



Paper to be presented at the DRUID Academy 2012

on

Venue: University of Cambridge /The Moeller Centre

## **Analysing the Determinants of Entrepreneurship in European Cities**

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### **Abstract**

Analysing the Determinants of Entrepreneurship in European Cities

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The task of understanding the role of creativity within economic development has been addressed by an extensive amount of literature in a variety of disciplines including economics, management and psychology. Creativity is now understood as a key input for entrepreneurship (Ko and Butler, 2007);(Hamidi et al., 2008);(Villalba, 2010). In turn, entrepreneurship has been established a significant source of innovation (Acs and Audretsch, 2005) and economic growth (Audretsch, 2004);(Praag and Versloot, 2007). These findings motivate the question: what factors determine the differences of creativity within different contexts, such as that of the city?

This paper builds upon previous works to explore the concept of 'Creative City' proposed by Landry (2000) as policy directive for promote the competitiveness of cities. We establish a particular focus towards entrepreneurial activity as a tangible measure of creativity. Based on this conception, we leverage on the Eclectic Framework introduced in Audretsch et al. (2002) to investigate the determinants which are theorised to influence the rate of business creation: supply-side and demand-side elements, actual and equilibrium rates of entrepreneurship, government intervention, and culture. We characterise these components in a dataset (extracted from Eurostat's Urban Audit data collections) composed of 20 indicators of 209 cities from 22 European countries during three periods: [1999, 2002], [2003, 2006] and [2007, 2010]. We analyse the data structure and group these variables using a principal component analysis, constructing six representative indices which capture the common variance in the dataset. We use these indices in an econometric analysis (OLS and random effects) to model entrepreneurial dynamism. We find the 'Tertiary-oriented economy & high employment' (demand-side), 'Tertiary education and declining population' (supply-side), and 'Small public sector, large population and transport & communication' (government intervention) indices to have a significant and positive impact upon the quantity of new business registered. On the other hand, strong evidence indicates a negative effect from the 'Full-time employment, upper and further education & low land area' (supply-side) index. Alongside these effects, we find that Eastern European cities have higher entrepreneurship rates, followed by Western, Northern and Southern European regions (the latter showing the lowest rates of business creation). We also identify an advantage from capital cities with respect to others. We validate the consistency of these results by employing

diagnostics on our regressions. The contribution of this paper centres on allowing policy-makers who seek to promote entrepreneurship at the city-level to distinguish between context-specific factors and those which may be influenced by policy. As a benchmarking tool, we provide city rankings for each index. Finally, we mention the necessity of further efforts in data collection and analysis regarding institutional and cultural indicators which may help to clarify the observed geographical discrepancies.

Main references:

Acs, Z. J. and Audretsch, D. B. (2005). Entrepreneurship, Innovation and Technological Change. *Foundations and Trends in Entrepreneurship*, 1(4):149-195.

Audretsch, D. (2004). Sustaining innovation and growth: Public policy support for entrepreneurship. *Industry & Innovation*, 11(3):167-191.

Audretsch, D., Thurik, R., Verheul, I., and Wennekers, S. (2002). An Eclectic Theory of Entrepreneurship. In Audretsch, D., Thurik, R., Verheul, I., and Wennekers, S., editors, *Entrepreneurship: Determinants and Policy in a European-US Comparison*, pages 11-82. Kluwer Academic Publishers, Boston/Dordrecht.

Hamidi, D. Y., Wennberg, K., and Berglund, H. (2008). Creativity in entrepreneurship education. *Journal of Small Business and Enterprise Development*, 15(2):304-320.

Ko, S. and Butler, J. (2007). Creativity: A key link to entrepreneurial behavior. *Business Horizons*, 50(5):365-372.

Landry, C. (2000). *The Creative City: A Toolkit for Urban Innovators*. Earthscan Publications Ltd., London, 1st edition.

Praag, C. M. and Versloot, P. H. (2007). What is the value of entrepreneurship? A review of recent research. *Small Business Economics*, 29(4):351-382.

Villalba, E. (2010). Monitoring Creativity at an Aggregate Level: A proposal for Europe. *European Journal of Education*, 45(2):314-330.

THE EUROPEAN CHAIR ON INTELLECTUAL CAPITAL MANAGEMENT

## Working Paper Series

A Multidisciplinary Perspective

No. 2011-2A

Version: November 2, 2011

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### **Analysing the Determinants of Entrepreneurship in European Cities** Pieces from the ‘Creative City’ Puzzle

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# 1 Introduction: Successful Cities and Creativity

Creativity has been an elusive concept for researchers and policy-makers. The work of (Florida, 2002), which declared that a city's economic success is determined not by raw physical labour or materials, but by its capacity to attract talented people, received both a considerable amount of attention among politicians and criticism from academics. His work has been cited 3539 times, according to *Google Scholar*, and several local governments have implemented initiatives inspired by his ideas<sup>1</sup>. In the scientific community, however, it has been received with controversy; some pointing out a lack of rigour in both concepts and employed methodologies for data analysis (Markusen, 2006);(Peck, 2005);(Scott, 2006). This revealed gap in understanding has, in turn, fuelled the field of study of entrepreneurship, in which researchers have devoted efforts to advance on the intuition behind the economic implications of creativity in societies. These findings motivate the question: what factors determine differences of creativity within different contexts, such as that of the city?

This paper builds upon previous works to explore the concept of 'Creative City' proposed by Landry (2000) as policy directive for promote the competitiveness of cities. We establish a particular focus towards entrepreneurial activity as a tangible measure of creativity. Based on this conception, we leverage on the *Eclectic Framework* introduced in Audretsch et al. (2002) to investigate the determinants which are theorised to influence the rate of business creation: supply-side and demand-side elements, actual and equilibrium rates of entrepreneurship, government intervention, and culture. We characterise these components in a dataset—extracted from *Eurostat's Urban Audit data collections*—composed of 20 indicators of 209 cities from 22 European countries during three periods: [1999, 2002], [2003, 2006] and [2007, 2010]. We analyse the data structure and group these variables using a principal component analysis, constructing six representative indices which capture the common variance in the dataset. We use these indices in an econometric analysis (OLS and random effects) to model entrepreneurial dynamism, including time, regional classification, and 'capital city' dummies. We find the 'Tertiary-oriented economy & high employment' (demand-side), 'Tertiary education and declining population' (supply-side), and 'Small public sector, large population and transport & communication' (government intervention) indices to have a significant and positive impact upon the quantity of new business registered. On the other hand, strong evidence

indicates a negative effect from the 'Full-time employment, upper and further education & low land area' (supply-side) index. Alongside these effects, we find that Eastern European cities have higher entrepreneurship rates, followed by Western, Northern and Southern European regions—the latter showing the lowest rates of business creation. We also identify an advantage from capital cities with respect to others. We validate the consistency of these results by employing several diagnostics on our regressions. The contribution of this paper centres on allowing policy-makers—interested in promoting entrepreneurship at the city-level—to distinguish between context-specific factors and those which may be influenced by policy.

This paper is organised as follows: Following this introduction, in Section 2 we present a concise review of previous work, to summarise how researchers have faced the task of understanding creativity in relation to economic performance of cities. Through this background, we also discuss how to understand the determinants of entrepreneurship, notably by introducing the *Eclectic Framework*. With these previous works in consideration, we dedicate Section 3 to describe the Eurostat dataset we gathered to apply the *Eclectic Framework* and how we identify the underlying structure of the data to define categories and build representative indices. In Section 4, we describe how the structured data is to be modelled in an econometric analysis to explain the business creation rate. In Section 5, we portray the evidence gathered from the regressions and present pertinent diagnostics. These results allow us to propose the ranking of European cities, as a benchmarking tool, in terms of the derived indices with a revealed and statistically significant influence upon entrepreneurial activity. Finally, in Section 6 we synthesise our findings and lessons, reflecting on opportunities for future research. We particularly mention the necessity of further efforts in data collection and analysis regarding institutional and cultural indicators which may help to clarify the observed geographical discrepancies.

## 2 Background: Creativity, Innovation and Entrepreneurship

The task of understanding the role of creativity within economic development has been addressed by an extensive amount of literature, from a variety of disciplines. The most accepted theoretical views pertain to entrepreneurship and innovation. The general consensus among economists is that technological change and innovation are the principal constituents of economic

<sup>1</sup> (Peck, 2005) denotes policy initiatives in United States cities and states such as Michigan's *Cool cities*, Memphis's *Creative 100* and Tampa Bay's *Creative TampaBay*, among others

growth (Aghion and Durlauf, 2005);(Barro and Sala-i-Martin, 2003)<sup>2</sup>. Entrepreneurship, in turn, has been identified as a key (albeit not exhaustive) source of innovation (Acs and Audretsch, 2005) and, in some instances, a significant source of knowledge spillovers and economic growth as well (Audretsch, 2004);(Sternberg and Wennekers, 2005). Finally, the attribute of *creativity*, approached from a variety of disciplines, has been shown to influence the rate of business creation. We look deeper into the connections between creativity, innovation, and entrepreneurship below.

Creativity is necessary but not sufficient for innovation (Amabile, 1996). In other words, the potential of ideas cannot be materialised without undergoing the processes of implementation and execution. Even though a significant portion of creativity exists within already established companies, leading to new processes and products, these experiences are harder to measure in relation to new businesses. By definition, an entrepreneur strives for putting in place the appropriate resources required to launch a new product or service (Leibenstein, 1968). A new business concretely implies the positioning a new idea into a specific market.

“In most cases, [indicators of entrepreneurship] could be regarded as pointers of creative achievements. *A new firm is the consequence of a creative act.* The indicators point to creativity efforts, since, by definition, they focus on something ‘new’ and with ‘value’.” (Villalba, 2010) (Italics added).

This intuition is confirmed in several empirical studies which show that the personal trait of creativity leads toward entrepreneurial intent<sup>3</sup>. Therefore, entrepreneurship may be regarded as a tangible expression of creativity.

In a given start-up, the founder’s values and motivations determine, to a great extent, the culture and work environments of the resulting organization (Baum and Locke, 2004). This means that the entrepreneur’s creative capabilities are tightly linked with the firm’s performance and innovativeness. Baron and Tang (2011) develops this idea by identifying relationships between qualitative measurements of creative capabilities in entrepreneurs and the resulting performance of their firms. In their work, they surveyed 110 entrepreneurs in the United States regarding individual qualities including creativity<sup>4</sup> and *number of innovations* and *“radicalness” of innovation* as performance variables. These variables are shown, in their main result, to be positively and significantly affected by their creativity measurement. A note-

worthy caveat of this relationship is that it has higher strength in more dynamic environments, i.e., industries which have shown more variation of sales in their period of study.

Praag and Versloot (2007) reviewed a collection of 87 articles published in high-impact journals on the economic value of entrepreneurship. The scrutinised quantitative studies dealt with discerning the several economic contributions of entrepreneurship; the most relevant for the context of this paper being employment generation and innovation. Regarding employment, most of the included studies show that entrepreneurship favours job creation, although these jobs are lower in quality (e.g., pay and benefits) in comparison to the new positions offered by well-established firms. New businesses grow relatively at a faster rate than their counterparts. However, the created jobs are also less secure because of higher volatility and chances of firm-dissolution. Remarkably, employees from entrepreneurial companies report higher satisfaction. In the field of innovation, the body of evidence has shown that entrepreneurs invest as much as well-established firms, but generate fewer innovations. However, new businesses excel both in patent production *per employee* and in patent citations. In terms of adoption of innovations, new businesses prefer low-cost solutions, while it is more probable that their counterparts opt for higher cost innovations. The authors highlight particularly the empirical, country-level studies which show positive contributions of entrepreneurial activity and the capacity to innovate (Europe and US) (Sternberg and Wennekers, 2005) and with technological change (European Union) (Acs and Varga, 2005).

Meusburger et al. (2009) highlighted the importance of the spatial dimension when studying creativity. Entrepreneurs do not work in social, cultural nor economic isolation. They are either encouraged or hindered depending on the established societal and organisational infrastructures. Entrepreneurship, as a creative process, occurs in a specific environment in which the entrepreneur interacts with collaborators (business partners) and an audience (customers). These spatial restrictions justify the selection of cities, rather than regions or nations, as an appropriate level of study.

## 2.1 Entrepreneurship: The Eclectic Framework

Considering entrepreneurship as a proxy for creativity, we now focus on the question: what factors affect the creation of business, particularly in the context of cities? To approach this question, we turn towards the *Eclectic*

<sup>2</sup> For more on the link between innovation and economic growth, please refer to (Barreneche García, 2010).

<sup>3</sup> See for example (Zampetakis and Moustakis, 2006);(Ko and Butler, 2007);(Hamidi et al., 2008);(Zampetakis et al., 2011).

<sup>4</sup> Measured by rating their extent of involvement with new ideas and approaches to customer problems, new applications of existing technologies, risk-taking, radical new ideas, and long term vision or applications.

*tic Framework* first proposed in (Audretsch et al., 2002), which has aimed to integrate the existing literature in this field of study. It is based on a multidisciplinary perspective, as follows:

“[T]he framework distinguishes various disciplines and several levels of analysis (micro, meso and macro), and classifies the explanatory factors into two categories—supply and demand side. From the demand side, the framework focuses on factors that influence the industrial structure and the diversity of consumers’ tastes, such as technological development, globalization and standard of living developments. The supply side looks into various structural characteristics of the population and the way these affect the likelihood of someone becoming an entrepreneur. Population growth, urbanization rate, age structure, participation of women in the labor market, income levels and unemployment are examples of such factors. While the supply and demand sides refer to the macro level, the eclectic framework also integrates the decision-making process explaining how and why individuals make the choice to become self-employed as opposed to other job opportunities in terms of risks and rewards of different occupational alternatives ...” (Freytag and Thurik, 2006).

In summary, this framework is composed of six basic elements:

- ↪ **Demand side**, which creates opportunities of new businesses through consumers’ needs of goods and services;
- ↪ **Supply side**, providing the potential for entrepreneurs to act upon these opportunities;
- ↪ **Individual decision making**, including the *personal* traits which influence the individual tendency towards engaging in entrepreneurship;
- ↪ **Actual and equilibrium rates**, which pertain to the duality of natural (optimal) and current new business dynamism in the given context;
- ↪ **Government intervention**, relating to the policies which influence entrepreneurial activity; and
- ↪ **Culture**, which includes the *societal* traits which affect the individual tendency towards engaging in entrepreneurship.

Grilo and Thurik (2008) implemented this framework in an income-choice model to explain entrepreneurial engagement levels in Europe and the US. The design a qualitative measure of individual inclination towards entrepreneurship and introduce a multinomial logit model to explain these preferences in terms

of demographic indicators, measures of perceptions regarding administrative complexities, availability of financial support, and risk tolerance. They include near 18,000 observations from the 15 Older European Union Member States, Norway, Iceland, Liechtenstein, and the United States. Among several findings, they highlight that males are shown to be more prone to entrepreneurial engagement; European countries display lower levels of engagement than the United States; higher administrative complexities have a negative effect upon higher engagement levels; and that, remarkably, perception of lack of financial support did not yield any significant effect.

Freytag and Thurik (2006) applied the framework to investigate the influence of culture in a cross-country setting (25 European countries and the US) upon both preferences for entrepreneurship and actual levels. In contrast to Grilo and Thurik (2008), they study entrepreneurship from a country-aggregate rather than individual perspective. They found that cultural factors work better for explaining preference rather than actual rates of entrepreneurship. In particular, they found that regulations which constrain economic freedom, a communist heritage, higher levels of life expectancy, and social spending were deterrents of entrepreneurial intentions.

With the previous background in mind, we can now address our objective of understanding determinants of entrepreneurship in European cities<sup>5</sup>. To serve this purpose, in the following section we will present the gathered data, embedding it under the previously described framework.

### 3 Data: Eurostat’s Urban Audit

The *Eurostat Urban Audit Data Collection* offers information and standardised metrics pertaining to different aspects of quality of life in European cities. “Quality of life is crucial in attracting and retaining a skilled labour force, businesses, students, tourists and, most of all, residents in a city.” (Eurostat, 2011). As this principle suggests, this data collection is highly relevant to the concept of ‘Creative City’, providing a dense set of indicators which help to describe how favourable is the environment in a given city for entrepreneurship. With our concrete purpose of understanding what determines entrepreneurship as a creative act in cities throughout the European continent, we select *New business registered* as our performance variable, opting for a dynamic perspective of entrepreneurship (Acs and Varga, 2005). We then extracted indicators and classified them following the Eclectic Framework. This extraction process yields a total of 20 variables, which describe different aspects

<sup>5</sup> To our knowledge, there are no applications of the Eclectic Framework at the city level.

Table 1: Summary Statistics for Selected Variables

	Obs	Mean	Std. Dev.	Min	Max
<b>Demand Side</b>					
Prop. of Emp. in Mining, Manufacturing & Energy (%)	273	22.85	8.93	6.9	47.1
Prop. of Emp. in Construction (%)	273	6.11	2.69	2	17.8
Prop. of Emp. in Trade, Hotels & Restaurants (%)	273	18.45	3.27	8.7	32.6
Prop. of Emp. in Transport & Communication (%)	273	6.88	2.28	2.4	14.7
Prop. of Emp. in Financial Intermediation Activities (%)	273	16.93	6.96	3.3	38.4
Prop. of Emp. in Commercial Services (%)	273	42.27	7.65	25	66
Prop. of Emp. in Secondary Sector Industries (%)	273	16.75	8.00	3.7	40.9
Prop. of Emp. in Tertiary Sector Industries (%)	273	76.03	9.44	49.5	92.5
<b>Supply Side</b>					
Total land area (km <sup>2</sup> , Log)	273	5.25	0.87	2.53	7.86
Total Population (Log)	273	12.52	0.85	10.95	15.79
Demographic Young-Age Dependence (%)	273	34.65	7.16	23.2	71.1
Demographic Old-Age Dependence (%)	273	23.73	5.12	8.9	38.2
Average Employment per Company (Log)	273	2.53	0.78	0.64	4.88
Full / Part-time Employment (%)	273	8.67	12.35	1.51	89.11
Total employment / Population in Working Age (%)	273	0.77	0.21	0.34	1.69
Students in Upper and Further Education per 1000 Inh (Log)	273	4.10	0.52	2.1	5.85
Students in Tertiary Education per 1000 Inh (Log)	273	4.41	0.72	1.03	5.95
<b>Actual and Equilibrium Rates</b>					
Pre-Existing Companies per 1000 Inh (Log)	273	3.49	0.78	0.71	5.23
Self-Employment Rate (%)	273	10.02	3.35	3	23
<b>Government Intervention</b>					
Prop. of Emp. Public Admin., Health & Education (%)	273	33.76	6.72	20.2	52.1

Source: Authors' calculations based on [Eurostat, 2011]

relevant to new business creation, from 209 cities in 22 European countries in the years between 1999 and 2010. This source data is divided into three quadrennial periods: [1999, 2002], [2003, 2006] and [2007, 2010]. 273 observations were obtained in total. Table 1 displays the selected variables, their classification under the framework, and their corresponding summary statistics.

These indicators are mostly straightforward; more information regarding Eurostat's Urban Audit data collection can be found in (European Commission, 2010). Precisions need to be made regarding *Demographic Young-Age Independence (YD)* and *Demographic Old-Age Independence (OD)*, which are defined as follows:

$$YD = \frac{POP_{x < 20 \text{ years}}}{POP_{20 \text{ years} \leq x \leq 65 \text{ years}}} \quad (1)$$

$$OD = \frac{POP_{x > 65 \text{ years}}}{POP_{20 \text{ years} \leq x \leq 65 \text{ years}}} \quad (2)$$

These two demographics capture the proportions of two different age groups in a given city. *YD* measures

the proportion of the population younger than 20 years old and over 65 years old over the population aged between 20 and 65. Similarly, *OD* calculates the ratio of the population cohort older than 65 over the inhabitants between 20 and 65 years of age. By looking at these two indicators one can have an idea of the population's age distribution in cities.

There are three pertinent remarks need to be made at this point regarding our implementation of the Eclectic Framework. First, since we are considering a dynamic perspective at an aggregate city-level, we exclude *Individual decision making* variables; these are more relevant for income-choice models (Freitag and Thurik, 2006) as in Grilo and Thurik (2008). Secondly, Urban Audit is rather weak regarding the *Government Intervention* and *Culture* elements of the framework (non were available for the latter). This limitation needs to be recognised, as it is ideally recommended to take into account characteristics particularly specific of the historical, temporal, institutional, spatial and social contexts; these provide individuals with opportunities and limitations in

their entrepreneurial endeavours (Welter, 2011). However, following previous works, we compensate for this by grouping the data by countries and including these groups in our models, as it will be shown in the next section. This captures a great proportion of the *Government Intervention* and *Culture* elements. Finally, several cities appear in either two or three periods simultaneously, although most of them are only in one of the three. Generally, inside the Urban Audit data collection each country has a homogeneous availability of data in a given year, e.g., all French city data corresponds to the [1999, 2002] period. In our modelling, we consider these time heterogeneity, but the fact that different countries offer data for different periods makes benchmarking difficult across nations; it would be misleading to compare French data from [1999, 2002] with that of United Kingdom from [2003, 2006]. Therefore, we produce individual benchmarks for each country.

To give a clearer picture of the composition of the dataset, Table 2 indicates the amount of city-observations per country. As this table shows, the availability of data is not homogeneous through the Eurostat dataset. Germany has the most city-observations, doubling France which takes the second place. Under the United Nations geographical classification of countries (United Nations, 2011), the data structure can be considered as: 42% Western Europe, 25% Northern Europe, 23% Eastern Europe, and 10% Southern Europe. The full list of included cities can be found in Appendix A.

Table 2: Included Countries and Associated Amount of City-Observations

Country	No. of Obs	Country	No. of Obs
Germany	65	Norway	6
France	31	Czech Rep.	5
UK	31	Denmark	4
Poland	28	Finland	4
Slovakia	16	Slovenia	4
Spain	15	Suisse	4
Sweden	14	Lithuania	3
Netherlands	13	Cyprus	1
Romania	13	Hungary	1
Portugal	7	Latvia	1
Estonia	6	Luxembourg	1

Source: Authors' calculations based on [Eurostat, 2011]

Another distribution that should be taken into account is that of the time periods: 134 (49%) of the city-observations are from [1999, 2002], 122 (45%) from [2003, 2006] and the remaining 17 (6%) from [2007,

2010]. These proportions must be taken into account in data analysis, i.e., produced results are representing some countries and time-periods more than others.

### 3.1 Confronting two structures: theoretical framework vs empirical data

Even though we have above a considerable amount of data to apply the Eclectic Framework, we cannot proceed to use it for linear regression modelling as it is. Many of the variables are heavily correlated with each other, and this would violate the assumption of linear independence between the independent variables. To solve this problem, we employ a Principal-Component Analysis (PCA) to identify common variance in the data and build a set of indices, each of them uncorrelated to others. For example, variables *Proportion of Employment in Tertiary Sector Industries* and *Proportion of Employment in Commercial Services* are highly correlated and thus should be able to make part of a common index. However, these variables are not so correlated with *Demographic Independence* and *Students in Tertiary Education per 1000 Inh* and thus these last two, which are highly related to each other, can be separated into another group to build another separate index<sup>6</sup>. This procedure can also be regarded as an empirical test of the Eclectic Framework; does the data structure (variance) follows that of the classification provided by the theoretical framework? Should 'Demand side' variables should be taken independently from 'Supply side' variables, and so on? Table 5 shows the results for the PCA. The middle columns display the factor loadings: the correlations between each identified factor (group of common variance) and each variable. The last column shows the amount of variance that is unique from the variable and not included in the identified factors. The procedure successfully recognised an underlying structure from the variables. Given the most significant values from the correlation matrix, in bold, we can interpret the factors as follows:

To interpret each factor, we highlight the highest correlation value for each indicator (row) to see which factor it influences the most. We then look at each factor (column) to see the what variables have the highest presence. Factor 1 shows highlighted correlations for *Prop. of Emp. in Mining, Manufacturing & Energy* (negative), *Prop. of Emp. in Financial Intermediation Activities* (positive), *Prop. of Emp. in Commercial Services* (positive), *Prop. of Emp. in Secondary Sector Industries* (negative), and *Prop. of Emp. in Tertiary Sector Industries* (positive). This group of variables describes an economy which is service rather than industry-oriented. Furthermore, *Total Employment / Population in Working Age* has its highest correlation in

<sup>6</sup> Note that in these examples we are dealing with positive correlations, while other variables might be negatively correlated. Strong negative correlations would equally violate the assumption of linear independence.



Table 3: Factor Analysis of Selected Variables

	CORRELATIONS						<i>Uniqueness</i>
	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	
<b>Demand Side</b>							
Prop. of Emp. in Mining, Manufacturing & Energy (%)	<b>-0.97</b>	0.06	0.18	0.01	0.06	0.05	0.01
Prop. of Emp. in Construction (%)	-0.49	0.25	-0.07	<b>0.60</b>	-0.07	-0.02	0.33
Prop. of Emp. in Trade, Hotels & Restaurants (%)	0.10	-0.28	0.17	<b>0.76</b>	0.06	-0.13	0.29
Prop. of Emp. in Transport & Communication (%)	0.09	0.42	<b>0.48</b>	-0.25	0.25	-0.14	0.44
Prop. of Emp. in Financial Intermediation Activities (%)	<b>0.81</b>	-0.10	0.35	-0.15	-0.13	0.22	0.13
Prop. of Emp. in Commercial Services (%)	<b>0.80</b>	-0.08	0.54	0.12	-0.02	0.10	0.04
Prop. of Emp. in Secondary Sector Industries (%)	<b>-0.92</b>	-0.02	0.22	-0.19	0.09	0.06	0.06
Prop. of Emp. in Tertiary Sector Industries (%)	<b>0.98</b>	-0.05	-0.14	-0.07	-0.03	-0.03	0.02
<b>Supply Side</b>							
Total land area (km2, Log)	0.25	0.27	0.03	-0.03	<b>-0.64</b>	-0.15	0.44
Total Population (Log)	0.32	0.02	<b>0.57</b>	0.01	-0.56	0.10	0.26
Demographic Young-Age Independence (%)	-0.06	0.10	-0.20	0.02	-0.02	<b>-0.85</b>	0.22
Demographic Old-Age Independence	0.27	-0.29	-0.05	0.04	-0.42	<b>0.53</b>	0.38
Average Employment per Company (Log)	0.29	<b>-0.89</b>	0.03	0.09	0.05	0.10	0.11
Full / Part-time Employment (%)	-0.38	0.18	0.20	0.26	<b>0.59</b>	-0.08	0.36
Total employment / Population in Working Age (ratio)	<b>0.57</b>	-0.28	0.20	0.07	0.29	0.39	0.31
Students in Upper and Further Education per 1000 Inh (Log)	-0.18	0.33	-0.10	-0.47	<b>0.52</b>	0.12	0.34
Students in Tertiary Education per 1000 Inh (Log)	0.04	0.36	-0.18	0.04	0.27	<b>0.48</b>	0.52
<b>Actual and Equilibrium Rates</b>							
Pre-Existing Companies per 1000 Inh (Log)	-0.10	<b>0.91</b>	0.03	-0.01	0.04	-0.02	0.16
Self-Employment Rate (%)	0.09	-0.02	0.11	<b>0.66</b>	0.09	0.34	0.42
<b>Government Intervention</b>							
Prop. of Emp. Public Admin., Health & Education (%)	0.46	0.02	<b>-0.80</b>	-0.23	-0.02	-0.16	0.07

Cumulative Explained Variance: 75.45%

Source: Authors' calculations based on [Eurostat, 2011]

this factor. This means that European cities with tertiary-sector oriented economies display higher levels of employment. We name Factor 1 **Tertiary-Oriented Economy & High Employment**.

Continuing to the next column, Factor 2, we see that *Average Employment per Company* (negative) and *Pre-Existing Companies per 1000 Inh* (positive). This factor describes cities in which there is a high number of small and medium enterprises (per capita). We thus name it **SME Prevalent**.

Similarly, Factor 3 reveals statistical relationships between *low* proportions of employment in public administration, health, and education, *high* amounts of inhabitants and proportions of employment in transport and communication. In other words, cities with low populations are more dependent in public employment and have less workers in transportation and communication industries. We will use **Small Public Sector, Large Population, Transport & Communication** for referring to this factor.

The fourth factor expresses that European cities with high levels of self-employment are also places with important construction and tourism economic activities. Therefore, we use **Self-Employment, Construction & Tourism**. With the fifth factor we find that cities with higher proportions of full-time employment (in relation to part-time) have, simultaneously, higher amounts of per capita students in upper and technical education (per capita) and smaller land areas. We name it **Full-Time Emp., Upper and Further Education, Low Land Area**.

Finally, the sixth factor describes a declining demographic structure, in which the proportion of older population cohort is high and the young population cohort is low. This type of population distribution is associated with high amounts of students (per capita) assisting universities and other types of tertiary education. We then give this last factor the name **Tertiary Education & Declining Population**.

This factor structure can be regarded as stable, considering that the observations-to-variables proportion of 273:20 (13.65:1) is above the accepted 10:1 recommendation for PCA (?). The presence of some deviations from the factors as to the Eclectic Framework is noteworthy. Factor 1 mainly composed of ‘Demand side’ variables, includes a ‘Supply side’ variable; *SME Prevalent* takes one ‘Supply side’ and one ‘Actual and Equilibrium Rates’ variable, and so on. However, the elements from the Eclectic Framework are mostly in cohesion according to the PCA. Keeping in mind a certain vagueness between boundaries, Factors 1 and 4 can be regarded as ‘Demand Side’; Factor 2 as an expression of the ‘Actual

and Equilibrium Rates’ element; Factor 3 as an partial form of ‘Government Intervention’; and Factors 5 and 6 as ‘Supply side’.

As PCA aims to extract the most amount of information from the data, it maximises the overall variance that is to be captured by each index. It is important to note that the resulting index is not homogeneously correlated by its main variables and that variables with lower loadings, while they play a smaller role in the factor, should not be disregarded<sup>8</sup>. From this PCA, we construct indices which represent the common variance within the 18 included indicators from Eurostat’s Urban Audit and each of the identified factors. In each of the factor columns from Table 3, the loadings indicate the weight of each indicator in the resulting index. These indices can be used to benchmark European cities. However, to check for the relevance of these indices towards entrepreneurial dynamism, we should first proceed to specify an econometric analysis in order to discover meaningful statistical relationships.

## 4 Modelling Entrepreneurship

Our objective is to measure the impact of different elements of the Eclectic Framework upon entrepreneurship. For this purpose, we model business creation as a function of the factors we have identified in the previous section, from Eurostat data pertaining to the framework. This econometric analysis is undertaken in a set of three models, presented below.

$$nb_i = \sum_{k=1}^6 \beta_k I_{ki} + c + \epsilon \quad (3)$$

$$nb_i = \sum_{k=1}^6 \beta_k I_{ki} + \sum_{l=1}^2 \beta_l T_{li} + c + \epsilon \quad (4)$$

$$nb_i = \sum_{k=1}^6 \beta_k I_{ki} + \sum_{l=1}^2 \beta_l T_{li} + \beta_9 C_i + c + \epsilon \quad (5)$$

$$nb_i = \sum_{k=1}^6 \beta_k I_{ki} + \sum_{l=1}^2 \beta_l T_{li} + \beta_9 C_i + \sum_{m=1}^3 \beta_m R_{mi} + c + \epsilon \quad (6)$$

Our explained variable is, specifically, the *log of New business registered*  $nb_i$ . Equation 3, corresponds to the ba-

<sup>7</sup> As mentioned earlier other characteristics from this element and ‘Culture’ are to be captured using the country classifications

<sup>8</sup> Note, for example, the correlation of -0.56 between *Total Population* and Factor 5 ‘Full-Time Emp., Upper and Further Education, Low Land Area’.

sic model which only includes the six indices  $I_k$  as explanatory variables, a constant  $c$  and an error term  $\epsilon$ . The next model, Equation 4, adds two time-period dummy variables  $T_l$ , one for [1999, 2002] and one for [2003, 2006], thus taking into account time effects. The third model, Equation 5, includes a binary variable  $C_i$  for distinguishing between capital and non-capital cities. Finally, Equation 6 depicts the fourth model, which increasingly considers regional discrepancies – culture and other forms of government intervention (e.g., policies) – by including three dummy variables  $R_m$  which encapsulate the mentioned geographical classification by the United Nations. The summary statistics for the variables to be included in the regressions of these models are shown in Table 4 below.

## 5 Interpreting and Evaluating the Key Determinants of Entrepreneurship

Table 5 contains the results yielded by the regressions of the three models given above, using the data collected from Eurostat’s Urban Audit, with *New business registered* as the dependent variable. The table indicates the estimated coefficients for each of the models. The first three sets of estimations (columns) are produced using the Ordinary Least Squares (OLS) method. Column (1)

contains the estimations for the basic model (Equation 3), column (2) corresponds to the second model which considers time effects (Equation 4), and column (3) and (4) additionally take into account the capital and geographical classifications (Equations 5 and 6), respectively. The last three columns account for the calculations produced using Random Effects (Generalised Least Squares), using countries as the panel variable. These last three estimations can be regarded as an even finer view of heterogeneity between countries: while the fourth model groups city-observations in term of regions, random effects computations group them in terms of individual countries. Columns (5), (6), and (7) extend the first, second and third models by adding these country-specific effects<sup>9</sup>. As evidence of heteroskedasticity was found in every specification, we employ the Huber-White Sandwich Estimator to calculate robust standard errors.

We base our decision to use Random Effects on two statistical tests. We first use the Breusch and Pagan Lagrangian multiplier test, with states as hypothesis that the variances across groups are equal to zero. In our application, this hypothesis translates into declaring that there are no specific country-effects. This hypothesis was rejected, which means that there are pronounced and pertinent differences across countries which are not accounted by the other explanatory variables (indices).

Table 4: Summary Statistics for the Regression Variables

	Obs	Mean	Std. Dev.	Min	Max
<b>Explained Variable</b>					
New business registered per capita	273	7.39	1.04	5.08	10.64
<b>Identified Factor Indices</b>					
Tertiary-Oriented Economy & High Emp.	273	0	1	-2.94	1.99
SME Prevalent	273	0	1	-2.83	2.31
Small Public Sector, Large Pop., Trans. & Comm.	273	0	1	-2.47	3.21
Self-Emp., Construction & Tourism	273	0	1	-2.13	4.33
Full-Time Emp., Upper+ Education & Low Area	273	0	1	-2.26	3.95
Tertiary Education & Declining Pop.	273	0	1	-4.55	2.34
<b>Dummy Variables</b>					
[1999, 2002] Obs	273	0.49	0.50	0	1
[2003, 2006] Obs	273	0.45	0.50	0	1
Capital City	273	0.10	0.30	0	1
Western Europe City	273	0.42	0.49	0	1
Northern Europe City	273	0.25	0.44	0	1
Eastern Europe City	273	0.23	0.42	0	1

Source: Authors’ calculations based on [Eurostat, 2011]

<sup>9</sup> Considering country-specific effects renders the fourth model inapplicable. Intuitively, it does not make sense to have two geographic classifications when one is a more detailed version of the other; the dummy variables representing United Nation’s geographic classification can be expressed in linear combinations of the country dummy variables generated in the Random Effects regressions.

Table 5: Regressions for *New Business Registered*

VARIABLES	COEFFICIENTS						
	Ordinary Least Squares				Random Effects		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tertiary-Oriented Economy & High Emp.	0.324*** (0.0428)	0.318*** (0.0455)	0.292*** (0.0453)	0.342*** (0.0521)	0.472*** (0.0704)	0.457*** (0.0622)	0.360*** (0.0507)
SME Prevalent	0.232*** (0.0330)	0.237*** (0.0325)	0.206*** (0.0334)	0.121*** (0.0428)	0.217 (0.133)	0.240** (0.114)	0.205* (0.111)
Small Public Sector, Large Pop., Trans. & Comm.	0.529*** (0.0402)	0.530*** (0.0404)	0.483*** (0.0452)	0.412*** (0.0432)	0.524*** (0.0813)	0.525*** (0.0736)	0.484*** (0.0543)
Self-Employment, Construction & Tourism	-0.0879** (0.0347)	-0.0949*** (0.0350)	-0.101*** (0.0357)	0.0586 (0.0484)	0.0771 (0.0744)	0.0684 (0.0682)	0.0794 (0.0665)
Full-Time Emp., Upper+ Education & Low Area	-0.430*** (0.0574)	-0.430*** (0.0552)	-0.424*** (0.0560)	-0.545*** (0.0587)	-0.477*** (0.109)	-0.475*** (0.0954)	-0.431*** (0.0905)
Tertiary Education & Declining Pop. [1999, 2002]	0.295*** (0.0441)	0.292*** (0.0446)	0.292*** (0.0450)	0.270*** (0.0472)	0.217*** (0.0541)	0.209*** (0.0521)	0.196*** (0.0509)
Obs		-0.126 (0.209)	-0.0931 (0.212)	-0.2 (0.214)		-0.152 (0.264)	-0.148 (0.247)
[2003, 2006]		-0.0675 (0.203)	-0.0474 (0.206)	-0.0975 (0.200)		-0.115 (0.313)	-0.106 (0.293)
Capital City			0.407** (0.197)	0.564*** (0.188)			0.624*** (0.113)
Western Europe City				0.833*** (0.175)			
Northern Europe City				0.426** (0.173)			
Eastern Europe City				1.185*** (0.207)			
Constant	7.385*** (0.0371)	7.477*** (0.197)	7.412*** (0.202)	6.736*** (0.244)	7.196*** (0.159)	7.313*** (0.306)	7.147*** (0.299)
Observations	273	273	273	273	273	273	273
R-squared	0.661	0.663	0.673	0.734	0.776	0.777	0.799

Note: Robust standard errors in parentheses  
\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Source: Authors' calculations based on [Eurostat, 2011]

This implies that it is worthwhile to extend the OLS regression using fixed or random effects. To decide between these two methods, we use a Hausman test with a null hypothesis stating that the country-specific effects are not correlated with the explanatory variables. Fixed effects takes the rejection of this hypothesis as an assumption. In our application of this test we could not reject this hypothesis and thus we opt for random effects.

Table 6 contains several results worthy to analyse in detail. We begin to analyse this table from top-to-bottom and left-to-right, starting by the index 'Tertiary-Oriented Economy & High Employment'. This index displays highly significant evidence, with p-values smaller than 1%, through all iterations. This suggests that the type of economy structure has a strong and positive influence upon the business creation rate. Cities

with service-oriented economies and high employment levels see pronouncedly more start-ups in relation to manufacture-oriented cities, with lower employment rates. The second index, 'SME Prevalent', yields less conclusive evidence. OLS regressions –columns (1) through (4)– show positive and highly significant coefficients, suggesting that cities with more SMEs than large companies witness more businesses being founded<sup>10</sup>. However, the significance of this impact is partially lost in the random effects regressions. The third index, 'Small Public Sector, Large Population, Transport & Communication' offers recurrently, like the first index, positive coefficients of highest significance through all the regressions. This means that cities in which there is a large population, a small amount of employment in the public sector and an advance transport and communi-

<sup>10</sup> In other words, these particular results suggest that a higher proportion of SME as to big businesses is a favorable condition towards business creation.

cation sector, have high levels of entrepreneurial dynamism. In other words, the data shows that small European cities which rely in state-offered employment have a disadvantageous position in entrepreneurial dynamism. Fourthly, there was no conclusive evidence for ‘Self-Employment, Construction & Tourism’. Even though there is initially evidence of a slightly negative effect –columns (1) through (3)– its significance is eliminated when considering country-effects, both regionally –column (4)– and individually –columns (5) through (7)–. The fifth index, ‘Full-Time Emp., Upper and Further Education, Low Land Area’, provides also remarkable and regular p-values close to zero. The associated coefficients are negative, which expresses that smaller cities, with higher levels of non-tertiary education and superior proportions of full-time over part-time employment, also display entrepreneurial stagnation. Finally, the regressions assigned positive coefficients with p-values lower than 1% for the ‘Tertiary Education & Declining Population’ index, suggesting that there are more start-ups in cities with larger amounts of university students and with smaller population of less than 20 year-olds and larger proportions of people aged over 65. Its coefficient values are relatively lower than those from other significant indices, which suggests that the business creation rate is more sensitive to context-specific factors such as the economy structure in comparison to different human capital levels.

To synthesise, Figure 1 depicts the relationship between of each of the indices and *New business registered*, illustrating the marginal effects captured by the OLS regression of model 2. The graphs presented here are called ‘added-variable plots’ and show the individual effect of one particular index upon business creation, assuming the other variables in the model remain constant. In each of the graphs, each point represents a city-observation and fitted lines represent the relationship within the variables. We can see that the significant coefficients from Table 5 –column 2– are associated with plots in which the city observations are close to the fitted line.

We now look at the time, capital and regional dummy variables. The period-specific variables were not assigned any significant coefficient. More pertinently, ‘capital city’ and the regional classifications show positive and significant effects which can be understood as sources of entrepreneurship which are unaccounted by the other indices. Leaving the previously described effects aside, more businesses were registered in capital cities than in comparison to non-capital cities. Similarly, Eastern European cities displayed the most elevated rates, followed by Western and then Northern European cities; Southern Europe, the null case of the regional classification dummies, therefore displays an unaccounted disadvantageous position. The origins of these diver-

gences may be explained by differences in policy and culture, for which data is not available in Eurostat’s Urban Audit collection. Despite the relevance of the regional classification, the r-squared metrics show that the random effects version of model 3 –columns (7)– yields the best indicators regarding goodness-of-fit, although not by far. This means that there is a considerable portion of explanatory power that is attributed to country-specific effects which goes beyond the regional classification; a more fine-grained view in terms of individual countries is recommended for this particular econometric setup. Further efforts in data recollection and in research are required to clarify these regional discrepancies.

As a benchmarking tool, we include city rankings in Appendix B in terms of *New businesses registered* and each of the constructed indices. The fact that the random effects implementations of our models, which include country-specific effects, are superior means that it is more accurate to compare cities within countries rather than at a continental or even regional level. Furthermore, we include rankings only for countries with more than 10 city-observations. We consider that including rankings for less represented countries may be misleading. When reading these rankings, it is important to take into account the reference year of the city in question, as some cities within the same country refer to different periods. Moreover, a few cities appear more than once within each country. While we include the rankings for all six indices, we highlight those which show a significant impact upon *New businesses registered*.

## 6 Policy Implications

From these results, European policy-makers who wish to promote entrepreneurship in their cities should distinguish between factors that are context-specific and others which may be influenced by policy. The business creation rate is, to an important extent, determined by the economic structure: cities oriented towards manufacture activities should not, in general, be expected to achieve similar business creation rates as in cities which are service-oriented. In other words, a starting point for benchmarking should be in terms of the ‘Tertiary-Oriented Economy & High Employment’ Index; policy-makers should look at cities with similar positions in this particular ranking. This also applies, in a certain extent, to the ‘Small Public Sector, Large Population, Transport & Communication’ and ‘Full-Time Emp., Upper and Further Education, & Low Area’ indices. However, government officials from these smaller-sized cities might be able to devise specific incentive mechanisms for promoting migration and compensating for the disadvantages of entrepreneurial activities in relation to state-offered employment, e.g., more uncertainty and funding

Figure 1: Marginal Contributions towards *New Business Registered*



Source: Authors' calculations based on [Eurostat, 2011]

requirements; aiding entrepreneurs to manage the higher personal risks incurred, in comparison to full-time positions; conceiving strategies to make entrepreneurship attractive for students in non-tertiary education; and by dealing with the spatial (land area) limitations..

Perhaps the most room for policy relies in the ‘Tertiary Education & Declining Pop.’ Index, which supports government collaborations with universities and other tertiary education institutions. We find pertinent to explore policies which involve encouraging tertiary education and taking advantage of the mechanisms which guide highly educated individuals to found new companies.

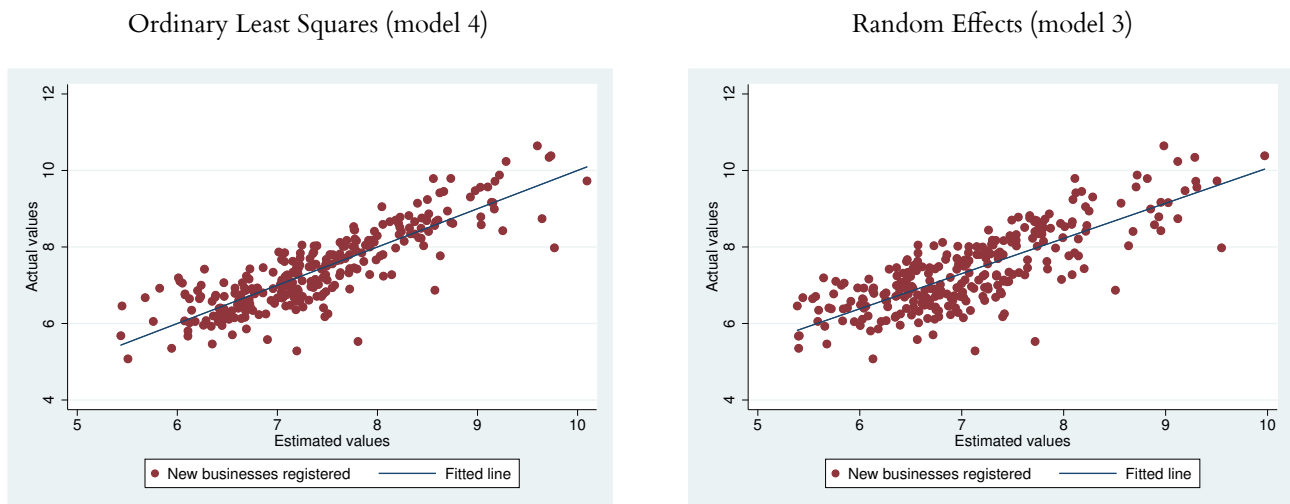
### 6.1 Regression Diagnostics

We implement a variety of diagnostics to support for the validity of the results produced by each of the regres-

sions. To check for an accurate calculation of the significance of the produced coefficients, we use an inter-quartile analysis to verify the normality of the predicted errors: no severe outliers were found and thus we can affirm that residuals are close to a normal distribution. We inspect the possibility of multicollinearity, as it might be a problem particularly in the OLS regressions, by calculating the variance inflation factors in each of the models: none of these statistics were worrisome. We examine the linear assumption by analysing scatter plots between the regression residuals and each of the indices produced by the PCA: we could not identify any non-linear pattern.

Figure 2 illustrates the performance of the OLS regression for model 4 and the random effect regression for model 3. These two graphs plots the actual values of *New business registered* versus those predicted by the respective models.

Figure 2: Actual vs Estimated Values



Source: Authors’ calculations based on [Eurostat, 2011]

## 7 Conclusions: Lessons and Outlook for the Creative City

We operationalise creativity in the context of cities by focusing at entrepreneurial dynamism and investigating its determinants. Following previous literature, particularly the Eclectic Framework which provides an effective approach for analysing the several factors which influence entrepreneurship, we extract pertinent indicators from Eurostat’s Urban Audit data collection. This yields 17 variables with respect to 209 cities from 22 European countries for three quadrennial periods between 1999 and 2010. We analyse the structure of this data and construct representative indices. We then set up econometric models which employ these indices, along with

the temporal and geographical dimensions of the city-observations.

We successfully apply the Eclectic Framework to distinguish several significant effects upon entrepreneurial dynamism in the context of European cities. We find positive contributions to the number of new business registered from the ‘Tertiary-oriented economy & high employment’ (demand-side), ‘Tertiary education and declining population’ (supply-side), and ‘Small public sector, large population and transport & communication’ (government intervention) indices. Furthermore, we observe a negative impact from the ‘Full-time employment, upper and further education & low land area’ (supply-side) index. These indices are helpful to distinguish between context and pol-

icy driven determinants of entrepreneurship. Alongside these effects, we find that Eastern European cities have the largest entrepreneurship rates, followed by Western and Northern Europe, and finally by Southern European cities—the most relatively stagnant region in terms of foundations of business. We also identify an advantage from capital cities with respect to others. These localized discrepancies highlight the need of accounting, compiling and investigating further institutional and cultural indicators which might have pertinent complementary roles in determining business creation rates in European cities.

## References

- Acs, Z. J. and Audretsch, D. B. (2005). Entrepreneurship, Innovation and Technological Change. *Foundations and Trends in Entrepreneurship*, 1(4):149–195.
- Acs, Z. J. and Varga, A. (2005). Entrepreneurship, agglomeration and technological change. *Small Business Economics*, 24(3):323–334.
- Aghion, P. and Durlauf, S. N. (2005). Handbook of economic growth.
- Amabile, T. M. (1996). *Creativity and Innovation in Organizations*. Harvard Business School Press, Boston.
- Audretsch, D. (2004). Sustaining innovation and growth: Public policy support for entrepreneurship. *Industry & Innovation*, 11(3):167–191.
- Audretsch, D., Thurik, R., Verheul, I., and Wennekers, S. (2002). An Eclectic Theory of Entrepreneurship. In Audretsch, D., Thurik, R., Verheul, I., and Wennekers, S., editors, *Entrepreneurship: Determinants and Policy in a European-US Comparison*, pages 11–82. Kluwer Academic Publishers, Boston/Dordrecht.
- Baron, R. A. and Tang, J. (2011). The role of entrepreneurs in firm-level innovation: Joint effects of positive affect, creativity, and environmental dynamism. *Journal of Business Venturing*, 26(1):49–60.
- Barreneche García, A. (2010). Linking National Systems of Innovation and Economic Growth under the Knowledge Economy Framework. Master's thesis, Ritsumeikan University.
- Barro, R. J. and Sala-i-Martin, X. (2003). *Economic growth*. MIT Press, Massachusetts.
- Baum, J. and Locke, E. A. (2004). The relationship of entrepreneurial traits, skill, and motivation to subsequent venture growth. *Journal of Applied Psychology*, 89(4):587–598.
- European Commission (2010). *European Regional and Urban Statistics Reference Guide*. Eurostat Methodologies and Working Papers. Office for Official Publications of the European Communities.
- Eurostat (2011). City statistics – Urban audit. Recovered online in September 2nd, 2011 from [http://epp.eurostat.ec.europa.eu/portal/page/portal/region\\_cities/city\\_urban](http://epp.eurostat.ec.europa.eu/portal/page/portal/region_cities/city_urban).
- Florida, R. (2002). *The Rise of the Creative Class*. Number May. Basic Books.
- Freytag, A. and Thurik, R. (2006). Entrepreneurship and its determinants in a cross-country setting. *Journal of Evolutionary Economics*, 17(2):117–131.
- Grilo, I. and Thurik, R. (2008). Determinants of entrepreneurial engagement levels in Europe and the US. *Industrial and Corporate Change*, 17(6):1113–1145.
- Hamidi, D. Y., Wennberg, K., and Berglund, H. (2008). Creativity in entrepreneurship education. *Journal of Small Business and Enterprise Development*, 15(2):304–320.
- Ko, S. and Butler, J. (2007). Creativity: A key link to entrepreneurial behavior. *Business Horizons*, 50(5):365–372.
- Landry, C. (2000). *The Creative City: A Toolkit for Urban Innovators*. Earthscan Publications Ltd., London, 1st edition.
- Leibenstein, H. (1968). Entrepreneurship and development. *American Economic Review*, 38(2):72–83.
- Markusen, A. (2006). Urban development and the politics of a creative class: evidence from a study of artists. *Environment and Planning - Part A*, 38(10):1921–1940.
- Meusburger, P., Funke, J., and Wunder, E. (2009). Introduction: The Spatiality of Creativity. In Meusburger, P., Funke, J., and Wunder, E., editors, *Milieus of Creativity*, volume 2 of *Knowledge and Space*, pages 1–10. Springer Netherlands.
- Peck, J. (2005). Struggling with the Creative Class. *International Journal of Urban and Regional Research*, 29(4):740–770.
- Praag, C. M. and Versloot, P. H. (2007). What is the value of entrepreneurship? A review of recent research. *Small Business Economics*, 29(4):351–382.
- Scott, A. (2006). Creative cities: conceptual issues and policy questions. *Journal of urban affairs*.
- Sternberg, R. and Wennekers, S. (2005). Determinants and Effects of New Business Creation Using Global Entrepreneurship Monitor Data. *Small Business Economics*, 24(3):193–203.
- United Nations (2011). United Nations Statistics Division – Standard Country and Area Codes Classification (M49). Recovered online in August 10th, 2011 from <http://unstats.un.org/unsd/methods/m49/m49regin.htm>.
- Villalba, E. (2010). Monitoring Creativity at an Aggregate Level: a proposal for Europe. *European Journal of Education*, 45(2):314–330.
- Welter, F. (2011). Contextualizing Entrepreneurship—Conceptual Challenges and Ways Forward. *Entrepreneurship Theory and Practice*, 35(1):165–184.



- Zampetakis, L. A., Gotsi, M., Andriopoulos, C., and Moustakis, V. (2011). Creativity and entrepreneurial intention in young people: Empirical insights from business school students. *The International Journal of Entrepreneurship and Innovation*, 12(3):189–199.
- Zampetakis, L. A. and Moustakis, V. (2006). Linking creativity with entrepreneurial intentions: A structural approach. *The International Entrepreneurship and Management Journal*, 2(3):413–428.

## Appendix A: Included Cities

Table 5: List of Included *Western European* Cities

Country	City	Country	City	Country	City
ESTONIA	Tartu	GERMANY	Augsburg	LUXEMBOURG	Luxembourg (Grand Duchy)
	Aix-en-Provence		Berlin		's-Gravenhage
	Ajaccio		Bielefeld		Almere
	Besançon		Bochum		Amsterdam
	Bordeaux		Bonn		Apeldoorn
	Caen		Bremen		Arnhem
	Cayenne		Darmstadt		Breda
	Clermont-Ferrand		Dortmund		Eindhoven
	Dijon		Dresden		Enschede
	Fort-de-France		Düsseldorf		Groningen
	Grenoble		Erfurt		Nijmegen
	Le Havre		Essen		Rotterdam
	Lens - Liévin		Frankfurt am Main		Tilburg
	Lille		Frankfurt (Oder)		Utrecht
	Limoges		Freiburg im Breisgau		Bern
	Lyon		Göttingen		Genève
	Marseille		Halle an der Saale		Lausanne
	Metz		Hamburg		Zürich
	Montpellier		Hannover		
Nancy	Karlsruhe				
Nantes	Kiel				
Orléans	Koblenz				
Paris	Köln				
Pointe-a-Pitre	Leipzig				
Poitiers	Magdeburg				
Reims	Mainz				
Rouen	Mönchengladbach				
Saint Denis	Mülheim a.d.Ruhr				
Saint-Etienne	München				
Strasbourg	Nürnberg				
Toulouse	Potsdam				
Tours	Regensburg				
	Schwerin				
	Stuttgart				
	Trier				
	Weimar				
	Wiesbaden				

Table 6: List of Included *Northern European* Cities

Country	City	Country	City	Country	City
DENMARK	Aalborg	NORWAY	Bergen	UNITED KINGDOM	Aberdeen
	Aarhus		Kristiansand		Birmingham
	København		Oslo		Bradford
	Odense		Stavanger		Bristol
ESTONIA	Tallinn		Tromsø		Cardiff
FINLAND	Helsinki	Trondheim	Coventry		
	Tampere	Göteborg	Edinburgh		
	Turku	Jönköping	Glasgow		
LATVIA	Riga	Linköping	Inner London		
	Kaunas	Malmö	Kingston-upon-Hull		
LITHUANIA	Panevezys	Örebro	Leeds		
	Vilnius	Stockholm	Leicester		
		Uppsala	Liverpool		
			London		
			Manchester		
			Newcastle		
			Nottingham		
			Portsmouth		
			Sheffield		
			Wolverhampton		
			Wrexham		

Table 7: List of Included *Eastern European* Cities

Country	City	Country	City	Country	City
CYPRUS	Lefkosia		Bialystok		Alba Iulia
	Brno		Bydgoszcz		Bacau
	Ostrava		Gdansk		Braila
CZECH REPUBLIC	Plzen		Gorzów Wlkp.		Bucuresti
	Praha		Jelenia Gora		Calarasi
	Usti nad Labem		Katowice		Cluj-Napoca
HUNGARY	Budapest		Kielce	ROMANIA	Craiova
			Konin		Giurgiu
			Krakow		Oradea
			Lodz		Piatra Neamt
		POLAND	Lublin		Sibiu
			Nowy Sacz		Targu Mures
			Olsztyn		Timisoara
			Opole		Banska Bystrica
			Poznan		Bratislava
			Rzeszow		Kosice
			Suwalki	SLOVAKIA	Nitra
			Szczecin		PreSov
			Torun		Trencin
			Warszawa		Trnava
			Wroclaw		Zilina
			Zielona Gora		

Table 8: List of Included *Southern European* Cities

Country	City	Country	City
	Aveiro		Alicante/Alacant
	Braga		Badajoz
	Coimbra		Barcelona
PORTUGAL	Funchal		Bilbao
	Ponta Delgada		Córdoba
	Porto		L'Hospitalet
	Setúbal		Logroño
	Ljubljana	SPAIN	Madrid
SLOVENIA	Maribor		Málaga
			Palma de Mallorca
			Santiago de Compostela
			Sevilla
			Valencia
			Vigo
			Vitoria/Gasteiz

## Appendix B: Rankings

Table 9: City Rankings for New Business Registered and Identified Factor Indices, per Country

FRANCE									<i>Ranking Period</i>		
<i>City</i>	New business registered per capita	Tertiary-Oriented Economy & High Emp.	SME Prevalent	Small Public Sector, Large Pop., Trans. & Comm.	Self-Employment, Construction & Tourism	Full-Time Emp., Upper+ Education & Low Area	Tertiary Education & Declining Pop.	[1999,2002]	[2003,2006]	[2007,2010]	
Paris	1	1	2	1	8	10	1	✓			
Lyon	2	22	11	3	23	28	15	✓			
Marseille	3	8	7	12	12	30	18	✓			
Bordeaux	4	11	9	9	10	25	9	✓			
Lille	5	19	23	5	13	27	24	✓			
Toulouse	6	20	10	7	14	20	5	✓			
Montpellier	7	3	4	22	5	22	10	✓			
Nantes	8	15	14	6	18	23	21	✓			
Aix-en-Provence	9	9	5	11	2	26	17	✓			
Strasbourg	10	14	18	4	11	16	19	✓			
Grenoble	11	27	21	16	25	24	6	✓			
Saint-Etienne	12	31	29	17	21	31	7	✓			
Rouen	13	16	16	10	24	19	20	✓			
Fort-de-France	14	4	3	27	4	9	27	✓			
Saint Denis	15	5	6	31	7	11	30	✓			
Clermont-Ferrand	16	29	25	13	28	18	2	✓			
Nancy	17	7	17	24	16	3	11	✓			
Tours	18	21	22	15	19	15	8	✓			
Metz	19	6	12	21	17	5	22	✓			
Caen	20	23	28	23	20	6	14	✓			
Orléans	21	18	26	8	30	13	23	✓			
Dijon	22	17	15	14	27	7	13	✓			
Pointe-a-Pitre	23	2	1	29	3	1	28	✓			
Reims	24	24	30	19	9	4	16	✓			
Cayenne	25	13	8	30	1	8	31	✓			
Le Havre	26	26	27	2	31	12	26	✓			
Besançon	27	25	19	26	26	14	12	✓			
Limoges	28	28	24	20	29	21	4	✓			
Lens - Liévin	29	30	31	18	15	29	29	✓			
Ajaccio	30	12	13	25	6	17	25	✓			
Poitiers	31	10	20	28	22	2	3	✓			

GERMANY

City	New business registered per capita	Tertiary-Oriented Economy & High Emp.	SME Prevalent	Small Public Sector, Large Pop., Trans. & Comm.	Self-Employment, Construction & Tourism	Full-Time Emp., Upper+ Education & Low Area	Tertiary Education & Declining Pop.	Ranking Period		
								[1999,2002]	[2003,2006]	[2007,2010]
Berlin	1	20	7	25	9	65	59		✓	
Hamburg	2	12	14	6	15	64	60		✓	
München	3	28	38	15	26	50	14		✓	
Hamburg	4	13	6	4	11	63	63	✓		
München	5	29	25	10	28	42	20	✓		
Köln	6	10	24	14	14	44	51		✓	
Köln	7	15	18	12	17	40	55	✓		
Frankfurt am Main	8	1	5	2	55	10	38		✓	
Düsseldorf	9	4	32	8	13	26	24		✓	
Leipzig	10	25	16	28	23	56	15		✓	
Dortmund	11	36	50	26	25	60	58		✓	
Frankfurt am Main	12	2	3	1	54	8	36	✓		
Stuttgart	13	52	58	18	60	39	11		✓	
Essen	14	42	51	23	10	61	44		✓	
Dresden	15	43	23	41	40	52	21		✓	
Nürnberg	16	40	54	5	35	34	35		✓	
Düsseldorf	17	6	27	7	7	25	33	✓		
Hannover	18	22	44	21	53	35	19		✓	
Leipzig	19	37	1	27	19	53	31	✓		
Bremen	20	53	36	11	42	47	47		✓	
Stuttgart	21	55	43	16	65	20	6	✓		
Dortmund	22	49	40	17	20	59	62	✓		
Essen	23	46	46	19	12	62	50	✓		
Dresden	24	35	8	31	37	43	43	✓		
Nürnberg	25	50	52	3	33	33	39	✓		
Wiesbaden	26	16	60	39	21	41	54		✓	
Bremen	27	54	35	9	38	46	56	✓		
Hannover	28	41	20	22	31	31	26	✓		
Bochum	29	63	62	44	32	58	25		✓	
Karlsruhe	30	17	41	29	27	22	13		✓	
Bonn	31	7	22	60	51	24	23		✓	
Augsburg	32	59	59	36	36	36	16		✓	
Bielefeld	33	58	56	38	29	48	45		✓	
Mönchengladbach	34	61	65	24	2	51	64		✓	
Wiesbaden	35	21	57	34	8	37	57	✓		
Kiel	36	27	49	48	47	23	27		✓	
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮

## GERMANY

City	New business registered per capita	Tertiary-Oriented Economy & High Emp.	SME Prevalent	Small Public Sector, Large Pop., Trans. & Comm.	Self-Employment, Construction & Tourism	Full-Time Emp., Upper+ Education & Low Area	Tertiary Education & Declining Pop.	Ranking Period		
								[1999,2002]	[2003,2006]	[2007,2010]
∴	∴	∴	∴	∴	∴	∴	∴	∴	∴	∴
Erfurt	37	26	19	37	50	27	48		✓	
Bochum	38	65	61	42	30	57	29	✓		
Bremen	39	51	29	13	58	55	42			✓
Magdeburg	40	24	15	54	48	38	10		✓	
Halle an der Saale	41	14	17	50	64	30	32		✓	
Freiburg im Breisgau	42	19	31	53	18	17	40		✓	
Bielefeld	43	60	53	32	24	45	49	✓		
Mönchengladbach	44	64	64	20	5	54	65	✓		
Mainz	45	9	30	57	44	12	12		✓	
Erfurt	46	45	13	40	34	29	52	✓		
Magdeburg	47	32	10	51	45	32	41	✓		
Kiel	48	31	33	46	62	7	22	✓		
Halle an der Saale	49	33	11	47	61	28	53	✓		
Potsdam	50	3	9	62	46	19	17			✓
Darmstadt	51	47	47	45	39	9	4			✓
Freiburg im Breisgau	52	30	21	49	16	16	37	✓		
Mülheim a.d.Ruhr	53	62	63	30	1	49	28			✓
Regensburg	54	56	55	35	63	3	1			✓
Koblenz	55	5	45	55	22	4	5			✓
Schwerin	56	18	12	56	59	14	18			✓
Darmstadt	57	48	42	43	41	5	3	✓		
Göttingen	58	39	34	59	43	13	7			✓
Regensburg	59	57	48	33	52	2	2	✓		
Trier	60	34	28	58	3	6	8			✓
Koblenz	61	8	37	52	49	1	9	✓		
Weimar	62	38	39	64	4	21	34			✓
Frankfurt (Oder)	63	11	4	63	57	15	30			✓
Weimar	64	44	26	65	6	18	46	✓		
Frankfurt (Oder)	65	23	2	61	56	11	61	✓		

NETHERLANDS

City	New business registered per capita	Tertiary-Oriented Economy & High Emp.	SME Prevalent	Small Public Sector, Large Pop., Trans. & Comm.	Self-Employment, Construction & Tourism	Full-Time Emp., Upper+ Education & Low Area	Tertiary Education & Declining Pop.	Ranking Period		
								[1999,2002]	[2003,2006]	[2007,2010]
Amsterdam	1	1	1	2	3	6	6		✓	
Rotterdam	2	4	2	1	13	12	12		✓	
s-Gravenhage	3	3	4	8	10	8	10		✓	
Utrecht	4	2	3	5	8	1	4		✓	
Eindhoven	5	13	13	4	11	9	2		✓	
Almere	6	7	8	3	2	3	13		✓	
Breda	7	8	6	7	1	10	8		✓	
Groningen	8	6	5	12	7	2	1		✓	
Tilburg	9	10	9	6	6	7	9		✓	
Enschede	10	12	7	11	5	11	7		✓	
Apeldoorn	11	9	10	10	4	13	11		✓	
Nijmegen	12	11	12	13	9	5	3		✓	
Arnhem	13	5	11	9	12	4	5		✓	

City	New business registered per capita	Tertiary-Oriented Economy & High Emp.	SME Prevalent	Small Public Sector, Large Pop., Trans. & Comm.	Self-Employment, Construction & Tourism	Full-Time Emp., Upper+ Education & Low Area	Tertiary Education & Declining Pop.	Ranking Period		
								[1999,2002]	[2003,2006]	[2007,2010]
Warszawa	1	1	3	1	1	26	4	✓		
Krakow	2	14	7	18	3	25	6	✓		
Lodz	3	20	19	9	17	27	1	✓		
Wroclaw	4	8	5	17	7	24	5	✓		
Poznan	5	10	12	5	2	19	10	✓		
Lodz	6	17	14	12	25	28	3		✓	
Wroclaw	7	2	2	13	9	23	2		✓	
Szczecin	8	12	1	2	15	18	16	✓		
Gdansk	9	15	13	6	11	21	18	✓		
Gdansk	10	6	6	7	19	22	14		✓	
Lublin	11	5	9	27	14	15	21	✓		
Bydgoszcz	12	24	20	4	20	20	20	✓		
Katowice	13	16	18	3	10	17	7	✓		
Bialystok	14	9	16	24	13	10	25	✓		
Kielce	15	21	11	26	5	12	9	✓		
Torun	16	25	23	11	23	16	17	✓		
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮



POLAND

City	New business registered per capita	Tertiary-Oriented Economy & High Emp.	SME Prevalent	Small Public Sector, Large Pop., Trans. & Comm.	Self-Employment, Construction & Tourism	Full-Time Emp., Upper+ Education & Low Area	Tertiary Education & Declining Pop.	Ranking Period		
								[1999,2002]	[2003,2006]	[2007,2010]
∴	∴	∴	∴	∴	∴	∴	∴	∴	∴	∴
Olsztyn	17	11	10	21	12	6	22	✓		
Olsztyn	18	3	8	16	16	5	19		✓	
Rzeszow	19	22	21	25	4	2	11	✓		
Zielona Gora	20	7	17	19	8	4	12	✓		
Gorzów Wlkp.	21	23	24	23	26	14	24		✓	
Zielona Gora	22	4	15	15	24	3	13		✓	
Gorzów Wlkp.	23	26	25	14	21	13	23	✓		
Opole	24	13	4	28	6	8	8	✓		
Nowy Sacz	25	19	26	10	18	1	27	✓		
Jelenia Gora	26	18	22	22	27	11	15	✓		
Konin	27	28	28	8	22	9	26	✓		
Suwalki	28	27	27	20	28	7	28	✓		

ROMANIA

City	New business registered per capita	Tertiary-Oriented Economy & High Emp.	SME Prevalent	Small Public Sector, Large Pop., Trans. & Comm.	Self-Employment, Construction & Tourism	Full-Time Emp., Upper+ Education & Low Area	Tertiary Education & Declining Pop.	Ranking Period		
								[1999,2002]	[2003,2006]	[2007,2010]
Bucuresti	1	1	1	1	3	13	4	✓		
Cluj-Napoca	2	3	2	11	1	11	1	✓		
Timisoara	3	5	3	5	7	10	3	✓		
Craiova	4	4	7	8	9	5	8	✓		
Oradea	5	6	4	4	8	6	7	✓		
Bacau	6	11	10	6	5	4	9	✓		
Sibiu	7	10	8	9	11	7	2	✓		
Targu Mures	8	7	9	12	6	3	6	✓		
Braila	9	13	12	2	12	8	10	✓		
Piatra Neamt	10	9	13	3	4	9	12	✓		
Alba Iulia	11	8	6	13	2	2	5	✓		
Calarasi	12	12	5	10	10	12	11	✓		
Giurgiu	13	2	11	7	13	1	13	✓		

## SLOVAKIA

City	New business registered per capita	Tertiary-Oriented Economy & High Emp.	SME Prevalent	Small Public Sector, Large Pop., Trans. & Comm.	Self-Employment, Construction & Tourism	Full-Time Emp., Upper+ Education & Low Area	Tertiary Education & Declining Pop.	Ranking Period		
								[1999,2002]	[2003,2006]	[2007,2010]
Bratislava	1	1	8	1	9	10	9			✓
Bratislava	2	3	4	3	8	15	8	✓		
Bratislava	3	2	1	2	10	14	5		✓	
Kosice	4	10	11	4	16	16	15	✓		
Kosice	5	8	7	5	14	13	12		✓	
Zilina	6	14	14	7	7	2	4			✓
Banska Bystrica	7	4	12	13	1	1	10			✓
PreSov	8	7	13	12	3	5	11			✓
Nitra	9	9	15	9	4	6	2			✓
Banska Bystrica	10	6	6	6	2	4	14	✓		
PreSov	11	11	9	14	13	11	16	✓		
Trnava	12	16	16	11	15	7	1			✓
PreSov	13	13	5	15	6	3	13		✓	
Banska Bystrica	14	5	2	16	12	9	6		✓	
Zilina	15	12	3	8	5	12	7		✓	
Trencín	16	15	10	10	11	8	3		✓	

## SPAIN

City	New business registered per capita	Tertiary-Oriented Economy & High Emp.	SME Prevalent	Small Public Sector, Large Pop., Trans. & Comm.	Self-Employment, Construction & Tourism	Full-Time Emp., Upper+ Education & Low Area	Tertiary Education & Declining Pop.	Ranking Period		
								[1999,2002]	[2003,2006]	[2007,2010]
Madrid	1	1	3	3	13	15	9		✓	
Barcelona	2	7	6	2	10	13	2		✓	
Valencia	3	11	10	6	7	10	5		✓	
Vigo	4	13	2	12	6	7	4		✓	
Málaga	5	3	4	13	2	12	14		✓	
Palma de Mallorca	6	2	8	4	1	4	15		✓	
Bilbao	7	9	11	7	14	6	3		✓	
Alicante/Alacant	8	10	7	8	4	11	8		✓	
Córdoba	9	8	9	11	8	14	13		✓	
San. de Compostela	10	6	1	14	3	2	1		✓	
Sevilla	11	4	14	9	9	3	12		✓	
Vitoria/Gasteiz	12	14	13	5	15	9	7		✓	
L'Hospitalet	13	12	15	1	12	1	11		✓	
Logroño	14	15	12	10	11	5	6		✓	
Badajoz	15	5	5	15	5	8	10		✓	

SWEDEN

City	New business registered per capita	Tertiary-Oriented Economy & High Emp.	SME Prevalent	Small Public Sector, Large Pop., Trans. & Comm.	Self-Employment, Construction & Tourism	Full-Time Emp., Upper+ Education & Low Area	Tertiary Education & Declining Pop.	Ranking Period		
								[1999,2002]	[2003,2006]	[2007,2010]
Stockholm	1	2	3	2	5	14	14		✓	
Stockholm	2	1	4	1	3	3	6			✓
Göteborg	3	7	7	3	9	5	4			✓
Göteborg	4	10	11	4	13	4	3		✓	
Malmö	5	4	10	5	1	2	8			✓
Malmö	6	6	13	6	7	1	5		✓	
Uppsala	7	3	1	10	4	13	7			✓
Uppsala	8	5	2	11	10	11	9		✓	
Linköping	9	11	9	9	11	12	1			✓
Örebro	10	8	5	12	2	8	11			✓
Jönköping	11	12	6	7	8	7	10			✓
Linköping	12	13	14	13	14	10	2		✓	
Örebro	13	9	8	14	6	6	12		✓	
Jönköping	14	14	12	8	12	9	13		✓	

UNITED KINGDOM

City	New business registered per capita	Tertiary-Oriented Economy & High Emp.	SME Prevalent	Small Public Sector, Large Pop., Trans. & Comm.	Self-Employment, Construction & Tourism	Full-Time Emp., Upper+ Education & Low Area	Tertiary Education & Declining Pop.	Ranking Period		
								[1999,2002]	[2003,2006]	[2007,2010]
London	1	5	1	1	17	31	25	✓		
Inner London	2	2	2	2	30	18	5	✓		
Birmingham	3	17	16	10	23	22	29		✓	
Birmingham	4	25	10	6	25	27	28	✓		
Leeds	5	14	7	7	16	24	16		✓	
Leeds	6	20	5	5	15	26	15	✓		
Leicester	7	30	23	20	22	9	13	✓		
Glasgow	8	7	25	15	10	20	12		✓	
Manchester	9	1	6	3	27	1	26		✓	
Edinburgh	10	3	11	12	3	21	2		✓	
Sheffield	11	18	8	16	12	23	10		✓	
Bristol	12	6	14	13	7	15	17		✓	
Bristol	13	13	4	9	14	12	6	✓		
Manchester	14	4	3	4	31	2	21	✓		
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮

UNITED KINGDOM

City	New business registered per capita	Tertiary-Oriented Economy & High Emp.	SME Prevalent	Small Public Sector, Large Pop., Trans. & Comm.	Self-Employment, Construction & Tourism	Full-Time Emp., Upper+ Education & Low Area	Tertiary Education & Declining Pop.	Ranking Period		
								[1999,2002]	[2003,2006]	[2007,2010]
∴	∴	∴	∴	∴	∴	∴	∴	∴	∴	∴
Bradford	15	24	26	14	11	25	31		✓	
Bradford	16	29	20	8	8	29	30	✓		
Sheffield	17	26	9	18	6	28	8	✓		
Liverpool	18	9	18	28	28	14	23			✓
Leicester	19	22	21	24	21	6	19			✓
Cardiff	20	11	15	22	1	19	27			✓
Liverpool	21	15	12	25	29	13	22	✓		
Coventry	22	21	28	19	20	11	18			✓
Nottingham	23	8	19	23	5	3	9			✓
Wolverhampton	24	27	27	21	4	16	14			✓
Newcastle	25	10	17	31	26	8	3			✓
Aberdeen	26	19	24	11	9	17	1			✓
Kingston-upon-Hull	27	28	31	17	19	10	24			✓
Newcastle	28	12	13	26	24	7	4	✓		
Portsmouth	29	16	29	29	13	4	11			✓
Portsmouth	30	23	22	27	18	5	7	✓		
Wrexham	31	31	30	30	2	30	20			✓