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PAPER 199:

## THE GEOGRAPHY OF NEW MARKET FIRMS IN GERMANY

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## **Abstract**

The *Neuer Markt*, launched in 1997 by Deutsche Börse, the German stock exchange, is Europe's closest equivalent to the Nasdaq, the US high-tech oriented stock market. Although the New Economy in Germany is not restricted to Neuer Markt firms one may argue that these firms and their employees form the spearhead of Germany's New Economy.

The paper analyses the spatial structure of the firms listed at Neuer Markt, differentiating between NEMAX<sup>1</sup> firms in general and New Economy firms in a more narrow sense. We compare their spatial structure with the structure of the 'traditional economy' and ask why the spatial structure of the New Economy might differ from that of the traditional economy.

Key Words: New Economy, Space Economy, Neuer Markt

JEL Classification: G19, O30, O18, R11

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<sup>1</sup> The "NEMAX" is the Neuer Markt index.

## I. Introduction

The Neuer Markt, launched in 1997 by Deutsche Börse, the German stock exchange, is Europe's closest equivalent to the Nasdaq, the US high-tech oriented stock market. Its short history may be subdivided into three distinct phases: rapid growth (March 1997 – March 2000), deep crisis (March 2000- fall 2001) and beginning consolidation<sup>2</sup> (fall 2001 until today).

In only three years, Neuer Markt had grown from one to 337 listings and accounted for 80 per cent of the capitalization of all European growth stock markets combined (FT 2001).<sup>3</sup> At its peak in March 2000 the NEMAX All Share Performance Index reached 8583 points compared to a base level of 1000 points in December 1997. The Neuer Markt helped to turn a country of bond investors into shareholders (table 1)

**Table 1: Share holders and funds owners in Germany**

		1997	1999	1998	2000	2001
A	Number of shareholders	3920	5005	4515	6211	5959
B	Number of funds owners	2308	4744	3185	8365	10174
C	Number of people who hold shares and funds	627	1518	911	2748	2694
D	Shareholders and funds owners together (A+B-C)	5601	8231	6789	11828	13439
E	D as percentage of population older than 14 years	8.9 %	12.9 %	10.7 %	18.5 %	21.0 %

Source: DAI-Factbook (October 2001)

Neuer Markt worked so well "...because it filled a void between a crowded but cash-starved homegrown technology sector and Europe's largest, wealthiest pool of would-be investors"(FT 2001).

However, the rapid rise was followed by a deep fall: The NEMAX All Share Index fell from nearly 8600 points at its peak to less than 1000 points within one and a half year and is currently<sup>4</sup> below 600 points. Not only was Neuer Markt affected more heavily by the burst of the bubble than other growth segments (like Nasdaq or Nouveau Marché), but it has seen its reputation defaced by adverse publicity ranging from spectacular mismanagement to misleading information and causes of fraud and insider trading.

In fall 2001 Neuer Markt entered the third stage of its history, characterized by the endeavor of Deutsche Börse to restore confidence by tighter regulation and listing requirements and the de-listing of penny stocks and insolvent companies. It is not yet clear if this endeavor will be successful and if we will see a quick resurrection of Neuer Markt. Although positive news come more frequently now the downward trend is still not reversed.

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<sup>2</sup> The term "beginning consolidation" denotes the endeavor of Deutsche Börse to restore confidence by tightening the regulatory framework of Neuer Markt. It does not denote that the slump in prices has come to an end.

<sup>3</sup> Even after the crash the Neuer Markt's \$48 billion market capitalization dwarfs the \$ 11.4 billion of its main continental competitor, Nasdaq Europe (Business Week, July 2001).

<sup>4</sup> July 2002.

## II. The ‚Neuer Markt’ as a job machine

Nevertheless, it is worth while analysing Neuer Markt, not only because “... Germany is Europe’s biggest economy and desperately needs a vehicle for risk capital” (Business Week, July 2001), but because Neuer Markt has worked as a job machine, even in its deepest crisis: From the peak of the Neuer Markt index in March 2000 till summer 2001 (when the index fell to a tenth of its peak level) the number of employees in Neuer Markt firms almost doubled from 93.000 to 185.000. The market segments with the most rapid employment growth were financial services, internet and biotechnology (table 2).

**Table 2: Employment growth by sector**

Sector	Employment growth ( 2000 - 2001)	Total employment (march 2001)	Average number of employees per firm (march 2001)
Biotech	227 %	5821	291
Financial Services	223 %	8611	1722
Internet	119 %	32196	495
Industrials&Industrial Services	105 %	34205	1710
Media&Entertainment	97 %	10928	268
Technology	85 %	29989	431
IT-Services	77 %	23042	677
Telecommunications	52 %	15659	746
MedTech&Health Care	47 %	5849	505
Software	26 %	19907	376

Source: RBSC (2001)

The employment growth on Neuer Markt until summer 2000 was primarily due to the listing of new firms (‘IPO effect’), whereas since that time there were relatively few new listings<sup>5</sup> and several de-listings such that employment growth since then is primarily due to the expansion of firms already listed (real ‘growth effect’). Roland Berger Strategy Consultants (RBSC, for short) expect that Neuer Markt will continue to be a ‘job machine’ although employment growth rates are likely to be lower in the future (RBSC 2001).

The employment growth on Neuer Markt is concentrated on locations in Germany (75 per cent of all new jobs were created here). Nevertheless, Neuer Markt has also contributed to employment growth elsewhere, particularly in Germany’s neighbor countries (Austria, the Netherlands, Luxemburg) and in the US (table 3).

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<sup>5</sup> There were 33 new listings between August 2000 and December 2000. In the whole year 2001 there were only 11 new listings (compared to 132 in 2000).

**Table 3: Employees in Neuer Markt firms outside Germany, March 2001**

	Country	Employees	Number of firms with registered office in the respective country
<b>Europe</b>	NL	9059	9
	AT	8664	12
	LUX	5289	2
	IT	4011	1
	FR	2395	2
	CH	2213	6
	GB	1543	3
	IRL	1482	2
	IL	1025	7
	HUN	289	1
	DK	52	1
<b>Overseas</b>	USA	4172	9
	CAN	65	1

Source: RBSC 2001

**III. The spatial structure of NEMAX firms, employment and capital**

A closer look at the spatial structure of Neuer Markt firms reveals that they are not equally distributed over space but that there is a clear-cut tendency towards spatial concentration. The location of Neuer Markt firms is focussed on Germany's major cities and their direct hinterland. More than 44 per cent of all Neuer Markt firms based in Germany are located in the planning regions Munich, Rhine-Main (Frankfurt), Berlin and Hamburg. If one also considers those firms which are located in regions neighboring the above named cities the percentage increases from 44 to nearly 57 per cent (table 4). Neuer Markt employment and market capitalization show a similar concentration on the four leading cities.<sup>6</sup>

**Table 4: Germany's "top four" Neuer Markt locations, March 2001**

Planning Region	Number of NEMAX firms	Employees	Market Capitalization*
<b>München</b>	60	24259	6130,3
<b>Rhein Main</b>	26	21793	1680,4
<b>Hamburg</b>	22	10727	1673,3
<b>Berlin</b>	19	8302	1010,4
<b>Top four together</b>	127	65081	10494,4
<b>Top four in %</b>	44.4	44.6	30.9
<b>Top four + neighbors</b>	162	85370	19266,2
<b>Top four + neighbors in %</b>	56.6	58.5	56.8
<b>Germany as a whole</b>	286	145948	33944,2

\* in million €

<sup>6</sup> As can be derived from table 4 firms located in neighboring regions have on average a similar number of employees but a much higher market capitalization than firms located in the agglomeration centers themselves.

What really strikes the eye is the dominance of Munich: The planning region Munich accommodates almost as many Neuer Markt firms as the regions Rhine-Main (Frankfurt), Berlin and Hamburg together. The reasons why Munich and not the German capital Berlin (which has approximately twice as many inhabitants as Munich) or Germany's second-largest city (Hamburg) is the centre of the new economy are manifold: Munich is not only an industrial core region but also a high ranking financial center. Sternberg and Tamásy emphasize the role of national and Bavarian technology policies, the impact of F.J. Strauß as former prime minister of Bavaria and national Minister of Defence and the locational choice of Siemens headquarters (Sternberg and Tamásy 1999: 375). Furthermore, Munich accommodates more venture capital firms than any other German city and there appears to be a close interrelation between the location of venture capital firms and Neuer Markt firms (Dohse et al. 2002).

Even the Rhine-Main region (Frankfurt) accommodates more Neuer Markt firms than Germany's largest cities Berlin and Hamburg which may be due to the fact that Frankfurt is Germany's leading financial centre (and one of Europe's financial centres, too) as well as the head office of Deutsche Börse (the German stock exchange) and Neuer Markt. If we also consider neighboring regions the larger Rhine-Main area even outstrips Munich with respect to Neuer Markt employment and market capitalization.

East Germany (with the exception of Berlin) is almost an empty spot on the map of Neuer Markt which may indicate that NEMAX firms hardly grow in East Germany or that Neuer Markt firms shun East Germany (map 1, table 5).

[Map 1: NEMAX firms by planning regions, insert here]

**Table 5: NEMAX firms, employment and market capitalization by state**

State	Firms	Per-centage	Employees	Per-centage	Market Cap.	Per-centage
Baden-Württemberg	39	13,64	17225	11,80	2886,17	8,50
Bayern	82	28,67	33205	22,75	8606,84	25,36
Berlin	19	6,64	8302	5,69	1010,36	2,98
Brandenburg	1	0,35	43	0,03	64,77	0,19
Bremen	2	0,70	189	0,13	46,17	0,14
Hamburg	22	7,69	10727	7,35	1673,33	4,93
Hessen	37	12,94	28319	19,40	6984,83	20,58
Mecklenburg-Vorpommern	1	0,35	154	0,11	41,11	0,12
Niedersachsen	10	3,50	3481	2,39	1260,99	3,71
Nordrhein-Westfalen	45	15,73	19740	13,53	6452,65	19,01
Rheinland-Pfalz	5	1,75	5234	3,59	438,11	1,29
Saarland	3	1,05	2549	1,75	497,40	1,47
Sachsen	4	1,40	3548	2,43	962,62	2,84
Sachsen-Anhalt	1	0,35	1420	0,97	58,15	0,17
Schleswig-Holstein	9	3,15	8478	5,81	2463,24	7,26
Thüringen	6	2,10	3334	2,28	496,67	1,46
Total	286	100,00	145948	100,00	33943,41	100,00
Old Laender <sup>a</sup>	254	88,81	129147	88,49	31309,73	92,24
New Laender <sup>a</sup>	13	4,55	8499	5,82	1623,32	4,78

<sup>a</sup> Berlin not included.

Only 13 firms (which is less than five per cent of all Neuer Markt firms) are located in the five East German Länder (Brandenburg, Mecklenburg-Vorpommern, Sachsen, Sachsen-Anhalt and Thüringen) and their average size and market capitalization is not much above the

German average. Ten of these 13 firms are located in the southern parts of east Germany (Sachsen and Thüringen) which indicates that the south-north divide that is well documented for West-Germany may have spilled over to the east German economy.<sup>7</sup>

A broader inspection shows that the old Länder that formed the former West Germany account for roughly 90 per cent of Neuer Markt firms and employment and an even higher percentage of market capitalization, the leading states within West Germany being Bavaria, Hesse, Nordrhein-Westphalia and Baden-Württemberg (table 5).

Thus, the new economy in Germany as measured by Neuer Markt firms, employment and market capitalization is clearly overrepresented in the southern and western parts of the country and it is clearly underrepresented in the east.

Making use of a classification introduced by the Federal Office for Building and Regional Planning (Bundesamt für Bauwesen und Raumordnung) allows us to subdivide the 97 German planning regions into agglomeration areas, urbanization areas and rural areas. As can be seen from table 6 the large majority of all NEMAX establishments and activities is concentrated on the agglomerations and only an evanescent minority of NEMAX firms (employment and capital) is located in rural areas.

**Table 6 NEMAX firms, employment and market capitalization by type of region**

Type of Region	Firms	Per-centage	Employees	Per-centage	Market Cap.	Per-centage
Agglomeration Areas	219	0,77	109199	0,75	27534,5	0,81
Urbanisation Areas	60	0,21	34110	0,23	5847,8	0,17
Rural Areas	7	0,02	2639	0,02	561,9	0,02

#### IV. New Economy firms in a narrow sense

Neuer Markt is the growth segment of Deutsche Börse AG. Firms listed here are held to be innovative enterprises with high growth potential and high capital needs (Deutsche Börse 2001).<sup>8</sup> It was argued in the introduction that firms listed at Neuer Markt might be viewed as the spearhead of the new economy in Germany. However, a more narrow definition of new economy as information (or virtual) economy would exclude such sectors as biotech, financial services or industrial services.

To check if our previous results are still valid when using a more narrow definition we define an index “New Economy in a narrow sense” aggregating the NEMAX sub-indices Internet, IT-Services, Media&Entertainment, Software and Telecommunications and excluding the rest (table 7).

We find that the spatial distribution of firms belonging to the “New Economy in a narrow sense” is very similar to the pattern revealed by Neuer Markt firms in general (See map 2 and compare it with map 1).

<sup>7</sup> Other indicators support this view (see DIW et al. 2002).

<sup>8</sup> The listing at Neuer Markt is seen as an ideal exit for venture capital finance. Thus, to be listed at Neuer Markt firms should have grown out of their start up and seed capital phase and have entered a phase of expansionary growth.

**Table 7: New Economy in a narrow sense**

Sub-indices of NEMAX/AS	Sectors belonging to New Economy in a narrow sense	Number of Firms
Biotech		14
Financial Services		4
Industrials&Industrial Services		16
Internet	X	52
IT-Services	X	35
Media&Entertainment	X	38
MedTech&Health		11
Software	X	40
Technology		58
Telecommunications	X	18

[Map 2, insert here]

There is one noteworthy difference, however: the “New Economy in a narrow sense” is even more spatially concentrated than the Neuer Markt in general (table 8 ). The preference for urban agglomerations and the shunning of rural areas is obviously more pronounced in firms belonging to the information economy.

**Table 8: Spatial concentration of New Economy in a narrow sense and Neuer Markt in general**

	New Economy firms in a narrow sense	Neuer Markt firms in general
<b>Absolute concentration (Hirshman index)</b>	0,081	0,073
<b>Relative concentration (Lorenz-Münzer index)</b>	0,808	0,753
<b>Firms located in top four cities</b>	47.9%	44.4 %
<b>Firms located in rural areas</b>	0.9 %	2.4 %

## V. Comparing the spatial structure of Neuer Markt with the structure of the traditional economy and the knowledge economy

### *Neuer Markt versus traditional economy*

It is sometimes argued that in the information economy distance – and thus spatial proximity – loses its meaning. If this is true we should observe that new economy (Neuer Markt) activities are less concentrated in space than activities belonging to the traditional economy



(hypothesis 1). On the contrary, one may argue that new economy (Neuer Markt) firms depend more heavily on knowledge spillovers, labor market pooling and spatial proximity to customers than traditional economy firms. In this case we would expect Neuer Markt activities to be more concentrated than variables such as GDP or overall employment (hypothesis 2). Our results on spatial concentration presented in table 9 clearly corroborate hypothesis 2.<sup>9</sup>

**Table 9: Indices of spatial concentration**

		<b>Absolute Concentration (Hirschman)</b>	<b>Relative Concentration (Lorenz-Münzer)</b>
<b>Neuer Markt</b>	NEMAX firms	0,0728	0,7528
	NEMAX employment	0,0704	0,7926
	NEMAX market capitalization	0,0727	0,8066
<b>Knowledge Economy</b>	Patents 1998	0,0287	0,5401
	R&D expenditure 1997	0,0558	0,7039
	R&D employment 1997	0,0451	0,6533
<b>Traditional economy</b>	GDP 2000	0,0215	0,4423
	Employment 2000	0,0168	0,3632
	Population 2000	0,0156	0,3355
<b>Venture Capital</b>	Venture capital firms	0,0719	0,7988
	Independent VC firms	0,1410	0,9048

Furthermore, as can be seen from table 10 there is a high and statistically significant correlation between the spatial distribution of NEMAX firms, employment and capital and the regional distribution of GDP, income (GDP per head), labor productivity and employment. This indicates that Neuer Markt firms tend to cluster in rich regions with high labor productivity and a high density of economic activities.

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<sup>9</sup> The Hirshman index can take values between  $\frac{1}{N}$  and 1, whereas the Lorenz-Münzer index can take values between 0 and  $\frac{N-1}{N}$ . The Hirshman index is suited for comparisons between variables or for the analysis of developments over time. The interpretation of its absolute value as “degree of concentration” is, however, problematic since it is not invariant with respect to monotonous transformations. For this purpose, the Lorenz-Münzer index is the better choice.

**Table 10: Correlation between traditional economy variables and Neuer Markt variables**

Variable A (traditional economy)	Variable B (Neuer Markt)	Correlation between A and B	Rank-Correlation between A and B
Regional GDP	NEMAX Firms	0,834	0,716
Regional GDP	NEMAX-Employment	0,817	0,679
Regional GDP	NEMAX Capitalization	0,612	0,663
Regional Productivity (GDP/worker)	NEMAX Firms	0,559	0,493
Regional Productivity (GDP/worker)	NEMAX-Employment	0,537	0,446
Regional Productivity (GDP/worker)	NEMAX Capitalization	0,508	0,432
Regional Income (GDP/head)	NEMAX Firms	0,662	0,527
Regional Income (GDP/head)	NEMAX-Employment	0,625	0,460
Regional Income (GDP/head)	NEMAX Capitalization	0,523	0,435
Regional Employment	NEMAX Firms	0,732	0,686
Regional Employment	NEMAX-Employment	0,718	0,662
Regional Employment	NEMAX Capitalization	0,518	0,642

*Neuer Markt versus knowledge economy*

We go one step further now and compare the spatial structure of Neuer Markt activities with the spatial structure of what may be called the “knowledge economy”, measured by knowledge or technology indicators such as regional R&D employment and expenditure, or regional patent applications. The high and significant correlation between these regional technology indicators and NEMAX firms, employment and market capitalization (table 11) indicates that technologically strong regions are also strong in terms of the new economy; technologically backward regions are also underrepresented in terms of Neuer Markt employment and market capitalization.

**Table 11: Correlation between knowledge economy variables and Neuer Markt variables**

Variable A (Knowledge economy)	Variable B (Neuer Markt)	Correlation between A and B	Rank-Correlation between A and B
R&D expenditure	NEMAX Firms	0,770	0,620
R&D expenditure	NEMAX-Employment	0,702	0,561
R&D expenditure	NEMAX Capitalization	0,601	0,537
R&D employment	NEMAX Firms	0,802	0,625
R&D employment	NEMAX-Employment	0,737	0,582
R&D employment	NEMAX Capitalization	0,629	0,542
Patents	NEMAX Firms	0,755	0,662
Patents	NEMAX-Employment	0,702	0,620
Patents	NEMAX Capitalization	0,569	0,600

There is one notable qualification to this finding, however: the South West (Baden-Württemberg) which may be seen as the technological heartland of Germany (and is leading in

terms of patent applications and R&D intensities) is falling behind Bavaria (but also behind Hessen and Nordrhein-Westphalia) in terms of new economy firms, employment and, particularly, market capitalization (table 5). If this is the first indication of a permanent shift in the spatial structure of the German economy or just a temporary phenomenon has to be seen in the longer run.

A comparison of concentration measures such as Hirschman index (absolute concentration) or Lorenz index (relative concentration) shows that concentration of Neuer Markt activities is clearly higher than patent or R&D concentration (table 9). This indicates that the new economy might aggravate the existing technological divide. Our finding also suggests that it is not just knowledge spillovers that are responsible for the spatial concentration of Neuer Markt activities but that there must be something else behind this finding. Our hypothesis that still has to be tested is that it might be the proximity to venture capital firms.

## **VI. Conclusions**

Opposed to expectations that the Internet would render the importance of spatial proximity obsolete (lead to a “death of distance”) and pave the way for a more even distribution of economic activities in space our results show that the new economy seems to aggravate rather than to reduce regional concentration. In other words: the centers profit from employment growth, higher tax revenues and positive image effects associated with the new economy whereas the periphery is falling further behind. This is particularly true for those sectors that form the new economy in a narrow sense, i.e. Internet, IT-Services, Media&Entertainment, Software and Telecommunications.

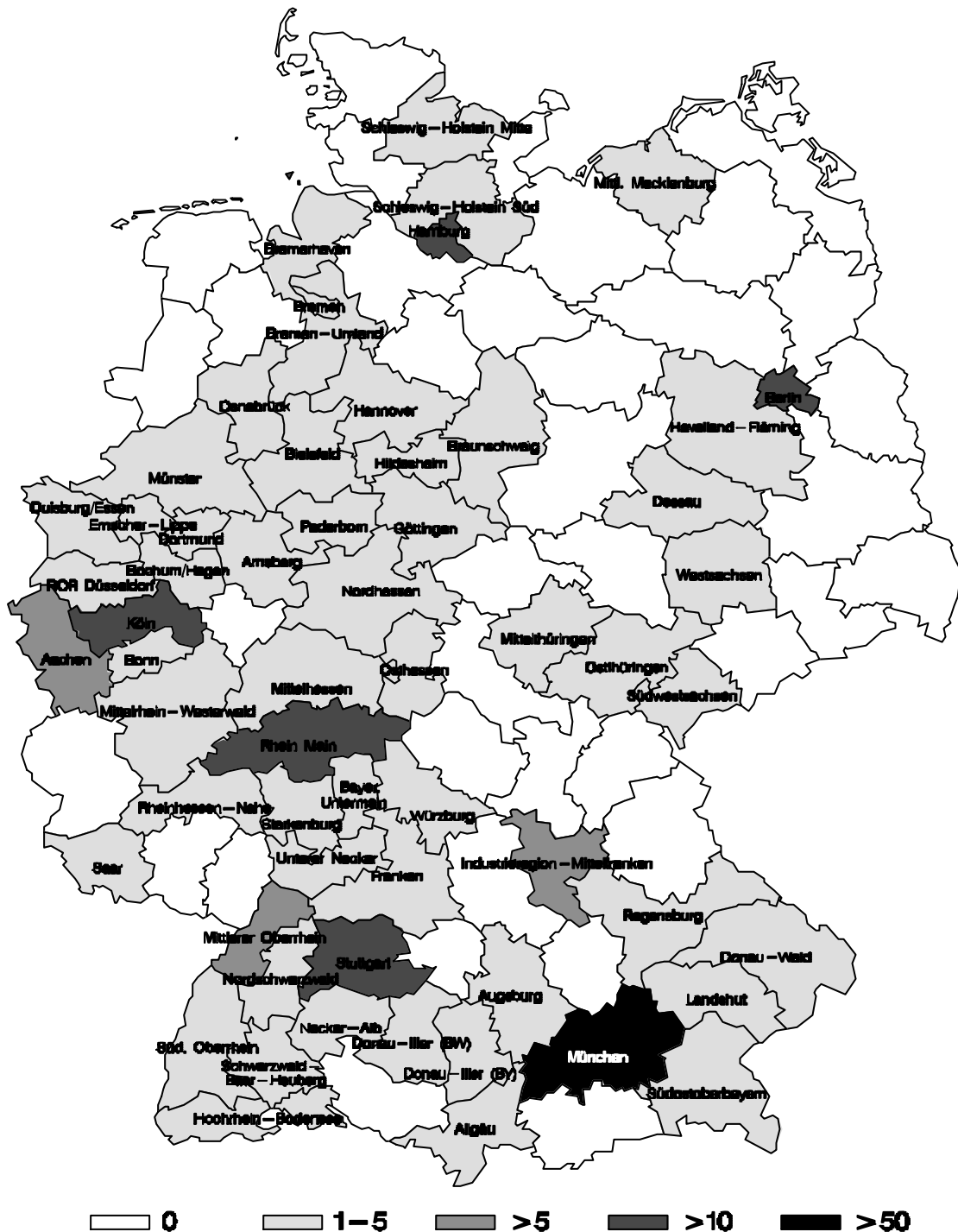
The spatial pattern of Neuer Markt activities is very similar to that of other innovative activities such as R&D input or patent output although some qualifications have to be made: First, the spatial concentration of Neuer Markt activities is clearly higher than patent or R&D concentration. And second, Bavaria (and particularly the Munich agglomeration area) is outstanding in terms of Neuer Markt activities, whereas Baden-Württemberg with its technological cores Stuttgart and Karlsruhe that are on a par with Munich concerning R&D and patenting activities has not managed to establish an equivalent level of Neuer Markt activities.

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Map 1: Neuer Markt firms by planning regions



Map 2: New economy firms in a narrow sense by planning regions

