

Regional science research in the Nordic countries in the light of some chosen international journals¹

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Abstract: This article analyzes the evolution of research in regional science in the Nordic countries in the period 1991-2000, situating it in an international context. With this aim in mind, we first elaborate on the rankings of countries, authors and institutions in terms of the publications in a sample of nine top international regional journals. Second, we compare the publication patterns of Nordic authors with the ones observed at the international level. The results show that the Nordic countries' share in regional research has been relatively low (especially when compared to other disciplines). Sweden, Denmark, Finland and Norway appear in the rankings while Iceland is not present. The analysis of their publication patterns has also thrown some light on the peculiarities of regional research in these countries. Nordic author's contributions are on a par with international standards, with two exceptions: a greater interest in social and political issues, and more use of quantitative techniques.

Key words: Regional studies, Bibliometrics, Rankings.

JEL codes: R10, A10, A11, A14

1. Introduction and objectives

According to Lonmo and Anderson (2003), the six countries that reported the greater increment on the Gross Domestic Expenditure on Research and Development/Gross Domestic Product ratio between 1989 and 1999 were: Iceland, Finland, Denmark, Japan and Sweden. As can be seen, the Nordic countries have made an important effort to increase their R&D performance. More recent statistics, which confirm this fact, can be found in EUROSTAT Yearbook (2004): Between 1993 and 2001 the expenditure on R&D in Sweden has increased from 2.99% to 4.27%; in Denmark from 1.74% to 2.4%; in Finland from 2.18% to 3.41%; in Iceland from 1.33% to 3.06%; while Norway is the only country with a decrement, from 1.72% to 1.6%. Most of these percentages are above the Euro-zone percentage that has risen from 1.89% to 1.91 for the same period.

These efforts have been reflected in the amount of scientific production that places these countries in important positions in the worldwide rankings. According to ISI Essential Science Indicators, Sweden, Denmark and Finland placed 11, 17 and 19 in all fields' research during the period 1994-2004, with 305,856 papers and 3,235,119 citations received, which represents 3.89% and 4.18% of the overall number of papers and citations, respectively¹.

Has regional studies in the Nordic countries been positively affected by this improvement in R&D performance? To our knowledge, only five studies have analysed the relevance of regional research looking at the different authors, institutions and countries that have contributed to most relevant journals. First, Kau and Johnson (1983) calculated the output of academic institutions and authors from 1965 to 1980 in selected regional journals, finding a widespread interest in regional science; and second, Rey and Anselin (2000) (following the classification by Anselin, Rey and Talen 2000) examined the publication patterns in five regional science journals during the 1990s, establishing rankings for authors using article counts, page counts and citation indices. Third, Suriñach *et al.* (2003) analyse the publication patterns in regional and urban science during the 1990s from publications in nine top international journals. Fourth, Isserman (2004) analyzes the citations received by articles published in 13 regional journals from 1958 up to the present, with the aim of identifying the main researchers in this field in every ten-year period. Lastly, Florax and Plane (2004) consider the articles published during the last 50 years in the journal Papers in Regional Science.

Perhaps, in the context of the Nordic countries, the most interesting results can be found in these two last articles.

First, on one hand, Florax and Plane (2004) find that the contribution of Nordic authors to Papers in Regional Science represents a 5% score in terms of pages per author from 1955 to 2003. Looking at individual countries, contributions by authors affiliated to Swedish institutions represent a 3.5% score (being the second most productive country in Continental Europe), to Finnish institutions at 0.7%, Danish institutions at 0.4% and Norwegian ones at 0.4%. These shares have increased during the considered period for Finland and Norway, but have decreased from 1995 to 2003 for Denmark and Sweden. It is worth mentioning that Iceland is not found in these rankings. Florax and Plane (2004) also find that Stockholm was placed 12th in their ranking of institutions by means

of cities according to author-pages between 1955 and 2003. By sub-periods, from 1975 to 1984, Stockholm was placed the 3rd; from 1985 to 1994, Umeå was placed the 4th and Stockholm was placed the 15th; and, from 1995 to 2003, Helsinki was placed the 22nd.

Second, on the other hand, analysing the citations received by contributions in different regional journals, Isserman (2004) finds that some scientists from the Nordic countries can be found among the most cited authors and intellectual leaders of the 'take off' generation. In particular, AE Andersson is found to be one of the most cited authors from 1977-1989 and 1990-2001 and he is included in the top list of all time leaders.

Taking into account these previous works, the objective of this paper consists of focusing explicitly on the situation of the Nordic countries' regional research in an international context, considering publications in a wider sample of journals from 1991 and 2000. This evaluation includes author, and institutional rankings as well as an analysis of the main objectives, topics, techniques and the kind of data used.

The rest of the paper is organised as follows: first, the paper's methodological approach is described; next, in sections three and four, the empirical results are presented; and, finally, we conclude with some remarks on these results.

2. Methodology

An extensive explanation of the methodology applied in this study can be found in Suriñach *et al.* (2003). In this section, we briefly describe the main points of our approach.

The study is based on refereed articles published in nine top international regional journals from 1991 to 2000. The strategy of selecting these nine journals was as follows: Initially, we considered the possibility of considering international and national journals, books, working papers or communications to conferences between 1991 and 2000. The number of items to be analyzed was however so large that we decided to concentrate on a sample of journals with a similar dissemination (international) level, and published continuously between the years 1991 and 2000 in the field of regional science. The criteria applied to define this sample can be summarised as follows: First, we chose journals that were included in the Econlit database for at least a part of the time period considered. We then reduced this sample of journals further to those included in the Social Science Citation Index database in one or more of the following categories: Demography, Economics, Environmental Studies, Geography, Planning and Development, Transportation and Urban Studies. Next, we reviewed the 'aim and scopes' section of all these journals to select only those that deal with regional problems. The final list of considered journals is shown in table 1. We have to recognise that there is a clear 'anglophone bias' in these publications, and that should be kept in mind when interpreting the results in the next sections².

Table 1. Top international regional journals included in the analysis

Annals of Regional Science (ANN REGIONAL SCI)
International Journal of Urban and Regional Research (INT J URBAN REGIONAL)
International Regional Science Review (INT REGIONAL SCI REV)
Journal of Regional Science (J REGIONAL SCI)
Journal of Urban Economics (J URBAN ECON)
Papers in Regional Science (PAP REG SCI)
Regional Science and Urban Economics (REG SCI URBAN ECON)
Regional Studies (REG STUD)
Urban Studies (URBAN STUD)

As is standard practice in this kind of analysis, this paper focuses on the analysis of accepted refereed articles. For this reason, book reviews, book and publication notes, short comments, debates and surveys, and related sections (where available) were not considered. Apart from article counts, the analysis is complemented with pages counts. Using the number of articles would give equal weight to long and short papers. However, as journal editors have a limited number of pages per issue and a limited number of issues per year, during the evaluation process they are likely to allocate more pages to papers of higher quality and to shorten those of lower quality papers. As a result, the number of published pages may be a better indicator of quality research³. However, the disparity of characters and page size in the different journals could be a possible source of distortion and, for this reason, we have also considered standardized pages. In particular, we have expressed all journal pages in terms of American Economic Review equivalents, as it had been extensively used in the literature⁴. In the standardization process we took great care to consider any changes in the format of the journals and, for this reason, the weights differ over time for four of the journals analysed.

The next step was to obtain detailed information about all articles published in the journals selected in the ten-year period. Table 2 provides some summary statistics about the obtained database.

Table 2. Description of the sample of regional articles considered

Journal	Articles			Pages			Standardized pages		
	1991-2000	1991-1995	1996-2000	1991-2000	1991-1995	1996-2000	1991-2000	1991-1995	1996-2000
ANN REGIONAL SCI	248	108	140	4,307	1,734	2,573	3,184	1,278	1,906
INT J URBAN REGIONAL	310	147	163	5,483	2,534	2,949	5,318	2,457	2,860
INT REGIONAL SCI REV	162	94	68	2,659	1,354	1,305	1,745	853	892
J REGIONAL SCI	288	138	150	5,463	2,350	3,113	4,131	1,786	2,345
J URBAN ECON	438	217	221	8,574	3,868	4,706	5,487	2,475	3,011
PAP REG SCI	228	121	107	4,196	2,076	2,120	3,161	1,557	1,604
REG SCI URBAN ECON	348	187	161	7,085	3,564	3,521	4,676	2,352	2,323
REG STUD	420	184	236	5,456	2,453	3,003	6,965	3,139	3,825
URBAN STUD	914	387	527	16,202	6,467	9,735	14,905	5,949	8,956
TOTAL	3,356	1,583	1,773	59,425	26,400	33,025	49,576	21,849	27,727

3,356 articles were published in these nine journals between 1991 and 2000. The journal with the highest number of articles was Urban Studies with 914, while the one with the lowest number of articles was the International Regional Science Review. Similar results are to be found in terms of standardised pages. During the second half of the 1990s, Urban Studies, Regional Studies, the Annals of Regional Science, the Journal of Urban Economics and the Journal of Regional Science increased the number of published standardized pages, while in the rest of journals it remained fairly stable.

The average article is some 15 standardized pages in length. During the second half of the 1990s, the average length of articles has tended to increase: the average number of standardized pages per article in 1991-1995 was 14; while in 1996-2000 it was 16. There are however large differences between journals: for example, during 1991-1995 the average number of standardized pages in articles published in the International Journal of Urban and Regional Research was around 17, and around 8 in the International Regional Science Review. The only journal in which the average number of standardized pages per article decreased over the decade in all categories is Regional Studies, one of the journals that showed the largest increase in the number of articles published.

One additional aspect to take into account is how to deal with multi-authored papers. Regarding this issue, the standard procedure is to assign to each author the number of pages of the articles multiplied by $1/n$ where n is the total number of authors in each paper. One problem is that the Econlit database only provides information about the first three authors in each paper. If there are four or more authors, it appears as '<first author's name>'et al.'. For these articles, we assigned a fourth of the article to the first author. The same approach was applied to assign pages when an author was affiliated to more than one institution according to the information published in the article. As Conroy and Dusansky (1995) point out, this approach may yield rankings that do not reflect the current composition of departments. This approach assigns faculty affiliation based on department residence at the date of publication, rather than at different points in time during the period covered. As the time period considered is relatively long, we expect that the effects of changes in the author's affiliation will be collected in a natural

way (where changes in the final years of the period will not be considered). This decision has two implications: first, a ‘Nordic’ publication will be a publication by a researcher affiliated to an institution based in a Nordic country independent of his/her nationality; and, second, publications by Nordic authors working in foreign institutions are not considered.

Following the approach by Anselin *et al.* (2000), we also considered the publication patterns in these different journals and, for this reason, after a careful check, we classified each published article in different categories depending on the purpose, topic, technique and data used. Table 3 contains the different categories of each considered aspect.

Table 3. List of categories for each of the considered variables

Purpose	Topics	Techniques	Type of Data 1
Policy analysis	Methodological articles	Non quantitative	Time Series
Structural analysis	Natural resources management & environment	Descriptive analysis	Cross Section
Prediction	Human resources: Demography	Multivariate analysis	Panel Data
Other	Human resources: Labour market	Univariate econometric analysis	Simulated data
	Economic growth and development	Uni-equational Regression models: quantitative variable	Type of Data 2
	Housing analysis	Uni-equational Regression models: qualitative variable	
	Land use patterns and planning	Multi-equational Regression models	Micro data
	Transportation	Spatial econometrics	Macro data
	Sectoral analysis	Optimisation methods	Simulated data
	Firm location	Geographical Information systems	
	Social and political issues	Cost-benefit analysis, valuation, project evaluation	
	Monetary and financial issues	Demographic analysis	Simulated data
	Trade	Computable General Equilibrium and Social accounting matrix	
Other topics	Input output analysis		
		Other methods	

For the first variable, the purpose of the analysis, As Hägerstrand (1970, 1989) remarks that regional science is about people and it tries to solve problems that involve policies (policy analysis), a basic understanding of reality (structural analysis) or simply aims to predict the future (prediction). In order to see if the recent evolution of this science has followed this path, we have established four categories for our classification of the purpose of analysis of regional research: ‘policy analysis’, ‘structural analysis’, ‘prediction’ and ‘others’ (the last category including mainly methodological articles).

As regards topics, fourteen categories involving regional themes of analysis were considered. They are shown in the second column in table 3. Although it is possible that one paper may have focused on more than one topic in the list, we only considered one

possibility, and tried to identify the emphasis of the author (for example, by looking at the keywords or the Econlit subject classification codes in the paper).

The classification of papers according to the techniques applied was rather more complex, since most papers used more than one of the techniques considered (see the third column in table 3). We therefore classified each paper on the basis of the most complex of the techniques applied, the one most frequently used, or the one that had most bearing on the conclusions of the research.

For the type of data used, two different criteria were applied: first, taking into account the time dimension of the data (i.e. 'time series', 'cross section' and 'panel data') and second, the nature of data (i.e. 'macro data' or 'micro data'). For both criteria, there is another possibility: the use of 'simulated data'. As different kinds of data may be used in one and the same paper, we have assigned here the data used with the most complex of the techniques applied, the one most frequently used, or the one that had most bearing on the conclusions of the research (in concordance with the classification of techniques).

3. Nordic countries' regional studies in the international context

3.1 Nordic countries' contributions to regional studies

In order to analyze the relative position of Nordic countries' regional research in an international context, we have elaborated the countries' rankings for the period 1991-2000 and for two sub-periods, 1991-1995 and 1996-2000. The results in terms of articles, pages and standardized pages are shown in table 4⁵.

Table 4. Countries' rankings (articles, pages and standardized pages)

Articles			1991-2000		1991-1995		1996-2000	
United States			1,378	42%	744	47%	633	36%
United Kingdom			749	23%	307	20%	442	25%
Continental Europe			637	20%	263	17%	372	21%
<i>1991-2000</i>	<i>1991-1995</i>	<i>1996-2000</i>						
Netherlands	Netherlands	Netherlands	124	4%	52	3%	71	4%
Germany	Germany	Germany	99	3%	45	3%	54	3%
France	Sweden	France	64	2%	26	2%	43	3%
Sweden	Israel	Spain	49	2%	21	2%	35	2%
Israel	France	Israel	49	2%	21	2%	28	2%
Other(25)			252	8%	98	6%	141	8%
Other (36)			554	17%	256	16%	298	17%
Total			3,318	100%	1,570	100%	1,745	100%
Et-al			36		10		25	
Total			3,354		1,580		1,770	

Pages			1991-2000		1991-1995		1996-2000	
United States			25,186	43%	12,682	48%	12,504	39%
United Kingdom			12,684	22%	5,038	19%	7,646	24%
Continental Europe			11,067	19%	4,277	16%	6,790	21%
<i>1991-2000</i>	<i>1991-1995</i>	<i>1996-2000</i>						
Netherlands	Netherlands	Netherlands	2,227	4%	912	4%	1,315	4%
Germany	Germany	Germany	1,734	3%	745	3%	989	3%
France	Sweden	France	1,226	2%	410	2%	895	3%
Sweden	France	Spain	834	1%	332	1%	607	2%
Israel	Italy	Israel	824	1%	317	1%	515	2%
Other (25)			4,218	7%	1,561	6%	2,469	8%
Other (36)			9,799	17%	4,216	16%	5,582	17%
Total			58,734	100.0%	26,213	100%	32,522	100%
Et-al			686		185		501	
Total			59,421		26,398		33,023	

Standardized pages			1991-2000		1991-1995		1996-2000	
United States			18,988	39%	9,519	44%	9,469	35%
United Kingdom			12,423	25%	4,997	23%	7,426	27%
Continental Europe			9,358	19%	3,644	17%	5,714	21%
<i>1991-2000</i>	<i>1991-1995</i>	<i>1996-2000</i>						
Netherlands	Netherlands	Netherlands	1,872	4%	779	4%	1,093	4%
Germany	Germany	Germany	1,423	3%	619	3%	804	3%
France	Sweden	France	1,055	2%	347	2%	757	3%
Sweden	France	Spain	692	1%	297	1%	514	2%
Israel	Italy	Israel	702	1%	290	1%	441	2%
Other (25)			3,614	7%	1,312	6%	2,105	8%
Other (36)			8,235	17%	3,527	16%	4,708	17%
Total			49,004	100.0%	21,687	100.0%	27,317	100.0%
Et-al			566		157		408	
Total			49,570		21,844		27,725	

As we can see from this table, authors affiliated to American institutions are placed first in the ranking with a percentage around 40% of total publications. The United Kingdom was placed second with a score of 20% and the rest of the European countries were placed third with a similar share. The only Nordic country that appears in the first ranking positions is Sweden. During the period 1991-1995, Sweden was placed third among Continental Europe countries' in terms of articles, pages and standardized pages. However, it does not appear among the five most productive countries during the second sub-period. In any case, the good performance during the first part of the decade permits Sweden to achieve fourth position among Continental Europe countries during the whole period.

Table 5 describes the sample of articles published by authors affiliated to Nordic countries' institutions in the total sample. As we can see from this table, between 1991 and 2000, authors affiliated to these institutions published 98 articles, 1690 pages and 1416 standardized pages (although, in fact, authors affiliated to Nordic countries' institutions were involved in 114 articles⁶) between 1991-2000. If we compare these figures with the total figures in table 2, the share of the Nordic countries' contributions to these top nine international journals is about a 3%. Looking at sub-periods, we can see how, in absolute terms, the number of articles has increased from 43 to 55, the number of pages from 682 to 1008 and from 573 to 844 in terms of standardized pages. It is worth mentioning however that, in relative terms, this increase was similar to that experienced at the international level, and as result, the relative share has remained more or less constant.

Table 5. Description of the sample of regional articles published by authors affiliated to institutions in the Nordic countries

Journal	Article			Pages			Standardized pages		
	1991-2000	1991-1995	1996-2000	1991-2000	1991-1995	1996-2000	1991-2000	1991-1995	1996-2000
ANN REGIONAL SCI	15	9	6	263	154	109	193	113	80
INT J URBAN REGIONAL	9	6	3	137	88	49	132	85	47
INT REGIONAL SCI REV	4	1	3	78	10	68	51	6	45
J REGIONAL SCI	7	2	5	148	33	115	112	25	87
J URBAN ECON	5	2	4	84	22	62	53	14	39
PAP REG SCI	15	8	7	294	133	161	220	99	121
REG SCI URBAN ECON	10	4	6	164	56	108	108	37	71
REG STUD	14	4	10	178	59	119	227	75	152
URBAN STUD	21	9	12	346	127	219	319	117	202
TOTAL	101	45	55	1,692	682	1,010	1,415	571	844

An important aspect that should be kept in mind when looking at the results in the following sections is that the number of publications by authors from institutions placed in the Nordic countries during the considered period is quite small.

3.2 Nordic countries' recognized institutions in regional studies

In this section, academic institutions are listed according to the publication performance of their researchers in the regional journals under consideration and the relative position of institutions in the Nordic countries is examined⁷.

Authors from a total of 1,113 institutions published in the selected journals during the decade. 53 of them were from Nordic countries: 22 from Sweden, 11 from Finland, 10 from Denmark and 10 from Norway. There were no institutions from Iceland included in the ranking.

The first five Nordic institutions according to the different criteria were Umeå University, the Royal Institute of Technology in Stockholm, Uppsala University, Stord/Haugesund College, Jönköping University, and the Institute for Futures Studies. The relative position of Umeå University in international ranking terms was 102 in terms of articles, 130 in terms of pages and 132 in terms of standardized pages.

Table 6. Ranking of Nordic institutions whose authors have published regional articles 1991-2000

Ranking of institutions 1991-2000	Country	Articles		Pages		Std. Pages	
		Pos.	N	Pos.	N	Pos.	N
Umeå University*	Sweden	1	8	1	119	1	99
Royal Institute of Technology in Stockholm	Sweden	2	7	2	105	2	87
Uppsala University	Sweden	4	5	3	99	3	82
Stord/Haugesund College	Norway	9	4	4	97	4	73
Jönköping University	Sweden	5	5	6	89	5	73
Institute for Futures Studies	Sweden	3	6	5	94	6	68
Copenhagen University	Denmark	6	4	8	63	7	60
Odense University	Denmark	7	4	7	71	8	56
University of Jyväskylä	Finland	8	4	10	57	9	53
University of Oslo	Norway	11	3	9	61	10	50
Stockholm School of Economics	Sweden	10	3	11	57	11	50
Aarhus University	Denmark	14	2	14	44	12	45
Swedish Institute for Regional Research (SIR)	Sweden	15	2	12	57	13	42
Roskilde University	Denmark	12	3	13	46	14	40
Göteborg University	Sweden	13	2	17	32	15	38
National Swedish Institute for Building Research, Gävle, Sweden	Sweden	16	2	16	34	16	30
University of Helsinki	Finland	17	2	15	35	17	29
Norwegian Building Research Institute	Norway	18	2	18	31	18	24
University of Tromsø	Norway	19	2	20	28	19	23
Örebro University	Sweden	21	2	21	26	20	23
Helsinki University of Technology	Finland	22	1	24	23	21	22
Norwegian Institute for Urban & Regional Research	Norway	23	1	23	24	22	22

* Position in the international ranking: 102nd in terms of articles, 130th in terms of pages and 132nd in terms of standardised pages. Only institutions publishing 2 articles or more than 20 standardized pages (out of 53) are shown. Full rankings are available from the authors on request.

Splitting the total sample into sub-periods, members of 679 institutions published articles in the set of journals from 1991 to 1995, while 822 institutions were represented

between 1996 to 2000. 388 institutions appeared in both databases. The rankings for Nordic institutions by sub-periods are shown in tables 7 and 8.

Table 7. Ranking of Nordic institutions whose authors have published regional articles 1991-1995

Ranking of institutions 1991-1995	Articles		Pages		Std. Pages	
	Pos.	N	Pos.	N	Pos.	N
Royal Institute of Technology in Stockholm*	1	6	1	96	1	78
Institute for Futures Studies	2	5	2	78	2	56
Umeå University	3	5	3	65	3	55
Aarhus University	9	2	6	34	4	32
Roskilde University	4	2	5	36	5	30
National Swedish Institute for Building Research, Gävle, Sweden	5	2	7	34	6	30
University of Jyväskylä	6	2	4	37	7	28
Odense University	7	2	8	30	8	25
Copenhagen University	8	2	9	25	9	23
Helsinki University of Technology	11	1	10	23	10	22
Göteborg University	10	1	13	19	11	21
Örebro University	12	1	11	22	12	20

* Position in the international ranking: 65th in terms of articles, 53rd in terms of pages and 64th in terms of standardised pages. Only institutions publishing 2 articles or more than 20 standardized pages (out of 28) are shown. Full rankings are available from the authors on request.

Table 8. Ranking of Nordic institutions whose authors have published regional articles 1996-2000

Ranking of institutions 1996-2000	Articles		Pages		Std. Pages	
	Pos.	N	Pos.	N	Pos.	N
Uppsala University*	1	4	2	88	1	74
Stord/Haugesund Collage	4	4	1	97	2	73
Jönköping University	2	4	3	75	3	56
University of Oslo	5	3	4	61	4	50
Umeå University	3	4	6	54	5	44
Swedish Institute for Regional Research (SIR)	7	2	5	57	6	42
Stockholm School of Economics	6	3	7	50	7	42
Copenhagen University	8	2	9	38	8	37
Odense University	9	2	8	41	9	32
University of Jyväskylä	10	2	16	20	10	26
Norwegian Building Research Institute	11	2	10	31	11	24
University of Tromsø	12	2	12	28	12	23
Norwegian Institute for Urban & Regional Research	14	1	14	24	13	22
Statistics Norway	15	1	13	26	14	20

*Position in the international ranking: 108th in terms of articles, 78th in terms of pages and 95th in terms of standardised pages. Only institutions publishing 2 articles or more than 20 standardized pages (out of 39) are shown. Full rankings are available from the authors on request.

In the first sub-period, 28 Nordic institutions were included in the ranking, while in the second, this figure increased to 38. This result is in line with the world increase in the number of institutions that published in the considered journals. 14 of these institutions appear in the two rankings.

During the first sub-period, the first three positions, according to the different criteria, were held in the different rankings by the Royal Institute of Technology in Stockholm, the Institute for Futures Studies and the Umeå University. During the second sub-period these positions were held, respectively, by Uppsala University, Stord/Haugesund College, Jonkoping University, the University of Oslo and Umeå University. Only Umeå University appears in the top positions of both rankings.

It is also worth mentioning that during the first period the best placed Nordic institution at the international level (the Royal Institute of Technology in Stockholm) was among the top 65 institutions in terms of articles during the first period but the best placed institution during the second sub-period (Uppsala University) was among the top 108 during the second.

3.3 The major contributors from Nordic institutions to regional articles during the considered period

During the ten years considered, a total of 3160 authors published in the selected journals. 105 of them were affiliated to Nordic institutions. Table 9 shows the ranking of authors affiliated to Nordic institutions in terms of their publication performance during the decade. Wei Bin Zhang, Borje Johansson, Inge Thorsen and David F. Batten occupy the first three positions in terms of articles, pages or standardized pages. The relative positions in terms of the international ranking of Wei Bin Zhang were 42nd in terms of articles, 58th in terms of pages and 84th in terms of standardized pages⁸.

Table 9. Ranking of Nordic authors who have published regional articles 1991-2000

Ranking of authors 1991-2000	Country	Articles		Pages		Std. Pages	
		Pos.	N	Pos.	N	Pos.	N
Zhang,-Wei-Bin*	Sweden	1	5	1	79	1	57
Johansson,-Borje	Sweden	2	4	2	64	2	52
Thorsen,-Inge	Norway	5	2	3	60	3	46
Jensen-Butler,-Chris**	Denmark	6	2	5	45	4	45
Westlund,-Hans	Sweden	7	2	4	57	5	42
Haila,-Anne	Finland	8	2	7	39	6	37
Karlsson,-Charlie	Sweden	14	2	6	39	7	33
Batten,-David-F.	Sweden	3	3	8	39	8	31
Andersson,-Roger	Sweden	18	1	11	32	9	29
Clark,-Eric	Sweden	4	3	12	32	10	29
Hacker,-R.-Scott	Sweden	9	2	9	37	11	28
Sjoberg,-Orjan	Sweden	15	2	16	30	12	27
Borgegard,-Lars-Erik	Norway/Sweden	10	2	10	37	13	27
Kristensen,-Gustav	Denmark	11	2	13	31	14	27
Nordvik,-Viggo	Norway	12	2	14	31	15	24
Westerlund,-Olle	Sweden	16	2	17	26	16	23
Kangasharju,-Aki	Finland	13	2	18	25	17	22
Elander,-Ingemar	Sweden	19	1	20	22	18	20
Stark,-Oded	Norway	20	1	15	31	19	20

* Position in the international ranking: 42nd, 58th and 84th in terms of articles, pages and standardised pages.

** Position in the international ranking taking into account all his publications included those when affiliated to institutions different from Nordic ones, 58th in terms of articles, 44th in terms of pages and 24th in terms of standardised pages.

Only authors publishing 2 articles or more than 20 standardized pages (out of 105) are shown. Full rankings are available from the authors on request.

If we split the sample into two sub-periods (1991-1995 and 1996-2000), 1685 authors appeared in the first sub-period database, a figure that rose to 2008 in the second sub-period. 527 were published in both sub-periods. The rankings of authors affiliated to Nordic institutions for the two sub-periods are shown in tables 10 and 11.

Table 10. Ranking of Nordic authors who have published regional articles 1991-1995

Ranking of authors 1991-1995	Articles		Pages		Std. Pages	
	Pos.	N	Pos.	N	Pos.	N
Johansson,-Borje*	2	3	2	57	1	46
Zhang,-Wei-Bin	1	4	1	63	2	45
Batten,-David-F.	3	3	3	39	4	31
Clark,-Eric	4	3	5	32	5	29
Haila,-Anne	7	1	6	23	6	22
Jensen-Butler,-Chris	5	2	4	34	3	32
Elander,-Ingemar	8	1	7	22	7	20

* Position in the international ranking: 36th in terms of articles, 40th in terms of pages and 38th in terms of standardised pages.

Only authors publishing 2 articles or more than 20 standardized pages (out of 48) are shown. Full rankings are available from the authors on request.

Table 11. Ranking of Nordic authors who have published regional articles 1996-2000

Ranking of authors 1996-2000	Articles		Pages		Std. Pages	
	Pos.	N	Pos.	N	Pos.	N
Thorsen,-Inge*	1	2	1	60	1	46
Westlund,-Hans	2	2	2	57	2	42
Andersson,-Roger	9	1	4	32	3	29
Hacker,-R.-Scott	3	2	3	37	4	28
Sjoberg,-Orjan	6	2	8	30	5	28
Nordvik,-Viggo	4	2	5	31	6	24
Kangasharju,-Aki	5	2	10	25	7	22
Karlsson,-Charlie	8	1	7	31	8	22
Borgegard,-Lars-Erik	7	2	9	26	9	20
Stark,-Oded	10	1	6	31	10	20

*Position in the international ranking: 80th in terms of articles, 32nd in terms of pages and 44th in terms of standardised pages.

** Position in the international ranking taking into account all his publications included those when affiliated to institutions different from Nordic ones, 46th in terms of articles, 39th in terms of pages and 19th in terms of standardised pages.

Only authors publishing 2 articles or more than 20 standardized pages (out of 68) are shown. Full rankings are available from the authors on request.

Between 1991 and 1995, 48 Nordic authors published in the selected journals. The first three positions were occupied by Borje Johansson, Wei Bin Zhang, David F. Batten and Chris Jensen Butler. The relative position of Johansson in the international ranking was 36th in terms of articles, 40th in terms of pages and 38th in terms of standardized pages.

For the second sub-period (1996-2000), the number of authors increased to 68. Only 11 authors were present in both rankings. The first three positions for the second sub-period according to the three criteria (articles, pages and standardized pages) were occupied by Inge Thorsen, Hans Westlund, Roger Andersson and R Scott Hacker. The

relative position of Thorsen in the international ranking was 80th in terms of articles, 32nd in terms of pages and 44th in terms of standardized pages.⁹

4. The publication patterns of Nordic authors' contributions

In this section, the result of our consideration of the four characteristics mentioned above, in terms of published regional studies, is shown, and will help us to illustrate the most relevant features of the Nordic countries' research. In particular, we analyse the publication patterns of Nordic contributions in regional studies, and the similarities and differences with international patterns in terms of the purpose of this research, the most important topics, techniques and the kind of data used in the analysis. Lastly, the relevance of co-authorship is also considered. We measure these patterns using the proportion of standardized pages devoted to every category.

We hoped that the results would enable us to identify any major differences between regional studies, and secondly, to study whether there have been changes over time. In order to avoid nuisance distortions caused by yearly irregular observations, as in the previous section, we split the time period into two sub-periods: from 1991 to 1995 and from 1996 to 2000.

4.1 Purpose of the analysis

In order to consider the purpose of the analysis of the selected regional studies, we have established four categories: 'policy analysis', 'structural analysis', 'prediction' and 'others' (the last category including mainly methodological articles).

Table 12 shows that there are some differences between international contributions and contributions by Nordic authors in terms of the purpose of the analysis. The two patterns are quite close to each other: the most relevant category is 'structural analysis', followed by 'policy analysis'. In both cases, the first category lost relevance in the second sub-period in favour of the second.

Table 12. Percentage of standardized pages for each category of 'purpose'

Purpose	International contributions			Nordic contributions		
	1991-1995 %	1996-2000 %	1991-2000 %	1991-1995 %	1996-2000 %	1991-2000 %
Policy analysis	29	35	31	23	29	26
Structural analysis	61	59	61	69	58	63
Prediction	2	1	2	1	3	2
Other	8	5	6	7	10	9
Total	100	100	100	100	100	100

4.2 Topics considered

In this section, we focus on identifying the topics of interest of regional research in the Nordic countries. Are they interested in fewer topics now than at the beginning of the decade? Table 13 shows the most important topics of interest in regional studies for both international and Nordic contributions during the two considered sub-periods: 1991-1995 and 1996-2000.

Table 13. Most frequent topics in the sample of articles (proportion of standardized pages where the topic is analysed)

Topics	International contributions			Nordic contributions		
	1991-1995 %	1996-2000 %	1991-2000 %	1991-1995 %	1996-2000 %	1991-2000 %
Methodological articles	6	4	5	2	6	5
Natural resources management and environment	3	2	2	2	0	1
Human resources: demography	8	6	7	8	3	5
Human resources: labour market	8	8	8	7	14	11
Economic growth and development	13	15	14	15	14	14
Housing analysis	11	13	12	6	12	10
Land use patterns and planning	7	5	6	15	1	7
Transportation	3	5	4	8	7	8
Sectoral analysis	9	7	8	1	7	5
Firm location	9	9	9	13	10	11
Social and political issues	16	19	18	7	19	14
Monetary and financial issues	1	0	0	0	0	0
Trade	3	3	3	6	3	4
Other topics	3	3	3	8	3	5
Total	100	100	100	100	100	100

For international articles, the most frequent topics were ‘economic growth and development’, ‘housing analysis’, ‘social and political issues’ and ‘firm location’, while for Nordic articles, the most commonly analysed topics were ‘social and political issues’, ‘economic growth and development’, ‘firm location’, ‘human resources: labour market’ and ‘housing analysis’. It is however worth mentioning that while at the international level, considered topics have been roughly stable during the two sub-periods, in the Nordic countries there have been substantial changes. In particular, less attention has been paid to ‘land use patterns and planning’ in favour of ‘social and political issues’, ‘human resources: labour market’ and ‘housing analysis’.

4.3 Techniques applied

Some studies have considered whether scientists in general economics or other specialized economic fields are using more complex quantitative techniques than in the past. For example, using a sample of the top ten general-interest journals, Figlio (1994) reported that between 1960 and 1992 the proportion of articles presenting empirical research increased substantially, due probably to improvements in information technology.

Table 14 highlights the proportion of publications that did not apply any quantitative technique in their analysis in the sets of articles considered. This ratio is around 20% for international articles and only 16% for Nordic articles.

Table 14. Percentage of standardized pages according to technique

Technique	International contributions			Nordic contributions		
	1991-1995 %	1996-2000 %	1991-2000 %	1991-1995 %	1996-2000 %	1991-2000 %
Non quantitative	22	20	21	18	15	16
Descriptive analysis	25	26	26	25	28	27
Uni-equational Regressions models: quantitative variable	17	17	17	15	22	19
Computable General Equilibrium and Social accounting matrix	12	12	12	20	8	13
Uni-equational Regressions models: qualitative variable	4	6	5	4	4	4
Optimization methods	4	5	5	0	5	3
Multivariate analysis	3	3	3	0	3	2
Multi-equational Regression models	2	2	2	4	5	5
Spatial econometrics	1	1	1	0	1	0
Cost-benefit analysis, valuation, project evaluation	1	1	1	3	0	1
Geographic Information systems	1	0	1	2	0	1
Input Output analysis	2	1	1	1	1	1
Univariate econometric analysis	1	1	1	0	1	1
Demographic analysis	0	0	0	0	0	0
Other methods	4	4	4	10	8	8
Total	100	100	100	100	100	100

As regards the type of quantitative techniques applied, the two patterns are again quite similar. It is worth mentioning however that in the Nordic countries, there is a higher use in relative terms of multi-equational regression models. Looking at the different sub-periods, and again in relative terms, there is a clear decrease in the number of papers using computable general equilibrium models and social accounting matrix methods and a clear increase in the use of standard uni-equational regression models for quantitative variables.

4.4 The type of data used

Regarding the relationship of data to time, we inspected the use of 'cross section' data, 'time series' data and 'panel' data. Considering the full set of articles, table 15 shows an interesting increasing trend in the use of 'panel' data, and a relative decrease in the use of 'time series' data in the international data set. Again, this trend is also observed for the Nordic countries' case with an even higher intensity. It is also worth mentioning the clear reduction in the share of papers that have not considered the use of data during the second sub-period.

Table 15. Percentage of standardized pages where different kinds of data are used (1)

Kind of data	International contributions			Nordic contributions		
	1991-1995 %	1996-2000 %	1991-2000 %	1991-1995 %	1996-2000 %	1991-2000 %
Time series	11	8	9	14	11	13
Cross section	32	32	32	24	25	24
Panel data	17	22	19	22	30	27
Simulated data	6	8	7	5	10	8
Other / Non Quantitative	35	30	32	36	23	28
Total	100	100	100	100	100	100

In both set of articles, ‘macro’ and ‘micro’ ‘data’ were much more frequently used than ‘simulated’ data (see table 16). In the Nordic countries’ case, there is a higher use of macro data, although there was a substantial increase regarding the use of micro and simulated data during the second sub-period.

Table 16. Percentage of standardized pages where different kinds of data are used (2)

Kind of data	International contributions			Nordic contributions		
	1991-1995 %	1996-2000 %	1991-2000 %	1991-1995 %	1996-2000 %	1991-2000 %
Micro data	24	28	26	15	24	21
Macro data	35	34	34	44	43	43
Simulated data	7	8	7	5	10	8
Other / Non Quantitative	34	30	32	36	23	28
Total	100	100	100	100	100	100

4.5 The relevance of co-authorships

One last aspect of interest is the relevance of co-authorships in the Nordic countries’ contributions compared to the international data set. Table 17 shows the number of articles by one, two, three or more than three authors in the international and in the Nordic countries’ data sets. As can be seen from this table, the share of Nordic countries’ contributions with more than one author is quite close to that observed in the international case, namely, about 50%.

Table 17. Relevance of co-authorship in Nordic regional publications (measured in terms of standardized pages)

Authors	International regional science publications				Nordic regional science publications			
	Articles	%	Std. Pages	%	Articles	%	Std. Pages	%
1	1,735	52	25,265	51	54	54.68	762	53
2	1,250	37	18,612	38	38	38.84	547	39
3	299	9	4,553	9	6	6.47	107	8
>3	72	2	1,147	2	-	0	-	0
Total	3,356	100	49,577	100	98	100	1,416	100

5. Final remarks

In this paper, we have identified the most productive institutions in the Nordic countries and the authors affiliated to these institutions in regional research, from 1991 to 2000, using information on articles published (and pages) from a sample of widely recognized journals in this field, formed by the Annals of Regional Science, the International Journal of Urban and Regional Research, the International Regional Science Review, the Journal of Regional Science, the Journal of Urban Economics, Papers in Regional Science, Regional Science and Urban Economics, Regional Studies and Urban Studies. The publication patterns of the authors affiliated to Nordic country institutions have also been compared to the ones observed at the international level.

The results have shown that the Nordic countries’ share in regional studies has been relatively low (especially when compared to other disciplines). In this sense, Sweden,

Denmark, Norway and Finland appear in the rankings while Iceland is not present. In any case, it has to be pointed out that Sweden was placed between the five most productive continental European countries during the first half of the 1990s. Between 1991 and 2000, and in terms of articles, the best-placed institution at the international level is Umeå University (among the top 102 institutions) with the best-placed researcher being Wei Bin Zhang (among the top 42 contributors)¹⁰.

The analysis of the publication patterns of Nordic country contributions compared to international ones has also shed some light on the peculiarities of regional research in these countries. In particular, publication patterns are quite close to the international norm with two exceptions: first, a higher interest in social and political issues and, second, a higher use of quantitative techniques.

Notes

¹ http://www.in-cites.com/research/2004/may_31_2004-4.html

² This bias is a consequence of using the Econlit and the ISI SSCI databases (see Guimaraes, 2002).

³ As suggested by an anonymous referee, an interesting extension of our analysis will be to complement it with some measure of quality. In particular, it seems that the most appropriate procedure will consist of focusing on authors' citation counts. In our opinion, the main problem with this approach for the analysis here will be the identification of authors in the Nordic countries that can be 'labelled' as regional scientists.

⁴ See, for example, Conroy and Dusansky (1995).

⁵ All figures in the tables have been rounded to zero decimal places. Precise figures are available from the authors on request.

⁶ This difference lies in the fact that some articles were co-authored with authors affiliated to foreign institutions.

⁷ As rankings are based on a very few number of papers, only institutions who have published 2 or more papers or 20 or more standardized pages in the considered paper are shown in the following tables. Full rankings are available from the authors on request.

⁸ It is worth mentioning that if we take into account all the publications by Chris Jensen Butler, including those when affiliated to non-Nordic institutions, his position in the international rankings will be better than that of Wei Bin Zhang in term of standardised pages. In particular, he will be 58th in terms of articles, 44th in terms of pages and 24th in terms of standardised pages.

⁹ As before, it is worth mentioning that if we take into account all of the publications by Chris Jensen Butler including those when affiliated to non-Nordic institutions, his position in the international rankings will be better than that of Inge Thorsen in terms of articles and standardised pages. In particular, he will be 46th in terms of articles, 39th in terms of pages and 19th in terms of standardised pages.

¹⁰ See footnotes 7 and 8 for a discussion on the contributions by Chris Jensen Butler.

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