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Agglomeration and polarization of R&D expenditures in Europe: analysis by stochastic kernels

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Agglomeration and polarization of R&D expenditures in Europe: analysis by stochastic kernels[*]

Claudia Lanconelli[**]

Abstract:
This thesis has the aim of analyzing the situation of R&D expenditures distribution in European regions to evaluate the possibility of the presence of a distribution under a core-peripherical model on the basis of Krugman's theory. I studied the phenomenon through stochastic kernels, the method of analysis developed first by Quah to show intradistribution dynamics. The evidence shows the reduction in time of regional differences in R&D expenditures, with an increase of the number of regions with medium level of expenditures and the reduction of the number of low investment regions.

Keywords: Nonparametrics Methods, Econometric Software, Choice of Technology, Size and Spatial Distribution of Regional Economics Activity

JEL classification: C14, C87, O14, R12

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1. Introduction

Nowadays one of the principal factors inducing growth is believed to be innovation. Some studies analyze the relevance of innovation in economic growth, but only few have looked at innovation differences as elements leading inequalities in spreading growth. This thesis studies the R&D expenditures distribution in Europe and Italy. The aim is to assess if there is a trend over polarization of the level of the investments or, on the opposite side if low investment regions are catching up on high investment regions, both in Europe and in Italy. The presence of polarization could mean a possible core-peripherical model on the basis of Krugman's studies, where there are high innovative regions near regions with low level of R&D expenditures. Moreover state and neighbourhood effects on regional pre-capita R&D expenditures are studied to verify their role in determining regional behaviors. The state effects want to verify if the belonging state has a role in determining the regional level of per-capita research and development expenditures. The neighbourhood effects instead analyze the influence of neighbouring regions on regional level of pre-capita expenditures.

These particular analysis are based on the New Economic Geography theory, which tries to explain the forces which leads industries to cluster.

The objectives of the thesis can be summarized as follow:

1. Analyze the evolution of regional level of expenditures over time, to verify if it has increased or remained stable during the period considered;
2. Verify if there is a tendency over polarization inside states or in some European areas, which are not necessarily restricted to national borders.
3. Verify if the level of regional pre capita research and development expenditures are influenced by the level of state or neighbouring regions expenses.

The idea for this thesis comes from a stage at the OECD I did from January to June 2006. There I collaborated to a study on unemployment clustering done by Garcilazo Jose Enrique and Spiezia Vincenzo. I applied this methodology of data analysis to data on R&D expenses, to verify if something similar to what came out for unemployment rates, can be also valid for R&D expenses.

2. Literary review

The NEG has been the first innovative theory, who attempted to provide an explanation for agglomeration of industry and workers, in addition to those that already existed thanks to geographical economics. This literature shows how pecuniary externalities can influence trade and location of industries, how centrifugal and centripetal force, coming from the backwards and forwards linkages, can lead to agglomeration and concentration of such

industries, and the differences in nominal and real wages resulting from these processes[1].

The interest in this branch of the economy grew after the first model developed by Krugman. He found out two forces working for divergence of industries, the "home market effect" that leads to an increase in wages in the regions with the larger market, and the "price index effect", due to worker mobility across regions because of differences in real wages. On the other side one force works for convergence. It is the level of competition for the local peasant market[2]. Regions with a large demand for manufactures tend to have a larger than proportional manufacturing sector, due to the home market effect, and cheaper manufacturing goods, due to the price index effect. According to this, the market effect predicts that regions with a large home market will export manufacturing goods, while the price index effect influences the cost of living for consumers and the cost of intermediates for firms[3].

Following development of the model are due to Krugman himself, Puga, Venables and other authors.

Despite the large literature regarding the NEG there aren't yet models considering the possibility that the presence of innovation can influence the development of an area. Some models take into account the innovation factor, but always as a way to induce manufacturing concentration.

Baldwin considers that factor accumulation can play the same role as workers migration in inducing agglomeration through demand linkages. He includes a Research and Development activity in his model. This factor is last forever and non-tradable, so that production occurs where invention take place. An agglomeration process will occur if the profits granted by new patents are increased by the presence of a larger number of firms. Vice versa divergence will occur.

In another model, Martin and Ottaviano consider an intertemporal version of forward and backward linkages. The model has the same basic structure of Krugman's model, with two countries and two sectors, one perfectly competitive and the other monopolistically competitive. In addition an R&D sector is included, and it is perfectly competitive. This one uses specialized services as only input for the invention of new industrial variety, and there are constant returns to patent accumulation, so the growth in the long run will be sustained. In this model the role of R&D laboratories is similar to the labour mobility in the Krugman's model, and it gives input to the circular causation that will lead to agglomeration of firms. Consequently, the lower the costs to produce innovation, the faster the innovation promotion and the larger the increase of the local demand for intermediates. This process will lead to an agglomeration of firms[4].

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[1] Mikkelsen, Eirik Inge. 2004. "New economic geography- an introduction survey". *NORUT Samfunnsforskning AS*

[2] Krugman, Paul. 1991. "History versus expectations". *Quarterly journal of economics* **106**: 651-667

[3] Mikkelsen, Eirik Inge. 2004. "New economic geography- an introduction survey". *NORUT Samfunnsforskning AS*

[4] Ottaviano, Gianmarco and Puga Diego. 1997. "Agglomeration in the global economy: a survey of the 'new economic geography'. *Centre for Economic Performance* discussion paper n. 356, LSE

Audretsch and Feldman, again, test the importance of geographic location to different types of industries by linking the geographic concentration in manufacturing industries to industry specific characteristics, specifically, the relative importance of knowledge spillovers. Their results show that innovation activities tend to cluster more in industries where knowledge spillovers play a decisive role. Although such industries tend to exhibit a greater geographic concentration of production, the results suggest that the propensity for innovative activity to cluster is more attributable to the role of knowledge spillovers and not merely the role of geographic production concentration.[5]

These assumptions can lead to the conclusion that the possibility of an increasing growth due to the concentration of innovation activities can be an explanation of the different levels of development that are today clearly distinguishable in our society.

3. Data characteristics

The data for my study are computed from Eurostat, at Nuts2 level, from the table: Science and Technology (research and development, patents/ R&D expenditure and personnel/ Total intramural R&D expenditure (GERD) by sectors of performance and region. The sectors are business enterprise sector, government sector, higher education sector and private non profit business sector. It is analyzed the level of pre capita expenditures because of the biases due to the absolute value of capital regions' expenditures, which are obviously larger than the other regions', influencing the kernels.

Unfortunately data availability for European regions is not huge, therefore we have to exclude some countries, although their geographic proximity and similar characteristic with the other regions analyzed. Some of these are for example: Switzerland, for which there are no data available for any years, Belgium and Luxembourg for 1997 and 2000. Another problem there is in Italy: despite the OECD classification considers both Bozen and Trent two distinct regions; we must unify them because data availability covers only Trentino Alto Adige as a whole. In addition to Eurostat's data, I did some researches on National Statistical Offices and some estimates to extend the dataset. For the estimates we have computed the regional percentage of R&D expenditures and applied it to the national level of expenditures of the following year and in some cases to the previous too, filling some blanks. When the data is available for the year before and after the one needed, an average of the regional expenditure in these two years have been calculated to get the missing value.

The temporal analysis is done for Europe from 1997 to 2003 and for Italy a longer time period is analyzed. It goes from 1993 to 2003. The time period is chosen to take also into account the effect of Lisbon strategy, to assess if from the mid 90s to the 2003 the level of R&D expenditures has been increased also by the effect of supranational policies.

[5] Audretsch, David B. and Feldman Maryann P. 1996. "R&D spillovers and the geography of innovation and production". *The American Economic Review* **86.3**: 630-640

Given the absence of data for some regions in some years, we want to verify also the effects the inclusion these has on the results obtained, and as a consequence two different sets of regions have been defined. The first includes 106 regions for which data are available for all years studied, whereas the second includes all data available for the years, therefore in such a situation the comparison of graphs should be done with some reserves. The first group is composed by regions from Austria, Germany, Spain, France, Greece, Hungary, Italy, Netherlands and Norway. On the other side the countries, whose data are available only for one or two years, and whose regions compose the set N are: Belgium, Czech Republic, Finland, Ireland, Luxembourg, Poland, Portugal, Slovak Republic, Sweden and United Kingdom.

4. Methodology

To measure persistence or convergence of phenomenon, in fact, stochastic kernels are useful tools. The instrument has been proposed by Quah and then it has been used in a large number of studies, to show clustering inside and between countries. Despite, generally, the main field of study is unemployment or employment regional distributions, in my thesis I wanted to verify if something similar occurs also for R&D expenditures.

A stochastic kernel is a non parametric method of data analysis that permits to reveal changes within the distribution, since it estimates the probability of transitioning from any point in the distribution to another point of another distribution. It is essentially a continuous state-space and a discrete-time Markov process, which can be represented through a probability matrix. The kernel in fact reflects a conditional probability of a distribution on another distribution, (Pr x|y). The discretization of the state space choose to represent the matrix has been proved to represent a possible problem. It can make lost the Markov property. Sandra Bulli (2001) demonstrates that it matters, despite the behavior of a large number of researchers, who claim that discretization doesn't matter. In her work, Sandra Bulli presents a possible solution that does not affect the Markov property, demonstrating her theory.

The state effects correspond to the effect at country level and they can be associated to the effects of national policy for R&D investments, whereas neighbourhood effects are obtained through a weighted average of pre capita expenditures of neighbouring regions. State and neighbourhood effects are measured by conditioning a distribution of group relative R&D expenditures to overall relative expenditures, where groups are member state or neighbourhood regions. These effects are obtained through the probability of regional R&D investments conditional to belong to a state or to reside next to a particular set of neighbours, and are represented with a GAUSS routine, which was developed by George Shuetrim and has been modified by Lopez Bazo. It uses a Gaussian kernel with the bandwidth selection recommended by Silverman[6].

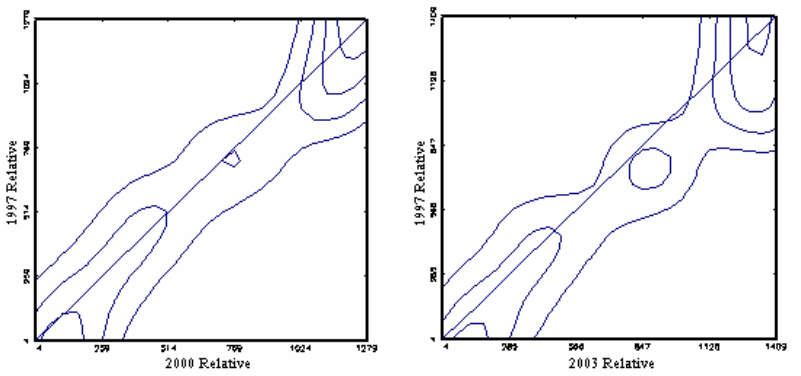
[6] See Garcilazo, Jose Enrique and Spiezia Vincenzo. 2006. "Regional unemployment clusters: new evidence from OECD countries"

5. Analysis of R&D expenditures distribution in Europe

The first step of the analysis is to verify the time dynamics in Europe. The graphs show the probability of transition from a base year, in this analysis 1997, to 2000 and 2003. The contour plot displays on the x-axis the relative values of regional R&D expenditures in 2000 and in 2003, and on the y-axis the relative value in 1997. The third axis measures the estimated probability density of transitioning from any point in the original axis (vertical) to any other point in the conditional axis (horizontal), displaying the probability distribution of regional R&D investments in 2000 and in 2003, conditioned on their relative distribution in 1997.

Figure 1. Stochastic kernel 106 European TL2 regions,
Time dynamics

1997-2000 1997-2003



The graphs show persistence in the regional level of expenditures: the largest part of the probability mass is concentrated about the diagonal and slightly under it. Regions tend to maintain their level of R&D expenditures: if they invested few in 1997, they maintain their relative level of expenses, but with an increase in absolute terms, due to the probability mass under the diagonal (graph on the right). The trend is confirmed in the following period and it is stronger than before. The probability mass is still around the diagonal and under it. Moreover a third peak in the centre of the diagonal is now more visible, showing that a certain number of regions have increased their expenses creating a cluster.

They show also polarization, due to the two concentration of probability mass in the two opposite corners of the diagonal. There is a group of regions that invest much, and tend to maintain and increase that level of expenses in time, and on the opposite side, another group of regions that invest few, but whose expenses tend to increase in time. A twin peaks pattern results from the first kernel and it slowly tends to change in a three peaks pattern in the second kernel, letting suppose a future uniformity in the distribution of R&D investments in Europe. The level of expenditures increases in time as clarified by the probability mass located under the diagonal in Figure 4.3. This sheds light on the possible effect of Lisbon Strategy on regional investment choices: the European policy on innovation induced regions to increase investments.

Looking at the regions, in the top right side of the contour plot, that increase their level of investments, I found that these are the regions of Paris, Wien, Baden-Württemberg in Germany and Trøndelag in Norway. The peak in the centre of the plot includes Bremen, Bayern, Berlin and the province of Midi-Pyrenees in France.

The second step is to verify state and neighbourhood effects in Europe. In this analysis the kernels graph, against state and neighbourhood effect on the y-axis, regional expenditures on the x-axis, displaying their trend to follow neighbours and state levels if the probability mass is centred around the diagonal, and, on the other side, absence of influence of these effects, if it is concentrated vertically on the -axis. The z-axis measures, in this case, the probability that a region invests a certain sum in R&D whether it belongs to a particular state (with its particular R&D policy) or it resides next to a set of neighbouring regions (with own R&D investments).

The analysis, here presented only for 2003, regards two set of regions: the first considers all data available, including regions such as Sweden, for which this is the only year available, whereas the second considers only the regions we used to study time dynamics, which are Austria, Germany, France, Greece, Spain, Italy, Norway and Netherlands. This gives us the possibility to verify also the effect a larger number of regions have on the results obtained.

Figure 2. Stochastic kernel **106** European TL2 regions, 2003

State effects Neighbourhood effects

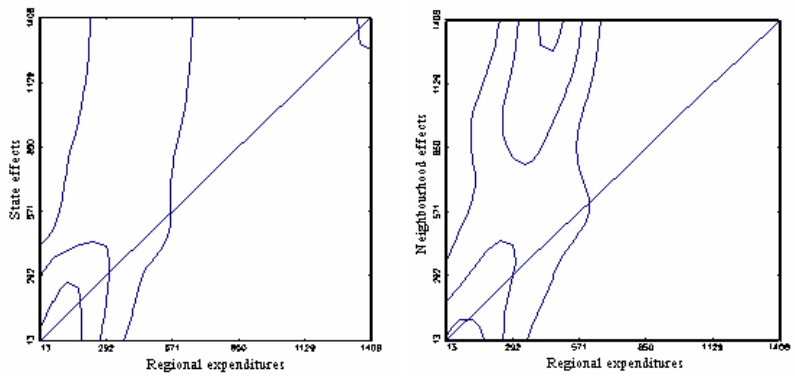
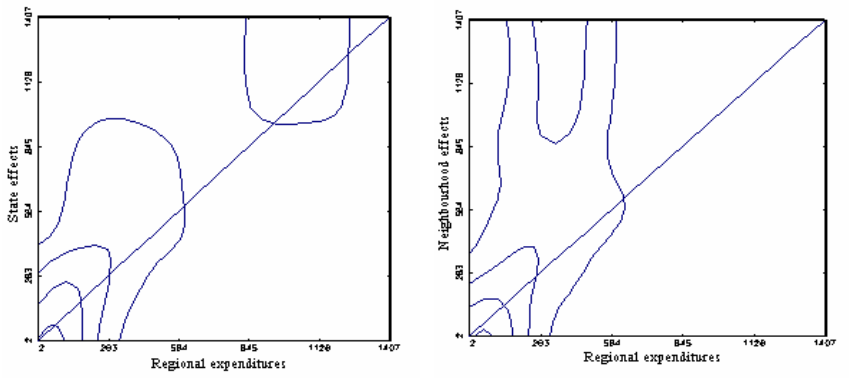


Figure 3. Stochastic kernel **152** European TL2 regions, 2003

State effects Neighbourhood effects



The contour plots show that both state and neighbourhood effects are relevant only for regions with low level of pre capita R&D expenses and that they have no role in determining the level of expenses for regions which invest much. This is demonstrated by the probability mass: it approaches the diagonal only in the left bottom corner, whereas the rest of it is parallel to the y axis.

Differences between the two sets come from state effects, whereas for neighbourhood effects there aren't so evident differences. Regarding neighbourhood effects, I find a significant probability mass vertical to the y-axis. It points to the scarce influence neighbours' levels of pre capita investments have on the regional values. The shape of the kernel shows evidence of a twin peaks distribution, where there are regions more influenced by the neighbours' R&D investments and another peak of regions with expenses totally independent from neighbours, hence neighbours are not useful to determine their regional investments. In this area we find regions such as Luxembourg, some Finnish and Swedish regions in the extended set, Baden-Württemberg in Germany, the province of Midi-Pyrenees in France, and two Norwegian regions, one of which includes the capital.

Looking at the sectoral distribution of investments, it results that the most of them come from the business sector followed by the High education sector, hence university investments principally, without a significant role for the government sector.

The probability mass for state effects, when a large number of regions are involved, instead, has a different shape. The effects are still relevant for regions with low level of expenses but also for some regions with high level, as demonstrated by the probability mass in the top right corner of the plot. These regions belong to Finland and Sweden. They are states which invest much more than the other European countries in R&D.

Summing up the results seek out that belonging to a state with high level of R&D investments does not imply that a region has high investments too, even if the likelihood is higher than for regions that belong to low innovative states. The same assumptions are valid considering the neighbourhood effects.

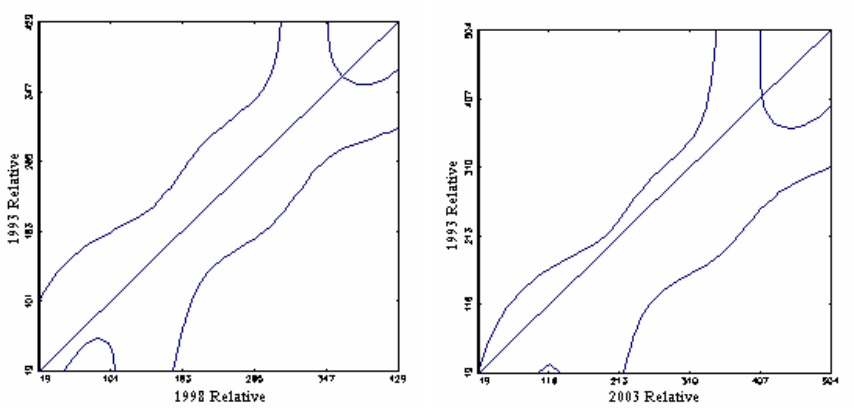
An addition extension of the analysis wants to make evidence of the sectoral distribution of the R&D expenditures.
I looked to percentiles to identify analytically the regions falling into the first and the last 10% of the distribution, and therefore to assess if there are differences in the sectoral R&D expenditures between the opposite sides of the distribution.
For the regions falling in the 10^{th} percentile, the larger funding in R&D is the high education sector, with sometimes a double amount of expenditures compared to the business or the government sector expenditures. This underlines the relevance of universities and other similar institutions in determining the regional situation but also shows evidence of the marginal role of private sector. On the other side, regions in the 90^{th} percentile are characterized by the greatest part of the expenditures due to the business sector, followed almost always by the high education one and the government. Having a look to the distribution of investment for high investment regions, it is possible to see that the business sector often exceeds the high education one more than twice, and that the government sector is almost always very close to the education one.
For all regions the relevance of no-profit sectors is marginal or data are not stated. At the same time the relevance of government investments seams larger for capital regions compared to the others.
If we include in a table the regions with the highest and the lowest level of expenditures, it is possible to see that both, the most and the less innovative regions, are almost the same in the three year considered, and that sometimes a country that has some regions within the most innovative one, has regions within the less innovative one too, such as Austria and France. For example, in the first case, there is the region of Wien within the most innovative countries in 2003, and, at the same time, there is the region of Burgerland that falls into the less innovative regions in the same year. This demonstrates how disparities can exist between regions, despite the same state identity.

6. A focus on Italian situation

The Italian analysis refers to a longer period of time than the one analyzed for Europe: ten years instead of seven. It goes from 1993 to 2003, and time dynamics are checked from 1993 to 1998 and from 1993 to 2003. Moreover, for a single state, calculate state effects does not make sense because they want to assess if, belonging to a state rather than to another, can affect regional choices of expenses, but in such a case all regions belong to a single state, which would have the same effects on all.
I need also to unify the data for the provinces of Trent and Bozen because, until 2001, the data were available only for the region Trentino Alto Adige as a whole.
So in the following contour plot are represented time dynamics for all Italian regions.

Figure 4. Stochastic kernel 20 Italian TL2 regions,
Time dynamics

1993-1998 1993-2003



The kernels show persistence over time in the regional level of pre capita R&D expenditures. The probability mass is located about the diagonal, and from 1993 to 2003 it displays also an increase in absolute values of expenditures, with the mass located under the diagonal. This means that regions that invest few in R&D in 1993 tend to maintain the position in 1998 and 2003, even if, at the end of the time period, they have increased their global level of investments.

It is possible to state that the increase in national R&D expenditures registered from 1995 to 1998 affected positively all regions, not only the most innovative. On the opposite side, nothing can be said about the downward trend that characterized the national level of R&D expenditures, because our analysis considers as base year 1993, when the trend was already present. Considering the 1998 as second year, we find the level of expenditures is already over the 1993 value, preventing to observe the downward trend we are talking about.

Two peaks result from the graphs: one in both the diagonal's corners. This confirms the presence of polarization in Italy, with some regions that invest much and other that invest few. At the same time, the area in the left bottom corner tends to reduce in time, demonstrating that regions with low level of expenditures improve their situation. The area in the right top corner instead increases from 1998 to 2003, showing that other regions reach a high level of investments and become part of the last 90th percentile of the distribution.

Through probability matrices it has been possible to observe which regions fall in which part of the distribution. I analyze the 10th percentile and the 90th percentile that represent about the two groups of regions I said above.

In the 10th percentile there are especially regions from the south of Italy. They are: Calabria, Puglia, Molise, Basilicata, Sicily, Sardinia, and in addition Aosta Valley and Marche. In the following period of time only six of these regions are still part of the 10th percentile. Sardinia and Marche have improved their situation.

The 90th percentile instead includes only three regions: Piedmont, Lombardy and Lazio, which are reached in time by Emilia-Romagna.

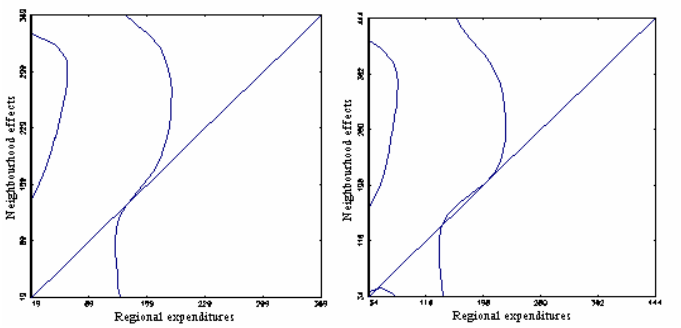
Thus there is evidence that the South of Italy is the area with fewer investments and with few improved situations in a ten year period, while the North West, with Turin and Milan, covers an important role in innovation, as results from a large number of studies on Italian industrial economy. On the other side the north east of Italy does not have high innovative regions, even if it presents important level of industrial activities.
To assess the results of my analysis I checked this again a study of Accetturo and Ehrlich about the distribution of R&D activity in Italy[7].
They consider the distribution of innovative activity on the basis of the personnel hired in industrial activity for about 200 sectors and for 103 Italian provinces, in 1971, 1981, 1991, 2001. It is immediately evident a difference between this and our study, regarding data coverage both in time and on territorial division. We refer to data regarding NUTS2 regions, in Eurostat classification, reclassified under the OECD TL2 grid. Moreover periods of time taken into account differ, but our study goes from 1993 to 2003 so that let it possible to considers also the evolution in 2001 in an indirect way. Accetturo and Ehrlich's analysis concludes that innovation activities are not uniformly distributed across Italian provinces, and that centripetal forces are not stronger than centrifugal one. Accetturo and Ehrlich find evidence of a core-periphery pattern, with persistence over time of regional dynamics. Through kernels they find presence of a core periphery pattern, with the most provinces non-specialized and few specialized provinces, that is evident for all the sectoral distinctions analyzed.
Our study seams to confirm this result: we find two specialized areas, in the North West and in Lazio with a surrounding of non-specialized regions. This model evolves from 1993 to 2003, as can be seen from both Figure 4.9 and 4.10.
Time dynamics in Accetturo and Ehrlich show persistence in specialization for Italian provinces. Our analysis at regional level confirms this result: as already seen, the probability mass of the kernels (Figure 4.9 and 4.10) is located about the diagonal. The improved situation of some regions is also confirmed by Accetturo and Ehrlich analysis, which finds that some provinces in medium-high tech sector succeeded in becoming specialized starting from a situation of de-specialization. In our analysis a similar role is covered by Emilia-Romagna.
A focus on the core provinces, resulting from their analysis, makes clear a correspondence with our results: provinces of Turin, Milan and Rome results the most specialized in high tech activities, like our high investment regions. They also find an innovative area in Campania, exactly in Naples, but due to differences in data characteristics, we cannot find it out. No high tech industries results in North East of Italy, where we also find regions with medium-low level of R&D investments.

[7] Accetturo, Antonio, Ehrlich Laura. "Regional specialization in Italy: an analysis of innovative activities". *Kiel Institute for World Economics*

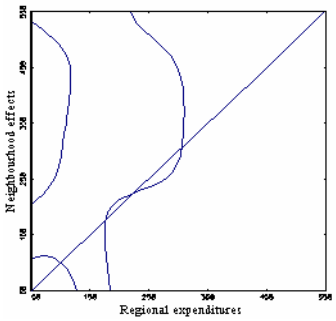
The second part is the analysis of neighbourhood effects in Italy.

Figure 4.13 Stochastic kernel 20 Italian TL2 regions, Neighbourhood effects

1993 1998



2003



The graphs show the scarce influence of neighbouring regions in determining regional level of pre capita R&D expenditures. The probability mass is located prominently vertical to the y-axis. Through time, the situation changes a bit: in 1998 a larger mass is shown in the bottom left corner of the kernel and it increases in 2003. This lets suppose that neighbouring regions increase their influence on regions with low level of expenditures, whereas the situation does not change for regions that have high level of R&D expenditures. An example comes from the region of Marche, which falls in the first 10% of the distribution in 1993. In the following time period, there is an improvement in the R&D expenditures of Emilia Romagna, and can have induced the improving of the Marche situation too.

Looking again at the source of R&D expenditures, because Eurostat's data, I used for the analysis, were also classified for the investments source. The considerations made for Europe are also valid for Italy. Therefore the principal source of expenses, for regions with low level of R&D expenditures, is the high educational sector and that, on the other side, the private business sector has not a significant role. The situation is reversed for regions with high level of R&D expenditures: the private business sector is the principal source of funding, while the high educational sector is the

second source. In any case, the government sector results to have an important role only for Lazio due to the fact that it includes the state capital. There aren't data, or they are very few, on no-profit sector.

7. Conclusions

Summing up, the kernels show that for regions which invest few in R&D both state and neighbourhood effects can influence their outcome, whereas for regions with high level of investments they seam to do not play a role at all. Belong to a state or have certain neighbours can influence the level of regional R&D pre capita investments, so that regions in the same state have similar level of expenses and neighboring countries behave similarly. From the graphs, it results difficult to define which one of the two effects is stronger than the other, but thinking logically I can say that the importance of state innovative policy is greater than the relevance of the neighbours' behavior.

At the same time, the analysis makes evidence that nor state nor neighbouring regions have a fundamental role in influencing high R&D pre capita expenses regions' behavior. Moreover data demonstrate the principal source of funding is business sector.

I tried to find out a possible explanation. A first hypothesis can be the presence of multinational companies, for which statal funding can be absent. A cluster of innovative business will attract other business interested in innovation because it is easier to locate where there are already all services a company needs to.

Another possible explanation, for larger business sector R&D investments than the other sectors contributions, is the possibility of statal funding to business companies which invest in R&D. If this possibility exists, probably the likelihood that regions with high pre capita investments see their sectoral distribution more in favor of business sector would be comprehensible. The same situation can exists if, instead of statal funding, a reduction in taxation for high R&D investments companies is provided.

The relevance of state effects on regions with low level of R&D expenditures can be easily explained as a parallelism to the previous situation. Whereas for high expenditures regions incentives to business activities to locate near each others are high, for low expenditures regions they are not. In these regions therefore innovation is lower due to the absence of incentives that prevent clustering. Thus state innovative policies define regional situation, leaving a minor role to neighbourhood effects.

Finally, the kernels here presented show persistence of regional position in R&D expenditures with a general increasing in investments over time for all regions, both in Europe and in Italy. At the same time they show polarization, with two groups of regions, one in the bottom and one in the top corner of the kernels. In time in Europe another peak grows up, showing a new cluster of regions with intermediate level of R&D expenditures. In Italy instead the regions in the bottom corner are reduced in number, and the one in the top corner increases, demonstrating an improvement in all regions level of R&D investments.

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Austria

National Statistical Office of Austria http://www.statistik.at/index.shtml

Belgium

National Institute of Statistics http://statbel.fgov.be/home_fr.htm

Czech Republic

Czech Statistical Office http://www.czso.cz/

Finland

Statistics Finland http://www.tilastokeskus.fi/index_en.html

France

National Institute for Statistics and Economic Studies
http://www.insee.fr/fr/home/home_page.asp

Germany

Federal Statistical Office http://www.destatis.de/e_home.htm

Greece

National Statistical Service of Greece http://www.statistics.gr/

Ireland

Central Statistics Office of Ireland http://www.cso.ie/

Italy

National Institute of Statistics http://www.istat.it/English/index.htm

Luxembourg

Central Service for Statistics and Economic Studies
http://statec.gouvernement.lu/

Netherlands

Statistics Netherlands http://www.cbs.nl/en/

Norway

Statistics Norway http://www.ssb.no/english/

Poland

Central Statistical Office http://www.stat.gov.pl/english/index.htm

Portugal

National Statistics Institute http://www.ine.pt/index_eng.htm

Slovak Republic

Statistical Office of the Slovak Republic http://www.statistics.sk/

Spain

National Institute of Statistics http://www.ine.es/

Sweden

Statistics Sweden http://www.scb.se/

United Kingdom

Office for National Statistics http://www.statistics.gov.uk/

OECD, Organization for Economic Cooperation and Development
http://www.oecd.org/home/0,2987,en_2649_201185_1_1_1_1_1,00.html