Promoting regional growth and innovation: relatedness, revealed comparative advantage and the product space

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Product and Network Space Arguments

- Product space and network space arguments of Hausmann and Hidalgo, Hidalgo et al. and Hausmann et al.: *Science*, *Proceedings of the National Academy of Sciences, Journal of Economic Growth, Plos One*
- Two core principles:
- For products and services sharing similar production assets and capabilities → countries exporting one will tend to export the other
- Countries specialised in trade of products and services which are more centrally located in global trade networks will tend to exhibit stronger growth and development
- HH arguments reflects cognitive capabilities and related variety arguments for knowledge transfer

Product and Network Space Arguments

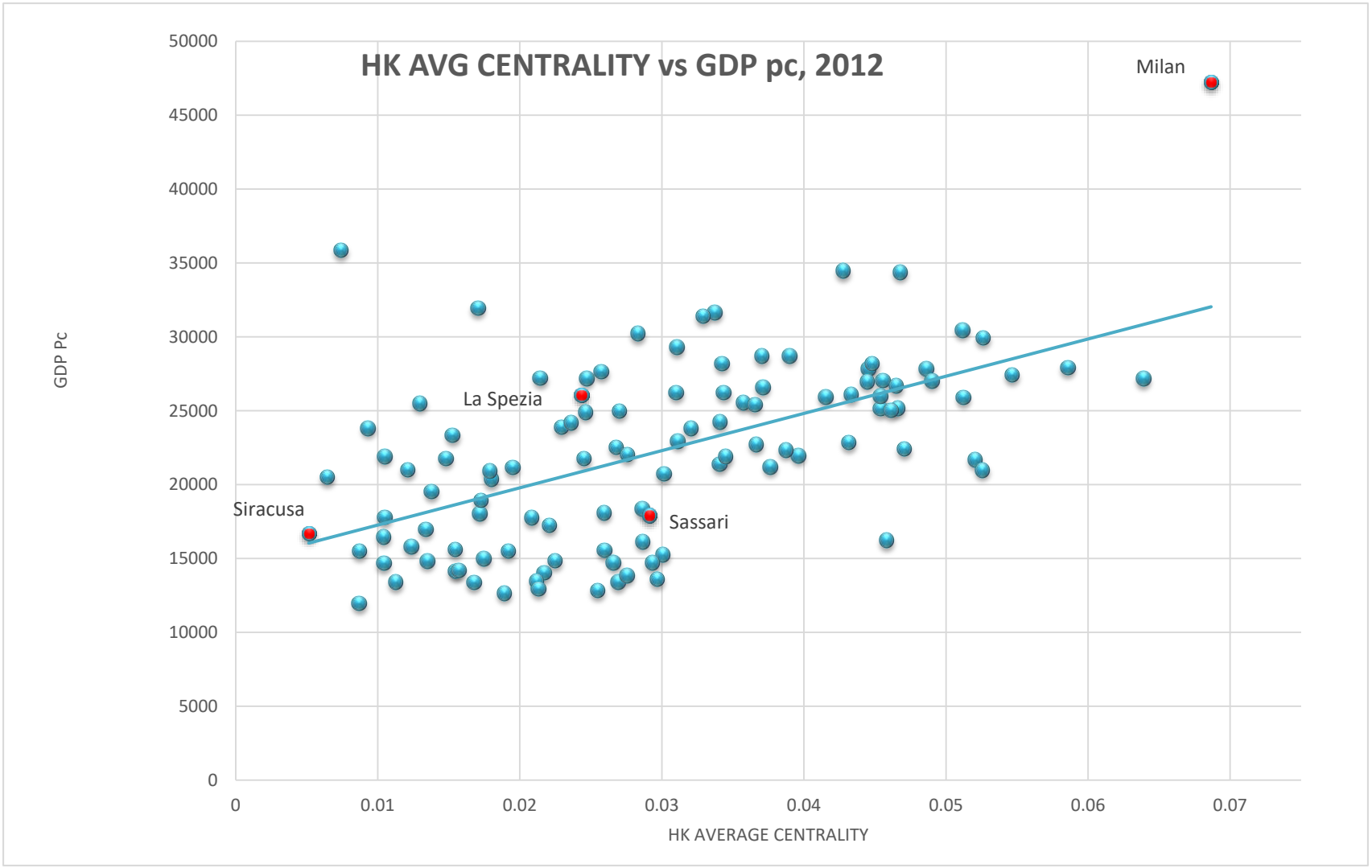
- Different to urban economics arguments → diversity versus specialisation
- Hidalgo and Hausmann 2009; Hausmann and Klinger 2006, 2007
- Hausmann and Klinger (2006) – HK
- Hidalgo, Klinger, Barabási, Hausmann (2007) - HKBH
- Hausmann, Hwang and Rodrik (2007) – HHR
- $RCA_{c,i} = (x_{c,i}/X_{c,t})/(x_{w,i}/X_{w,t})$ and where the pairwise conditional probability is calculated using all countries (or regions)
- Hidalgo et al.(2007) use a network analysis to show that industrialized countries have more products with RCA > 1
  Network centredness

Product and Network Space Arguments

- Hausmann-Klinger HK (2006) index of average centrality w.r.t. GDP $\rightarrow$ relies only on Balassa indices of > 1
- Hidalgo et al. (2007) – HKBH PRODY – RCA weighting using GDP per capita for countries with RCA > 1
- Hausmann, Hwang and Rodrik (2007) – trade sophistication index HHR EXPY – average PRODY value weighted according to the country's trade share in that product
- PSP approach $\rightarrow$ first calculate product/service centrality and then multiply by the region's RCA (>0) and then sum across all products/services
- $PSP_{p,t} = \sum_i (C_{i,t} * \mathrm{X}RCA_{p,i,t})$ where $XRCA_{p,i} - 1 \leftrightarrow 1$

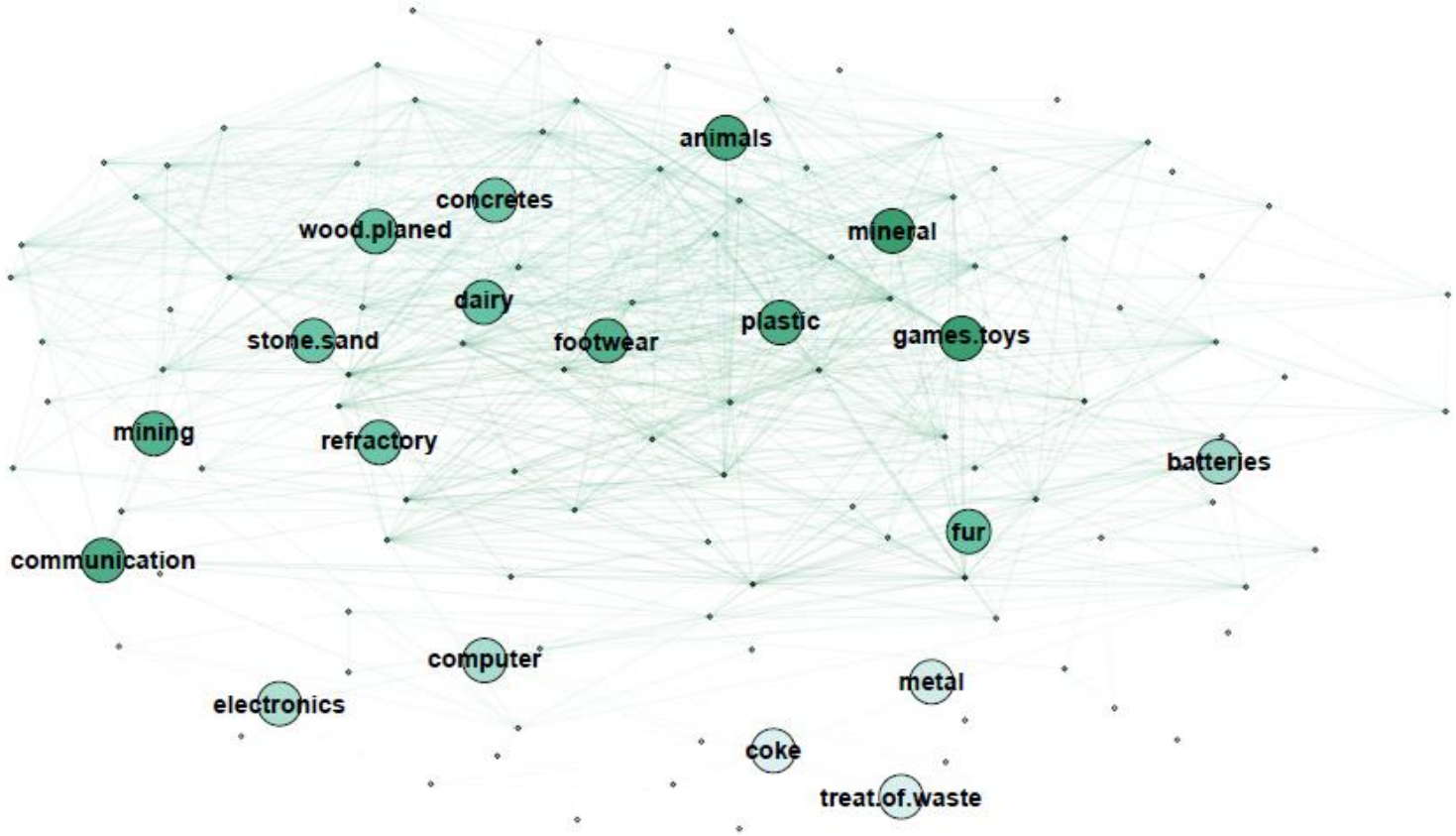
Product and Network Space Arguments

- The Product Space is the network representation of this matrix of proximities
- ISTAT data: 110 provinces; 118 product classes; 6 years (2006-2011)
- Based on RCA values, we calculate the proximity ϕ between product *i* and product *j* at year *t*, where the conditional probability is calculated using all Italian provinces c.

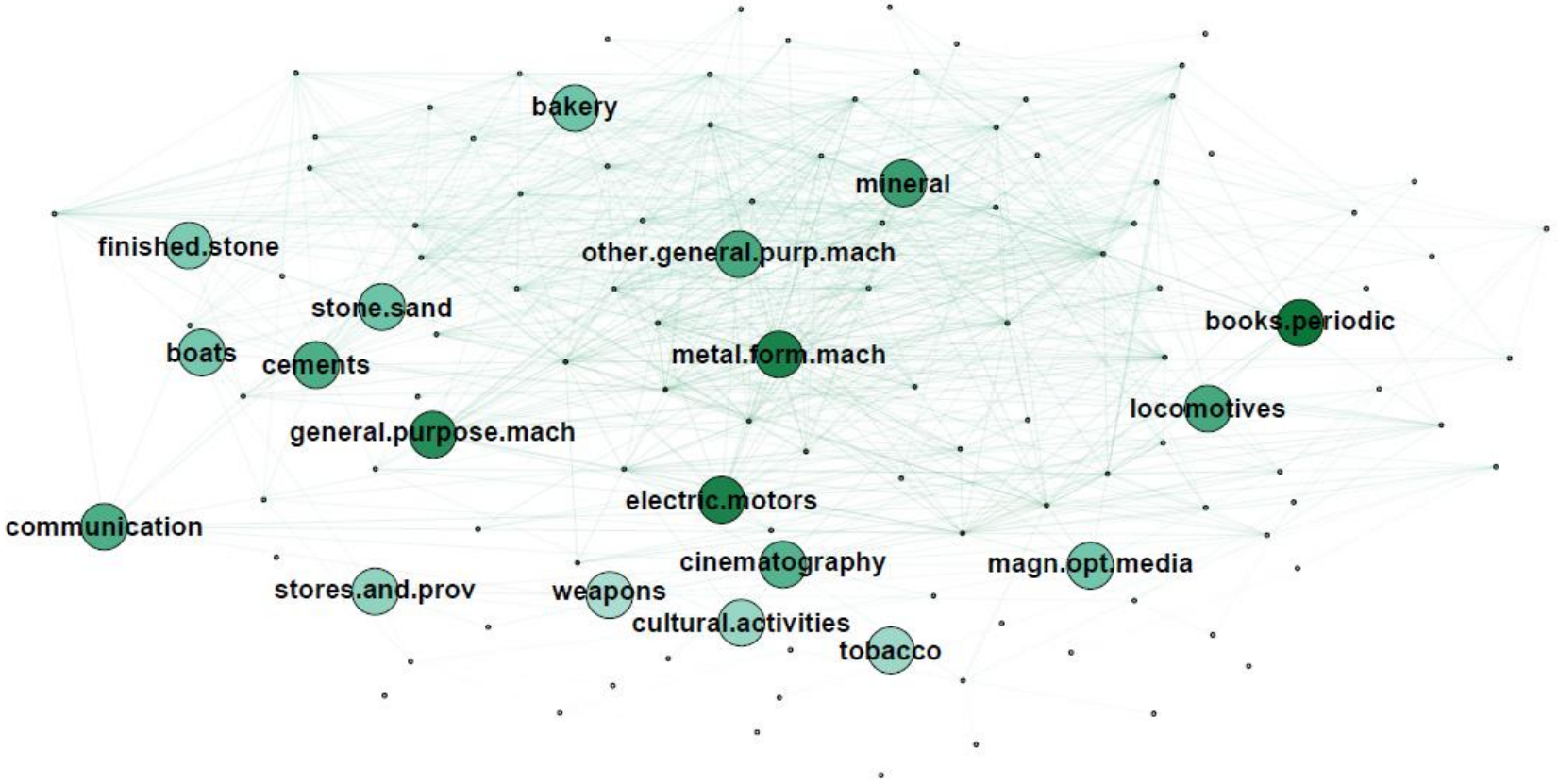


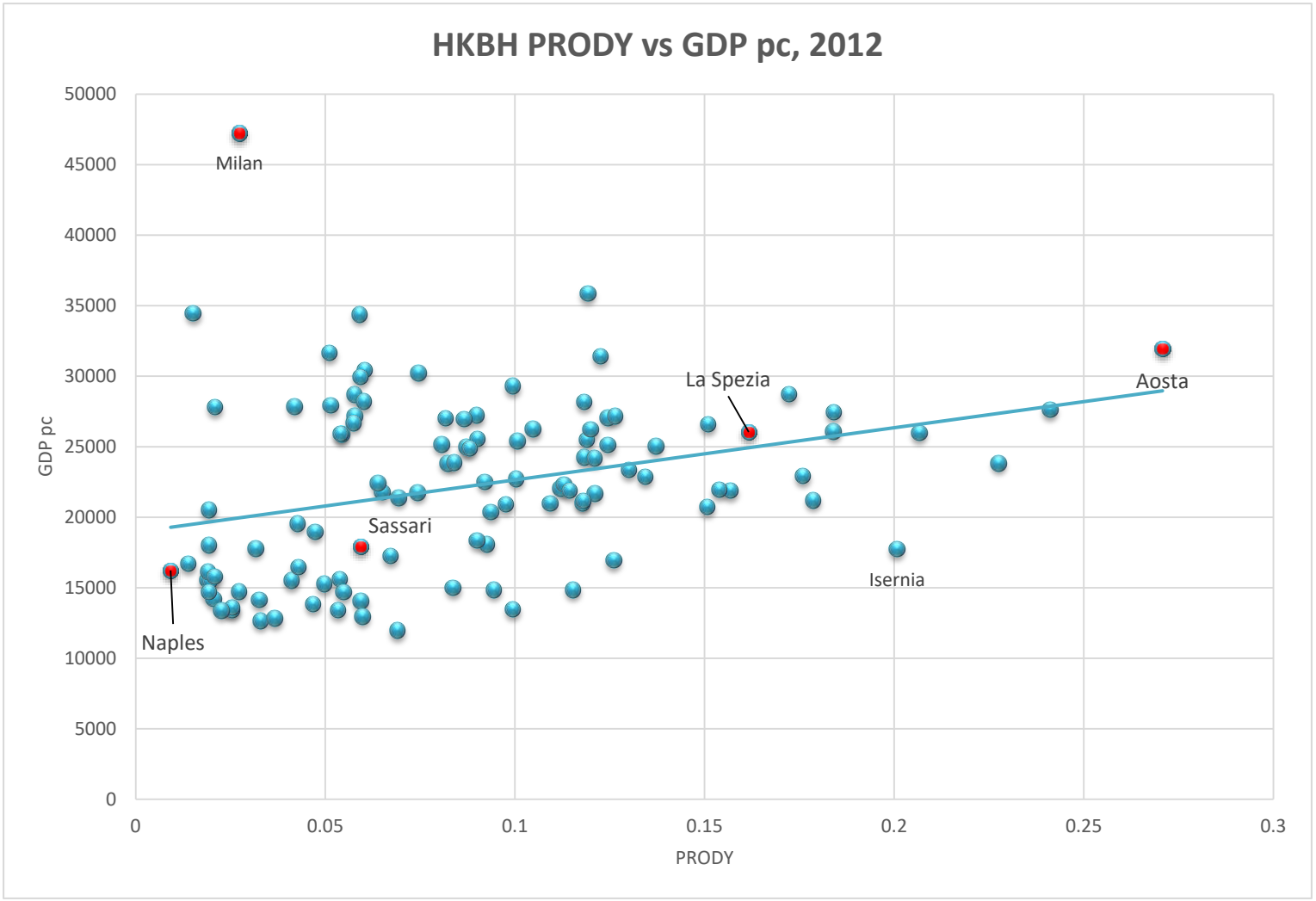
Correlation = 0.565; R^2 = 0.320

The Network Positioning for Sassari province using the HK AVERAGE CENTRALITY Index

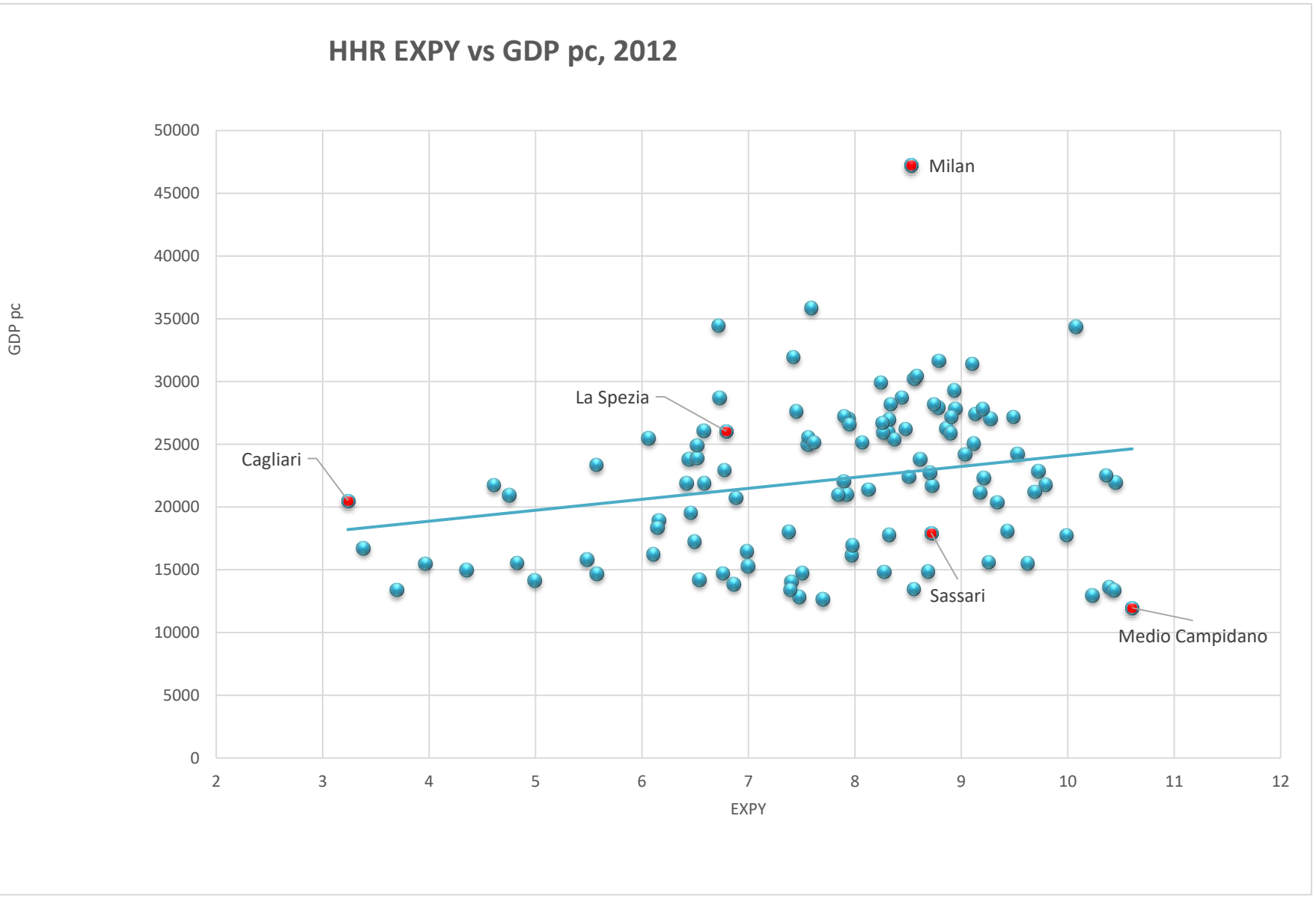


The Network Positioning for La Spezia province using the HK AVERAGE CENTRALITY Index



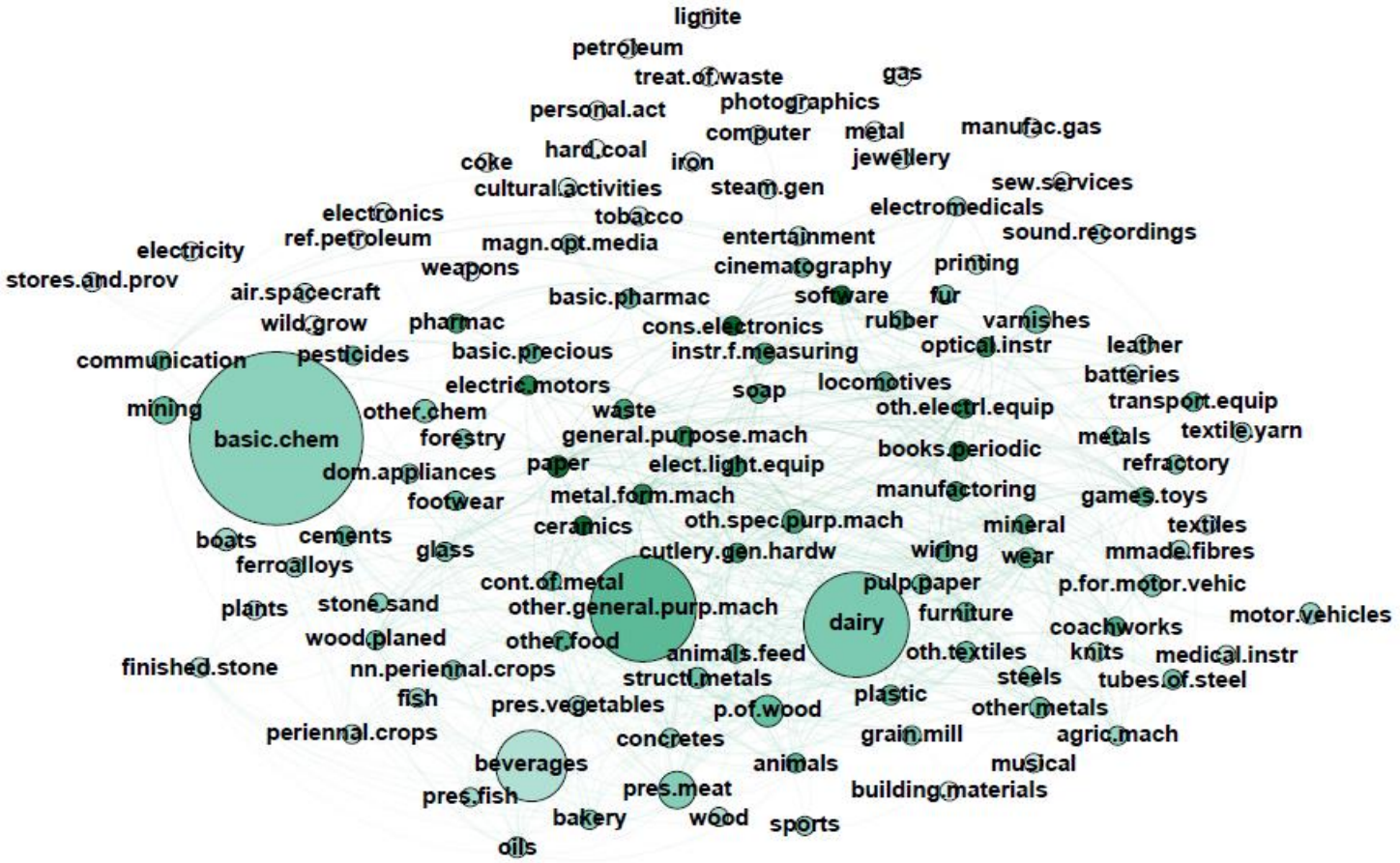


Correlation = 0.319; R^2 = 0.102

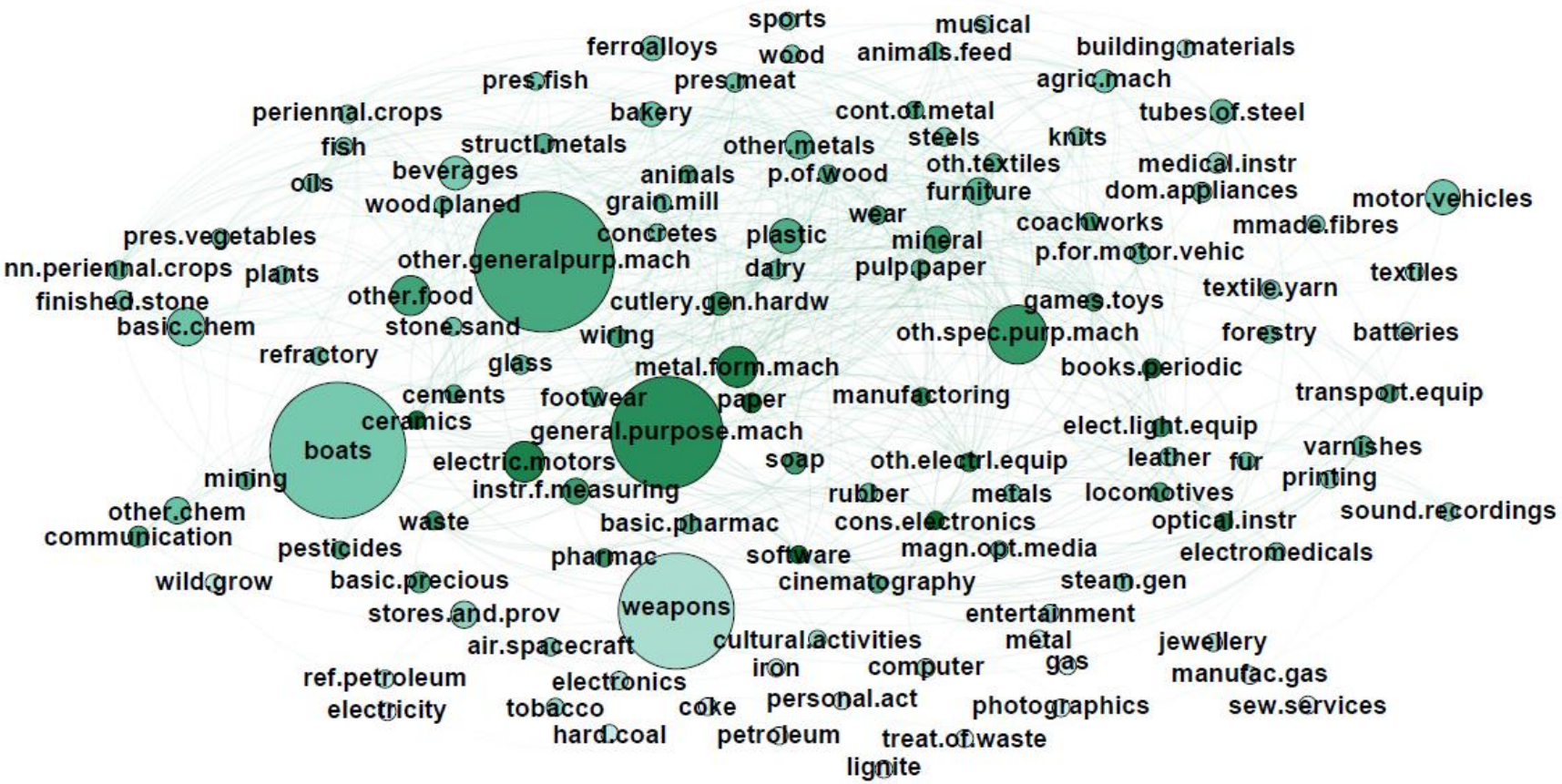


Correlation = 0.226; R^2 = 0.051

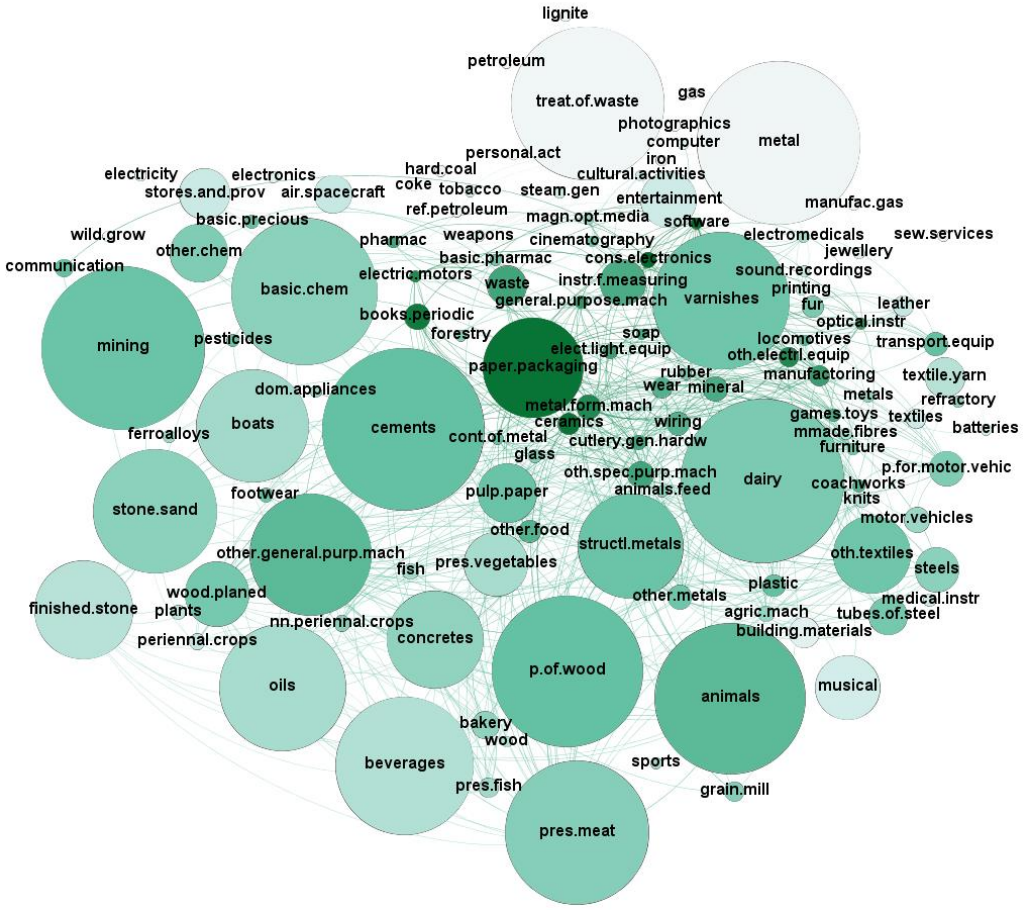
The Network Positioning for Sassari province using the HHR EXPY Index



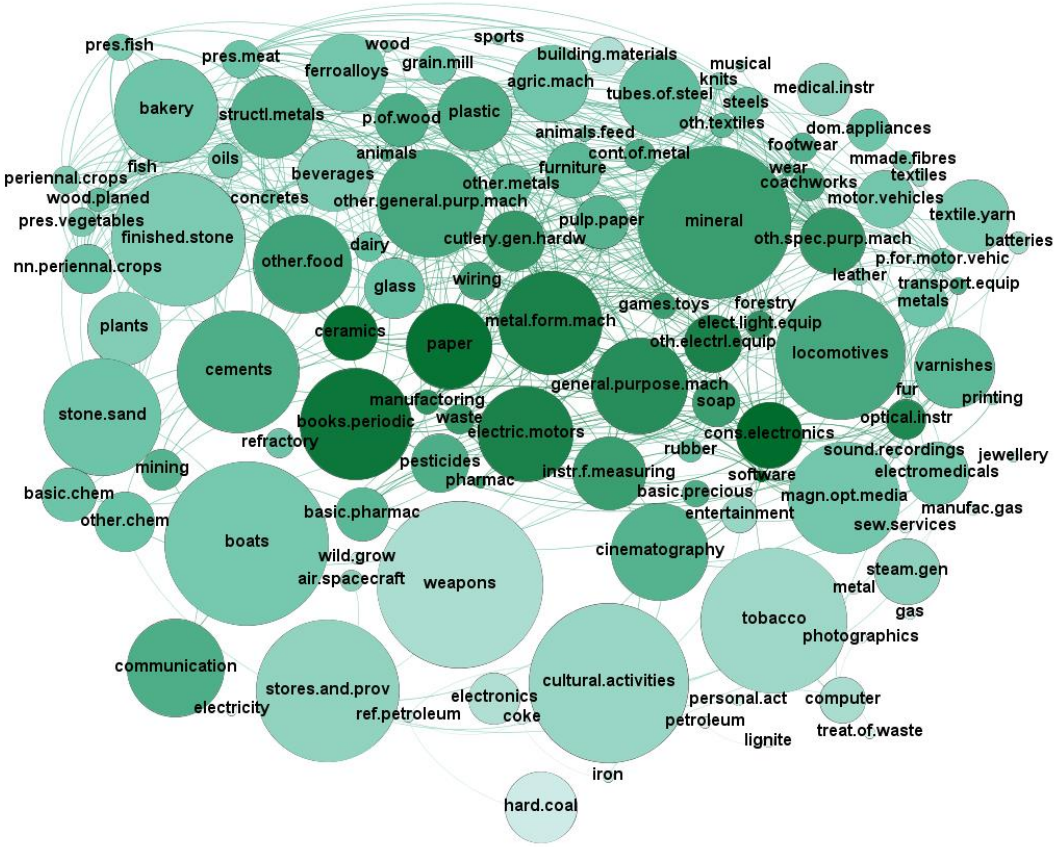
The Network Positioning for La Spezia province using the HHR EXPY Index

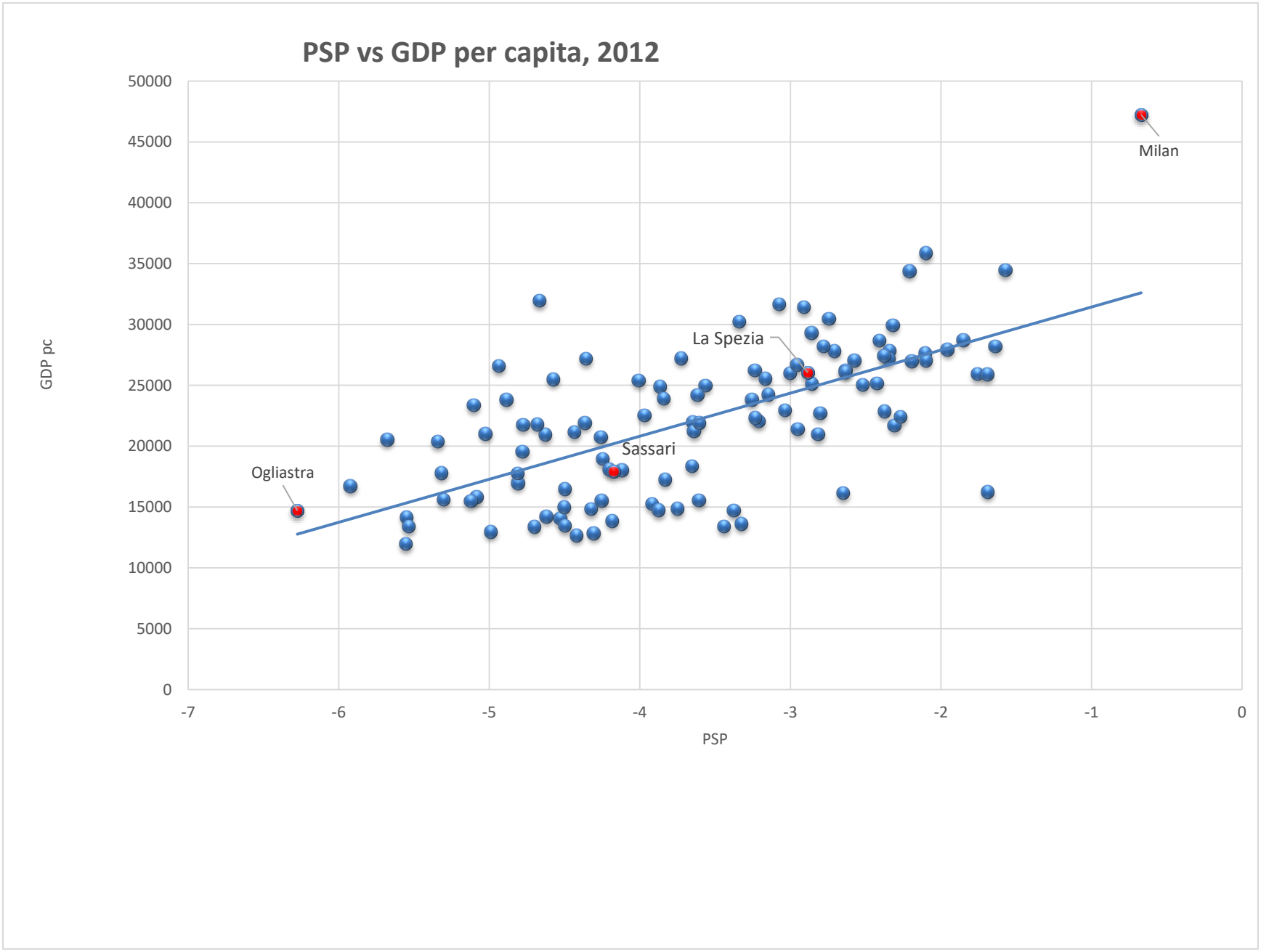


The Network Positioning for Sassari province using the PSP index



The Network Positioning for La Spezia province using the PSP index





Correlation = 0.653; R^2 = 0.426

Dependent variable: GDP 2006-2011

	Reg (3.1)	Reg (3.2)	Reg (3.3)	Reg (3.4)
Constant	0.201***	0.177**	0.191***	0.176**
	(0.069)	(0.074)	(0.072)	(0.074)
Product Space	0.276***	0.207***	0.247***	0.205***
Position	(0.033)	(0.035)	(0.033)	(0.035)
Variety		0.203***		0.193***
		(0.042)		(0.045)
Diversity			0.078***	0.015
			(0.026)	(0.026)
Pat	0.485***	0.434***	0.483***	0.436***
	(0.052)	(0.053)	(0.051)	(0.052)
Edu	0.020	−0.006	0.001	−0.008
	(0.029)	(0.027)	(0.028)	(0.027)
RD	−0.021	−0.036*	−0.021	−0.035*
	(0.020)	(0.020)	(0.020)	(0.020)
Adv Sect	0.298***	0.260***	0.310***	0.264***
	(0.035)	(0.034)	(0.037)	(0.035)
Pop Dummy	−0.122***	−0.145***	−0.127***	−0.145***
	(0.024)	(0.023)	(0.023)	(0.023)
dt_2	−0.349***	−0.307***	−0.341***	−0.308***
	(0.086)	(0.084)	(0.085)	(0.084)
dt_3	−0.186**	−0.169**	−0.173*	−0.167*
	(0.087)	(0.086)	(0.088)	(0.086)
dt_4	−0.342***	−0.315***	−0.338***	−0.316***
	(0.089)	(0.092)	(0.091)	(0.093)
dt_5	−0.114	−0.038	−0.092	−0.038
	(0.095)	(0.095)	(0.094)	(0.095)
dt_6	−0.217**	−0.232***	−0.200**	−0.228***
	(0.087)	(0.086)	(0.087)	(0.085)
R-square	0.691	0.707	0.696	0.707
Adjusted R-square	0.686	0.701	0.690	0.701

Dependent variable: Pat 2006-2011

	Reg (4.1)	Reg (4.2)	Reg (4.3)	Reg (4.4)
Constant	0.027	0.017	0.032	0.022
	(0.055)	(0.053)	(0.057)	(0.056)
Product Space	0.109***	0.069**	0.129***	0.088***
Position	(0.025)	(0.028)	(0.029)	(0.030)
Variety		0.128***		0.196***
		(0.029)		(0.034)
Diversity			−0.059	−0.115***
			(0.036)	(0.039)
GDP	0.676***	0.635***	0.683***	0.627***
	(0.029)	(0.030)	(0.031)	(0.029)
Edu Sc	0.094**	0.065*	0.113***	0.088**
	(0.038)	(0.038)	(0.037)	(0.038)
RD	−0.049**	−0.054**	−0.052**	−0.061**
	(0.024)	(0.024)	(0.025)	(0.025)
Adv Sect	−0.128***	−0.138***	−0.141***	−0.169***
	(0.040)	(0.040)	(0.042)	(0.043)
Pop Dummy	0.136***	0.119***	0.140***	0.115***
	(0.019)	(0.019)	(0.019)	(0.018)
dt_2	−0.114*	−0.092	−0.118*	−0.088
	(0.062)	(0.063)	(0.062)	(0.063)
dt_3	−0.042	−0.036	−0.050	−0.048
	(0.071)	(0.071)	(0.073)	(0.073)
dt_4	0.059	0.066	0.060	0.072
	(0.083)	(0.083)	(0.085)	(0.086)
dt_5	−0.028	0.013	−0.040	0.010
	(0.119)	(0.115)	(0.115)	(0.113)
dt_6	−0.037	−0.056	−0.045	−0.081
	(0.093)	(0.089)	(0.093)	(0.089)
R-square	0.567	0.573	0.569	0.581
Adjusted R-square	0.559	0.564	0.561	0.572