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Explaining the Regional Distribution of New Economy Firms – A Count Data Analysis

by

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Abstract

Although there is a host of literature on the locational choice of traditional economy firms, relatively little is known about the locational needs and preferences of new economy firms. Therefore, the current paper provides an empirical analysis of the factors determining the regional distribution of new economy firms in Germany. Using a count data analysis, we find evidence that the number of firms listed in a particular region depends positively on the region's knowledge potential (as measured by the number of patents or by the number of R&D employees) as well as on the regional supply of venture capital.

Keywords: new economy firms, regional distribution, venture capital, knowledge potential, count data analysis

JEL classification codes: R30, R58, O30, C21, G24

1 Motivation

A fundamental shift is taking place in advanced industrialized countries, a shift from the managed economy to the entrepreneurial economy, also referred to as the knowledge economy or simply as the *new economy* (Audretsch and Thurik 2001). While causes and consequences of the emergence of the new, entrepreneurial economy have been elaborated elsewhere (e.g. Audretsch 1995, Audretsch and Thurik 2001), the focus of the current paper is on the role of geography in the new economy.

The production process in the traditional economy may be characterized by a neoclassical production function with land, labor and capital as input factors. The availability and the prices of these inputs as well as the proximity to suppliers and customers are the most important location factors for firms belonging to the traditional economy. By contrast, knowledge has emerged as the most important production factor in the new, entrepreneurial economy. As knowledge[1] cannot be costlessly transferred across geographic space (Krugman 1991, Lucas 1993), one would expect that geography plays a greater role for firms belonging to the new economy than for firms belonging to the traditional, managed economy. Indeed, there is evidence in the literature that new economy

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[1] We use the term knowledge in the sense of tacit knowledge here, i.e. knowledge that cannot easily be standardized or codified. Knowledge that can easily be standardized or codified and thus can be costlessly transferred over large geographic distances is referred to as "information".

firms are spatially more concentrated than firms belonging to more traditional sectors of the economy (see, e.g., Norton 2000 for the US, Maurel and Sedillot 1999 for France or Dohse and Steude 2003 for Germany). In this paper, we go one step further and ask what determines the regional distribution of new economy firms and new economy employment in Germany. Our hypothesis to be tested in the empirical part of the paper is drawn from Norton who hypothesizes that new ideas are "… most likely to occur, to be put in practice, and to reach the stage if going public … where knowledge workers could hook up with venture capitalists – the suppliers not only of money but of management expertise of the kind most technology-based start-ups lack" (Norton 2000, ch. 3).

The paper is organised as follows: In section 2 we discuss the factors that might explain the regional distribution of new economy firms from a theoretical point of view in more detail. Section 3 contains the data description and some stylized facts about the geography of new economy firms in Germany. In section 4 we discuss the econometric approach adequate for the analysis of count data and present and discuss the estimation results. In section 5 we summarize the main results of our analysis.

2 Determinants of regional distribution

In this section we discuss the factors hypothesized to be most important in explaining the regional distribution of new economy firms, i.e. the availability of

knowledge and the availability of venture capital.[2] It should be kept in mind that the regional distribution of new economy firms is determined by factors which affect the firms' location choice as well as their decision to go public. While the availability of knowledge plays a role only at the first stage (the firms' location choice) the availability of venture capital affects the location choice as well as the decision to go public.

The role of knowledge

There seems to be unanimity among economists that new knowledge is one of the most important sources of economic growth. The spatial dimension of knowledge, however, is often neglected. Obviously, the costs of information transfer over large distances have been decreasing rapidly during the last decades. So, at first glance, in the age of Internet, fax and E-mail spatial aspects may seem of ever decreasing influence. This is, however, not the whole story. There are good reasons to assume that spatial proximity encourages the creation and diffusion of knowledge such that knowledge can be viewed as a special kind of a local public good: Recent empirical studies have shown that knowledge spillovers are geographically localized (Jaffe, Trajtenberg, Henderson (1993), Glaeser et al. (1992), Audretsch and Feldman (1996)). This may be due to the

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[2] Although we do not discuss the well-known location factors of the traditional economy (such as the availability and price of land, unskilled labour and the proximity to customers) in extensio here, this is not to deny that they have an influence on the spatial distribution of new economy firms at all. Our hypothesis is just that their influence is small compared to the influence of knowledge and venture capital availability.

fact that new knowledge is often unstructured and highly complex (tacit knowledge) and can thus best be transferred face to face (see Polanyi 1958). Furthermore, new knowledge is often produced cooperatively in joint ventures or innovation networks. In these cases the advantage of spatial proximity is not so much the reduction of information costs but the fact that only close personal relationships allow for the evolution of incentive and sanction mechanisms necessary for the keeping of the implicit cooperation contracts (Bröcker 1995).

If it is true that knowledge spillovers are driving economic growth and that spatial proximity is crucial (i.e. that knowledge spillovers are localized) we would expect that the propensity of new firms to locate in a region *r* depends on the already existing stock of knowledge in that region, referred to as the region's 'knowledge potential' in the remainder of this paper. This regional 'knowledge potential' is likely to be particularly important for firms with a knowledge-intensive production process, as it is typical for most enterprises belonging to the 'new economy'.

The role of capital

The number of new economy firms in a region *r* is likely to depend on the regional supply of financial means offered to such firms. This is because of particular characteristics of these firms. First, these firms are young and lack a track record necessary to access organized equity and debt markets. If these firms have access to organized capital markets, the number of new economy

firms would not be affected by the regional capital supply since firms can raise capital hundreds of kilometres far away from their own locations. Second, these firms may invest intensively in intangible assets. Investing mainly in intangible assets means that collateral is not at banks' disposal to control investment risks. If these firms offer collateral, again the number of new economy firms would not be affected by the regional capital supply since firms can get loans from banks which are far away from the firms' locations. Thus, in the case of new economy firms, traditional forms of finance do not work well calling for a new form of finance called venture capital finance.

In addition to offering capital, venture capitalists actively select promising firms out of a large number of firms seeking finance and they support and monitor the progress of the selected firms. This active involvement is time-consuming. In the United States, lead venture capitalists, who take on the support of the firms when several venture capitalists invest money, spend on average two hours per week in firms if these firms are in their early stages of development (Gorman and Sahlman 1989). Venture capitalists' active involvement, however, is principally crisis- and project-oriented. They are not involved in the day-to-day management of the firms. Because of venture capitalists' active involvement, venture capital is a comparatively expensive form of finance, and is therefore naturally used by those firms only that have limited access to other forms of capital.

US studies suggest that venture capital finance has a positive impact on the development of firms. In the sample of Silicon Valley start-ups analysed by Hellmann and Puri (2000), venture-capital-backed firms bring their products earlier to the market than their non-venture-capital-backed counterparts do so that the former can realize first mover advantages. Moreover, evidence found by Megginson and Weiss (1991) suggests that the total costs of going public including the underwriters' fee are lower for venture-capital-backed firms than for their non-venture-capital-backed counterparts. In addition, Kortum and Lerner (2000) show that venture-capital-backed firms take out significantly more patents than other comparable firms.

We expect venture capital to be regionally concentrated for several reasons: First, venture capitalists settle down in regions with sufficient investment opportunities. Because transaction costs of an active involvement in new economy firms depend on the distance between venture capitalists and the firms they finance, venture capitalists prefer to be closely located to their portfolio firms. Second, venture capitalists build networks to other venture capitalists and industrialists leading to increasing economies of scale. Network contacts to other venture capitalists are important to syndicate investments, i.e., to finance a single firm by several venture capitalists, which mainly serves to share information (Bygrave and Timmons 1992) and to increase venture capitalists' experience in financing firms (Lerner 1994). Network contacts to industrialists are important because they are used to build up contacts to customers and

suppliers for venture-capital-backed firms. For flourishing network contacts to develop, personal contacts seem to be important resulting in regional concentration.

The supply of venture capital might not only influence the firms' location choice but also the firms' decision to go public. Typically, venture capitalists want to exit from their participations after some time has passed. Apart from maximizing returns, an initial public offering of venture-capital-backed firms on a stock market is favourable seen from the venture capitalists' point of view for (at least) two reasons: First, Black and Gilson (1998) argue that a liquid stock market offers venture capitalists and entrepreneurs the opportunity to enter into an implicit contract over control. Since an initial public offering gives the entrepreneur the opportunity to re-acquire control at least partly (since the entrepreneur can obtain main management positions in the listed firm), the entrepreneur has lower incentives for opportunistic behaviour. Second, Black and Gilson (1998) argue that stock markets are important for the development of venture capital finance because with initial public offerings of venture-capital-backed firms, the venture capitalists can build reputation more easily and, thus, they can raise capital from outside investors at more favourable conditions.

Thus, we expect that in regions in which venture capital is available the number of new economy firms is higher than in other regions.

3 Data

3.1 Sources and description

In order to test the impact of regional knowledge potential and venture capital on the regional distribution of firms in the new economy, we use the number of firms listed on Germany's Neuer Markt (March 2001) in region *r* as an approximation for firms in the new economy. As a second endogenous variable in our regression analysis, we use the number of employees of the firms listed on the Neuer Markt. Our sample consists of 286 firms often operating in the information and communication business. In 2001, these firms had 145,948 employees.

To measure the knowledge potential of a region, there is certainly no single indicator covering all relevant facets of the regional knowledge potential. We thus consider a variety of different indicators in the empirical analysis. These are, inter alia: patents (as a measure of innovative output), R&D employment (as input measures to the innovation process), and the number of highly qualified employees in a region (as a measure of human capital availability and university spin offs).

Regional patent data were taken from the "Patentatlas Deutschland" published by Deutsches Patent- und Markenamt (The German Patent Office) in 2000. Regional R&D employment data were provided by the Stifterverband Wissenschaftsstatistik. Regionally disaggregated data on highly qualified

employees are available from the Bundesamt für Bauwesen and Raumordnung (The German Federal Office for Building and Regional Planning).

We approximate venture capital activity by the number of venture capital investors in a region *r* and by the number of venture capital investors' portfolio firms. Data on venture capital investors and their portfolio firms are taken from the web site of the *Bundesverband deutscher Kapitalbeteiligungsgesellschaften* (German Venture Capital Association, BVK). Venture capital activity in Germany is not comparable to venture capital activity in the United States because our German data include venture capital investors who offer mainly financial means but who do not necessarily support the management teams of the enterprises (Schertler 2003).

3.2 Descriptive statistics

Table 1 presents descriptive statistics of the endogenous and exogenous variables of our data set. Using planning regions (Raumordnungsregionen), we distinguish between 97 regions (map 1). The regional distribution of the firms listed on the Neuer Markt in our sample is very concentrated. Six regions of these 97 host more than ten firms listed on the Neuer Markt, while 37 regions host no firms listed on the Neuer Markt at all. The planning region München has the highest number of firms (60), followed by the Rhein Main region (26), Hamburg (22), and Berlin (19). On average, each region has about three firms

listed on the Neuer Markt. These three firms together have 1,500 employees, on average.

With respect to the measurements of the knowledge potential, on average each region has 380 patents in 1998, 2,927 R&D employees in 1997, and more than 23 thousands of highly qualified employees in 1999. Interestingly, the number of highly qualified employees is less dispersed across Germany's regions than the number of patents and the number of R&D employees as suggested by the standard deviations. München and Stuttgart are the regions in Germany with the highest level of knowledge potential. München has the highest number of R&D employees and the highest number of highly qualified employees, while Stuttgart has the highest number of patents.

With respect to venture capital activity, on average each region has 1.9 venture capital investors, who have, on average, 53 firms in their portfolios. The region Rhein Main has the highest number of venture capital investors (29), followed by München (26), Hamburg (17), and Berlin (12). This order is very similar to the one of the number of firms listed on the Neuer Markt.

Table 2 shows that correlation coefficients between endogenous and exogenous variables are comparatively high. In particular, the correlation coefficient between the number of firms listed on the Neuer Markt and our measurements of the knowledge potential is between 0.76 and 0.82. The correlation coefficient between the number of firms and the number of venture

capital investors is with 0.86 even slightly higher than the ones of the knowledge potential.

In addition, Table 2 shows that our exogenous variables are highly correlated with each other. This must be kept in mind since it can affect the significance of single variables substantially. Of particular relevance for our estimation is the high correlation between the number of highly qualified employees and the various numbers of venture capital investors because, as we will see below, when using the number of highly qualified employees as a measure of knowledge potential we often do not get interpretable results. Moreover, there is a very high correlation between the number of portfolio firms and the number of R&D employees.

4 Regression analysis

4.1 Methodological remarks

Our dependent variable (number of Neuer Markt firms in region r) is an integer which affects the choice of an adequate econometric model a rather sophisticated task. In modelling a discrete variable the classical linear regression model is inadequate because the distribution of residuals is heteroscedastic non-normal and the predicted probabilities can take values above unity (Blundell et al. 1995: 335). Thus, for count data it has become usual to apply a poisson or negative binomial model, following the seminal works by Gourieroux et al. (1984), Hausman et al (1984) and Cameron and Trivedi (1986).

The simplest form is a model in which the dependent variable follows a Poisson distribution, which means that the variance of this variable is set equal to its mean and unobservable heterogeneity is ruled out. The negative binomial model is more general than the poisson model as it allows for heterogeneity in the mean function and thus relaxes the variance restriction. "However, the heterogeneity allowed for in this way is independent of the regressors and cannot be correlated over time" (Blundell et al. 1995: 335).

The Poisson Model

In the Poisson specification, the conditional probability density function for a Neuer Markt firm i locating in region r is given by: Prob $(Y_r = y_r \mid X_r) = \frac{e^{-\lambda_r} \lambda_r^{y_r}}{y_r!}$

with $\lambda_r = E(Y_r) = Var(Y_r) = e^{X'_r \beta}$.

In our basic model we specify this as:

$$X'_r \beta = \beta_0 + \beta_1 PAT_r + \beta_2 VC_r + \beta_3 \text{BioRegio} + \beta_4 East + u_r,$$

where PAT_r denotes the number of patent applications from region r, VC_r denotes the number of venture capital firms in region r, *BioRegio* is a dummy which takes the value of 1 if the region has participated in the BioRegio contest and 0 otherwise, and *East* is a dummy which takes the value of 1 if the firm is located in East Germany, otherwise takes the value of 0.

Estimation with maximum likelihood is straightforward. Since the log-likelihood function is globally concave, standard numerical algorithms will

converge rapidly to a unique maximum (Winkelmann and Zimmermann 1991: 140).

The exponential form ensures nonnegativity, however, it has to be checked if the variance restriction holds. We use a Likelihood Ratio Test to detect violations of the Poisson assumption of equal mean and variance. If the conditional mean is greater than the conditional variance this is referred to as "overdispersion". The opposite case is called "underdispersion".

If the variance restriction doesn't hold – as is very often the case – we have to make specific parametric assumptions about the way the variance differs from the mean (e.g. to assume that the variance is linear or quadratic in the mean). This is the idea behind the negative binomial models (Blundell et al. 1995: 336).

The negative binomial model

The negative binomial (negbin) specification is given by

$$\text{Prob}\,(Y_r = y_r \mid u\,) = \frac{\exp((-\lambda_r \exp(u_r))\lambda_r^{y_r}}{y_r!}$$

Where exp(u) has a gamma distribution with mean 1 and variance α. The negbin model has an additional parameter α, but allows for a natural form of "overdispersion", given by

$$E(Y_r)/Var(Y_r) = 1 + \alpha\, E(Y_r)$$

The negbin model leads to consistent estimators if there is some heterogeneity in the data but no permanent unobservable effect. Permanent heterogeneity will

display itself through persistent serial correlation in the residuals (Blundell et al. 1995: 336).

If there is a qualitative difference between transition from zero events to the first occurrence, and from the first occurrence to further occurrences a hurdle (or zero-inflated) model might be appropriate (Lambert 1992, Greene 1994). In our model this might be the case if there is a two stage process governing the decision to be listed at the Neuer Markt, analogous to the location decision of foreign investors in the List model of county-level determinants of inbound FDI (List 2001 957f.)

The traditional models (Poisson, negbin) and the zero-inflated negbin are not nested, thus the normal technique (comparing log likelihoods) cannot be applied to discriminate between them. Vuong has developed a test statistic for non-nested models that can be applied in this case. If $|V| < 1.96$ the test supports neither model at the 5 per cent level (e.g. ZIP vs. standard poisson). If $V > 1.96$ the zero inflated model is supported, whereas large negative values (< -1.96) support the standard model.

4.2 What determines the regional distribution of the new economy?

4.2.1 Our basic regression - Choice between the NegBin and the Poisson Model

In the following, we will document the choice between the Poisson, the Negbin, and the zero-inflated Negbin Model in our basic model with the number of new economy firms in region *r* as endogenous variable and the number of patents,

the number of venture capital firms, the BioRegio dummy, and the East Germany dummy as exogenous variables.. As seen in Table 3, the Likelihood Ratio test indicates overdispersion in our data set. Thus, for our data set the negative binomial model is appropriate. Moreover, the Vuong test indicates for our basic specification that the zero-inflated model is preferred over the simple model.

As can be seen in Table 3, the number of venture capital investors and the number of patents have a significant positive impact on the number of new economy firms in region *r* as we have expected. In addition to the variables measuring the knowledge potential and venture capital activity, we do also include two dummy variables. As mentioned above, the first one is equal to one if the region has participated in the BioRegio contest. The second one is equal to one if the region is in Eastern Germany (Berlin got a 1) and zero otherwise. While we expect a positive coefficient if a region has participated in the BioRegio contest[3], we expect a negative coefficient if the region is in Eastern Germany. In our basic regression, the BioRegio dummy is significant and has the expected positive sign, while the East Dummy is not significant.

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[3] The BioRegio contest was designed as a competition among Germany's leading biotech regions – moderated and judged by the Federal Government – and had the objective to bring forward the commercialisation of science and to improve the entrepreneurial climate within the regions (Dohse 2000). "More than any other federal initiative it has produced rapid, positive results and galvanized entrepreneurship in respect of new firm formation, also giving a significant boost to Germany's lagging venture capital industry." (Cooke 2002: 171) Regions that participated in the BioRegio contest are therefore hypothesized to provide a particularly good breeding ground for the growth of young technology firms, not just in the biotech sector.

From a theoretical point of view, it would be desirable to include further explanatory variables such as the spatial distribution of overall employment or regional population density into the regression. We do without them, however, since their inclusion inhibits convergence of the estimations. This might be the result of too little variation in our data set. Not only are our measures of venture capital and knowledge highly correlated (see Table 2), but both variables are also highly correlated with the spatial distribution of overall employment or regional population density.

4.2.2 Robustness of the results

In this section, we present the results of a number of model specifications in order to check the robustness of our basic regression. As it is shown in Table 4, the Wald test indicates highly significant model specifications as in our basic regression. In addition, the Likelihood Ratio test indicates for all model specifications overdispersion in our data set. Thus, for our data set the negative binomial model is appropriate. Moreover, the Vuong test indicates for all model specifications that the zero-inflated model is preferred over the simple model.

The various measures of the knowledge potential have always a significant positive impact on the number of new economy firms in a region irrespective of whether we use the number of venture capital investors or the number of portfolio firms. In column 1 and 4 of Table 4, the coefficient of the number of R&D employees is highly significant and positive as expected. With respect to

our third measure of the knowledge potential, we find in column 2 that the number of highly qualified employees has also a positive and significant coefficient. When we include the number of portfolio firms and the number of highly qualified employees, then we do not get results since the algorithm does not converge. When we include the number of portfolio firms and patents, then patents do also have a significant positive effect on the number of new economy firms in a region *r*.

Our venture capital measures, the number of venture capital investors in a region and the number of firms in venture capital investors' portfolios as a weighted measure are not always significant. In particular, when the number of R&D employees is us used the coefficient of the number of venture capital investors is positive and significant independently of whether the number of venture capital investors or the number of portfolio firms is used. When the number of highly qualified employees is used as an approximation for the knowledge potential, both measures of venture capital activity are insignificant. When including the number of patents and the number of venture capital investors' portfolio firms in the regression equation, the number of venture capital investors' portfolio firms is only significant at the 15 per cent level. This is because of the high correlation between these two variables: the correlation coefficient is higher than 0.8.

While the East Germany dummy has in no specification of Table 4 a significant impact, the BioRegio dummy is only significant when we use the

number of portfolio firms to measure venture capital activity. In this cases, a region which participated in the BioRegio contest has a higher number of new economy firms compared to a region which has not participated.

In addition to the number of firms listed on Germany's Neuer Markt, we do also use the number of employees of these firms as endogenous variable. Result are reported in Table 5. Again the Wald test indicates highly significant model specifications, the LR test indicates overdispersion in our data set, and the Vuong test indicates that the zero-inflated model is preferred over the simple model.

As shown by Table 5, all three measures of the knowledge potential have a positive significant effect on the number of employees in new economy firms in a region r. Thus, these variables do not only explain the number of new economy firms in a region but also the number of employees of these firms in a region. The dummy variable for East Germany and the dummy variable for regions participating in the BioRegio contest do not have a significant impact.

Our measures of venture capital activity have a positive significant effect on the number of employees in 5 out of 6 model specifications. While the number of venture capital investors is always significant, the number of portfolio firms is only significant when we use the number of patents or the number of R&D employees as an approximation for the knowledge potential. When we use the number of highly qualified employees as a measure for the knowledge potential, the coefficient of the number of portfolio firms is insignificant.

5 Summary

In this paper we have analysed the regional distribution of new economy firms in Germany. We found that new economy firms are very concentrated, with München, the Rhein Main region, Hamburg, and Berlin being the main centres of the German new economy. We have tested empirically whether the regional distribution of new economy Firms in Germany is determined by the availability of two crucial input factors: (i) knowledge in its various specifications as innovative output (patens), innovative input (R&D) or human capital and (ii) venture capital. Since our dependent variables, the number of firms listed on the Neuer Markt, and the number of firms' employees, are integer variables, we estimated a count data model.

In our analysis, knowledge in its various specifications has a significant positive impact on the number of new economy firms in a region. Moreover, availability of venture capital measured by the number of venture capital investors in a region, or by the number of portfolio firms of venture capital investors has in most model specifications a significant positive impact on the number of new economy firms. Insignificant coefficients of our measure of venture capital can be attributed to the high correlation between our measures of knowledge and venture capital.

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Map 1: Neuer Markt firms by planning regions

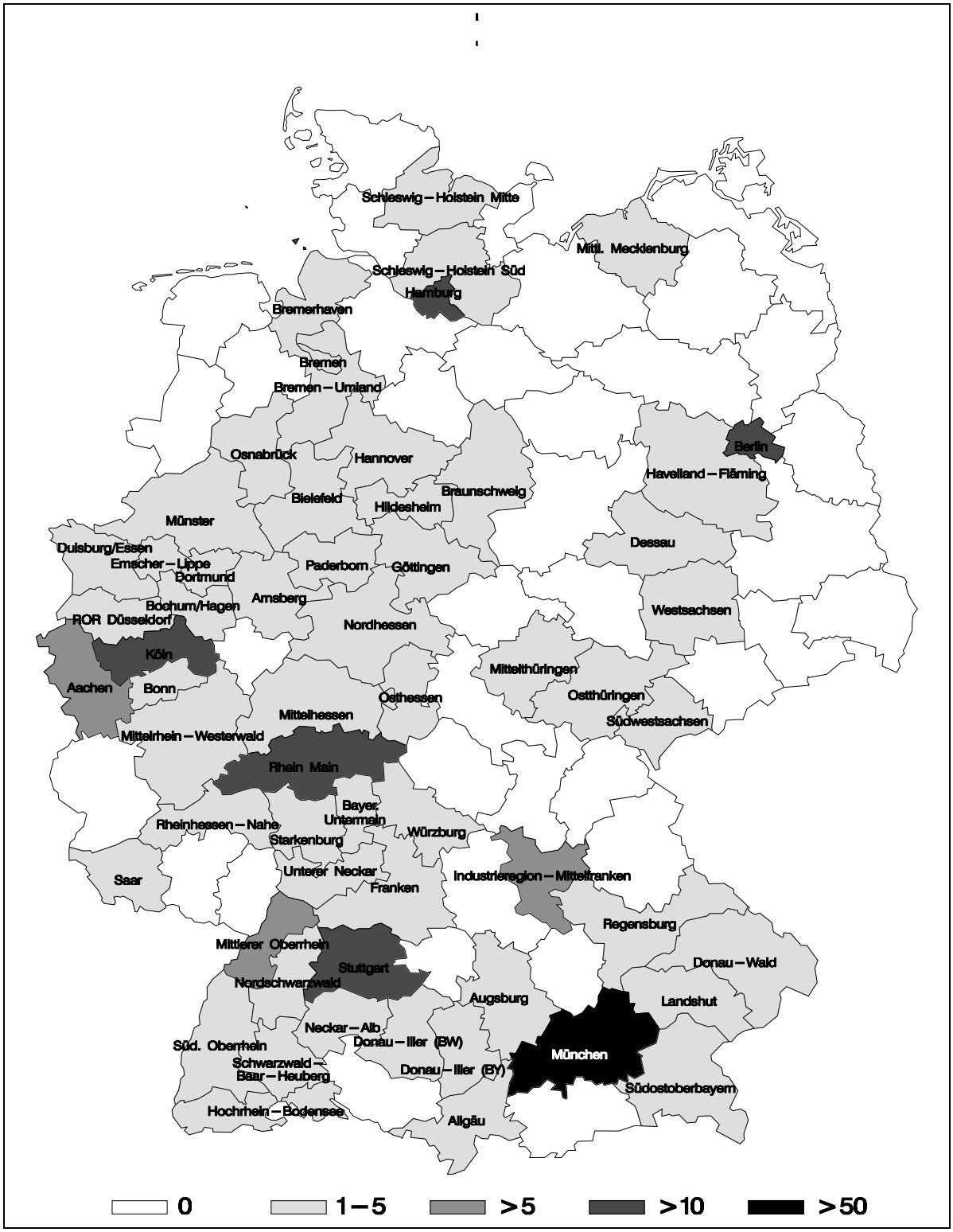

Table 1: Descriptive statistics

	Mean	Std. Dev.	Min	Max
a. *Endogenous Variables*				
Number of firms	3.0	7.3	0	60
Number of firms' employees	1,504.6	3,651.7	0	24,259.0
b. *Exogenous Variables*				
Number of patents in 1998	380.1	510.0	20.6	3,202.5
Number of R&D employees in 1997	2,926.8	5,406.1	0	34,405
Number of highly qualified employees in 1999	23,457.2	28,432.8	2,857.7	151,892.4
Number of venture capital investors in 2001	1.9	4.6	0	29
Number of portfolio firms in 2001	53.4	153.6	0	950

Table 2: Correlation coefficients

		1	2	3	4	5	6
1	Number of firms	1.00					
2	Number of firms' employees	0.93	1.00				
3	Number of patents	0.76	0.70	1.00			
4	Number of R&D employees	0.80	0.74	0.95	1.00		
5	Number of highly qualified employees	0.82	0.80	0.84	0.84	1.00	
6	Number of venture capital investors	0.86	0.90	0.64	0.66	0.84	1.00
7	Number of portfolio firms	0.77	0.83	0.81	0.84	0.81	0.78

Table 3: Explaining the regional distribution of the number of new economy firms (basic regression)

	Poisson	Negbin	Zero-inflated NegBin
Number of venture capital investors	0.0733 (5.82)***	0.0949 (2.99)***	0.0871 (3.65)***
Number of patents	0.0006 (3.84)***	0.0008 (2.73)***	0.0005 (2.66)***
BioRegio Dummy	0.4298 (1.69)*	0.2778 (1.21)	0.3968 (1.76)*
East Germany Dummy	-0.3390 (-0.72)	-0.6351 (-2.03)**	-0.3084 (-0.75)
Constant	0.1113 (0.64)	-0.0010 (0.01)	0.2494 (1.30)
LR	—	—	16.31***
Vuong test	—	—	2.36***
Wald test	743.34***	45.74***	49.87***
#observations (zeros)	97 (37)	97 (37)	97 (37)

***, **, * denotes significant at the 1, 5 and 10 per cent level. z-values are given under the coefficients.

Table 4: Robustness of estimation results when explaining the number of new economy firms

	(1)	(2)	(3)	(4)
Number of venture capital investors	0.0854 (3.71)***	0.0124 (0.40)	—	—
Number of portfolio firms	—	—	0.0016 (2.16)**	0.0014 (1.46)
Number of R&D employees	0.00004 (3.30)***	—	0.0001 (2.16)**	—
Number of highly qualified employees	—	0.0220 (2.74)***	—	—
Number of patents	—	—	—	0.0008 (2.16)**
BioRegio Dummy	0.3267 (1.34)	0.2978 (0.48)	0.6157 (2.28)**	0.7040 (2.45)***
East Germany Dummy	-0.2698 (-0.68)	-0.9243 (-1.66)	-0.4333 (-1.10)	-0.3702 (-0.82)
Constant	0.4375 (2.57)***	0.1561 (0.22)***	0.4148 (2.54)**	0.1789 (0.93)
LR	10.39***	8.01***	69.76***	79.08**
Vuong test	2.1**	2.81***	1.89**	2.06**
Wald test	60.68***	49.68***	38.65***	39.05***
#observations (zeros)	97 (37)	97 (37)	97 (37)	97 (37)

Note:. Results presented are those of zero-inflated negative binomial regressions.
***, **, * denotes significant at the 1, 5 and 10 per cent level. z-values are given under the coefficients.

Table 5: Impact of knowledge potential and venture capital on the regional distribution of new economy firms' employment

	(1)	(2)	(3)	(4)	(5)	(6)
Number of venture capital investors	0.0969 (5.39)***	0.0964 (5.72)***	0.0520 (2.20)**	—	—	—
Number of portfolio firms	—	—	—	0.0033 (3.45)***	0.0032 (3.80)***	0.0013 (1.10)
Number of patents	0.0004 (2.47)**	—	—	0.0002 (0.53)	—	—
Number of R&D employees	—	0.0000 (2.64)***	—	—	0.0000 (0.79)	—
Number of highly qualified employees	—	—	0.0148 (2.78)***	—	—	0.0168 (2.28)**
BioRegio Dummy	0.0338 (0.12)	0.0084 (0.03)	-0.0014 (-0.00)	0.1942 (0.70)	0.1662 (0.61)	0.0157 (0.05)
East Germany Dummy	0.0645 (0.24)	-0.0185 (-0.07)	-0.2193 (-0.81)	-0.0444 (-0.14)	-0.0747 (-0.27)	-0.2479 (-0.89)
Constant	6.8382 (34.34)***	6.9306 (37.89)***	6.7761 (33.40)***	6.9366 (29.02)***	6.9675 (36.90)***	6.7511 (31.60)***
LR	6.7e+04***	6.6e+04***	6.4e+04***	9.5e+04***	9.7e+04***	7.1e+04***
Vuong test	2.19**	1.84***	2.48***	2.38***	2.06**	2.85***
Wald test	64.03***	70.02***	102.70***	31.86***	31.23***	70.52***
#observations (zeros)	97 (37)	97 (37)	97 (37)	97 (37)	97 (37)	97 (37)

Note: Results presented are those of zero-inflated negative binomial regressions.
***, **, * denotes significant at the 1, 5 and 10 per cent level. z-values are given under the coefficients.