density _ S
FDI flow	1.000	0.862	0.002	0.017	0.200	0.031	-0.030	0.007	0.013	0.089	0.105	0.029	0.043	0.049	0.059
FDI flow_ex. Service		1.000	0.003	0.009	0.102	0.018	-0.029	0.012	0.006	0.047	0.063	0.017	0.012	0.022	0.027
Global City FDI			1.000	0.437	-0.108	-0.046	-0.212	-0.077	0.003	-0.265	0.025	0.083	-0.013	0.045	0.006
Regional City FDI				1.000	0.003	-0.022	-0.172	-0.196	0.001	-0.247	0.037	-0.077	-0.015	0.304	0.002
APS					1.000	0.097	0.127	0.128	0.128	0.412	0.412	0.116	0.116	0.115	0.115
Law						1.000	0.040	0.160	0.160	-0.067	-0.067	0.094	0.094	-0.082	-0.082
Geo.Distance							1.000	0.205	0.205	-0.031	-0.031	0.119	0.119	-0.162	-0.162
GDP_growth_D								1.000	-0.088	0.038	0.014	0.181	-0.037	-0.354	0.043
GDP_growth_ S									1.000	0.014	0.038	-0.037	0.181	0.043	-0.354
GDP share_ D										1.000	-0.057	-0.138	0.047	0.280	-0.029
GDP share_ S											1.000	0.047	-0.138	-0.029	0.280
income_ D												1.000	-0.090	-0.487	0.067
income_ S													1.000	0.067	-0.487
Pop_density_D														1.000	-0.065
Pop_density _ S															1.000