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The entrepreneurial advantage of world cities: evidence from global entrepreneurship monitor data

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The Entrepreneurial Advantage of World Cities; Evidence from Global Entrepreneurship Monitor Data

by

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THE ENTREPRENEURIAL ADVANTAGE OF WORLD CITIES; Evidence from Global Entrepreneurship Monitor Data

July 2008

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Abstract

Recent discussions in the Economic Geography literature increasingly focus on creative cities and the importance of creativity for achieving economic growth. Considering the increased attention on urban areas it is not surprising that the regional dimension of entrepreneurship is a subject of great interest. We set out a framework encompassing the individual process between entrepreneurial perceptions and entrepreneurial activity and demonstrate how the urban environment can have an impact on this process. We create entrepreneurship indices for 34 world cities exploiting the Global Entrepreneurship Monitor (GEM) Database 2001-2006. We investigate differences between the city-level and country-level for a selection of the indices. These exercises can be seen as initial tests of the 'entrepreneurial advantage of cities.' Based on the literature we expect that most indices will be higher for world cities, although exceptions are also plausible, for instance in world cities where the government resides. Our findings predominantly confirm the entrepreneurial advantage of world cities.

JEL-classification: R11, M13, O18

Keywords: entrepreneurship, world cities, entrepreneurial perceptions, entrepreneurial activity, urbanization, Global Entrepreneurship Monitor

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Introduction

The general importance of world cities for economic development is underlined by the fact that since 2007, more than 50% of the global population lives in urban areas. By 2030 nearly 5 billion people will live in cities - roughly 50 percent of the world population - whereas only 13 percent lived in cities in 1900. A recent issue of *Science* (2008) took a broad perspective on the ramifications of urban life and how they will impact global development. Glaeser et al (1992) stress the importance of the availability of human capital in cities in line with Jacobs' seminal work on cities' externalities (Jacobs, 1969). Furthermore, a high degree of cultural and economic diversity in metropolitan areas, compared to the rest of the country, may enhance growth (Florida, 2004; Lee et al., 2004).

Considering the increased attention on urban areas it is not surprising that the regional dimension of entrepreneurship is a subject of great interest. (Acs and Armington, 2004; Wagner and Sternberg 2004, Van Stel and Storey, 2004; Acs and Storey, 2004). However, two issues loom rather large on the horizon. First, the interplay between entrepreneurship and economic development has not been theoretically grounded in either the new growth theory or the new economic geography (Acs and Varga, 2005). Second, the empirical studies that focus on this while finding a correlation between entrepreneurship and growth have all focused on regional differences within a single country. Therefore, most cross-country comparisons on world cities (Taylor 2004; OECD 2007) do not have data enabling comparisons on entrepreneurship. Thus, while demographic and economic data on global cities are increasingly becoming available, little is known about entrepreneurial activity across global cities.

This paper is a first attempt at filling this gap. We set out a framework encompassing the individual process between entrepreneurial perceptions and entrepreneurial activity and demonstrate how the urban environment can have an impact on this process. We then use Global Entrepreneurship Monitor (GEM) data to study variations in entrepreneurial perceptions and entrepreneurial behavior across 34 world cities. The GEM data comprise of thousands of individuals answering questions on their perceptions towards, and involvement in, entrepreneurial behavior. This study is conducted annually in more than forty countries since the end of the 1990s (see Reynolds et al. 2005 for a detailed description of GEM data). By merging the existing national datasets from 2001 to 2006 and abstracting the responses from inhabitants from world cities, we have sufficient coverage for exploring entrepreneurial perceptions and entrepreneurial behavior in 34 world cities¹.

The analytical focus of this paper is purely descriptive. We aim at describing the various elements of the entrepreneurial process. That is, we set out differences in entrepreneurial perceptions, as well as stages of entrepreneurial activity. In addition, we explore some of the types of entrepreneurship. All indicators encompassing entrepreneurial perceptions, intentions and activity are examined. Finally, we investigate differences between the city-level and country-level for a selection of the indices. These exercises can be seen as initial tests of the 'entrepreneurial advantage of cities.' Based on the literature we expect that most indices will be higher for world cities, although exceptions are also plausible, for instance in world cities where the government resides.

We proceed first by presenting a framework that describes the entrepreneurial process and how characteristics on the national and metropolitan area level may influence the metropolitan pool of potential entrepreneurs, and ultimately, the number of people involved in early-stage entrepreneurial activity. The second part of this paper presents several indicators capturing different phases in the entrepreneurial process as well as characteristics of early-stage entrepreneurial activity at the city level. We conclude with a brief discussion and suggestions for further research in this avenue.

Entrepreneurship in world cities: relevance and definitions

It is generally accepted in the spatially oriented entrepreneurship research that entrepreneurship is primarily a "regional event" as Feldman (2001) put it (for further supporting arguments see Sternberg and Rocha 2007). That means that entrepreneurial decisions by individuals (in favor or against self-employment) as well as the success or failure of a start-up is influenced, beside other factors, by

¹ We require a minimum of 700 respondents per world city, where world cities are defined according to regional labor market boundaries, as explained further on.

factors related to the region where the individual and the start-up are located. This kind of regional impact – with the region typically being a sub-national territory clearly below a radius of 100 or even 50 km – is often stronger than the national or even continental impact.

Having defined the ‘region’ this way does not mean that we have already defined world cities, metropolitan areas or urban regions. Of course, only some regions can be classified as ‘urban’. In many countries, the majority of regions is more or less rural, but definitely not urban or even metropolitan. Thus, discussing entrepreneurship in urban regions or cities calls for a definition of a city or an urban region. There is no doubt that population density and a certain absolute number of inhabitants are the most popular criteria to distinguish urban from rural areas in empirical studies.

Several cross-regional empirical studies in different countries have shown that a positive relationship between population density, population size on the one hand and new firm formation on the other exist (Fotopoulos and Spence 1999 for Greek regions, Armington and Acs 2002 for US regions, Reynolds et al. 1994 for European regions, Brixey and Grotz, 2002 for German regions). However, density and absolute population size are only necessary but not sufficient criteria. Given the large and still increasing number of both large (in terms of population) and densely populated cities for example in China many of them lacking what we would call metropolitan it is clear that for the label metropolitan the sheer number of inhabitants and a high population intensity is not sufficient.

An urban climate has a lot to do with cultural richness, economic diversity, international connectivity, and infrastructure excellence (education, transport) that is not available in each city. The Loughborough working group on world cities has developed a valuable empirical framework to identify and to empirically analyze world cities or metropolitan regions (see <http://www.lboro.ac.uk/gawc/> and Taylor 2004). In lack of adequate quantitative data on these more qualitative characteristics of urban and metropolitan life most of the studies on regional entrepreneurship must rely on the simple, but available data covering populations size and population density. In such studies the latter serve as a proxy “for all kinds of regional influences, such as the availability and cost of needed resources like floor space and qualified labor, the presence of specialized services and venture capital, spatial proximity to customers and to other businesses in the industry, the regional knowledge stock and knowledge spillovers (...), quality of life (...) etc.” (Fritsch and Falck 2007, 159).

Entrepreneurship in world cities: Theory and measurement

In regionally motivated research we may distinguish three main arguments in favour of a special treatment of large cities/metropolitan areas because they offer explanations for more entrepreneurial activities in such agglomerations compared with other settlements.

Jacobs’ urban externalities

Jacobs (1969) had already focused on a specific type of agglomeration effects in her book on “The Economy of Cities” some 40 years ago. Her basic argumentation is still quite convincing: the more intensive intra regional competition among firms is the higher regional economic growth. Consequently, an increasing number of firms, resulting from more start-ups, would increase competition and thus regional economic growth. Different from the more static perspective of the Marshall-Arrow-Romer externalities that focus on *intra*-industry agglomeration (or localization economies) Jacobs externalities have a dynamic perspective in their focus upon *inter*-industry agglomeration (urbanization economies). Entry of new firms, exit of incumbent ones and firm turnover have stronger effect on regional innovativeness and productivity than competition among incumbent firms (Falck 2007, Aghion and Howitt 2006). Urbanization economies are positively correlated with population size of the city because a greater number of new firms, as observable in larger cities, increases the probability of inter-industry connections and spillover effects. Heterogeneity, **not** specialization in sectoral-regional clusters is seen as the most important determinant of regional economic growth.

Agglomeration and technological change

Technological change is the most important factor in long-run macroeconomic growth (Solow 1957). In new growth theory the technological element of the growth process is directly modeled within the

economic system as a result of profit motivated choices of economic agents. Recently published findings in entrepreneurship, the geography of innovation and the new economic geography suggest that the extent to which a country is “entrepreneurial” and its economic system is “agglomerated” could be a factor that explains technological change. In this section we outline these literatures from an economic growth perspective.

As long as the knowledge necessary for technological change is codified (i.e., it can be studied in written forms either in professional journals and books or in patent documentations) the access to it is essentially not constrained by spatial distance: among other means libraries or the Internet can facilitate the flow of that knowledge to the interested user no matter where the user actually locates.

However, in case knowledge is not codified, because it is not yet completely developed, or it is so practical that it can only be transmitted while knowledge is actually being applied, the flow of knowledge can only be facilitated by personal interactions. Thus, for the transmission of tacit knowledge spatial proximity of knowledge owners and potential users appears to be critical (Polanyi, 1967).² For example, several firms move their research facilities to geographic areas where significant amounts of related knowledge has already been accumulated in order to get easier access to that knowledge. Knowledge from other (industrial or academic) research facilities can be channelled via different means, such as, a web of social connections, the local labor market for scientists and engineers or by different types of consultancy relations between universities and private firms.

A large body of literature exists on the spatial extent of knowledge spillovers. At different levels of spatial aggregation (such as states, metropolitan areas, counties) in different countries (e.g., the US, France, Germany, Italy, Austria) and with the application of different econometric methodologies (e.g., various spatial or a-spatial methods) many of these studies conclude that geographical proximity to the knowledge source significantly amplifies spillovers between research and innovating firms. Strong evidence is provided both for the US (Jaffe, Trajtenberg and Henderson 1993, Varga 1998, Acs, Anselin and Varga 1979) and for Europe (e.g., Autant-Bernard 2001, Fischer and Varga 2003) that knowledge flows are bounded within a relatively narrow geographical range. Although certain industrial differences exist (such as for innovation in the microelectronics, instruments of biotechnology sectors proximity is more significant than for new technology development in the chemicals or the machinery industries) the hypothesis that spatial proximity is an important factor in innovation is strongly supported in the literature.

Varga (2000) provides empirical evidence that the spillover impact in knowledge production is positively related to the size of the region. Different types of agglomeration effects are at work to explain this phenomenon. Larger regions inhabit more firms connected by richer network linkages and as such the same knowledge generated by research in the area spills over to potentially more applications. Larger regions also offer a wider selection of producer services essential in technological innovation (e.g., information technology, legal, marketing services) contributing to a larger number of new technologies developed from the same knowledge base generated by (public and private) research in the area.

The new economic geography literature provides a general equilibrium framework where spatial economic structure is endogenously determined simultaneously with equilibrium in goods and factor markets (Krugman 1991, Fujita, Krugman and Venables 1999). This is a real breakthrough in economics given that before the appearance of the new economic geography no school of economics since von Thünen's *Der Isolierte Staat* in the early nineteenth century had been able to build an economic model where the development of spatial structure is treated endogenously within a general equilibrium framework (Samuelson 1983).

The most recent models in the new economic geography incorporate the effects of knowledge spillovers on the formation of spatial economic structure as well as provide the first attempts to explicitly integrate the two “new” schools of economics: the new growth theory and the new economic geography (Fujita and Thisse 2002, Baldwin et al. 2003). The need for the integration of the two schools is clear if one takes into account that agglomeration facilitates knowledge spillovers (according to the new economic geography) and knowledge spillovers determine per-capita GDP

² Referring to Gertler (2003), however, we should acknowledge that the spatial implications of the distinction between tacit and codified knowledge are more complex, because the cultural, contextual and institutional underpinnings of economic activities should not be ignored.

growth (according to the new growth theory) then it is not an unrealistic assumption that spatial economic structure affects macroeconomic growth³.

Creativity and the 'geography of talent'-hypothesis

According to the "economic geography of talent" hypothesis put forward by Florida (2004, 2002b), which he developed with data on regions in the US, highly qualified people tend to live in close spatial concentration. Such regions are characterised by low barriers to entry for well educated, young workers who are attracted in particular by cultural diversity and openness towards the new and the "different". The indices he has developed to back up his hypothesis empirically ("coolness index", "gay index") are capable of explaining the strong spatial concentration of creativity and talent in the USA and its metropolitan statistical areas (MSA).

Florida (2002a) especially focus on the role of "bohemia" for the economic growth of regions. Although some of the empirical data and indicators in Florida's work are disputable there is no doubt that the 'war for talents' has begun given the increasing shortage of highly-skilled labor in all industrialized countries and regions. There is a worldwide competition for talented people, especially among firms located in the limited number of real 'global cities' or 'world cities' in the definition of Taylor (2004). The hitherto small number of empirical studies on the spatial mobility and entrepreneurial activities of the members of Florida's "creative class" (Florida 2004, Boschma and Fritsch 2007) show, that they are highly mobile in a spatial sense, very discriminating when choosing locations and that they represent a large entrepreneurial potential.

While micro-based studies with individual data are still scarce, a study for German regions based upon macro data show that the number of creative people in a region seems to be positively correlated with a high share of immigrants, of innovations per employment and of start-ups (Fritsch and Stützer 2007). Florida (2004) stresses the attractiveness of urban areas for highly creative individuals. They either stay in such creative regions if they were born there or they leave other less creative regions. Florida (2002a) himself tries to shed some empirical light on his argument by describing and explaining the significant interregional differences in terms of creativity between US metropolitan statistical areas – and implicitly assuming that his creativity indices are much smaller in other non-urban US regions not analysed by him. Given the fact that creative people are more inclined to independence in general and to economic independence in particular it seems to be plausible that they have a higher propensity to start a company than non creatives. Consequently and keeping all other aspects equal, regions with higher shares of creative people (i.e. urban areas) should also be characterised by higher start-up rates (than non-urban areas).

While causalities are not always easy to figure out it seems to be obvious and in line with Florida's argumentation that there is an interdependent relationship between certain characteristics of a metropolitan city (e.g. cultural and/or ethnic diversity), the number of talented people within this city, and the amount of entrepreneurial activities. Talented people are more creative than the rest of the population, they are more entrepreneurial and they prefer cities with certain attributes like tolerance, economic welfare, knowledge intensity. Some of these cities are global cities but some smaller ones are also included. The creative city is not always a large one – and not all of the large ones are creative ones – but a considerable overlapping does exist. Creative or talented people need a certain kind of environment but – on the other hand - they also contribute to this cultural rich, creative environment due to their existence and their regional and social embeddedness.

Thus they are potentially able to create a self-enforcing intraregional process of economic growth that is knowledge-based and perpetuated by new firms the founders of which are normally creative persons from within the region. This process also helps to attract highly mobile talented people from other regions as a result of image effects (see, e.g., the argumentation by Glaeser, Kolko and Saiz (2001). In her seminal contribution to the role of cultural differences in two prominent US high-tech regions Saxenian (1994) combined the role of entrepreneurship, culture and competition to explain why three *regional* advantage matters – this time in favour of the Silicon Valley and against the Greater Boston area. Both regions are highly urbanized and densely populated but are not home of the biggest cities in the country.

³ Another recent strand of research related to this deals with 'Evolutionary Economic Geography' in which the underlying mechanisms are viewed as evolutionary, path dependent processes rather than equilibriums (see Boschma and Frenken 2006; Martin and Sunley 2006).

In order to sum up, agglomeration effects – no matter whether they are Jacobs externalities in terms of urbanization economies or Marshall-Arrow-Romer externalities in terms of localization economies - are the main argument why cities should have higher start-up rates than non-urban regions. Such effects include, among others, access to higher education, exploitation of local knowledge spillovers and the presence of highly sophisticated markets which offer a variety of niches that can be exploited by smaller firms. Furthermore, cities offer a great range of infrastructure, which is of interest especially for younger and/or more highly educated people. So, besides the enhancement of demand, cities also have larger shares of highly educated people, which increase the pool of potential entrepreneurs.

While the above theories suggest that cities are important for economic development, none of the above theories suggests, incorporates or integrates the entrepreneur into its core arguments. While some of the theories hint at this by focusing on people talent the connection between agents and regional development is suggested at best. The next section puts forward a way to help us integrate thinking on the possible connections.

The process of entrepreneurial orientation: from perceptions to activity

Perceptions to entrepreneurship and entrepreneurial intentions

Urban areas may be distinctive in how agents perceive entrepreneurship. Perceptions about entrepreneurship may affect the *supply side* and the *demand side* of entrepreneurship. On the supply side, or the ‘pool’ of potential entrepreneurs, important perceptions include both willingness and perceived ability to become an entrepreneur (Davidsson et al. 1991). Education levels and the availability of entrepreneurship training programs are possible determinants of perceived skills.

On the demand side, or ‘space for’ entrepreneurship, there need to be opportunities for entrepreneurship, but equally entrepreneurs need to *perceive* opportunities to start a business (Kirzner 1973; Shane 2003). The quantity and quality of perceived opportunities may be enhanced by regional and national conditions such as economic growth, population growth, culture, and national entrepreneurship policy.

But there are more factors than these at play. As agents see more and more successful entrepreneurs in their direct – mostly local - environment, this may enhance their perception of their own capabilities without enhancing actual capabilities. This effect will be enforced when the economic climate is favorable. Furthermore, there may be demographic differences in (perceived) entrepreneurial capabilities for historical socio-economic or cultural reasons. Policy programs may explicitly target groups exhibiting low shares of perceived capabilities as well as low shares of actual capabilities. Thus, several distinct regional and national conditions may affect perceived capabilities directly and indirectly.

In Figure 1 we identify the main components of entrepreneurial perceptions. In this model, Entrepreneurial Framework Conditions (EFCs) affect the extent to which people see *opportunities* to start a business and the extent to which they think they have the required *capabilities* to start a business. An important issue here is that the model deals with *perceived* opportunities and capabilities rather than “real” opportunities and capabilities. It is people’s perception of the environment and themselves that drives them into (or away from) entrepreneurship (Arenius and Minniti 2005; Minniti and Nardone 2007).

It is also possible that people decide to start a business when a very specific business opportunity comes into view unexpectedly. They may act on this even though, before the business opportunity came on their way, they did not see opportunities to start a business in their area. These people have not considered setting up a business until the opportunity was presented to them. Thus, for entrepreneurs, the perception of opportunities may come well in advance, or just before setting up the business, or at the same time⁴. Shane (2003) describes the process of individual-opportunity nexus

⁴ Hills and Singh (2004) report that among 472 US nascent entrepreneurs in 1998, for 37% the opportunity discovery came before the desire to start a business, while for 42% the desire to start came before the recognition of an opportunity. For the remaining 21% opportunity recognition and desire to start came at about the same time.

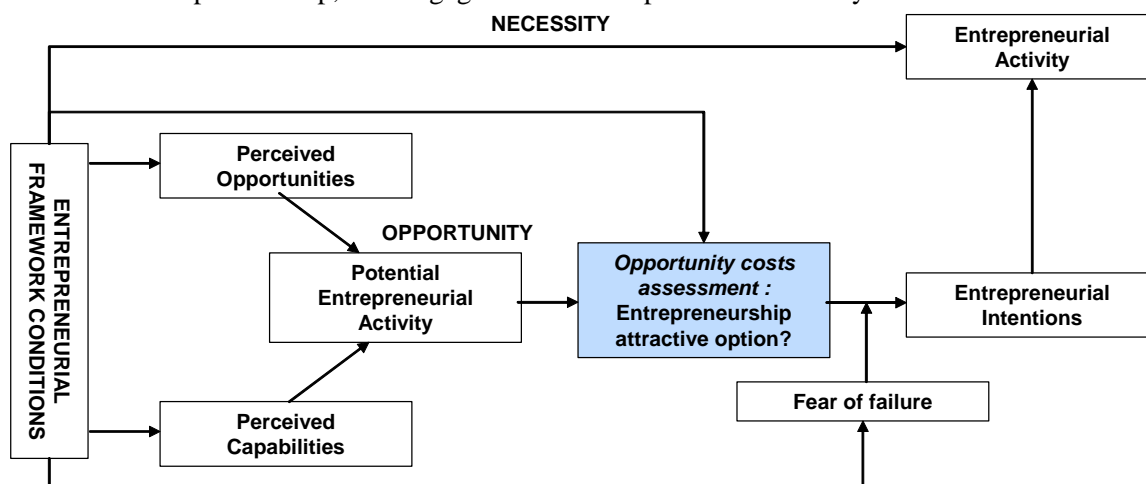
where it is given that opportunities exist⁵. In his model these existing opportunities need to be discovered. In this view, national governments could consider ways of increasing the likelihood of discovery as a means of enhancing the entrepreneurial climate.

If an individual exhibits positive perceptions towards entrepreneurship it is by no means certain that he or she will actually get involved in entrepreneurial activity. There are several assessments to be made, which may or may not be conscious. First, there is the *assessment of opportunity costs* (Lucas 1978; Shane and Venkataraman 2000), which involves comparing the expected returns of entrepreneurship to the expected returns of an alternative occupation. The most common alternative is ‘being employed’, but ‘being unemployed’ became an increasingly important alternative also in several industrialized countries like Germany where entrepreneurial activities by unemployed individuals was quite a popular option until recently when a Federal government program to support start-ups out of unemployment has been stopped (see also Bergmann and Sternberg 2007).

Then, there is a *risk-reward assessment*: even if the expected returns to entrepreneurship are considerably higher than the best alternative, the (perceived) risks involved may be too high for a person who is thinking about starting a business. An individual’s risk-avoidance preference may be a significant factor in the transition from potential (or latent) entrepreneurship to entrepreneurial activity (Khilstrom and Laffont 1979). While most empirical studies show that more risk-averse individuals less likely become entrepreneurs (Wagner 2008), recent results from an experimentally survey show that this is only true for people coming out of employment but not for previously unemployed or inactive persons for whom risk attitudes did not play a role in the decision whether or not to start a firm (Caliendo, Fossen and Kritikos 2008). At the same time, the individual may also be influenced by demographic characteristics such as age, gender, origin or ethnicity and also institutions. For instance, older people might include their health and the specifics of the health care system in the risk-reward assessment, while immigrants might perceive fewer alternative options for earning a living. Fear of failure is often considered as an important cultural component that is detrimental to new firm activity. However, so far this asserted effect has not been fully confirmed.

There is no general pattern describing the sequence in which assessments are made and steps are taken. But it is these intrinsic assessments that may ultimately lead to a proclaimed intention (and subsequent action) to start a business. The process described is explored with opportunity-related entrepreneurship in mind. As described in the previous section, this holds for the bulk of entrepreneurs, particularly in high-income countries. For some people, however, being involved in entrepreneurial activity is a necessity; there are simply no other options to earn a living and there is no comparative assessment to be made.

Figure 1: National and Regional Entrepreneurial Framework Conditions, Perceptions about Entrepreneurship, and Engagement in Entrepreneurial Activity



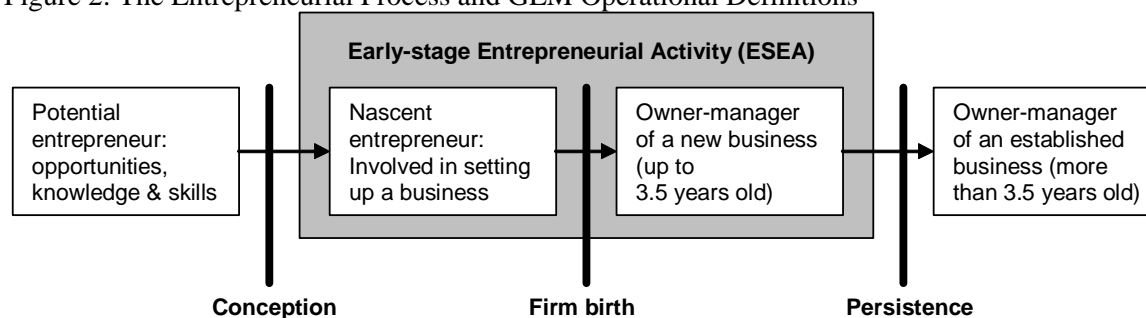
Source: Bosma et al. (2008) based on Wennekers (2006).

⁵ The model proposed by Shane focuses at entrepreneurial behavior without necessarily linking to owning and

Phases of entrepreneurial activity

Figure 2 summarizes the entrepreneurial process and GEM's operational definitions. Entrepreneurial activity starts at the point when individuals commit resources to start a business they expect to own themselves (nascent entrepreneurs). Two consecutive phases are also identified; (i) when they currently own and manage a new business that has paid salaries for more than three months but less than 42 months (new business owners); and (ii) when they own and manage an established business that has been in operation for more than 42 months (established business owners). Combining the phase of nascent entrepreneurship and the phase of new business ownership yields "Early-stage Entrepreneurial Activity" (ESEA)⁶.

Figure 2: The Entrepreneurial Process and GEM Operational Definitions



Source: Reynolds et al (2005)

The payment of any wages for more than three months to anybody, including the owners, is considered to be the "birth event" of actual businesses. Thus, the distinction between nascent entrepreneurs and new business owners depends on the age of the business. Businesses that have paid salaries and wages for more than three months and less than 42 months may be considered new. The cut-off point of 42 months has been made on a combination of theoretical and operational grounds. The prevalence rate of nascent entrepreneurs and new business owners taken together may be viewed as an indicator of early-stage entrepreneurial activity in a country. It represents dynamic new firm activity; even if a fair share of nascent entrepreneurs do not succeed in getting the business started, their actions may have an effect on the economy since they can put pressure on incumbent firms to perform better.

Business owners who have paid salaries and wages for more than 42 months are classified as "established business owners." Their businesses have survived the liability of newness. High rates of established business ownership may indeed indicate positive conditions for firm survival. However, this is not necessarily the case. If a country exhibits high degree of established entrepreneurship combined with low degree of early-stage entrepreneurial activity, this indicates a low level of dynamism in entrepreneurial activity.

The set of prevalence rates of the population engaged in the various life-cycle stages of owner-operated businesses form a primary and fundamental indicator of a region's entrepreneurial activity. Still, interpretations are not straightforward. For instance, a high share of established business owners paired with a low percentage of early-stage entrepreneurial activity may reflect a regional economy with sustainable businesses. On the other hand, it may also reflect a region with low entrepreneurial dynamism. While a certain degree of entrepreneurial dynamics is fruitful for economic development, fostering the established businesses adds to economic stability.

Identifying different types of early stage entrepreneurial activity

In order to address this issue for developing countries, GEM researchers started to collect data on both opportunity entrepreneurship (starting a business to exploit a perceived business opportunity) and necessity entrepreneurship (starting a business because you were pushed into it). However, both measures show higher levels in developing countries than in developed countries. Many respondents

managing a business.

⁶ ESEA is the same measure as what is known as TEA in most GEM reports. Here we use ESEA in order to emphasize the early-stage character of the measure.

are probably tempted to state they are pursuing an opportunity rather than being involved in entrepreneurial activities because they have no other option for work, even if the latter statement describes the activity best. Also, job opportunities and thus opportunity *costs* of entrepreneurship are higher in developed countries, reducing the degree of opportunity entrepreneurship. Put differently, agents may opt for being employed because of the good job opportunity. However if the existing job opportunities would be less rewarding (but still existent) this agent would, if involved in entrepreneurial activity, also state to be motivated by opportunity rather than necessity.

Thus, the relationship between necessity entrepreneurship and economic development is most likely *negative* in low-income countries while the relationship between opportunity entrepreneurship and economic development in high-income countries is most likely *positive*. This must be further balanced by the fact that some low income countries like India and China have high levels of opportunity entrepreneurship, at least in certain parts, and countries like Japan have very low levels of opportunity entrepreneurship and low growth.

Because opportunity early-stage entrepreneurial activity (or the general ESEA) could incorporate any type of entrepreneurial activity including self-employment, this rate can include low-growth or no-growth entrepreneurship. In the GEM data, nearly 50% of all start-up attempts do not expect to create any jobs within five years (Autio, 2007). In order to separate high-potential entrepreneurs, GEM methodology computes the High-Growth Expectation ESEA index (HEA), that is the percentage of adult-age population involved in ESEA who expect to create 20 or more jobs within five years⁷.

Data and methods

We use data from the Global Entrepreneurship Monitor (GEM) for creating indicators on regional entrepreneurial perceptions and regional entrepreneurial activity. Since 1999 GEM provides national indicators on entrepreneurial activity for an increasing number of countries (see Reynolds et al., 2005; Bosma et al., 2008). The indicators are based on telephone and face-to-face surveys among a representative sample of the adult population⁸. One important finding of the GEM studies so far is that cross-country variation in early-stage entrepreneurial activity is very persistent over years. By merging the individual-level GEM data over 2001-2006 for 34 metropolitan areas worldwide, we create indicators on entrepreneurial perceptions, intentions and activity. The indices pertain to the 2001-2006 period. Merging 2001-2006 data is justified since the existing evidence clearly points at the pervasiveness of regional differences in entrepreneurial attitudes and cultural values in general (Beugelsdijk et al. 2006). In addition, other regional measures of early-stage entrepreneurial activity appear to exhibit a large extent of path dependence (Parker 2005, Fritsch and Mueller 2007) and are largely determined by the regional industry structure (Brenner and Fornahl 2008).

We define metropolitan areas by the relevant local labor market area⁹. The selection of cities is restricted by sample sizes coverage in the GEM project; we require at least 700 observations in each urban area. All regional indices were obtained after weighting each respondent according to regional age and gender structures as provided by national census offices. Table 1 gives an overview of the included global cities and the boundaries of the urban areas involved.

Of the 34 cities included in our study, 33 are ranked in the top 100 (26 in the top 50, 8 in the top 10) of the GaWC dataset on network services connectivity for 315 world cities¹⁰. This is an indication that our sample consists of a relevant set of world cities – not only based on population but also based on network services connectivity. The total sample comprises over 101,836 adults between 18-64 years over 34 cities.

⁷ Like ESEA the HEA varies across GEM participant countries. For complete measures and explanation about HEA indexes see the *GEM 2007 Report on High-Growth Entrepreneurship* (Autio, 2007).

⁸ All developed countries participating in GEM use telephone interviews, most developing countries apply face-to-face interviews.

⁹ In this, the available data forces us to use wider urban areas than targeted in some occasions; this is the case when no detailed regional indicator exists. For instance, for Italy, the nuts2 level is the most detailed spatial level we can identify. Also the Kanto region is one third larger than what is usually defined as the Tokyo metropolitan area in terms of population size. On the other hand the identified region of Brussels may be too small with an area of only 161 km².

¹⁰ These data are produced by P. J. Taylor and constitute Data Set 12 of the GaWC Study Group and Network (<http://www.lboro.ac.uk/gawc/>) publication of inter-city data

Table 1 Metropolitan areas included in the study

Metropolitan area	Definition of metropolitan area in this study	Population (x 1000)*	Area (km ² x 1000)	Sample size 18-64 years
Amsterdam	Nuts3: Greater Amsterdam	1,200	0.7	1,504
Auckland	Region of Auckland (Unitary Authority)	1,400	16.1	2,211
Bangkok	Metropolitan Area	10,700	7.8	1,207
Barcelona	Nuts3: Barcelona	5,400	4.3	2,456
Berlin	Raumordnungsregion: Berlin (nuts1)	3,400	0.9	2,064
Brussels	Nuts1: Bruxelles	1,000	0.2	1,756
Buenos Aires	Ciudad Autónoma de Buenos Aires	13,000	4.8	2,510
Cape Town	Province Western Cape, urbanized area	3,000	2.5	1,535
Copenhagen	Nuts2: Hovedstadsreg	1,900	2.9	4,705
Dublin	Nuts3: Dublin	1,200	0.9	2,688
Frankfurt	Raumordnungsregion: Rhine-Main	5,800	13.0	1,552
Hamburg	Raumordnungsregion: Hamburg (nuts1)	1,800	0.8	1,010
Helsinki	Metropolitan Area: Uusima	1,400	6.4	3,043
Hong Kong	Country	7,000	1.1	6,004
Johannesburg	Province Gauteng, urbanized area	3,900	1.6	2,956
London	Nuts1: London	7,600	1.6	7,403
Los Angeles	SMSA: Los Angeles	12,900	12.6	919
Madrid	Nuts1: Madrid	5,600	8.0	7,044
Melbourne	Labor market area	3,800	8.8	2,875
Milan	Nuts2: Lombardia	9,300	23.9	1,735
Montreal	Census Metropolitan Area	3,600	4.3	2,302
Munich	Raumordnungsregion: Munich	6,000	27.7	1,372
New York	SMSA: New York	18,800	6.7	1,009
Paris	Nuts1: Île de France	11,300	12.0	2,168
Rome	Nuts2: Lazio	5,200	17.2	799
Rotterdam	Nuts3 : Greater Rijnmond	1,400	1.2	1,643
Santiago	Región Metropolitana de Santiago	6,100	15.4	1,692
Shenzhen	Metropolitan Area	12,000	2.0	4,040
Singapore	Country	4,600	6.5	17,884
Stockholm	County of Stockholm	1,900	6.5	2,306
Sydney	Metropolitan Area	4,300	12.1	2,937
Tokyo	Kanto Region	41,900	32.4	4,415
Toronto	Census Metropolitan Area	5,100	5.9	1,397
Vancouver	Census Metropolitan Area	2,300	2.9	695

* 2006 population as published by national statistics

Table 2 lists the entrepreneurship indexes included in this study - all derived from the Global Entrepreneurship Monitor surveys 2001-2006. The first set of indices relates to perceptions to entrepreneurship as described in Figure 1. The second set defines Early-stage Entrepreneurial Activity (ESEA) and two components. Opportunity ESEA only includes the individuals who indicate to be involved in ESEA merely to take advantage of a business opportunity. Nascent entrepreneurial activity rates only include the individuals who have not yet started their business (see Figure 2).

Different types of early-stage entrepreneurial activity are assessed by further examining the individuals involved in ESEA on the relative occurrences of job growth expectation, business activities and new product-market combinations. Business activities are linked to Florida's creative class as discussed in the theory section and to technology. Since the types of entrepreneurial activity are based on a much smaller sample (equal to the number of early-stage entrepreneurs in each city

sample) than the other indicators these results should, as regards the ranking of cities be interpreted with great care. It is the general pattern and particularly the overall pattern of world cities in comparison to the results for the rest of the rest of the country we are interested in.

Table 2 GEM Measures used in this study

Item	Definition of GEM measure
<i>Perceptions to entrepreneurship</i>	
Perceived opportunities	Percentage of 18-64 population who see good opportunities to start a firm in the area where they live
Perceived capabilities	Percentage of 18-64 population who believe to have the required skills and knowledge to start a business
Perceived opportunities & capabilities	Percentage of 18-64 population who have a positive perception of their own entrepreneurial capabilities and the entrepreneurial opportunities in the area where they live
<i>Early-stage Entrepreneurial Activity</i>	
ESEA: Early-stage entrepreneurial activity	Percentage of adult population 18-64 years involved in either nascent entrepreneurial activity or baby business ownership (see also Figure 2)
Opportunity ESEA	Percentage of adult population 18-64 years involved in ESEA (see above) and indicating to be involved to take advantage of a business opportunity (rather than 'no better options for work')
Nascent entrepreneurial activity	Percentage of adult population 18-64 years involved in nascent entrepreneurial activity (see also Figure 2)
<i>Types of Early-stage Entrepreneurial Activity</i>	
ESEA job growth expectation	Percentage in ESEA who expect at least 10 employees five years from now
ESEA in sectors linked to creative class	Percentage in ESEA, whose business activities are linked to creative class (see Table A1 in the Appendix)
ESEA technology sector	Percentage in ESEA, active in technology sector (OECD classification)
ESEA new product-market combination	Percentage in ESEA who claim that their product is new and who do not have/expect many competitors

Comparing the world cities

This section presents three types of results for global cities. First we look at early-stage entrepreneurial activity. Next we look at stages of entrepreneurial perceptions in world cities. The next section compares the characteristics of early-stage entrepreneurial activity in world cities with countries.

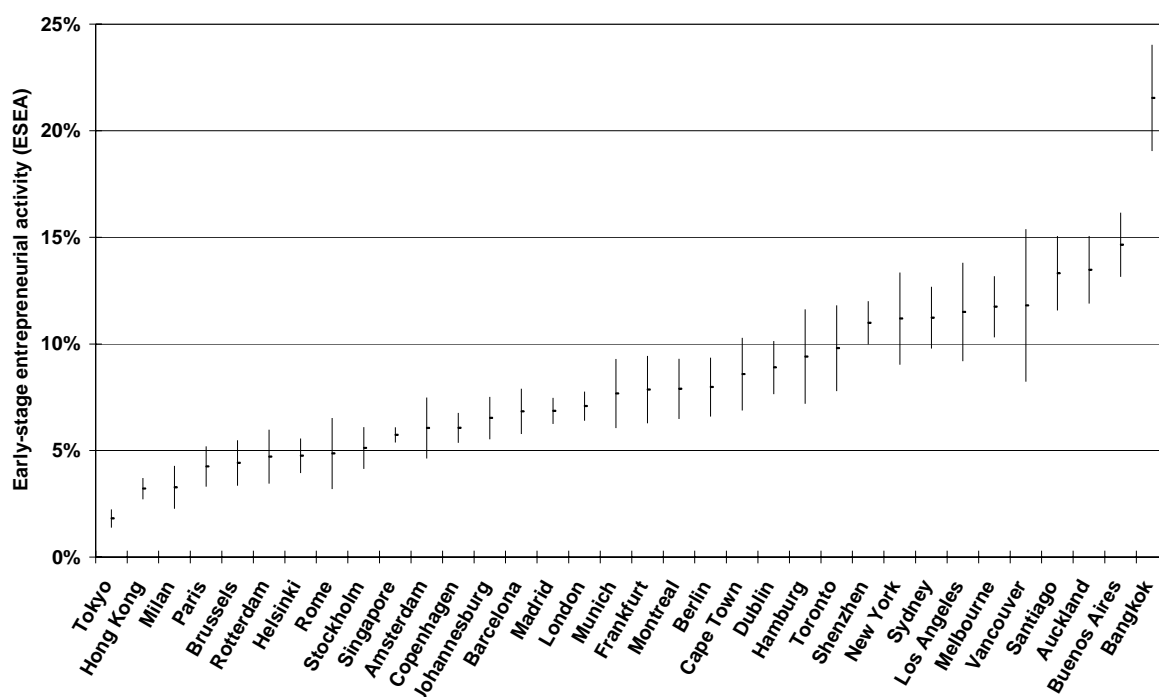
Early-stage entrepreneurial activity in world cities

We start describing the results by displaying prevalence rates of entrepreneurial activity in Figure 1. The vertical bars indicate 95% confidence level intervals. This means that, if the vertical bars do not overlap, we can state with 95% certainty that the ESEA rates differ. If the bars do overlap we cannot state with 95% certainty that the rates are different. The pattern that emerges from Figure 1 is to some extent similar to what is observed at the national level (Bosma et al 2008). Indeed, if we pair the results of the cities with the averages at the national level (averaged over years) the correlation coefficient equals 0.92¹¹.

¹¹ For Singapore and Hong Kong the city level rates equal the country-level rates by definition. If we exclude these two cities the correlation coefficient remains 0.92.

Auckland, Vancouver, Melbourne, Los Angeles, Sydney, New York rank in the top-six of most entrepreneurial cities in developed countries. These are all Anglo-Saxon cities. Early-stage entrepreneurial activity is lowest in Tokyo, Hong Kong, Milan, Paris, Brussels and Rotterdam. In general, European cities exhibit lower rates than other cities in Anglo-Saxon countries like the United States, Canada and Australia. This suggests that some cultural and institutional effects are at play. All the Anglo-Saxon countries are characterized by a high surplus of in-migration, strong impetus of individualism and a more or less passive role of the government – all these factors support entrepreneurship. In terms of the conceptual model in Figure 1, these effects may be rooted in entrepreneurial framework conditions leading to higher or lower levels of entrepreneurial perceptions, but also in the perceived risks and rewards of entrepreneurship relative to job opportunities ('opportunity costs'). These cultural and institutional differences are not necessarily determined by country borders. Montreal, situated in the 'French' part of Canada, has significantly lower early-stage entrepreneurial activity rate as compared to Toronto and Vancouver.

Figure 3 Early-stage Entrepreneurial Activity (ESEA) in Metropolitan Areas



The high ESEA rates for cities in non-OECD countries mirror the results at the country level. The high scores in Santiago, Buenos Aires and Bangkok can be explained to large extent by the lower levels of opportunity costs, as discussed with Figure 1. In Table 3 we present prevalence rates of several stages of entrepreneurial activity. Next to the overall early-stage entrepreneurial activity rates, the opportunity motivated ESEA rates are shown. Highest shares of opportunity ESEA are found in Copenhagen, Montreal, Hamburg, Dublin and Stockholm. In Bangkok, Santiago, Brussels, Tokyo, Hong Kong, Buenos Aires and Johannesburg the shares of opportunity ESEA are the lowest among the 34 included cities.

If we look at the share of nascent rates as a percentage of total early-stage entrepreneurial activity, we see Shenzhen, Stockholm, Madrid, Barcelona and Milan as the five cities with relatively few nascent entrepreneurs. Paris, Los Angeles, Hamburg, Buenos Aires and Brussels have highest proportions of nascent entrepreneurs – suggesting relatively many attempts that will not make it into a running business.

Table 3 Early-stage Entrepreneurial Activity in world cities

	In % of adult population 18-64 years			In % of ESEA	
	Early-stage Entrepreneurial Activity (ESEA)	Opportunity ESEA	Nascent entrepreneurship	Opportunity ESEA	Nascent entrepreneurship
Amsterdam	6.1	3.9	3.4	65	57
Auckland	13.5	9.5	8.9	71	66
Bangkok	21.5	12.9	11.6	60	54
Barcelona	6.8	4.4	3.4	64	50
Berlin	8.0	4.8	5.5	61	69
Brussels	4.4	2.4	3.2	55	72
Buenos Aires	14.7	6.8	10.6	47	72
Cape Town	8.6	5.3	5.8	62	68
Copenhagen	6.1	4.7	3.5	78	57
Dublin	8.9	6.5	5.5	74	62
Frankfurt	7.9	5.1	4.1	65	52
Hamburg	9.4	7.1	6.9	75	73
Helsinki	4.8	2.9	2.8	61	59
Hong Kong	3.2	1.7	1.8	52	55
Johannesburg	6.5	2.9	4.5	44	69
London	7.1	4.4	4.3	62	60
Los Angeles	11.5	8.3	8.8	72	76
Madrid	6.9	4.4	3.1	64	45
Melbourne	11.7	8.2	6.9	70	59
Milan	3.3	2.2	1.7	66	51
Montreal	7.9	6.0	5.2	76	66
Munich	7.7	5.4	4.7	71	61
New York	11.2	7.7	7.6	69	68
Paris	4.2	2.8	3.3	66	77
Rome	4.9	3.3	2.8	67	57
Rotterdam	4.7	3.0	2.7	63	58
Santiago	13.3	7.7	8.5	58	64
Shenzhen	11.0	7.8	4.1	71	38
Singapore	5.7	4.0	3.4	69	59
Stockholm	5.1	3.7	2.2	73	44
Sydney	11.2	7.5	6.6	67	59
Tokyo	1.8	0.9	0.9	52	52
Toronto	9.8	6.7	6.3	68	65
Vancouver	11.8	8.4	7.6	71	64

Entrepreneurial perceptions in world cities

Table 4 summarizes several components of the framework as displayed in Figure 1. Perceived capabilities to start a firm are highest in Auckland, Buenos Aires, Santiago, New York, Toronto, Vancouver and New York. We should note that the general perception of the 'average' firm in Buenos Aires might be different from that of Helsinki. Therefore, this indicator should be seen in the context of the stage of economic development. Also, a cultural influence seems to be present in this character; the cities of Tokyo and Hong Kong show by far the lowest self-confidence when it comes to starting a business. Both cities also score rather low on the perceived opportunities for starting a business (together with Singapore). The strong representation of eastern Asian cities in pessimistic entrepreneurial perceptions may partly reflect the importance of modesty within these cultures.

The third column of Table 3 represents the prevalence of individuals who have positive perceptions to opportunities and to their own capabilities of setting up a business. The larger the gap between these rates and involvement in entrepreneurial activity, the larger the associated opportunity

costs for entrepreneurship. This appears to be the case especially for European cities such as Amsterdam, Copenhagen, Stockholm and Helsinki. In other words, even though there is sufficient potential among inhabitants the attractiveness of entrepreneurship appears to be low for many Europeans compared to other possible sources of income. On the one hand one could conclude that in European cities entrepreneurial intentions are lagging behind, as compared to for instance cities in the United States and Australia. On the other hand one could argue that apparently there are plenty of good job opportunities in these European cities.

A variety of merely national characteristics could be underlying this phenomenon¹². It could be that there is a lot of red tape (administrative burdens) attached to starting a business, reducing the attractiveness of entrepreneurship. It could also be the case that employment protection is high. This could (i) discourage employees with positive entrepreneurial perceptions from switching to entrepreneurship and (ii) cause potential entrepreneurs to think carefully before hiring employees because they may suffer substantial losses in case their employees would become unfit for work.

For many middle- and low-income countries we see that the difference between entrepreneurial perceptions and entrepreneurial activity is relatively small, or even negative in the case of Bangkok.

¹² The pattern for country results is very similar, which suggests that it is especially national conditions that are at play here.

Table 4 Entrepreneurial Perceptions in World (in % of population 18-64 years)

	Perceived Opportunities	Perceived Capabilities	Perceived Opportunities & capabilities	Gap between Perceptions and ESEA
Amsterdam	56	40	22	16
Auckland	48	60	29	15
Bangkok	22	39	16	-6
Barcelona	39	46	18	11
Berlin	19	37	9	1
Brussels	31	35	13	8
Buenos Aires	34	61	20	6
Cape Town	30	50	22	13
Copenhagen	60	37	21	15
Dublin	38	47	21	12
Frankfurt	32	40	14	6
Hamburg	29	37	14	5
Helsinki	61	34	19	15
Hong Kong	20	21	6	3
Johannesburg	24	34	17	10
London	32	48	18	11
Los Angeles	29	51	20	8
Madrid	38	46	18	11
Melbourne	44	52	23	12
Milan	31	33	10	7
Montreal	32	49	18	10
Munich	39	43	18	10
New York	24	51	17	5
Paris	16	32	8	4
Rome	26	34	9	4
Rotterdam	42	38	16	12
Santiago	36	57	21	8
Shenzhen	46	41	22	11
Singapore	16	25	7	1
Stockholm	46	47	26	21
Sydney	47	50	25	13
Tokyo	7	11	3	1
Toronto	37	53	22	12
Vancouver	45	52	27	15

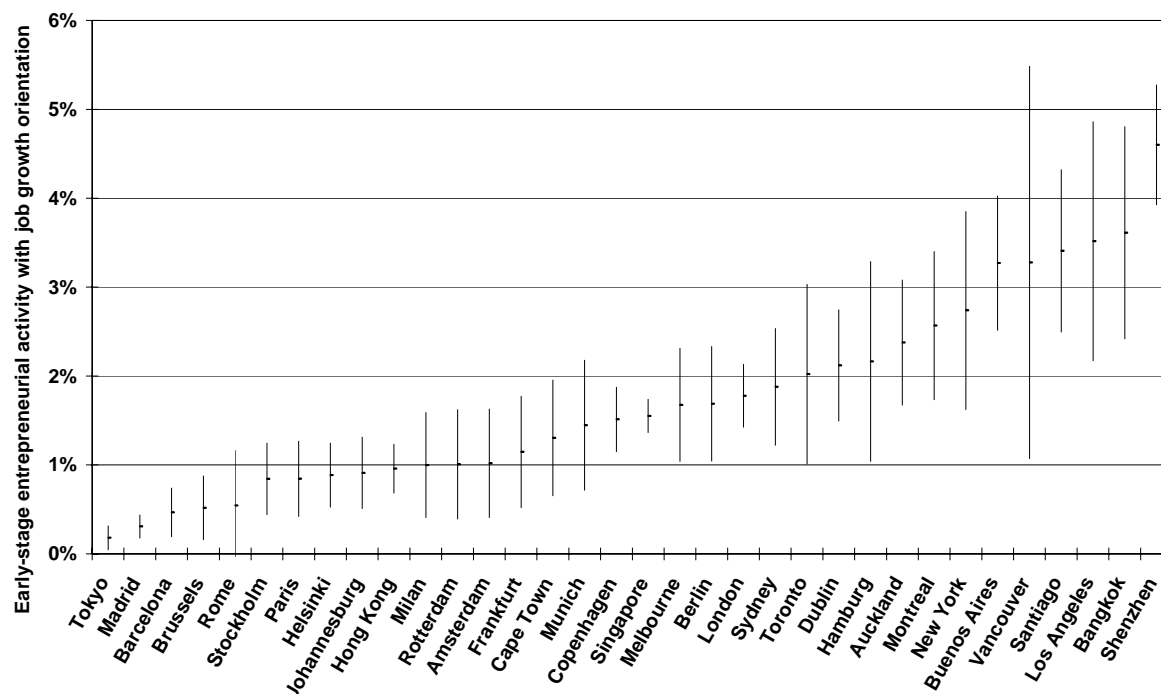
Characteristics of early-stage entrepreneurial activity in world cities

Figure 4 shows the prevalence rates of growth oriented entrepreneurship in the adult population for the 34 world cities included in this study¹³. Growth oriented early-stage entrepreneurs are most frequently found in Shenzhen, Bangkok, Los Angeles and Santiago. As can be seen from the figure the 95% confidence intervals are quite large. Still, the prevalence rate of growth oriented early-stage entrepreneurs in Tokyo, Rome, Barcelona and Madrid are significantly lower than those of, for instance, Copenhagen, London, Dublin and New York. Cities in non-OECD countries such as Buenos Aires, Santiago, Bangkok and Shenzhen have relatively high prevalence rates of growth oriented ESEA in the population between 18-64 years. The picture differs somewhat, however, if we look at *relative* occurrence of growth orientation.

¹³ Note that our definition of growth oriented entrepreneurship sets the boundary at an expected amount of 10 or more employees within five years, whereas Autio (2005,2007) uses 20 or more employees in his definition of high growth-expectation.

Table 5 shows the occurrence of several types of entrepreneurial activity, all in percentages of ESEA. We see for instance that job growth orientation differs widely; in particular the early-stage entrepreneurs in the two Spanish cities do not intend to grow, while growth orientation is highest in Shenzhen, Montreal, Los Angeles, Milan and Hong Kong.

Figure 4: Growth oriented early-stage entrepreneurial activity: percentage of population 18-64 year



The second column in Table 5 illustrates the connection between early-stage entrepreneurial activity and the existence of the creative class in world cities. Between 34% (Bangkok) and 80% (Amsterdam) of early-stage entrepreneurial activity occurs in a sector that is linked to the creative class¹⁴. For all cities in developed countries the percentage equals 48 or more. This is consistent with research by Lee et al. (2004) who argued that regional social characteristics influenced new firm formation. They showed that at the MSA level in the United States new firm formation is strongly associated with cultural creativity when controlled for the variables suggested by the literature. Firm formation is positively and significantly associated with the diversity Index but insignificantly with the melting Pot index. The share is strongest in Amsterdam, Berlin, Copenhagen, Frankfurt, Milan, Paris, Munich, Rome and London. In fact European cities appear to be leaders in entrepreneurship in creative class industries. The cities of Toronto, Copenhagen, Frankfurt and Vancouver have the highest shares of early-stage entrepreneurs in technology-sectors. Copenhagen, Buenos Aires, Hamburg, Santiago, Montreal, Toronto and Los Angeles indicate high degrees of new product-market oriented early-stage entrepreneurial activity.

¹⁴ We calculated the same percentages for established business owners. As expected these were lower for the far majority of the cities included.

Table 5: Characteristics of Early-stage Entrepreneurial Activity in world cities (in % of ESEA)

	Job growth oriented	Sectors linked to creative class	Use of latest technology	New product-market combination
Amsterdam	17	80	13	19
Auckland	18	58	13	15
Bangkok	17	34	3	15
Barcelona	7	53	9	12
Berlin	21	76	14	21
Brussels	12	60	9	19
Buenos Aires	22	54	9	33
Cape Town	15	44	5	16
Copenhagen	25	71	21	34
Dublin	24	57	14	22
Frankfurt	15	70	20	19
Hamburg	23	59	11	30
Helsinki	19	61	7	16
Hong Kong	30	54	5	15
Johannesburg	14	48	6	18
London	25	62	5	25
Los Angeles	31	52	10	26
Madrid	4	55	10	14
Melbourne	14	47	8	20
Milan	31	68	3	23
Montreal	33	55	14	32
Munich	19	66	16	19
New York	24	57	9	24
Paris	20	67	7	27
Rome	11	63	6	17
Rotterdam	21	58	11	23
Santiago	26	48	7	33
Shenzhen	42	61	10	7
Singapore	27	47	10	14
Stockholm	16	60	15	17
Sydney	17	58	15	24
Tokyo	10	60	2	6
Toronto	21	56	23	30
Vancouver	28	55	18	25

World cities compared to countries

As the theoretical section suggests agglomeration effects are the main arguments why cities should have higher level of entrepreneurship than the countries from which they come. The agglomeration effects include education, knowledge spillovers, the existing of specialized markets and sophisticated infrastructure. However, we should stress that the ESEA rates presented are overall rates of early-stage entrepreneurial activity. The types of entrepreneurial activity, such as growth orientation and innovation orientation are discussed further below and might give different results.

Early-stage Entrepreneurial Activity

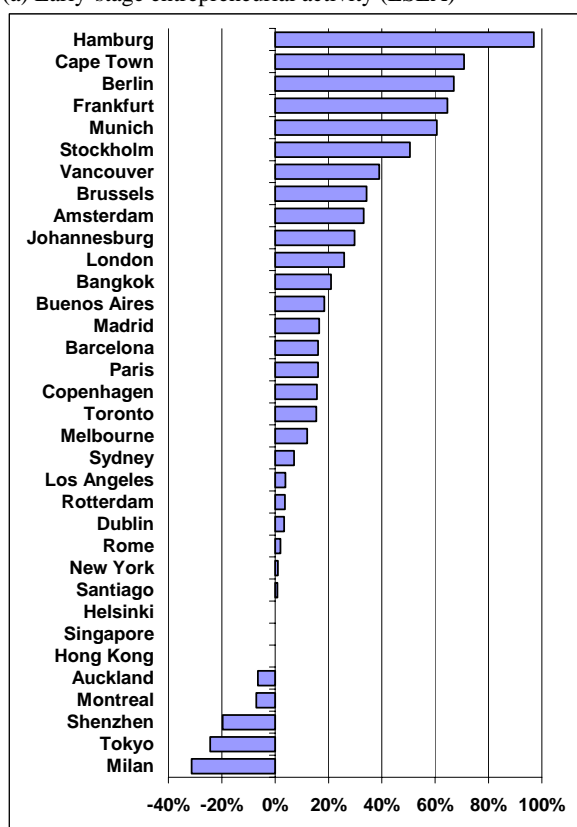
Figure 5a shows percentage differences of early-stage entrepreneurial activity between the city level and the country level. It is clear that early-stage entrepreneurial activity in a city differentiates from the rate at the country level. Many cities have higher early-stage entrepreneurial activity rates than the country, especially if the country itself is not very entrepreneurial. For example, four German cities

stand out with ESEA rates that are between 60% (Munich), 65% (Frankfurt/M.), 70% (Berlin) and 80% (Hamburg) higher than the national average over the period 2001-2006. Germany is the most unique case with vibrant entrepreneurial cities for an average performing country. For Cape Town, the difference is also over 65%, which is very different from Johannesburg (about equal to the national rate). Of the 34 world cities in our sample only five cities had a lower ESEA rates than the national average. They are Milan, Tokyo, Helsinki, Auckland and Paris. Milan and Tokyo are both large innovative cities but present anomalies. For example, Tokyo is one of the largest agglomerations in the world with 28 million people. Tokyo is also one of the leading centers of knowledge and connected the other leading technology centers in the world. This is especially surprising since Japan has one of the lowest ESEA rates in the world and Tokyo is almost 30% less. Paris and London, the two drivers of the European Union have ESEA rates in excess of the national average as expected, with New York and Los Angeles much closer to the higher U.S. national average.

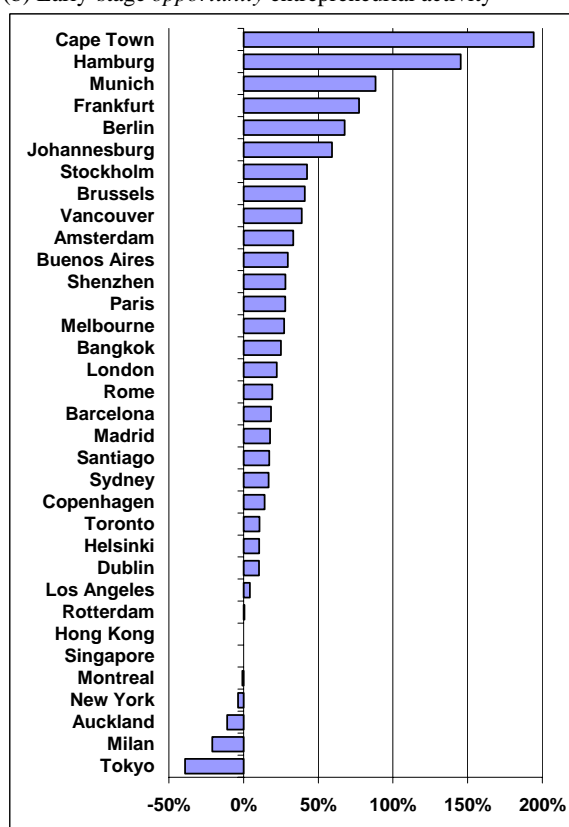
Figure 5b is similar to Figure 5a but differs in one dimension. Here only *opportunity* motivated early-stage entrepreneurial activity is considered, after which the city level result are compared to the country-level results. For most cities in developed countries, the results do not change considerably in comparison to Figure 6a: the degree of opportunity motivated entrepreneurship is fairly high. For most cities in lower income countries, however, the results do make a difference. For instance, for Cape Town the difference between city and country level becomes far more pronounced. Another notable example is the Shenzhen area: whereas the overall early-stage entrepreneurial activity rate is lower than the national average, the rate of *opportunity* early-stage entrepreneurial activity is higher.

Figure 5: Prevalence rates in entrepreneurial activity: city versus country results

(a) Early-stage entrepreneurial activity (ESEA)



(b) Early-stage *opportunity* entrepreneurial activity



Perceived opportunities and capabilities

If early-stage entrepreneurial activity should be greater in cities - as compared to the rest of the country - one would expect that the same would apply to perceived opportunities for entrepreneurship. In other words opportunity perception should be greater in large agglomerations. In fact this appears to be the case in Figure 6a. However, we have two exceptions. First, the range of differences between cities and the country appear to be greater not less, and second, almost half the cities perceive less opportunity. Looking at the case of Germany again, we see that Munich, Frankfurt and Hamburg occupy three of the top four positions with Berlin well down the list. These results are consistent with the previous differences. Moreover, again Tokyo is below the already low Japanese average.

Figure 6b shows the results of a similar analysis on perceived capabilities. Perceived skills and knowledge to start businesses are generally higher in cities as compared to the rest of the country, but the magnitude of the difference is smaller as compared to perceived opportunities.

What is perhaps most surprising is that New York City and Los Angeles are below the national average for both indicators. Is it possible that these great agglomerations in fact are not perceived as great caldrons of opportunity? In order to probe this question we set out the combined measure of perceived opportunities and capabilities (% difference with country) and *opportunity* early-stage entrepreneurial activity (% difference with country) in Figure 7. From the framework described in Figure 1 we expect to find a positive link. Note that, by examining differences between city level and country level on both axes, country effects are ignored. As shown in Figure 7 the correlation between the two is 0.73 and is positively sloped¹⁵. In other words the perception and reality differences with a country seem to be related, as we can see that Munich, Hamburg and Frankfurt all come out in the upper-right part of the scatter. The situation in the four identified German cities is very different from the rest of the country. While for many measures Germany has an average rate of entrepreneurship, its largest cities have rates of entrepreneurship and perceptions of opportunities that are positively correlated. This suggests that these differences might be country specific and that both cities and countries need to be considered in tandem.

¹⁵ The estimated slope controlling for an intercept is 0.77 and significantly different from zero at the 0.01 level (two-tailed). An alternative measure of perceived opportunities and capabilities was derived where entrepreneurs were excluded from the sample. This produced somewhat weaker results with an R-squared of 0.38, but still positive and significant.

Figure 6: Positive perceptions on opportunities and capabilities: city versus country results

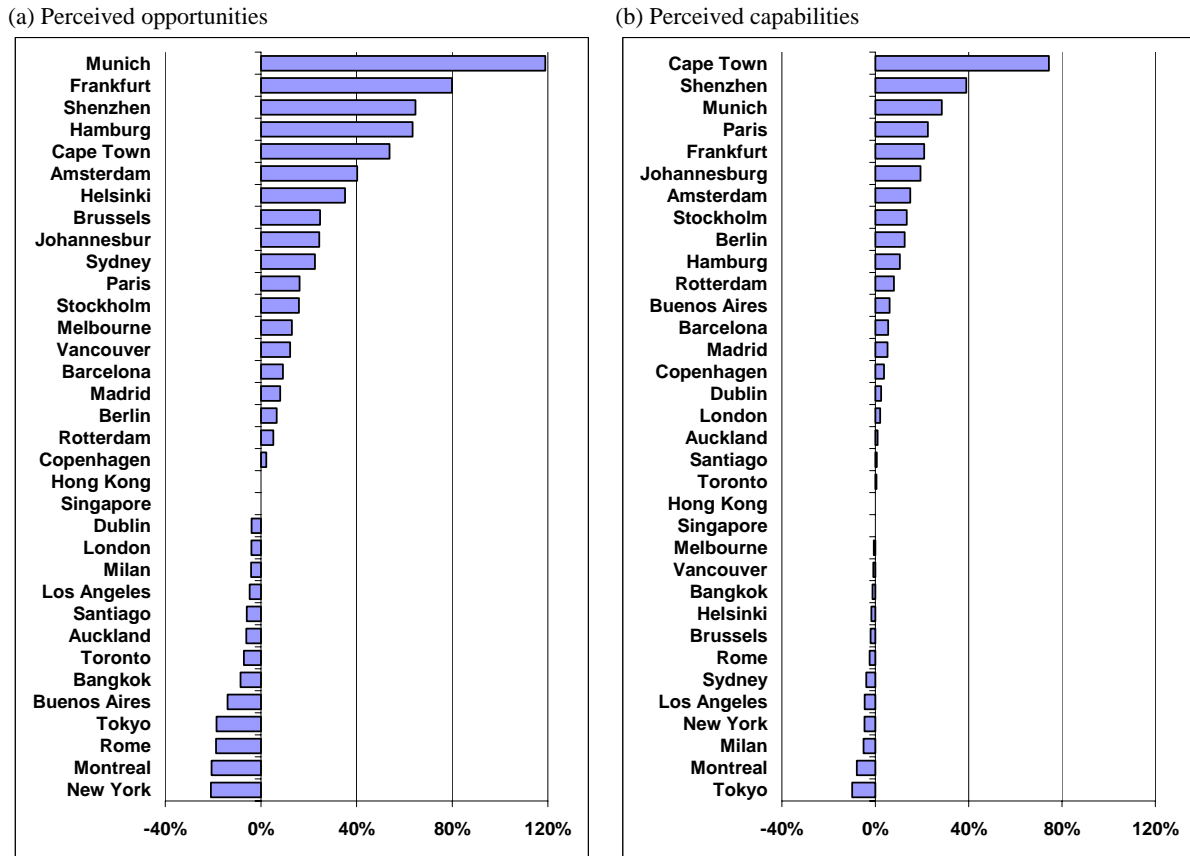
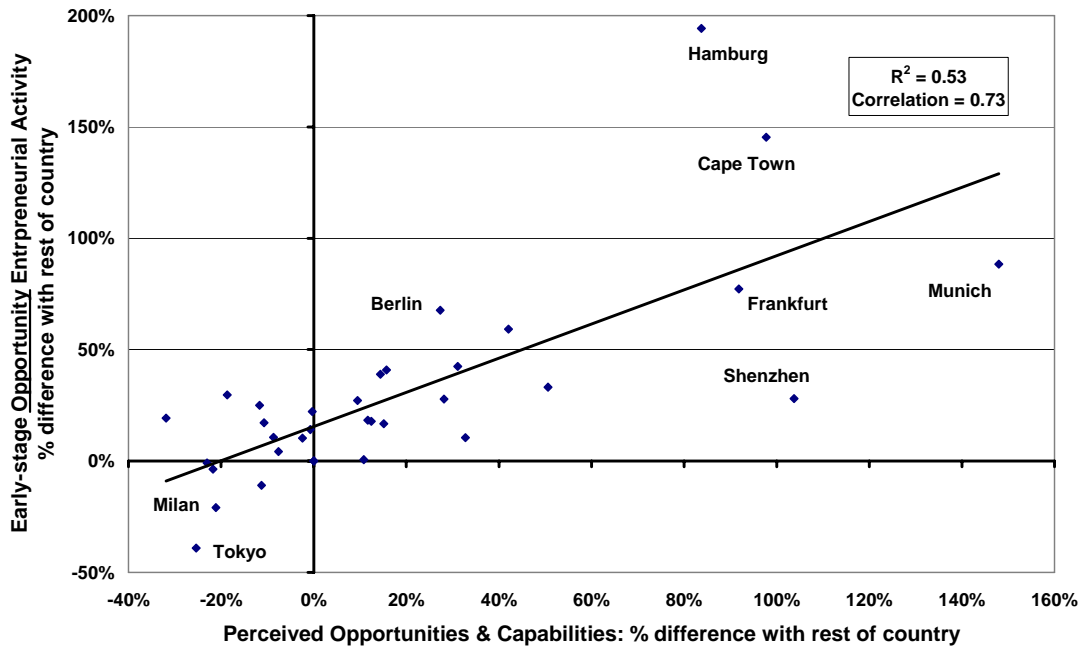


Figure 7 Link between perceived opportunities (% difference with country) and involvement in opportunity-driven ESEA (% difference with country)



Characteristics of early-stage entrepreneurial activity

Figure 8a looks the differences in job growth expectation between cities and countries. Here again most cities have higher expectations than the country. This time however, the outliers are Tokyo, Rome Frankfurt Madrid and Santiago. Paris is the clear leader with more than twice the national average, followed by Helsinki, Bangkok, Sydney, and Milan.

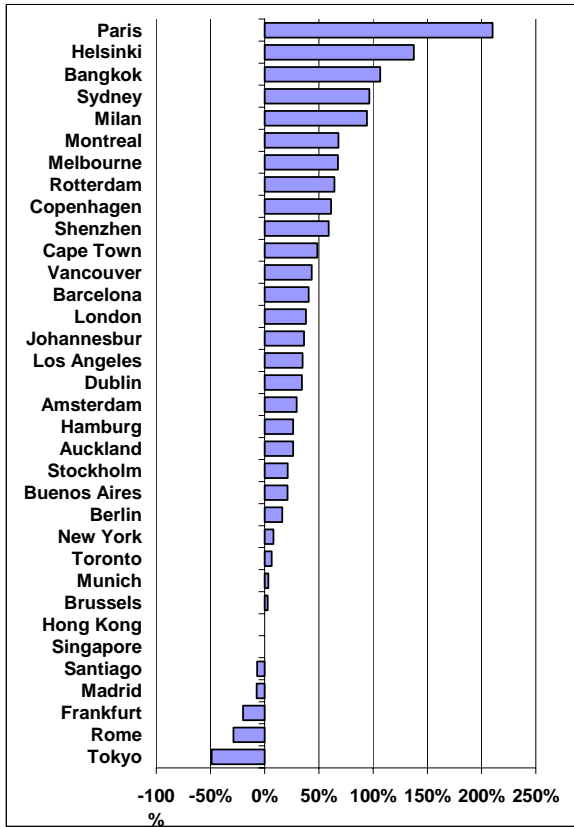
Figure 8b illustrates that entrepreneurial activity in cities is correlated with the existence of the creative class. There is only one city in our sample exhibiting relatively fewer entrepreneurs in sectors that are linked to the creative class: Melbourne. This particular result is, however, not significant and may be an outlier due to the rather large standard errors. The greatest differences between cities and countries in relation to the creative class industries are observed in cities in lower income countries: Johannesburg, Shenzhen and Cape Town form the top three. Paris, Milan and Helsinki are also cities with distinctive (and significant) entrepreneurial activity related to the creative class – as compared to the rest of the country.

Figures 8c and 8d examine the presence of early-stage activities in technology sectors and involvement new product market. Especially Figure 8d appears to exhibit relatively fewer advantages of urban agglomeration. However, we should note that the questions underlying the index for new product-market combinations should be seen in the regional context: new products and new markets are all relative to what is common practice in the region. In other words, what may be considered as a new product by consumers in a rural area may not be considered new in an urban area. We can see that the distinctive use of new product markets for world cities is the strongest in the developed countries with the exception of Buenos Aires and Bangkok.

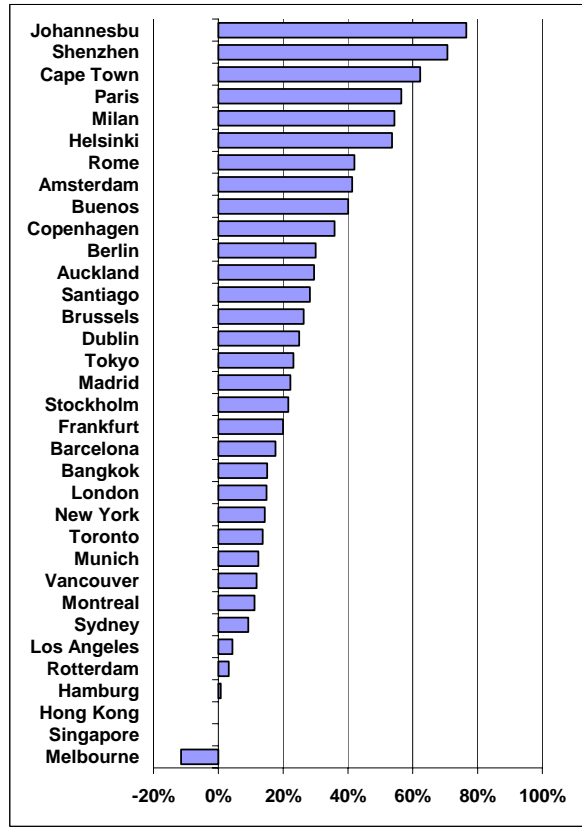
It is clear that different measures give us different rankings. However, concerning the types of entrepreneurship the numbers are small and the standard errors large so we are careful interpreting the results – in particular when studying a specific city. Still, the general pattern indicates that world cities have an entrepreneurial advantage in terms of job growth orientation and business activities linked to the creative class. The results also indicate that entrepreneurship in world cities is not necessarily outstanding in terms of innovation and technology if the regional context is appreciated. Non-urban areas may thus be able to catch-up in competitiveness. A strong linkage with the very latest developments in a world city would then be important.

Figure 8: Characteristics as percentage of ESEA: city versus country results

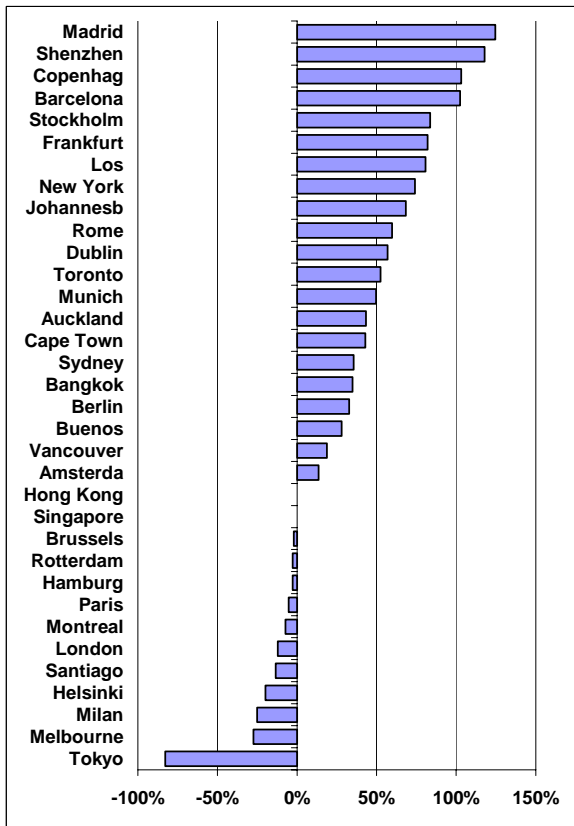
(a) Job growth orientation



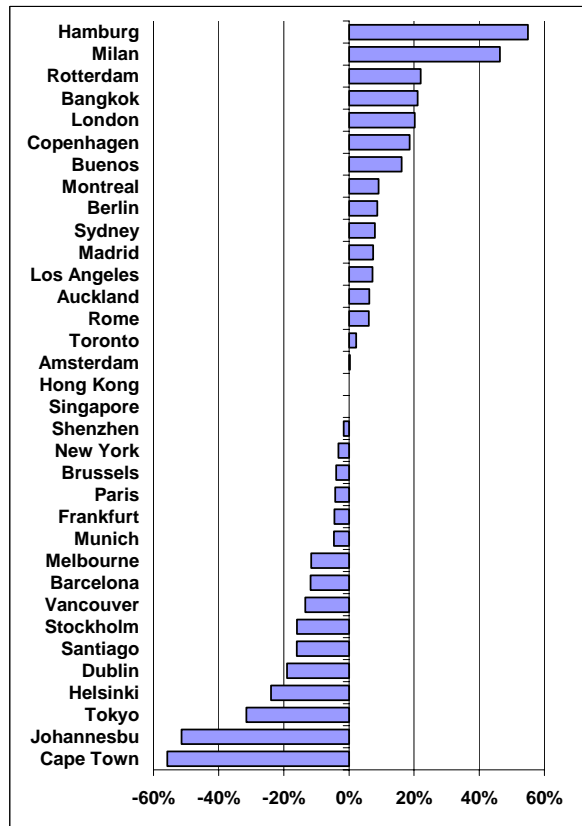
(b) Sectors linked to creative class



(c) Use of latest technology



(d) New product-market combinations



Discussion

Recent discussions in the Economic Geography literature increasingly focus on creative cities and the importance of creativity for achieving economic growth. Considering the increased attention on urban areas it is not surprising that the regional dimension of entrepreneurship is a subject of great interest. First, the interplay between entrepreneurship and economic development has not been theoretically grounded in either the new growth theory or the new economic geography. Second, the empirical studies that focus on this while finding a correlation between entrepreneurship and growth have all focused on regional differences within a single country. Therefore, most cross-country comparisons on world cities do not have data enabling comparisons on entrepreneurship.

Thus, while demographic and economic data on global cities are increasingly becoming available, little is known about entrepreneurial activity across global cities. We investigate differences between the city-level and country-level for a selection of the indices. These exercises can be seen as initial tests of the 'entrepreneurial advantage of cities.' Based on the literature we expect that most indices will be higher for world cities. We set out a framework encompassing the individual process between entrepreneurial perceptions and entrepreneurial activity and demonstrate how the urban environment can have an impact on this process.

Urban areas may be distinctive in how agents perceive entrepreneurship. Perceptions about entrepreneurship may affect the *supply side* and the *demand side* of entrepreneurship. On the supply side, or the 'pool' of potential entrepreneurs, important perceptions include both willingness and perceived ability to become an entrepreneur. Education levels and the availability of entrepreneurship training programs are possible determinants of perceived skills.

We use data from the Global Entrepreneurship Monitor (GEM) for creating indicators on regional entrepreneurial perceptions and regional entrepreneurial activity. Since 1999 GEM provides national indicators on entrepreneurial activity for an increasing number of countries. The indicators are based on telephone and face-to-face surveys among a representative sample of the adult population. By merging the individual-level GEM data over 2001-2006 for 34 metropolitan areas world wide, we create indicators on entrepreneurial perceptions, intentions and activity. The indices pertain to the 2001-2006 period.

The findings are interesting. As predicted by the theories, most large cities are more entrepreneurial than countries. The less entrepreneurial the country the larger is the city/country differences. The two most important city country differences are in Germany and Japan. For Japan, with one of the lowest ESEA rates in the world one would have expected that Tokyo would have a higher entrepreneurship rate. The opposite is true. In fact, one of the most successful economies in the world is saddled with one of the largest cities in the world with one of the lowest entrepreneurship rates. And this holds both for the ESEA index as well as for entrepreneurial perceptions. The other exception is Germany, with an average country performance has some of the best performing cities in the world and the largest city country differences. What explains this difference is beyond the scope of this paper, but clearly if Tokyo were a world class entrepreneurial performing agglomeration Japan would rank as an average country.

A study of this type has limitations. First, we have a sample selection bias in that sampling convenience and not any sort of scientific method generated the cities. Larger and more scientific selection needs to be undertaken to get a better handle on the role of entrepreneurial cities. This line of research should help us to try and bridge the gap between entrepreneurship research and research on other aspects of agglomerations.

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Appendix

Sectors linked to creative class:

For establishing whether or not entrepreneurs were active in sectors linked to the 'creative class' the ISIC code of the individual's business activities were used. Table A1 lists the ISIC codes of the sectors that have been linked to the creative class in this study.

Table A1 Sectors linked to creative class

ISIC code	Sector description
22	Publishing, printing and reproduction of recorded media
24	Manufacture of chemicals and chemical products
25	Manufacture of rubber and plastics products
29	Manufacture of machinery and equipment n.e.c.
30	Manufacture of office, accounting and computing machinery
31	Manufacture of electrical machinery and apparatus n.e.c.
32	Manufacture of radio, television and communication equipment and apparatus
33	Manufacture of medical, precision and optical instruments, watches and clocks
34	Manufacture of motor vehicles, trailers and semi-trailers
35	Manufacture of other transport equipment
523	Other retail trade of new goods in specialized stores
65	Financial intermediation, except insurance and pension funding
70	Real estate activities
71	Renting of machinery and equipment without operator and of personal and household goods
72	Computer and related activities
73	Research and development
74	Other business activities
80	Education
851	Human health activities
92	Recreational, cultural and sporting activities