

论文

我国省域创新产出的空间特征和时空演化——基于探索性空间数据分析的实证

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摘要:

以我国31个省域作为空间观测单元,以专利申请受理数作为创新产出的衡量指标,对我国1997~2008年期间省域创新产出的空间分布进行了探索性空间数据分析(ESDA)。通过计算区位基尼系数和集中度指数,发现我国的创新活动显示了相当高水平的空间集中,并且这种集中程度在过去的十多年里表现出了稳定的增长趋势;对全局的Moran's I统计分析表明:省际创新活动之间存在着显著的空间自相关(空间依赖性),证明了知识溢出的存在性和空间局限性;对局部的Moran's I分析进一步揭示了省际创新活动水平的相关模式,Moran散点图刻画了创新活动的空间集聚模式及其时空演变态势。研究结果说明经过十几年的发展,我国省域创新活动的地域性特征十分显著。

关键词: 创新产出 探索性空间数据分析 溢出 空间自相关 中国

Spatial characteristics and dynamic changes of provincial innovation output in China:An investigation using the ESDA

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Abstract:

Innovation activities in each region not only depend on their own characteristics, but also on those of the regions that form the neighborhood to which it belongs. Regional spillover as a spatial interaction is important in explaining agglomeration, innovation and regional growth. A great deal of literature has deeply dealt with the issue from a spatial perspective since the 1990s, especially in the context of urban and regional studies. Unfortunately, the traditional approaches to regional innovation suppose that each region is independent from others. This paper uses spatial statistical techniques to establish the statistical relations among data according to the geographical locations. It aims to understand the spatial dependence and autocorrelation related to geographical locations. Using the methods of exploratory spatial data analysis (ESDA) and spatial analysis software, this paper analyzes the spatial distribution of innovation outputs, measured by the number of patent applications, throughout 31 Chinese provinces from 1997 to 2008. The visual patent distribution plot has shown the distribution of innovation outputs at the provincial level and its spatial dynamic changes. A significantly high level of spatial concentration of innovation outputs among Chinese provinces has been captured by the computed spatial Gini coefficient and the Concentration Ratio, and the concentration level has increased steadily over the past 10 years. The analysis using the Moran's I statistics gives the strong evidence of spatial autocorrelation in innovation activities among provinces, while the concentration pattern of innovation activities among provinces and its changes over time have been revealed by using the local Moran's I and the Moran scatter plot, which indicate the clustering nature of the spatial distribution of provincial innovation activities. Spatial Gini coefficient and Moran's I index have indicated that innovation activities of Chinese provinces are not randomly distributed. Our findings suggest that innovation activities are spatially differentiated among Chinese provinces over the 10 years, and innovation activities at the provincial level are highly localized. This study can provide a scientific basis for the intuitive expression of the spatial correlation of innovation outputs among provinces, and puts forward that the spatial statistical analysis could present some references valuable for analyzing spatial structure and patterns and policy-making.

Keywords: innovation output ESDA spillovers spatial autocorrelation China

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参考文献:

- [1] Anselin L,Varga A,Acs Z J.Local geographic spillovers between university research and high technology innovations. *Journal of Urban Economics*,1997,42:422~448.
- [2] 李国平,孙铁山,卢明华。北京高科技产业集聚过程及其影响因素。 *地理学报*,2003,58(6):927~936.
- [3] Caniels M C,Verspagen B.Barriers to knowledge spillovers,and regional convergence in an evolutionary model. *Evolutionary Economics*,2001,11:307~329.
- [4] Audretsch D B,Feldman M P.Knowledge spillovers and the geography of innovation.In:Henderson J V,Thisse J.Handbook of Urban and Regional Economics(Volume 4).Amsterdam:North Holland Publishing,2004.2713 ~2739.
- [5] Bottazzi L,Peri G.Innovation and spillovers in regions:Evidence from European patent data. *European Economic Review*,2003,47(4):687~710.
- [6] Greunz L.Geographically and technologically mediated knowledge spillovers between European regions. *Annals of Regional Science*,2003,37(4):657~680.
- [7] 王铮,马翠芳,王莹,等。区域间知识溢出的空间认识。 *地理学报*,2003,58(5)773~780.
- [8] Ciccone A,Hall R E.Productivity and the density of economic activity. *American Economic Review*,1996,86:54 ~70.
- [9] Feldman M P.The new economics of innovation,spillovers and agglomeration:A review of empirical studies. *Economics of Innovation and New Technology*,1999,8:5~25.
- [10] Martin P,Ottaviano G.Growth and agglomeration. *International Economic Review*,2001,42(4):947~968.
- [11] Jun K.Technology spillovers,agglomeration,and regional economic development. *Journal of Planning Literature*, 2005,20:99~115.
- [12] Berliant M,Reed R R,Wang P.Knowledge exchange,matching,and agglomeration. *Journal of Urban Economics*, 2006,60:69~95.
- [13] 张玉明,李凯。省际区域创新产出的空间相关性研究。 *科学学研究*,2008,26(3):659~665.
- [14] 周密。我国创新极化现象的区域分布与极化度比较。 *当代经济科学*,2007,29(1):78~82.
- [15] 宋丽思,陈向东。我国四大城市区域创新空间极化趋势的比较研究。 *中国软科学*,2009,(10):100~108.
- [16] 魏守华,吴贵生。区域优势制造业与科技资源分布的匹配关系研究。 *中国科技资源导刊*,2008,40(4):31~39.
- [17] Feldman M P,Florida R.The geographic sources of innovation:Technological infrastructure and product innovation in the United States. *Annals of the Association of American Geographers*,1994,84(2):210~229.
- [18] 张钢,王宇峰。知识集聚与区域创新-一个对我国30个地区的实证研究。 *科学学研究*,2010,28(3):449 ~458.
- [19] Pavitt K.R&D,patenting and innovation activities,a statistical exploration. *Research Policy*,1982,(11):33 ~51.
- [20] Griliches Z.Patent statistics as economic indicators:A survey. *Journal of Economic Literature*,1990,(28):1661 ~1707.
- [21] Jaffe A.Technological opportunity and spillovers of R&D:Evidence from firms'patents,profits,and market value. *American Economic Review*,1986,76:984~1001.
- [22] 吴玉鸣。大学、企业研发与区域创新的空间统计与计量分析。 *数理统计与管理*,2007,27(2):318~324.

[23] Anselin L. Interactive techniques and exploratory spatial data analysis. In: Michael F Goodchild, David J Maguire, David WRhind. Geographical Information Systems, Principles, Technical Issues, Management Issues and Applications Paul A Longley. New York: John Wiley & Sons, 1999. 253~266.

[24] 苏方林. 中国省域R&D活动的探索性空间数据分析. 广西师范大学学报:哲学社会科学版, 2008, 44(6): 52~56.

[25] 蒲英霞, 葛莹, 马荣华, 等. 基于ESDA的区域经济空间差异分析-以江苏省为例. 地理研究, 2005, 24(6): 965~974.

[26] 范新生, 应龙根. 中国SARS疫情的探索性空间数据分析. 地球科学进展, 2005, 20(3): 282~291.

[27] 万鲁河, 王绍巍, 陈晓红. 基于GeoDA的哈大齐工业走廊GDP空间关联性. 地理研究, 2011, 30(6): 977~984.

[28] Cliff A D, Ord J. Spatial Processes, Models and Applications. London: Pion, 1981.

[29] Anselin L. Local indicators of spatial association-LISA. Geographical Analysis, 1995, (2): 93~115.

[30] Lim U. The spatial distribution of innovative activity in U.S. metropolitan areas: Evidence from patent data. Journal of Regional Analysis & Policy, 2003, 33(2): 97~126.

[31] Rey S J. Spatial empirics for economic growth and convergence. Geographical Analysis, 2001, 33: 195~214.

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4. 侯西勇, 徐新良. 21世纪初中国海岸带土地利用空间格局特征[J]. 地理研究, 2011, 30(8): 1370-1379
5. 王世金, 赵井东. 中国冰川旅游发展潜力评价及其空间开发策略[J]. 地理研究, 2011, 30(8): 1528-1542
6. 庄立, 刘洋, 梁进社. 论中国自然资源的稀缺性和渗透性[J]. 地理研究, 2011, 30(8): 1351-1360
7. 陈刚强, 李映辉, 刘娟. 中国入境旅游规模分布特征及其变化[J]. 地理研究, 2011, 30(6): 1044-1054
8. 高爽, 魏也华, 陈雯, 赵海霞. 发达地区制造业集聚和水污染的空间关联——以无锡市区为例[J]. 地理研究, 2011, 30(5): 902-912
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15. 关伟, 朱海飞. 基于ESDA的辽宁省县际经济差异时空分析[J]. 地理研究, 2011, 30(11): 2008-2016

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