



OECD Regional development Policy Conference
Understanding growth in different types of regions
Newcastle, March 2012



**Global integration, regional connectivity
and growth**

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Increasingly globally integrated economy

- Trade growth twice the one of GDP
- FDI growth twice the one of trade
- Shift from trade in goods to trade in tasks
- Increasing trade in services

Aim: to investigate the relationship between globalization, regional connectivity and economic growth in European regions (Nuts2)

Difficult task because:

- Globalization is a multi-faceted process (social, institutional, economic, technological changes)
- Data at regional level are scarce

Specific research question in this presentation: what are the growth factors in regions with different connectivity to the global economy?

Regional connectivity to the world is not only physical, but involves:

- Physical connectivity (infrastructure)
- Functional connectivity (economic functions)
- Sectoral connectivity (specialization in open sectors)

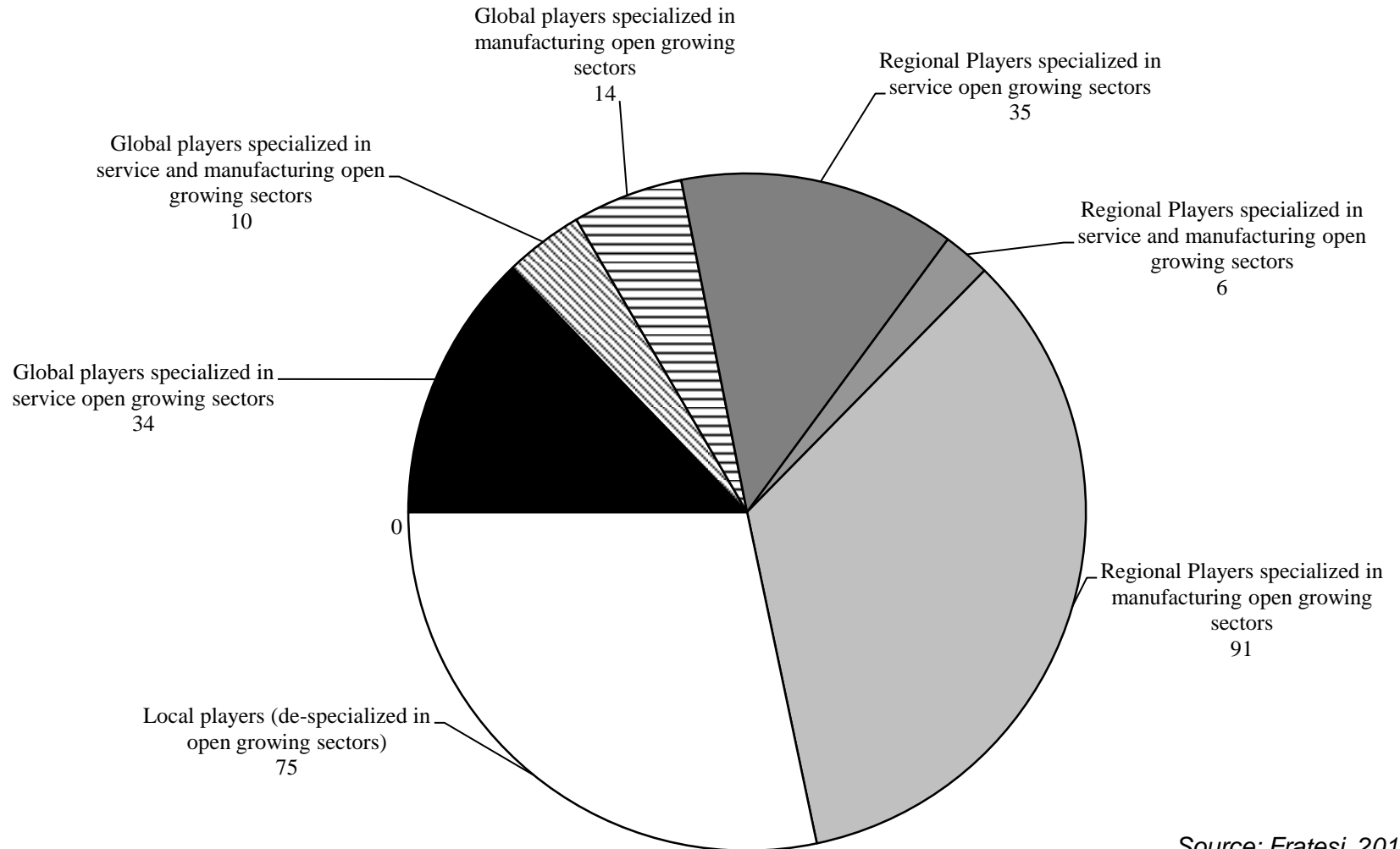
Measuring globalization at regional level: a theoretical taxonomy

- air connectivity through extra-European airflow connections
- extra-European born population
- high value-added functions (number of offices of advanced services firms)
- number of trans-national headquarters
- foreign direct investments from outside Europe

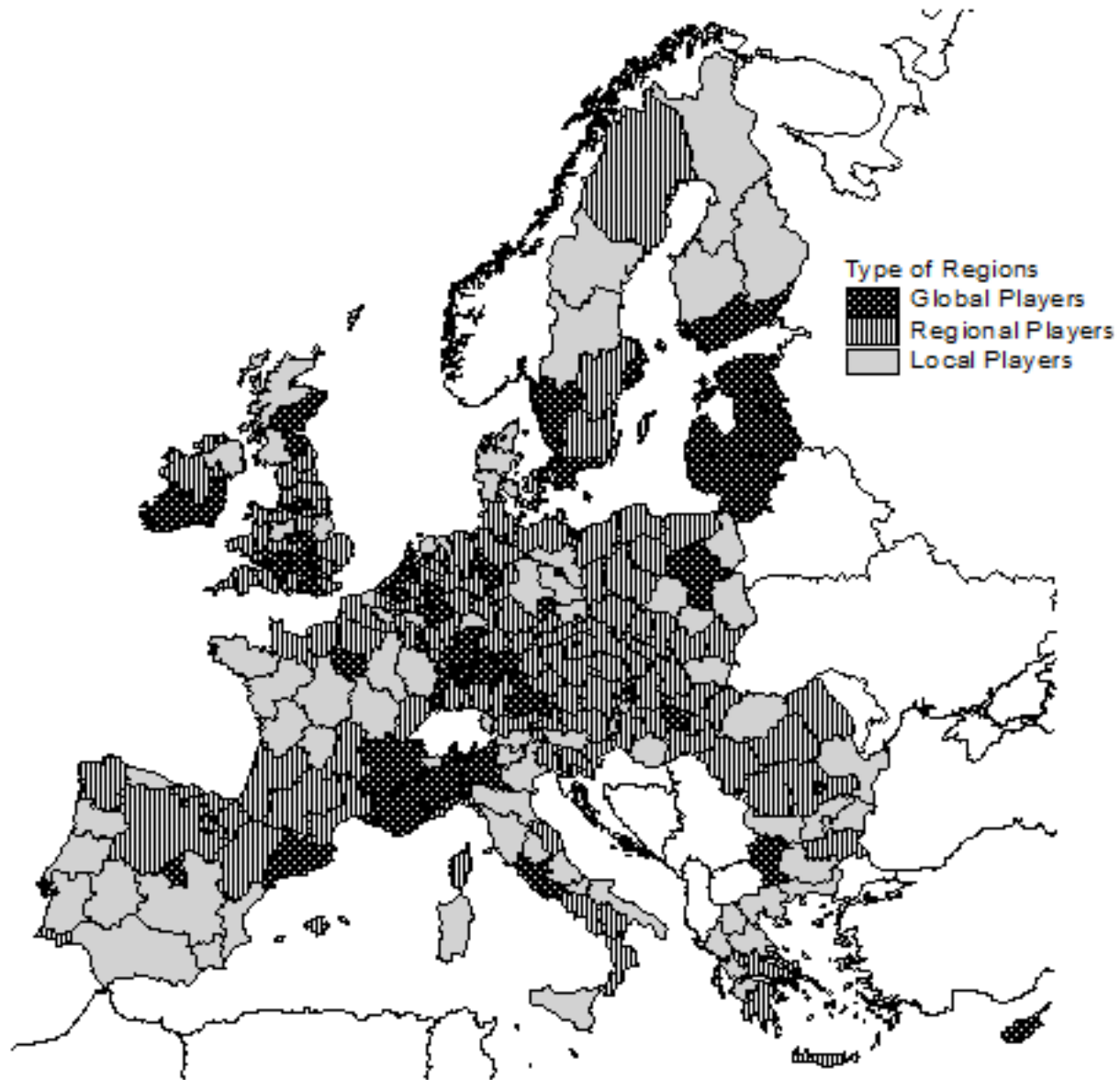
- Trade-open sectors (3 indicators)
- FDI open sectors (1 indicator)

| | | | |
|--|---|---|------------------------|
| | | Functional/territorial dimension (physical/functional connectivity) | |
| | | Openness above average | Openness below average |
| Economic dimension (sectoral connectivity) | Specialization in open growing sectors | 1 Global players | 2 Regional players |
| | De-specialization in open growing sectors | 4 Pure gateways | 3 Local players |

Manufacturing and service specialization

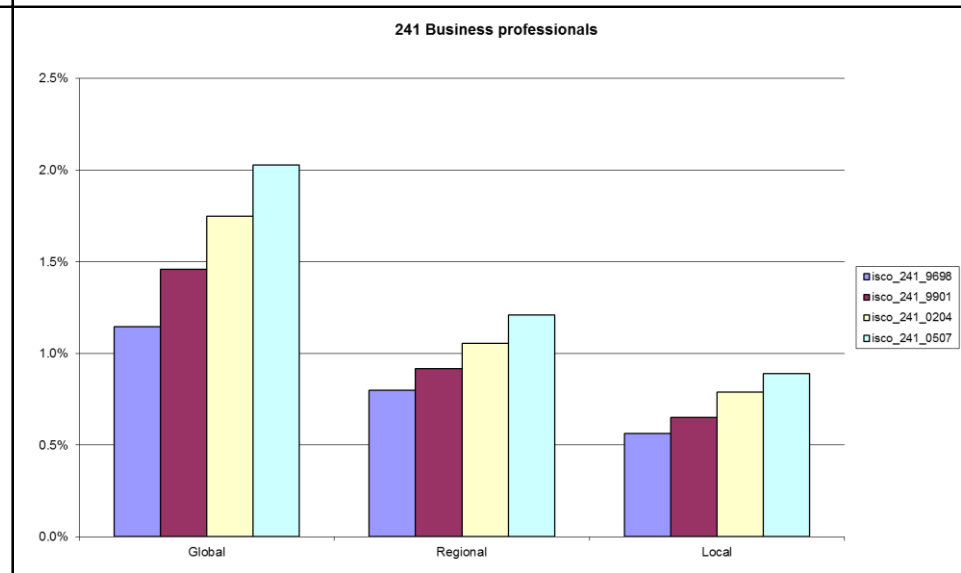
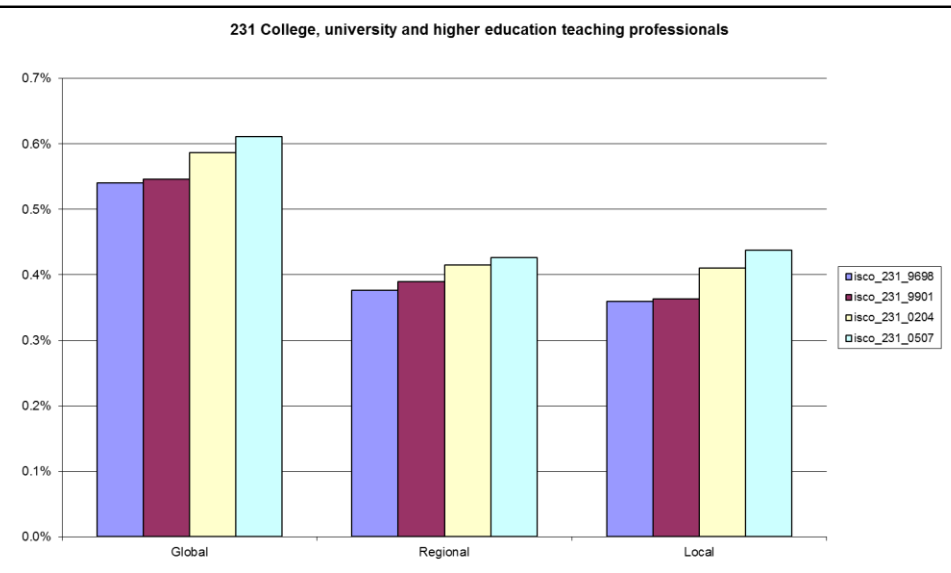
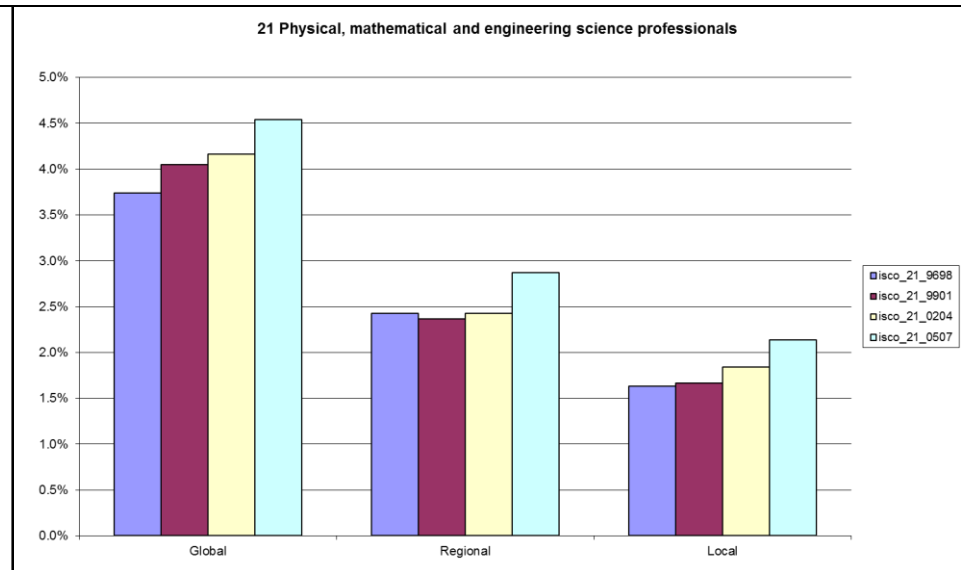
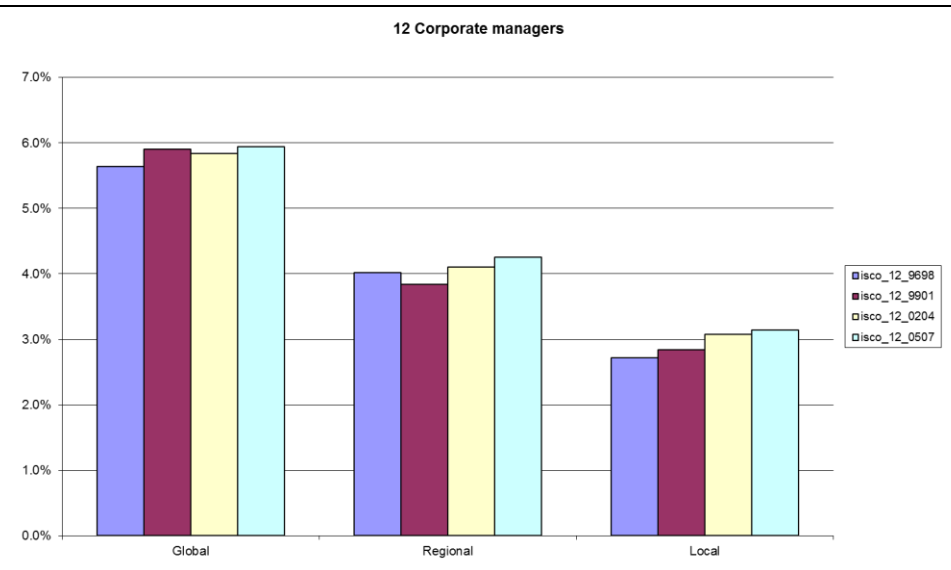


Source: Fratesi, 2012



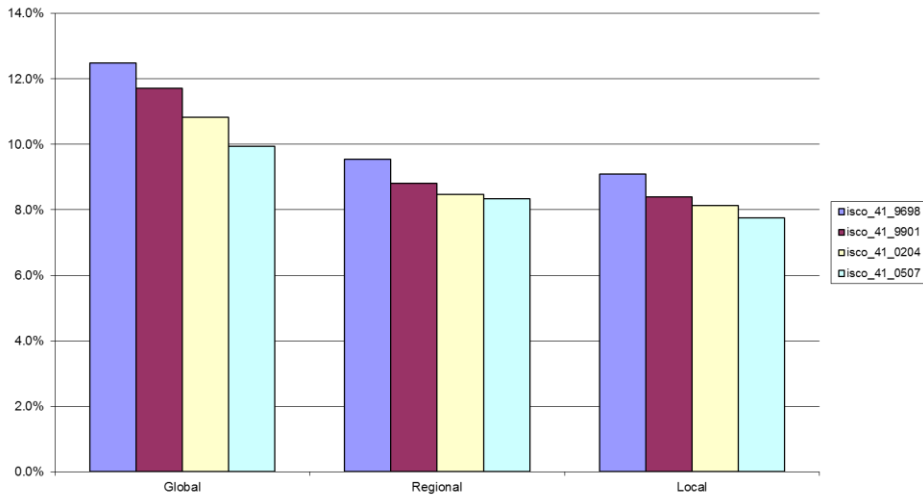
Source: Capello
Fratesi and Resmini,
2011

Labour market specialization and evolution (1)

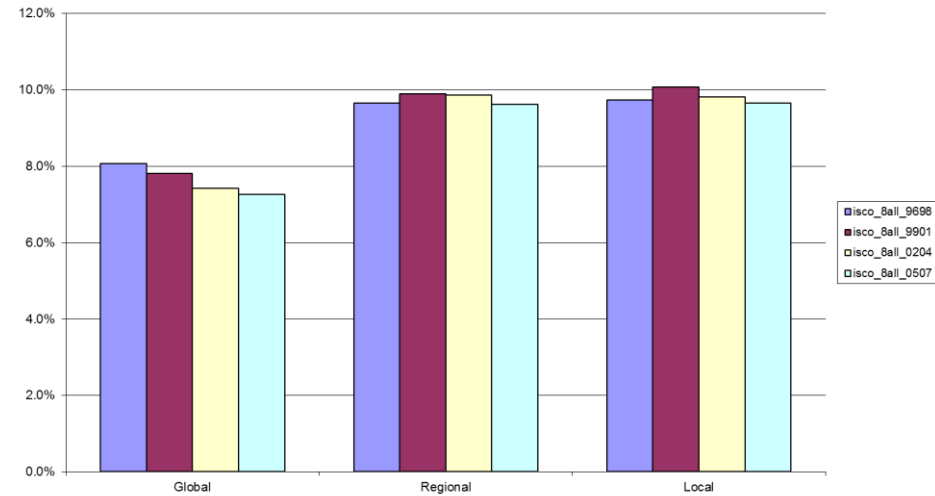


Labour market specialization and evolution (2)

41 Office clerks



8 Plant and machine operators and assemblers



Source: Capello
Fratesi and Resmini,
2011

| Structural variables | Regional types | | | F-test | sig. |
|---|----------------|----------|--------|--------|-------|
| | Global | Regional | Other | | |
| ECONOMIC VARIABLES | | | | | |
| Regional GDP per inhabitant (2000, 1995 prices) | 22296 | 14712 | 13579 | 18.93 | 0.000 |
| Regional unemployment rate (2000) | 0.072 | 0.086 | 0.105 | 5.8 | 0.004 |
| Labour productivity (Value added/total employment in 2000) | 39.136 | 30.799 | 29.946 | 6.270 | 0.002 |
| Labour productivity in the primary sector (2000) | 22.551 | 25.724 | 21.015 | 0.180 | 0.838 |
| Labour productivity in the manufacturing sector (2000) | 43.846 | 34.140 | 32.838 | 4.68 | 0.010 |
| Labour productivity in the service sector (2000) | 41.041 | 31.914 | 32.063 | 5.380 | 0.005 |
| TERRITORIAL STRUCTURE AND POPULATION | | | | | |
| Number of Megas (2000) | 41 / 58 | 20 / 132 | 7 / 75 | | |
| Population density (2000) | 740.698 | 172.923 | 99.338 | 21.71 | 0.000 |
| INNOVATIVENESS | | | | | |
| Human Resources in Science and Technology (% of total pop. in 2000) | 28.52 | 20.33 | 18.13 | 45.75 | 0.000 |
| Overall R&D expenditure on GDP (2003) | 2.12 | 1.28 | 0.97 | 18.57 | 0.000 |
| INFRASTRUCTURE ENDOWMENT | | | | | |
| Km of railways over regional area (2000) | 0.096 | 0.060 | 0.043 | 19.590 | 0.000 |
| Kms. of roads over regional area (2000) | 0.271 | 0.155 | 0.105 | 15.650 | 0.000 |
| Total infrastructure endowment (total transport infrastructure on area from ESPON Kten in 2000) | 0.189 | 0.071 | 0.044 | 13.830 | 0.000 |
| SOCIAL CAPITAL | | | | | |
| Share of citizens trusting others "a lot" or "quite" (2000) | 0.358 | 0.285 | 0.323 | 4.660 | 0.010 |

| <i>Sector (Ateco code in parenthesis)</i> | <i>Type of region</i> | <i>Employment</i> | <i>Productivity</i> | <i>GVA</i> |
|---|-----------------------|-------------------|---------------------|------------|
| Agriculture (A+B) | Local players | -2.76 | 2.88 | 0.04 |
| | Regional Players | -4.12 | 4.17 | -0.12 |
| | Global Players | -2.63 | 3.48 | 0.76 |
| Energy and Manufacturing (C+D+E) | Local players | -0.22 | 2.39 | 2.16 |
| | Regional Players | -0.79 | 3.16 | 2.35 |
| | Global Players | -1.17 | 3.04 | 1.83 |
| Construction (F) | Local players | 2.67 | -0.61 | 2.05 |
| | Regional Players | 1.39 | 0.25 | 1.65 |
| | Global Players | 2.16 | -0.39 | 1.76 |
| Services (from G to P) | Local players | 2.00 | 0.82 | 2.84 |
| | Regional Players | 1.73 | 1.46 | 3.21 |
| | Global Players | 2.04 | 1.52 | 3.60 |

| | All European regions | | | |
|--|------------------------|----------|-------|----------|
| | Global | Regional | Local | F |
| Growth rate 1997-2002 | 3.29 | 2.28 | 2.06 | 9.40*** |
| Growth rate 2002-2007 | 2.84 | 3.04 | 2.53 | 2.14 |
| Differential growth with respect to the nation 1997-2002 | 0.53 | -0.50 | -0.75 | 12.74*** |
| Differential growth with respect to the nation 2002-2007 | 0.12 | -0.09 | -0.41 | 5.33*** |
| | Old 15 country regions | | | |
| | Global | Regional | Local | F |
| Growth rate 1997-2002 | 2.94 | 2.45 | 1.96 | 6.03*** |
| Growth rate 2002-2007 | 2.26 | 2.44 | 2.21 | 1.00 |
| Differential growth with respect to the nation 1997-2002 | 0.19 | -0.31 | -0.79 | 7.11*** |
| Differential growth with respect to the nation 2002-2007 | -0.08 | 0.02 | -0.19 | 1.59 |
| | New 12 country regions | | | |
| | Global | Regional | Local | F |
| Growth rate 1997-2002 | 6.06 | 1.79 | 2.60 | 11.07*** |
| Growth rate 2002-2007 | 7.33 | 4.80 | 4.20 | 8.83*** |
| Differential growth with respect to the nation 1997-2002 | 3.14 | -1.06 | -0.57 | 17.42*** |
| Differential growth with respect to the nation 2002-2007 | 1.72 | -0.41 | -1.51 | 14.85*** |

Success factors for European regions

To be searched in:

- the degree of innovation of regions (*inno*)
- physical density (*den*)
- endowment of human capital (*humcap*)
- a balanced urban system, with the presence of cities
- FDI penetration in a region as a measure of regional attractiveness (*fdi*)
- presence of public funds (*pol*)
- all nation-wide macroeconomic factors (*natgrowth*)

$$regrowth_r = \alpha_0 + \beta_1 natgrowth_r + \beta_2 inno_r + \beta_3 den_r + \beta_5 pol_r + \beta_6 humcap_r + \beta_7 fdi_r + \beta_8 city + \varepsilon_r$$

Success factors for European regions (general results)

| | Model1 No FDI stand. | | | Model1 (complete) stand. | | |
|--|----------------------|-------------|------|--------------------------|-------------|------|
| | coeff. | p-value | sig. | coeff. | p-value | sig. |
| Innovation (Share of science and technology employment 2000) | 0.177 | 0.025 | ** | 0.141 | 0.085 | * |
| Physical density (Total km of infrastructure on sqm 2000) | -0.177 | 0 | *** | -0.198 | 0 | *** |
| Policies (Structural funds per capita 1994-1999) | 0.081 | 0.219 | | 0.075 | 0.254 | |
| Human capital (1999-2001) | 0.129 | 0.085 | * | 0.134 | 0.07 | * |
| FDI (number of FDI per million people 1999-2001) | | | | 0.070 | 0.009 | *** |
| City effect (dummy for rural regions with no large city) | -0.099 | 0.041 | ** | -0.097 | 0.045 | ** |
| Constant | | | *** | | 0.001 | *** |
| Country dummies | Included | significant | | Included | significant | |
| Obs | 246 | | | 246 | | |
| R2 | 0.7104 | | | 0.7134 | | |
| F | 84.26 | | | 59.15 | | |
| Moran's I | 0.719 | 0.472 | | 0.578 | 0.563 | |
| Spatial Error | | | | | | |
| Lagrange multiplier | 1.99 | 0.158 | | 2.26 | 0.133 | |
| Robust Lagrange multiplier | 0.734 | 0.392 | | 0.703 | 0.402 | |
| Spatial Lag | | | | | | |
| Lagrange multiplier | 1.301 | 0.254 | | 1.689 | 0.194 | |
| Robust Lagrange multiplier | 0.044 | 0.834 | | 0.132 | 0.717 | |

Source: Capello and Fratesi, 2012

Success factors for European regions (typology dummies)

| | Model1 | | | Model2 | | | Model3 | | | Model4 | | | Model5 | | |
|--|---------------|-------------|------|---------------|-------------|------|---------------|-------------|------|---------------|-------------|------|---------------|-------------|------|
| | stand. coeff. | p-value | sig. | stand. coeff. | p-value | sig. | stand. coeff. | p-value | sig. | stand. coeff. | p-value | sig. | stand. coeff. | p-value | sig. |
| Innovation (Share of science and technology employment 2000) | 0.141 | 0.085 * | | 0.111 | 0.183 | | 0.146 | 0.086 * | | 0.138 | 0.089 * | | 0.138 | 0.089 * | |
| Physical density (Total km of infrastructure on sqm 2000) | -0.198 | 0 *** | | -0.208 | 0 *** | | -0.197 | 0 *** | | -0.201 | 0 *** | | -0.201 | 0 *** | |
| Policies (Structural funds per capita 1994-1999) | 0.075 | 0.254 | | 0.076 | 0.248 | | 0.078 | 0.241 | | 0.084 | 0.202 | | 0.084 | 0.202 | |
| Human capital (1999-2001) | 0.134 | 0.07 * | | 0.139 | 0.059 * | | 0.133 | 0.075 * | | 0.134 | 0.071 * | | 0.134 | 0.071 * | |
| FDI (number of FDI per million people 1999-2001) | 0.070 | 0.009 *** | | 0.066 | 0.01 ** | | 0.071 | 0.009 *** | | 0.069 | 0.009 *** | | 0.069 | 0.009 *** | |
| City effect (dummy for rural regions with no large city) | -0.097 | 0.045 ** | | -0.090 | 0.058 * | | -0.097 | 0.046 ** | | -0.092 | 0.058 * | | -0.092 | 0.058 * | |
| Global players | | | | 0.034 | 0.394 | | | | | | | | | | |
| Regional players | | | | | | | 0.009 | 0.821 | | | | | | | |
| Global and regional players | | | | | | | | | | 0.028 | 0.482 | | | | |
| Local players | | | | | | | | | | | | | -0.028 | 0.482 | |
| Constant | | 0.001 *** | | | 0.001 *** | | | 0.004 *** | | | 0.002 *** | | | 0.001 *** | |
| Country dummies | Included | significant | | Included | significant | | Included | significant | | Included | significant | | Included | significant | |
| Obs | 246 | | | | | | 246 | | | 246 | | | 246 | | |
| R2 | 0.7134 | | | 0.714 | | | 0.7135 | | | 0.7141 | | | 0.7141 | | |
| F | 59.15 | | | 46.5 | | | 58.56 | | | 52.64 | | | 52.64 | | |
| Moran's I | 0.578 | 0.563 | | 0.543 | 0.587 | | 0.597 | 0.55 | | 0.598 | 0.55 | | 0.598 | 0.55 | |
| Spatial Error | | | | | | | | | | | | | | | |
| Lagrange multiplier | 2.26 | 0.133 | | 2.322 | 0.128 | | 2.24 | 0.134 | | 2.236 | 0.135 | | 2.236 | 0.135 | |
| Robust Lagrange multiplier | 0.703 | 0.402 | | 0.755 | 0.385 | | 0.706 | 0.401 | | 0.774 | 0.379 | | 0.774 | 0.379 | |
| Spatial Lag | | | | | | | | | | | | | | | |
| Lagrange multiplier | 1.689 | 0.194 | | 1.681 | 0.195 | | 1.654 | 0.198 | | 1.541 | 0.215 | | 1.541 | 0.215 | |
| Robust Lagrange multiplier | 0.132 | 0.717 | | 0.114 | 0.736 | | 0.12 | 0.729 | | 0.079 | 0.779 | | 0.079 | 0.779 | |

The heterogeneity of success factors 15

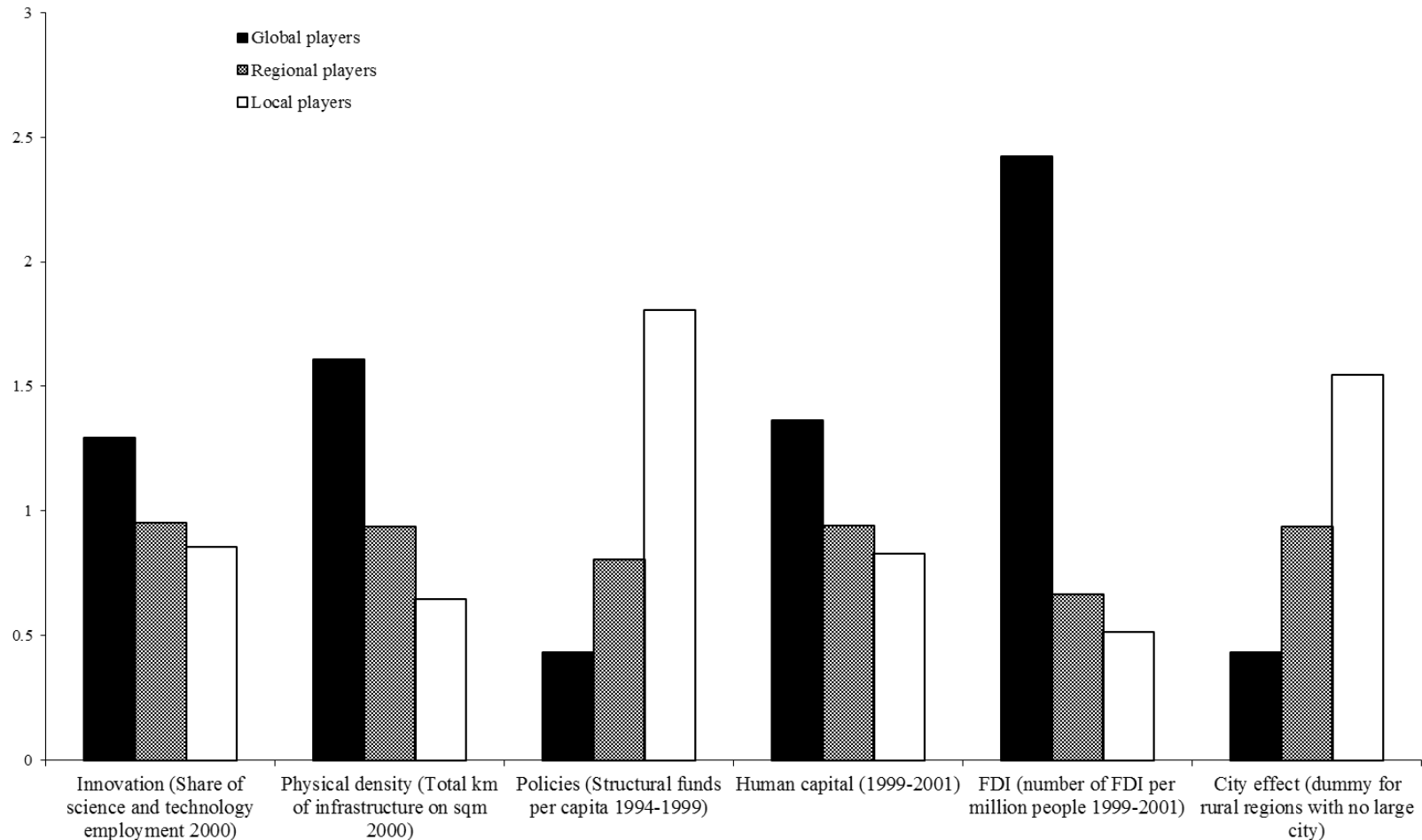
| | Model 1 (all regions) | | | Model 6 (only global and regic | | | Model 7 (only local players) | | | Model 7 SEM (only local playe | | |
|--|-----------------------|-------------|------|--------------------------------|-------------|------|------------------------------|-------------|------|-------------------------------|-------------|------|
| | stand. coeff. | p-value | sig. | stand. coeff. | p-value | sig. | stand. coeff. | p-value | sig. | stand. coeff. | p-value | sig. |
| Innovation (Share of science and technology employment 2000) | 0.141 | 0.085 * | | 0.154 | 0.059 * | | 0.146 | 0.36 | | 1.600 | 0.851 | |
| Physical density (Total km of infrastructure on sqm 2000) | -0.198 | 0 *** | | -0.208 | 0 *** | | -0.367 | 0.039 ** | | -4.929 | 0.009 *** | |
| Policies (Structural funds per capita 1994-1999) | 0.075 | 0.254 | | 0.095 | 0.199 | | -0.043 | 0.713 | | 0.000 | 0.183 | |
| Human capital (1999-2001) | 0.134 | 0.07 * | | 0.091 | 0.256 | | 0.092 | 0.423 | | 75.729 | 0.256 | |
| FDI (number of FDI per million people 1999-2001) | 0.070 | 0.009 *** | | 0.065 | 0.018 ** | | 0.258 | 0.212 | | 0.003 | 0.161 | |
| City effect (dummy for rural regions with no large city) | -0.097 | 0.045 ** | | -0.127 | 0.043 ** | | 0.028 | 0.734 | | 0.168 | 0.478 | |
| Constant | | 0.001 *** | | | 0.001 *** | | | 0.808 | | 2.644 | 0.103 | |
| Country dummies | Included | significant | | Included | significant | | Included | significant | | Included | significant | |
| Obs | 246 | | | 175 | | | 71 | | | 71 | | |
| R2 | 0.7134 | | | 0.7607 | | | 0.7599 | | | Squared correlation | 0.779 | |
| F | 59.15 | | | 82.2 | | | | | | Sigma | 0.76 | |
| Moran's I | 0.578 | 0.563 | | 0.488 | 0.626 | | -1.367 | 1.828 | | | | |
| Spatial Error | | | | | | | | | | | | |
| Lagrange multiplier | 2.26 | 0.133 | | 2.398 | 0.121 | | 6.445 | 0.011 ** | | | | |
| Robust Lagrange multiplier | 0.703 | 0.402 | | 0.591 | 0.442 | | 4.445 | 0.035 ** | | | | |
| Spatial Lag | | | | | | | | | | | | |
| Lagrange multiplier | 1.689 | 0.194 | | 2.088 | 0.148 | | 2.743 | 0.098 * | | | | |
| Robust Lagrange multiplier | 0.132 | 0.717 | | 0.281 | 0.596 | | 0.743 | 0.389 | | | | |

Chow test gives inconclusive evidence

| | Model 1 (all regions) | | | Model 8 (crossed effects) | | | Marginal effect on local players | | |
|--|-----------------------|-------------|------|---------------------------|----------|------|----------------------------------|----------|--|
| | stand. coeff. | p-value | sig. | General coefficient | p-value | sig. | p-value | sig. | |
| Innovation (Share of science and technology employment 2000) | 0.141 | 0.085 * | | 0.102 | 0.212 | | 0.257 | 0.106 | |
| Physical density (Total km of infrastructure on sqm 2000) | -0.198 | 0 *** | | -0.211 | 0 *** | | -0.108 | 0.028 ** | |
| Policies (Structural funds per capita 1994-1999) | 0.075 | 0.254 | | -0.013 | 0.863 | | 0.100 | 0.206 | |
| Human capital (1999-2001) | 0.134 | 0.07 * | | 0.160 | 0.036 ** | | -0.092 | 0.19 | |
| FDI (number of FDI per million people 1999-2001) | 0.070 | 0.009 *** | | 0.065 | 0.01 ** | | 0.030 | 0.53 | |
| City effect (dummy for rural regions with no large city) | -0.097 | 0.045 ** | | -0.123 | 0.058 * | | 0.053 | 0.454 | |
| Constant | | 0.001 *** | | | 0 *** | | -0.204 | 0.269 | |
| Country dummies | Included | significant | | | | | | | |
| Obs | 246 | | | 246 | | | | | |
| R2 | 0.7134 | | | 0.7248 | | | | | |
| F | 59.15 | | | 55.74 | | | | | |
| Moran's I | 0.578 | 0.563 | | 0.415 | 0.678 | | | | |
| Spatial Error | | | | | | | | | |
| Lagrange multiplier | 2.26 | 0.133 | | 2.485 | 0.115 | | | | |
| Robust Lagrange multiplier | 0.703 | 0.402 | | 1.323 | 0.25 | | | | |
| Spatial Lag | | | | | | | | | |
| Lagrange multiplier | 1.689 | 0.194 | | 1.163 | 0.281 | | | | |
| Robust Lagrange multiplier | 0.132 | 0.717 | | 0.001 | 0.982 | | | | |

Endowment of success factors, for global, regional and local players

Different growth models in differently connected regions mainly due to endowments



Impacts and effects of each success factor on regional growth

| | <i>Non-Standardized coefficients</i> | All regions | | Global Players | | Regional Players | | Local Players | |
|--|--------------------------------------|---------------|------------------|----------------|------------------|------------------|------------------|---------------|------------------|
| | | Average Value | Effect on Growth | Average Value | Effect on Growth | Average Value | Effect on Growth | Average Value | Effect on Growth |
| Innovation (Share of science and technology employment 2000) | 7.10 | 0.11 | 0.76 | 0.14 | 0.98 | 0.10 | 0.72 | 0.09 | 0.65 |
| Physical density (Total km of infrastructure on sqm 2000) | -1.59 | 0.23 | -0.36 | 0.37 | -0.58 | 0.21 | -0.34 | 0.15 | -0.23 |
| Policies (Structural funds per capita 1994-1999) | 2.1E-07 | 369'212 | 0.08 | 159'566 | 0.03 | 297'151 | 0.06 | 666'291 | 0.14 |
| Human capital (1999-2001) | 80.02 | 0.00 | 0.33 | 0.01 | 0.44 | 0.00 | 0.31 | 0.00 | 0.27 |
| FDI (number of FDI per million people 1999-2001) | 0.0003 | 192.34 | 0.06 | 465.95 | 0.14 | 127.74 | 0.04 | 99.16 | 0.03 |
| City effect (dummy for rural regions with no large city) | -0.36 | 0.40 | -0.14 | 0.17 | -0.06 | 0.37 | -0.13 | 0.61 | -0.22 |
| Constant | 1.45 | 1 | 1.45 | 1 | 1.45 | 1 | 1.45 | 1 | 1.45 |
| Estimated non weighted average growth | | | 2.17 | | 2.41 | | 2.11 | | 2.09 |
| Actual non weighted average growth | | | 2.43 | | 2.76 | | 2.47 | | 2.09 |

More internationally integrated European regions record GDP performance rates on average higher than those of the other types of regions.

Their higher general positive growth rates highlight their capacity to turn the challenges generated by a global economy into opportunities

Their competitive advantages are strong enough to enable their local economies to compete on a world market.

Whilst more globally connected regions outperform the others on average, this *trend is heterogeneous* and

- openness to a global economy per se does not give rise to economic growth

The reasons why global players grow, on average, more than the other groups of regions reside in their greater endowment of growth success factors.

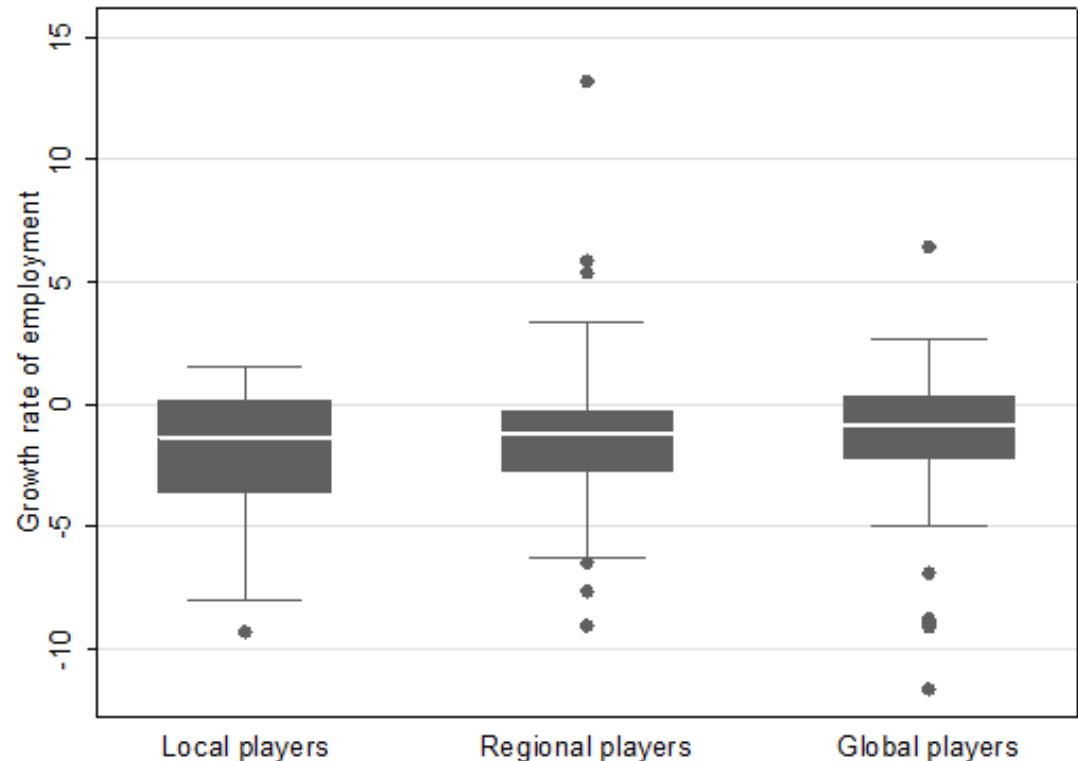
Ad-hoc intervention policies, that should be devoted to the reinforcement of those regional success factors able to increase inter-sectoral productivity

Pervasive policies have to be devoted to prepare territories for innovation and global competition, enhancing their adaptability to a changing external context

Two alternative hypotheses:

- More globally connected regions better able to resist due to stronger structure
- More globally connected regions more affected because more open

Still too early to get final evidence



Growth rate of employment between 2009 and 2008 at Nuts2 level

Source: Fratesi, 2012

Thank you for your attention

OECD Regional development Policy Conference
Understanding growth in different types of regions
Newcastle, March 2012

Global integration, regional connectivity and growth

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