



Amenities and new firm formation in rural areas

Lucia Naldi^a, Pia Nilsson^b, Hans Westlund^{c,a,*}, Sofia Wixe^a

^a Jönköping International Business School, PO Box 1026, SE-551 11, Jönköping, Sweden

^b Swedish University of Agricultural Sciences, Almas Allé 8, SE-750 07, Uppsala, Sweden

^c KTH Royal Institute of Technology, Teknikringen 10A, SE-100 44, Stockholm, Sweden

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ABSTRACT

Building on the neo-endogenous rural development model and the resource-based view of the firm, this paper investigates the role of place-based amenities for new firm formation. Empirically, we employ a full-population dataset encompassing new firms in Sweden from 2009 to 2016, combined with geocoded datasets with the spatial distribution of nature- and culture-based amenities. The results show that local amenities are indeed important factors in determining the rate of new firm formation. Estimating the model across urban and rural neighborhoods show that amenities are relatively more important in explaining new firm formation in rural areas as compared to urban. As such, our study contributes to the literature on diversification of the economies of rural areas by pointing at the important role that place-based amenities may play for an entrepreneurially-driven development of less developed and/or rural areas.

1. Introduction

Ever since the 1990s, the European rural development policy has been the subject of critical discussions among researchers in different fields. Traditional top-down policy was denominated as an *exogenous* model based on an urban perspective in which the rural areas merely should increase agriculture's productivity and let surplus labor migrate to the cities (Harris and Todaro, 1970; Lowe et al., 1998; Gkartzios and Lowe 2019). The critics pled initially for another model, an *endogenous* model in which the specific resources of an area (natural and cultural amenities, but also mobile, human resources) were the keys to its sustainable development, the economy would be based on diverse services, and local initiatives were the driving force (Lowe et al., 1998; Ray 1997). However, quite soon this perspective was complemented with insights in that the consequences of globalization, external markets and other influence made a pure endogenous model unrealistic. A *neo-endogenous* model for rural development, where endogenous and exogenous resources should find the best combinations adapted to the local community, became the synthesis (Ray 2001; Gkartzios and Scott 2014; Gkartzios and Lowe 2019). It should be stressed that this model contained not only (or not even primarily) economic considerations, but had a strong emphasis on power relations, local influence, ecological perspectives and alternative development strategies in general (Gkartzios and Scott, 2014).

Simultaneously, but independently of the abovementioned discussion of rural policy models, the concept of 'smart specialization' began to emerge in the European Union's regional policy discussions. Scientifically, the concept has its roots in an article by Foray et al. (2009) and has thereafter been interpreted and developed in various ways (see Lopes et al. (2019) and Hassink and Gong (2019) for overviews). It focuses on knowledge and innovation as important determinates of regional development and moves away from "one-size-fits all" strategies to embrace the heterogeneity of each region. In a nutshell, "smart specialization strategies are place-based policy strategies that aim to promote economic diversification of regions ... taking into account their unique characteristics and assets" (Tripl et al., 2016: 23). As noted by Tripl et al. (2016) and recently discussed by Balland et al. (2019) and Hassink and Gong (2019), 'smart specialization' is really about diversification, although a diversification that features both relatedness and local embeddedness. Since the concept of smart specialization has its background in the regional policy debate, it is not self-evident that it without further elaboration can be applied in the context of rural areas. Rural regions as a whole need to diversify their economies, but for individual villages (who's mere size makes diversification very difficult) this often means local 'specializations' that at the regional level complement each other and form a diversified region.

A critical concept of 'smart specialization' is 'entrepreneurial discovery'. In the words of Foray et al. (2009: 7) policies should "select and

* Corresponding author. KTH Royal Institute of Technology, Teknikringen 10A, SE-100 44, Stockholm, Sweden.

E-mail addresses: lucia.naldi@ju.se (L. Naldi), pia.a.nilsson@slu.se (P. Nilsson), hanswes@kth.se (H. Westlund), sofia.wixe@ju.se (S. Wixe).

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prioritise fields or areas where a cluster of activities should be developed, and to let entrepreneurs discover the right domains of future specialization". Finding such fields or areas must be challenging for less developed regions, and especially rural regions that typically do not have knowledge intensive sectors and regional innovation systems, and thus fall short in knowledge-based assets (Foray, 2016). Thus, the question arises: on what assets shall 'smart specialization', or rather, viable diversification strategies for rural regions focus on?

In this paper, we connect to the economic parts of the neo-endogenous approach, and investigate whether local resources in the form of amenities can be important place-based assets for promoting economic diversification through 'entrepreneurial discovery' and the development of rural regions through entrepreneurship. Following prior research, we define amenities as location-specific assets and services that make locations attractive for individuals and firms (Gottlieb, 1995). Specifically, drawing on the resource-based view of the firm (Barney, 1991; Helfat and Peteraf, 2003) — an increasingly important approach in the entrepreneurship literature (Alvarez and Barney, 2000) — we argue that proximity to nature- and culture-based amenities gives a firm access to unique and valuable resources that the entrepreneur can use to compete and grow. The role of amenities is especially vital for less developed, commonly rural and sometimes declining regions, since sparsely populated places generally have lower accessibility to knowledge resources, such as highly educated individuals and research centres (Tödtling and Trippl, 2005). Despite this, rural areas are not inherently less innovative than urban areas, but innovation processes and output may differ depending on the size and diversity of the regions, which is especially relevant in Swedish rural regions that often lack a critical mass in terms of market-, industry-, and population size (Shearmur, 2012). Capitalizing on local amenities, often unique for each place, may thus be a viable diversification strategy of less developed regions. If this is the case, policies at both national, regional, and local level encouraging such entrepreneurship could promote growth and development at the local level. Additionally, these clusters of new firm formation contribute further to the entrepreneurial discovery process, i.e., the learning aspect of agglomeration economies (cf. Duranton and Puga (2004)), which may induce an endogenous growth process through learning-by-doing at the local level (cf. Arrow (1962) and Romer (1986)).

Policy that promotes the use of local amenities by start-ups also allows for a bottom-up approach to achieve growth, which is at the core of 'smart specialization' (Capello and Kroll, 2016; Boschma, 2014). Our focus on the nexus between local amenities and entrepreneurship not only springs from the common recognition of the entrepreneur as a main driver of innovation, economic growth, and development (Schumpeter, 1934/1989; Kirzner, 1973), but it also informs of the process of 'entrepreneurial discovery' and the alignment between private entrepreneurs and policy makers. The amenities in focus of our empirical application are place-specific local characteristics that reflect heterogeneity in natural and cultural landscape characteristics including the local supply of nature reserves, preservation areas, and built heritages, of which some are nationally and/or locally designated as conservation areas that gives them a broader protection against development and some level of identity. We argue that these local assets provide an important common resource base that matters in the entrepreneurial discovery process as they make a positive contribution to the local character and sense of place because of their heritage- and aesthetic values. Indeed, new firms are diversified in the sense of operating in different industries and the same local amenity for one firm may not benefit another, as not all (potential) entrepreneurs will have access to the same amenities. Yet, the supply of local amenities can support the entrepreneurial discovery process as they induce local social capital and the local entrepreneurial identity, which has been shown to encourage further entrepreneurship (Westlund and Bolton, 2003; Westlund et al., 2014). As noted by Lopez et al. (2019: 2115), the operationalization of the process of business discovery has been "one of the major challenges when establishing a

policy of intelligent specialization of regions in Europe". Hence, both policy makers and individual entrepreneurs can gain insight from scientific evidence that point to the potential role played by place-specific amenities in new firm formation and amenity-spurred entrepreneurship can offer an area to further develop concrete policy tools that enhance firm-level capacities and connections to the surrounding environment. However, as stressed by the neo-endogenous model for rural development, the extent to which local actors are able to retain control over key decisions constitutes a critical determinant for their capability to realize this potential.

Empirically, we investigate the effects of nature- and culture-based amenities on new firm formation. We employ a unique dataset encompassing all new firms in Sweden from 2009 to 2016 in all sectors, combined with geocoded datasets with the spatial distribution of amenities, provided by the Swedish Board of Agriculture, the Swedish Meteorological and Hydrological Institute, and the Swedish National Heritage Board. Furthermore, to control for within-region heterogeneity, the analysis is conducted at the neighbourhood level. An empirical approach that considers the role of a wide range of nature- and culture-based amenities for new firm formation in rural areas has, to our knowledge, not previously been presented at this disaggregated level.

Our results show that local amenities are indeed important factors in determining the rate of new firm formation. In addition, estimating the model across urban and rural neighbourhoods show that the supply of nature- and culture-based amenities are relatively more important in explaining new firm formation in rural regions as compared to urban regions. A possible policy conclusion is then that rural growth strategies should focus on amenities as a base for locally embedded economic diversification. Besides the empirical contribution, our paper is the first one to connect the neo-endogenous rural development model with the policy of 'smart specialization'. Thereby, we provide a conceptual contribution to the literature on 'smart specialization' by unravelling the role that place-based amenities may play for an entrepreneurially-driven diversification of less developed regions.

2. Background and motivation

2.1. Location-specific factors, new firm formation and 'smart specialization' in rural regions

The literature on the location of new firms is increasingly recognizing the importance of location-specific factors and resources. Particular attention has been placed on benefits that originate from the presence of other firms and actors, which can be sorted under 'endogenous' location factors (McCann and Folta, 2008). Since the "net benefits to being in a location together with other firms increase with the number of firms in the location" (Arthur, 1990), entrepreneurs try to take advantage of agglomeration externalities. Spillovers from other co-located firms and actors might help new firms to access resources and knowledge and to mitigate liability of newness and smallness (Pe'er et al., 2008). Research on the positive effects of agglomeration have highlighted the resource benefits of locating in clusters, because such locations provide skilled employees, and spillovers of technology and know-how (Barkema and Drogendijk, 2007; Porter, 2000). However, evidence on the effects of agglomeration on firm survival and performance is mixed (Pe'er and Keil, 2013). For example, studies on the location of new firms report higher mortality rates among new firms located in clusters (Sorenson and Audia, 2000). Further and most importantly, agglomeration logics are particularly relevant for urban areas (Pe'er et al., 2008; Aharonson et al., 2007) and might be less

relevant predictors of location choices within rural regions.¹

Agglomeration economies in general terms concern spillovers arising from economic activity per se, commonly measured in terms of population density (c.f. Ciccone and Hall (1996) and Ciccone (2000)). More specific features of agglomeration economies concern the effects of industry specialization and diversity, commonly studied in terms of Marshall-Arrow-Romer (MAR) externalities (1992), and Jacobs externalities (Jacobs, 1969). A more recent strand of research focus on related diversity (following Frenken et al. (2007)), which can be argued to fall in between specialization and diversity. The argument is that the exploitation of knowledge spillovers is dependent on some sort of cognitive proximity, or relatedness, between the agents, which implies that potential entrepreneurs have a greater probability to become actual entrepreneurs when there are already existing firms within their ‘industrial domain’. Indeed, previous empirical research show that new firm formation is strongly influenced by the presence of related industries (see e.g. Acs and Armington (2004), Acs et al. (2007), Glaeser and Kerr (2009), and Delgado et al. (2010)). Frenken et al. (2007) distinguish between related variety, as described above, and unrelated variety, which broadly corresponds to Jacobs externalities. Related variety, or diversity (Wixe, 2018), is closely connected to some aspects of the policy concept of ‘smart specialization’, as relatedness, together with embeddedness and connectedness, is a key element also here (McCann and Ortega-Argilés, 2015). As discussed by Hassink and Gong (2019), different names, such as related variety, smart specialization, diversified specialization, and smart diversification, for essentially the same phenomenon is conceptually confusing. ‘Smart specialization’ may be a particularly bad choice of name since it can be misinterpreted to not be about diversification at all. Additionally, the apparent ‘coining’ of a new concept may hide that many elements of it can be found in older cluster policies as well as regional innovation policies (Hassink and Gong, 2019).

Agglomeration economies thus involve a set of spatial characteristics, such as diversification and specialization (or something in between), that are endogenous to economic growth (Varga and Schalk, 2004). Besides the effects of agglomeration and spillovers from firms doing related (and unrelated) activities, also factors that are exogenous to the economic actors (i.e., factors that are independent from the firms or entrepreneurs located in a specific area) may be the basis for ‘related diversification’, spurring local growth and development through new firm formation (McCann and Folta, 2008). In this paper, we argue that natural and cultural amenities are examples of such factors. This is in line with Marshall (1890/1929), who pointed at unique physical and special conditions as chief causes of firms’ location.

The role of amenities/place-bound resources for rural development has mainly been investigated in comparative case studies (e.g. Terluin and Post 2000; Ceccato and Persson 2003; Svendsen and Sorensen 2007; Courtney and Moseley 2008). However, there are a few studies with more general approaches. Goe and Green (2005) found that warm weather and outdoor recreation amenities had a strong relationship with the absolute wellbeing of U.S. nonmetropolitan regions. Deller et al. (2005) showed a clear relationship between amenities and U.S. regional economic growth. Isserman et al. (2009) found that amenities, measured by an index of climate, water and topography variables, mainly were insignificant in explaining differences between 1348 prosperous and non-prosperous U.S. counties. Neither did Agarwal et al. (2009) get any significant results of a natural beauty index in an investigation of economic performance of 149 English rural Local Authority Districts. On the other hand, Sorensen (2018) found that place-based, internal resources exerted a positive influence on population growth in a study of

489 small rural Danish communities. These and other recent examples, such as Bosworth and Turner (2018), Lavesson (2018), and Gieling et al. (2019), point at the importance of connections between various forms of local amenities and indicators of rural/regional development. However, to the author’s best knowledge, no quantitative studies on the relationship between amenities and new firm formation can be found in the literature.

Natural and cultural amenities might have a positive influence on entrepreneurship in rural and less developed regions for several reasons. First, they reduce the dependence on traditional endogenous growth factors that such regions commonly lack, specifically the matching, sharing, and learning mechanisms of urban agglomeration economies (cf. Duranton and Puga, 2004), as well as the economic diversity that commonly characterize larger cities (Jacobs, 1961, 1969). Second, they provide accessible resources in places where other types of resources are commonly lacking, specifically knowledge-intensive actors and activities (Tödting and Tripl, 2005; Tripl et al., 2015a). Recent research highlights the pivotal role of ‘external’ sources of economic development for regions that might lack own local knowledge and resources. The focus is placed on the capacity to attract and absorb knowledge from elsewhere, which might instigate a process of regional de-locking and new path creation (Tripl et al., 2015b). Amenities thus increase the capacity of a location to attract knowledgeable and creative individuals, such as entrepreneurs who seek business opportunities. Third, amenities are typically unique and place-based, meaning that firms need to utilize them in, or at least close to, specific locations (cf. McGranaham, 2008). Fourth, even though amenities are commonly utilized in the hospitality sector, they are not per definition tied to specific industries. This allows for a diverse entrepreneurial ecosystem and local industry composition, which gives variety in employment opportunities and increases the resilience to economic shocks (cf. Marshall, 1890; Roundy et al., 2017).

Accordingly, our research focuses on the proximity to natural and cultural amenities as an important determinant of location choices of new firms in rural regions. If amenities can be empirically shown to promote entrepreneurship, and thereby innovation, growth and development (Schumpeter, 1934/1989; Kirzner, 1973), they may play an important role in viable diversification strategies of rural regions, often denoted as ‘smart specialization’ in the context of the European Union. This new generation of policies is accounting for complex bilateral relationships between contextual—embedded—conditions, and seek to identify knowledge and innovations in related domains in which the region might hold an advantage (Lopes et al., 2019; Hassink and Gong, 2019). Nature- and culture-based amenities can be argued to be at the core of such policies for several reasons. First, since amenities are place-specific and spatially sticky, they are *embedded* in the location. Second, even though the new firms are preferably diversified and operate in different industries, they are *related* through the use of local amenities. This may induce local social capital and the local entrepreneurial identity, which has been shown to encourage further entrepreneurship (Westlund and Bolton, 2003; Westlund et al., 2014). Third, focusing on amenities allows for a bottom-up approach, as emphasized in place-based policies and the neo-endogenous rural development model, as the entrepreneurs can choose how to utilize the resources in their businesses (Boschma, 2014; Capello and Kroll, 2016). Fourth, nature- and culture-based amenities are diverse in themselves, which provides a potential base for a broader range of economic activities also in rural regions.

If successful, policy measures that promote the utilization of endogenous factors, that is, place-specific amenities, in entrepreneurial discovery processes could start a growth process that may over time contribute to the development of new endogenous growth factors (Baumgartner et al., 2013). Such growth factors include spillover and learning-by-doing effects due to local clusters of firms and entrepreneurs (cf. Maskell and Malmberg (1999)), especially in heterogeneous economic environments (Duranton and Puga, 2004). The spillover effects in terms of learning typically emerge from increased non-market, or social,

¹ Of course, as argued by Naldi et al. (2015), agglomeration economies are still applicable from a rural perspective since within rural regions there are areas that are relatively more or less urbanized, which may affect the location choice of entrepreneurs.

interactions (Rutten and Boekema, 2012; Glaeser and Scheinkman, 2003). The entrepreneurship culture may also improve the ‘people climate’ alongside the ‘business climate’ in less developed regions, which may not only attract new firms, but also new residents, thus contributing to endogenous growth (Florida, 2002; Asheim and Hansen, 2009).

As such, strategies and policies that leverage on nature- and culture-based amenities to spur innovation and growth are also in line with the recent developments within the literature on learning regions, which acknowledges the critical role of socio-spatial contexts. Since amenities are spatially sticky, they can provide a context that is specific to a certain location as well as attracts individuals from outside who will become socially or professionally linked to that context. Hence, natural and cultural amenities can enrich the real value of a place, which “is no longer a bounded territory with a set of characteristics but a space of professional and social networks and opportunities” (Rutten and Boekema, 2012: 988). A concrete example of a rural region that has been successful in capitalizing on its natural amenities is the Swedish municipality of Åre, described in Appendix 1.

2.2. A resource-based view approach to the location of new firms and local amenities

Nature- and culture-based amenities can be either tangible or perceptual. They range from land or water resources to built amenities, such as summer and winter-based recreational amenities, and social amenities, for example, local culture and traditions, foods, crafts, festivals, and ways of life (Deller et al., 2001; Markeson and Deller, 2012; McGranahan et al., 2010; Garrod et al., 2006).

The benefits of local amenities on new firm formation are theoretically grounded in the resource-based view (RBV) of the firm—a dominant approach in entrepreneurship research—initiated in the mid-1980s by Wernerfelt (1984), Barney (1986), and further developed by Barney (1991) and Peteraf (1993), among others. The RBV shifts the research attention from the structural conditions in the industry in which a firm competes, to the unique resources that the firm controls, or have access to, in explaining firm formation and firm-level competitive advantage. To be sources of firm-level competitive advantage, the resources must be valuable, rare, and costly to imitate and substitute (the so-called VRIN framework). Valuable resources are those that add value by enabling the firm to exploit opportunities and/or neutralizing threats. While the value is an important attribute, if a resource is controlled by numerous competing firms, then that resource is unlikely to be the source of firm-level competitive advantage. Thus, competitive advantage requires resources that are also rare. While valuable and rare resources provide temporary competitive advance, they can still be imitated and/or substituted with other valuable and rare resources. Therefore, RBV scholars hold that resources also need to be costly to imitate and non-substitutable to be sources of sustainable competitive advantage.

From an RBV perspective, proximity to amenities provides access to valuable, rare, and costly-to-imitate resources that local entrepreneurs may exploit through new firms. First, locations nearby rural amenities are limited in supply, making such locations scarce resources (Marcouiller and Clendinning, 2005). Second, amenities are immobile. The direct and/or indirect benefits they provide decrease with distance. Examples can range from natural areas and parks, to historic buildings as well as to cultural sites and settlements (Power, 2005). Third, proximity to amenities gives also access to socially-complex resources, such as unique bundles of creative workers, who choose to live near rural amenities (Deller et al., 2001; Markeson and Deller, 2012; McGranahan et al., 2010). These resources are difficult to reproduce or extend to other locations, and local entrepreneurs have informational advantage about these resources not easily accessible to outsiders.

Developing Barney’s work, Peteraf (1983: 185) provides further arguments for the existence of economic opportunities for new firms

around local amenities. “Suppose”—she writes—“it is perceived, *a priori*, by equally endowed firms that by occupying certain choice locations they can gain an inimitable resource position over their rivals. What will ensue is fierce competition for those locations to the point that the anticipated returns are, in essence, competed away”. Thus, locations near amenities can be sources of above normal returns “if some firms had the foresight or good fortune to acquire it in the absence of competition”. Local entrepreneurs might have such foresight. Dahl and Sorensen (2012), for example, hold that regional embeddedness can support entrepreneurs in identifying opportunities both through direct experience and through their network. Thus, local entrepreneurs can be expected to have a better sense of the economic opportunities of amenities.

Following this logic, local amenities can provide a number of resource benefits to new firms. First, amenities are location-specific resources that new firms can use in their business activities—for example, in tourism or recreation—which, in turn, generate a backdrop of related activities both upstream and downstream. There are several examples of firms that use local varieties, local materials, or special environmental conditions, and even human input and know-how (Stathopoulou et al., 2004). There are also studies that have documented the importance of local cultural traditions, such as popular music and rural festivals (Gibson, 2002). Second, amenities might be important for attaching and retaining specialized workers, especially from creative classes (Benson and O’Reilly, 2009; Gosnell and Abrams, 2011). McGranahan et al.’s (2010) study, for example, shows that growth of rural counties is based on outdoor amenities, the creative class and an entrepreneurial context, while McGranahan and Wojan (2007) demonstrate that outdoor amenities are important quality of life attributes for the rural creative class, which, in turn, is instrumental to job creation in rural areas. Further, Wojan et al. (2010) document the emergence of rural artistic havens, and identify amenities as important characteristics associated with the attraction of performing, fine arts and applied artists.

3. Data and variables

Statistics Sweden, the County Administrative Boards, the Swedish National Heritage Board and the Swedish Meteorological and Hydrological Institute are the main providers of data for the empirical analyses. Variables that measure new firm formation, agglomeration, and industry composition are constructed using firm-level geocoded data from Statistics Sweden. These firm-level micro data comprise a sample of all active firms (about 4.4 million) located across Sweden. The data contain information about employer characteristics, location of the firms and their industry belonging, indicated by their 5-digit Standard Industrial Code (SIC). Data from the remaining sources are used to construct variables that reflect neighbourhood supply of nature- and culture-based amenities (described further below). Our method to account for amenity supply at a disaggregated, or neighbourhood, level is to employ Small Areas for Market Statistics (SAMS) as the unit of analysis. In Sweden, there are approximately 9200 SAMS, and the geographical division is constant over time. This is an advantage of using SAMS rather than, for example, postcode areas, which are similar in terms of population size and density. Firm level data are aggregated using the neighbourhood level resulting in a panel with 69 596 observations over 2009 to 2016, which is the latest available year of data.

3.1. Dependent variable and urban-rural classification

The dependent variable is the number of new firms in each neighbourhood divided by the total number of firms to account for size effects. In constructing the dependent variable, we define new firms as 5 years or younger (Backman, 2015) and exclude firms that are start-ups as a result of mergers and acquisitions (Cefis and Marsili, 2015) and that have more than 10 employees. This size restriction follows the argument that start-ups with more than 10 employees can be assumed to be

reorganizations of activities that previously took place at an incumbent firm (Andersson and Klepper, 2013).² Following the argument that amenity supply may be especially vital for less developed and rural regions as a resource for new firm formation and thus economic growth, we apply an urban-rural classification to study differences across more densely populated urban areas and intermediate and peripheral rural areas. The chosen classification groups Swedish municipalities into two categories (urban and rural) based on population density and commuting patterns (Westlund et al., 2014). Urban neighbourhoods are in municipalities where 100% of the population live in cities or within 30 km from cities, including municipalities that have a population of at least 30 000 inhabitants. Smaller adjacent municipalities are included in this category if more than 50% of the labour force commutes to a neighbouring urban municipality. Rural municipalities are the remaining category and include both intermediate and peripheral rural areas. Urban municipalities are generally characterized by growing populations, labour markets and market demands, and they tend to facilitate both variety and concentration of consumer goods and public goods and services. Intermediate rural areas do often show positive development trends, while more peripheral rural regions are characterized by out-migration, ageing populations and a decline in employment opportunities. Although many peripheral rural areas face a negative growth in many economic indicators, there are also amenity-rich neighbourhoods within these remote areas that have witnessed growth during the last decades. An empirical approach that considers the role that a wide range of nature- and culture-based amenities play for new firm formation in rural areas has, to our knowledge, not been presented at this disaggregated level before.

3.2. Neighbourhood supply of nature- and culture-based amenities

Of main interest in this paper is to test the role of different types of place-based amenities with a focus on new firm formation. To facilitate a spatially explicit analysis we combine data from several geocoded databases to identify; *i*) neighbourhood supply of nature-based amenities (nature reserves and preservation areas (e.g., mown meadows, preserved forests, deciduous forests, pine forests and lakes) and coastal location, *ii*) neighbourhood supply of built heritages (listed buildings and heritages sites) and *iii*) neighbourhood climate (average precipitation and temperature). These data are provided in GIS format by the County Administrative Boards, the Swedish Board of Agriculture, the Swedish Meteorological and Hydrological Institute, and the Swedish Heritage Board and enable the measurement of amenity supply at a disaggregated level (neighbourhoods/SAMS). For each of the 9200 neighbourhoods, we use spatial joins to obtain the area covered by (or the number of) sites of each type. Since these variables rarely changes over time, they enter the model as time-invariant and they are measured at one point in time prior to the start of our eight-year panel (2009–2016). Similar spatially explicit approaches on the measurement of amenity supply can be found in Cho et al. (2008) with a focus on housing prices.

3.3. Industry, agglomeration, and size effects

Exploiting local amenities may be one viable growth and development strategy of less developed regions, but there are additional processes that work to encourage rural entrepreneurship. Clusters of related and unrelated firms, the institutional setting and the endogenous learning aspect of agglomeration economies have a strong influence on the entrepreneurial process through learning-by-doing at the local level

² We identify a total of 1 210 257 start-ups over the period 2009–2016, 20 032 start-ups have more than 10 employees and 739 415 are the results of mergers and acquisitions. After removing these we have a sample of 450 810 start-ups which we include in our definition of new firm formation.

(Romer, 1986; Duranton and Puga, 2004). Hence, we introduce a set of variables to control for such effects. The first two measure industry composition and they are constructed using an entropy approach that follows Jacquemin and Berry (1979), Frenken et al. (2007), and Wixe and Andersson (2017) (see these for full descriptions of the approach). Unrelated (UD) and related (RD) diversity at the neighbourhood level, r , are thus constructed as follows:

$$UD_r = - \sum_{g=1}^G E_g \ln E_g. \quad (1)$$

$$RD_r = \sum_{g=1}^G E_g H_g \quad (2)$$

Where:

$$H_g = - \sum_{i=1}^I E_{ig} \ln E_{ig}. \quad (3)$$

To calculate these measures, we use Standard Industrial Classification (SIC) codes at 2- and 5-digit levels. E_g denotes the share of total employment in each neighbourhood that belongs to the same 2-digit level g . E_{ig} denotes the share of employees that work in each 5-digit industry i , where the share is based on the employment in the two-digit industry g that industry i is sorted under (and not total employment). Unrelated diversity thus measures how the employees in the neighbourhood are spread over 2-digit industries (Eq. (1)), while related diversity measures the distribution of employees between 5-digit industries within the respective 2-digit industry (Eq. (3)), weighted by the 2-digit industry's share of total employment (Eq. (2)).

To capture local specialization, we introduce location quotients (LQ's), calculated as follows:

$$LQ_{s,r} = \frac{e_{s,r}/e_r}{e_s/e} \quad (4)$$

where $e_{s,r}$ denotes the number of employees in neighbourhood r and industries s , employed in either the agriculture, retail, or manufacturing industries. e_r denotes all employees in the neighbourhood, e_s the number of employees in industries s in the country and e the total number of employees in the country, regardless of industry. If the LQ is larger than one, the industries in question have a larger share of the employees in a neighbourhood than the country, implying that the neighbourhood is more specialized than average in those industries.

Population density and the share of highly educated employees are included to control for size effects and knowledge access, both measured at the neighbourhood level. Additionally, we include a variable to control for institutional setting and the influence of policy defined as the total annual amount of rural development and agricultural subsidies received by firms in the neighbourhood. The partly EU financed Swedish Rural Development Program is one important provider of subsidies to firms in rural areas and the overall aim of these subsidies is to support entrepreneurship and diversification of industries in rural areas.

Table A1 in Appendix 2 lists all variables described above and presents descriptive statistics.

3.4. Empirical model

Our variables in focus consist of a set of nature- and culture-based amenities which are inherently time-invariant or rarely change over time. Having this focus, we apply the Hausman and Taylor (1981) instrumental variable (IV) estimator that enables the coefficients of time-invariant variables to be estimated. The main idea is the separation between variables that are potentially uncorrelated and correlated with the neighbourhood specific fixed-effect and the use of time averages of those time-varying regressors that are uncorrelated as time-invariant

regressors (Baltagi et al., 2003). The main argument for the model is that no external instruments are needed as the exogenous variables function as their own instruments (Baltagi et al., 2016). Using this approach, we estimate the following model³

$$y_{it} = \alpha_i = \gamma X_{it} + \eta Z_{it} + u_i + \varepsilon_{it} \quad (5)$$

where y_{it} denotes the share of new firms in the i th neighbourhood at time t , X denote a vector of time-varying variables (including among other things our measures of industry composition) that are either correlated or uncorrelated with u_i (the neighbourhood specific fixed effect) and γ denote a vector of their corresponding coefficient estimates. Z is a vector of amenity variables that are time-invariant and either correlated or uncorrelated with u_i and η is a vector of corresponding estimates. We treat most of the variables that reflect agglomeration effects as time-varying and endogenous, except for population density, which is treated as a time-varying and exogenous in the model. Population density changes very slowly over time and in the choice among other variables that could serve as potential exogenous time-varying variables, population density appears to be the best option considering the correlations among the time-varying and time-invariant variables. Regarding the correlations between exogenous variables (amenity supply) and the endogenous time-invariant variables, they indicate a sufficient correlation to identify the coefficients of the endogenous variables.⁴

Building on the argument that different types of place-based amenities may interact in their influence on new firm formation, we also include a set of interaction terms between the density and industry variables and the nature- and culture-based amenities to investigate if the influence of amenity supply on new firm formation depends on population density and industry composition.

4. Regression results

The results from the estimation of Equation (5) are presented in Table 1. For comparative reasons we display the results of estimating the model using three different sub-samples, with all neighbourhoods and split by urban-rural location. The rationale follows the argument that amenity supply should be especially important for new firm formation in rural and remote areas, compared to urban, as they have fewer opportunities to benefit from the type of endogenous learning aspects that can be linked to urban areas and their agglomeration economies (Goffette-Nagot and Schmitt, 1999).

The results show the anticipated positive sign of many of the amenity supply variables (coastal location, open spaces, built heritages, and average temperature) when the model is estimated using all neighbourhoods. Interestingly, we do also find some differences between urban and rural areas. While many of the amenity supply variables are indicated to be positively and significantly associated with new firm formation in rural areas, they tend to be insignificant in urban areas (except for average temperature). There is no significant association between the supply of open spaces and built heritages in urban areas similarly to what we find in rural areas. In urban areas, new firm formation seems to be even negatively associated with access to coastline. These results indicate that local amenities are important factors in determining the rate of new firm formation in rural and rural remote areas.

The findings are thus generally consistent with the underlying idea that place-based amenities are important resources that local entrepreneurs in rural regions can exploit through new firm formation (Peteraf, 1993). They also contribute to the formation of viable growth policies of rural regions as they point to the importance of local amenities as assets

that can be exploited by entrepreneurs in order to diversify the economic milieu, denoted as ‘smart specialization’ in the context of the European Union. The results are robust to the inclusion of the time-varying controls that measure industry composition and the type of spillovers associated with agglomeration economies, they are also robust to the inclusion of interaction effects. Table 2 presents the results from including interaction terms to investigate if the influence of amenity supply on new firm formation depends on population density and industry composition, with a focus on rural neighbourhoods.

Comparing Tables 1 and 2, the results do not change markedly. Regarding the interaction effects, there is an added positive association between open space and new firm formation in relatively denser rural regions. Additionally, the interaction term between related variety and built heritage is significant and positive. These results imply that agglomeration economies matter also in a non-urban context, which is intuitive since there is considerable heterogeneity in density both between and within rural regions (cf. Naldi et al. (2015)). Additionally, they give a first indication of that agglomeration economies and amenities interact in their influence on new firm formation. That the association between related variety and new firm formation is stronger when there is more built heritage in the neighbourhood is especially relevant from a policy perspective, and strengthens our claim that place-specific exogenous factors may play an important role in regional growth and innovation strategies.

Regarding the variables that reflect agglomeration spillovers, these are estimated in separate specifications due to relatively strong correlations between some of the industry variables (most notably related and unrelated diversity). The results show that the coefficient of related diversity is positive and significant, indicating that a high degree of related industry activities is positively associated with new firm formation, which is robust to the inclusion of population density. This point to the importance of industry linkages and external economies, present in both urban and rural areas, for the start-up rate of new firms (Delgado et al., 2010). There is naturally a high correlation between related diversity and urbanization as variety in firms and products require a certain market potential. Although the effect of density supports theory and prior studies in that firm density increase the likelihood of failure (De Vaan et al., 2012; Gimeno et al., 1997), the effect of non-linear cluster effects (the squared covariate of density) could not be differentiated from zero and was thus not included in the final estimations.

The coefficient of unrelated diversity, measured as the distribution of employees between 2-digit industries, is positive and significant across the estimations, indicating that increases in the diversity of the local industrial base is positively related to new firm formation. This suggest that new firms benefit from geographic proximity to a diverse set of industries and that knowledge spillovers and interactions outside the industry is beneficial for the entrepreneurial process (Acs et al., 2007). Hence, our results point to that it is not only related diversity, commonly emphasized in the policy concept of ‘smart specialization’, that spurs new firm formation, but also diversity in a broader sense. This holds for both types of regions, even though the results indicate stronger relationships in rural places.

Turning to the location quotients, thought to reflect the influence of industry specialization. The coefficients reflecting specialization in both agriculture and retail are significant and positive indicating a positive association between new firm formation and the presence of a strong agricultural-industrial and retail base, lending support to the importance of efficiency gains associated with increases in specialization (Coelli and Fleming, 2004). Altogether, these results support the significance of also endogenous location factors, benefits that originate from the presence of other firms and actors (McCann and Folta, 2008), in explaining new firm formation. The rationale being that entrepreneurs’ capitalization on agglomeration externalities as the net benefits of being in a location together with other firms, increases with the number of firms in the location (Arthur, 1990).

³ For brevity, we use a simplified definition and refer to Hausman and Taylor (1981) for a detailed review of the estimator and its full derivation.

⁴ Results of all pre-estimation tests can be obtained on request.

Table 1
Regression results; Hausman-Taylor. Dependent variable: Share new firms.

	All	All	Rural	Rural	Urban	Urban
	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)
<i>Time-varying exogenous variables</i>						
Population density (ln)	0.208*** (0.005)	0.208*** (0.005)	0.330*** (0.007)	0.321*** (0.007)	0.018*** (0.004)	0.010*** (0.004)
<i>Time-varying endogenous variables</i>						
Share high education	0.104*** (0.005)	0.104*** (0.004)	0.079*** (0.006)	0.081*** (0.006)	0.153*** (0.008)	0.151*** (0.008)
Related diversity (ln)	0.062*** (0.004)	–	0.131*** (0.007)	–	0.026*** (0.004)	–
Unrelated diversity (ln)	–	0.060*** (0.009)	–	0.271*** (0.024)	–	0.121*** (0.001)
Support	8.02e-13 (4.16e-11)	–1.16e-12 (4.17e-11)	0.201*** (0.002)	0.201*** (0.002)	8.66e-11 (7.55e-11)	8.66e-12 (7.55e-10)
LQ agriculture	0.021*** (0.00)	0.021*** (0.00)	0.024*** (0.001)	0.024*** (0.001)	0.015* (0.008)	0.013* (0.007)
LQ retail	0.020*** (0.000)	0.020*** (0.000)	0.003 (0.003)	0.003 (0.003)	0.001*** (0.000)	0.001*** (0.000)
LQ manufacturing	–0.003*** (0.00)	–0.003*** (0.00)	–0.003*** (0.001)	–0.003*** (0.001)	0.005 (0.005)	0.005 (0.006)
<i>Time-invariant exogenous variables</i>						
Average temperature (ln)	0.123*** (0.005)	0.119*** (0.005)	0.151*** (0.006)	0.151*** (0.007)	0.009*** (0.000)	0.009*** (0.000)
Average precipitation (ln)	0.056 (0.054)	0.056 (0.054)	0.031 (0.031)	0.032 (0.031)	–0.023 (0.023)	–0.020 (0.023)
Lakes	0.000 (0.000)	0.000 (0.000)	0.003 (0.002)	0.003 (0.002)	0.001 (0.001)	0.001 (0.001)
Coastline	0.140*** (0.023)	0.140*** (0.023)	0.114*** (0.044)	0.113*** (0.043)	–0.021** (0.010)	–0.021** (0.011)
Open space	0.314*** (0.09)	0.310*** (0.090)	0.616*** (0.127)	0.604*** (0.125)	–0.018 (0.033)	–0.017 (0.033)
Built heritages	0.003** (0.001)	0.002** (0.001)	0.001*** (0.000)	0.001*** (0.000)	–0.001 (0.175)	–0.002 (0.174)
Constant	–0.224 (0.027)	–0.297*** (0.029)	–84.333*** (9.810)	0.009 (0.014)	0.012 (0.009)	0.010 (0.008)
Observations	69595	69596	29434	29434	40162	40162
Groups	8753	8753	3693	3693	5060	5060
Wald	3255.71***	3055.71***	646.51***	615.56***	3170.80***	3170.74***

***, ** and * indicate statistical significance at the one, five and 10% levels respectively. Models have been estimated with the share of new firms as dependent variable and results are robust. A robust Hausman-Taylor estimator that deals with the presence of outliers (Baltagi and Bresson, 2012) has been estimated for all models.

Table 2
Hausman-Taylor regression results with interaction terms. Dependent variable: Share new firms.

	Rural	Rural	Rural
	Coef. (Std. Err)	Coef. (Std. Err)	Coef. (Std. Err)
<i>Time varying exogenous variables</i>			
Population density (ln)	0.291*** (0.008)	0.329*** (0.005)	0.331*** (0.006)
Population density × Share open space	0.170*** (0.034)	–	–
<i>Time varying endogenous variables</i>			
Share high education	0.058*** (0.005)	0.050*** (0.006)	0.061*** (0.005)
Related diversity (ln)	0.101*** (0.006)	0.111*** (0.005)	0.091*** (0.007)
Related diversity (ln) × Open space	–	0.061 (0.502)	–
Related diversity (ln) × Built heritage	–	–	0.021** (0.010)
Support	0.196*** (0.005)	0.186*** (0.006)	0.185*** (0.004)
<i>Time invariant exogenous variables</i>			
Average temperature (ln)	0.123*** (0.008)	0.123*** (0.008)	0.123*** (0.008)
Average precipitation (ln)	0.030 (0.029)	0.031 (0.028)	0.031*** (0.028)
Lakes	0.003 (0.002)	0.002 (0.002)	0.002 (0.002)
Coastline	0.113*** (0.042)	0.115*** (0.041)	0.112*** (0.039)
Open space	0.561*** (0.101)	0.591*** (0.111)	0.601*** (0.121)
Built heritages	0.001*** (0.000)	0.001*** (0.000)	0.002*** (0.000)
Constant	80.203*** (9.780)	81.211*** (9.811)	84.695*** (9.701)
Observations	29434	29434	29434
Groups	3693	3693	3693
Wald	640.50***	638.51***	640.12***

***, ** and * indicate statistical significance at the one, five and 10% levels respectively. Models have been estimated with the share of new firms as dependent variable and results are robust. Locational quotients are included in the models. A robust Hausman-Taylor estimator that deals with the presence of outliers (Baltagi and Bresson, 2012) has been estimated for all models.

5. Conclusions: the role of amenities in growth and development policies for rural regions

The European Union policy concept of ‘smart specialization’ suggests that different regions should consider the sectors or factors in which they possess knowledge-based assets, capabilities and competences as areas for further diversification and potential growth and development. This might be challenging for less developed regions, especially rural ones, which typically do not have knowledge intensive sectors and regional innovation systems, and thus fall short in knowledge-based assets.

Employing perspectives from the neo-endogenous rural development model and from the entrepreneurship literature, we develop a model that accounts for the role of place-based natural and cultural amenities in explaining new firm formation in rural areas, accounting for the roles played by agglomeration and spillovers from related and unrelated sectors. In line with our theoretical and conceptual predictions, we find that variations in new firm formation at neighbourhood level follow variations in location-based amenities. New firms benefit from rural locations that are rich in natural amenities, especially in terms of coastline and land devoted to preserve open spaces. Further, new firm formation in rural areas is spurred by the presence of built heritages, which reflect the presence of amenities that have an important cultural component. Thus, place-based amenities seem to be important resources that local entrepreneurs may exploit through creating new firms. These findings contribute to further integrate the resource-based view—a literature that has been central to entrepreneurship research (Alvarez and Barney, 2000)—with the literature on economic geography.

These findings thus show that entrepreneurs benefit from local place-specific assets in terms of natural and cultural amenities. As such, they have important implications for growth and development policies for less developed and/or rural regions. A strategy that takes into account the role that place-based amenities play for new firm formation suggests that especially rural regions should find new innovative and diverse ways to utilize their amenities (Capello and Kroll, 2016). Building on the theoretical and conceptual background provided earlier in the paper, local policies that promote such entrepreneurship could over time induce an endogenous growth path, driven by an entrepreneurial discovery process, knowledge externalities, and learning-by-doing. As noted by Lopez et al. (2015: 2115), “the priority challenge of regional development is to find the right catalyst to increase local attractiveness

for innovators, technologies, and know-how". Our study suggests that natural and cultural amenities could be such catalysts in rural and remote regions.

Further, our findings have important implications for research on the effects of factors exogenous to the economic actors (i.e. firms or entrepreneurs) in rural areas. In line with the predictions of prior research, entrepreneurs benefit from agglomeration externalities, for example by being located in areas with high population density. Our study also sheds light on the importance of industry variety for entrepreneurship. Both dimensions of industry variety, related and unrelated, are significant predictors of new firm formation.

As this study is one of the first to systematically study the impact of amenities on new firm formation at a disaggregated level, some limitations should be stressed. The study comprises one country, and without similar studies of other countries it is hard to draw general conclusions. It should also be stressed that the groups of municipalities are quite heterogeneous; the rural group contains both city-close and very remote municipalities and neighbourhoods, and the urban group contains both metropolitan neighbourhoods and neighbourhoods in the outskirts of relatively small regional centres. More detailed divisions of the neighbourhoods could thus give a more nuanced picture regarding the importance of amenities in different types of regions. It is also difficult to say anything about to what extent new firm formation in a place is a result of external entrepreneurs' active search for certain amenities or a result of that nascent entrepreneurs living in a place discover the opportunity that local amenities represent. Another limitation is that, although we find that local amenities seem to have an impact on new firm formation, we do not know in what way new firms benefit from the amenities. Do the new enterprises capture the value of local amenities to compete in external markets or are the amenities improving local demand and trading conditions? This question is essential for forming local "smart" development strategies based on both local resources and conditions, as well as external demand, as the neo-endogenous model for rural development and the smart specialization

Appendix 1

The municipality of Åre is located in the interior of northern Sweden, and with the exception of the regional capitals and some of their suburbs, Åre is the only municipality in this part of Sweden that has shown a steady growth since the 1970s. Åre is not only Sweden's largest ski-resort in the winter, but also an all-year round destination, offering a mix of active sports, outdoor experience and social community lifestyle. The 'smart specialization' of Åre has entailed a focus on spurring innovations related to sporting and outdoor activities. As a result, Åre has become a hotbed for start-ups and corporate ventures in the sport-technology sector—such as innovative developments in products, material, techniques and methods for sporting—and in related sectors, such as rehabilitation technology sectors—such as innovative development within equipment for people with disabilities due to sport injuries. Thus, Åre's 'smart specialization' has in reality resulted in a diverse development of the broad field of sports, hospitality and tourism related industries.

The success of Åre can be partly attributed to local policies of strong public-private cooperation. Since the first years of the twenty-first century, local government and private actors worked together around what was called 'Vision 2011', meeting regularly to discuss long-term location-embracing strategies to capitalize on their natural amenities and to create a regional network. As reported by Nordin and Svensson (2007: 57), during this period Åre "has faced a period of growth, evident from, for example, the population growth in the municipality, which after a few years of decline, began to turn at the turn of the century". The authors conclude that Vision 2011 "can be argued to be a central determinant of the innovation capacity" of Åre (Nordin and Svensson, 2007: 61). Therefore, the case of Åre shows that while natural amenities have been the catalyst to increase local attractiveness and entrepreneurship, well thought through regional policies have been able to facilitate and support this process with investment support from the national government and the European Union, making local development sustainable in the long run.

Today, the continuous development of the municipality is mainly driven by private actors and the inflow of human capital. Åre can thus be claimed to have entered an endogenous growth path, however still characterized by both embeddedness and relatedness. Year after year, Åre has been the only rural municipality at the Swedish Top 10-list for start-ups per inhabitant. The case of Åre is thoroughly analysed in Nordin and Svensson (2007) and Nordin and Westlund (2009).

strategy suggest. It would be possible to investigate this problem in case studies of individual villages or areas, and based on such studies develop a taxonomy on the possible roles of various types of amenities.

Still another aspect that we have not been able to deal with in this study is potential variations in the reach of amenities' spatial influence; some amenities might be of relevance only as long as they are in sight, while the presence of others stretches much longer. All these issues can be addressed in future research, from studies of individual villages, cases or branches, to "macro" studies with more detailed data. Moreover, while rural regions as a whole need to diversify their economies, for individual villages this often means local 'specializations' that at the regional level complement each other and form a diversified region. These complementarities can be explored in future research as well.

Regional diversification and relatedness are critical issues nowadays and go hand-in hand with the 'smart specialization' strategy policy (Miguelez and Moreno, 2018). Traditionally, smart specialization is intended to focus strategy support on key industries and economic activities that match regional or potential strengths and allow for related diversification. However, as pointed out in the introduction, this approach might come up short on providing a viable strategy for rural regions. We propose that place-based amenities can be the focus of strategies that promote regional growth through entrepreneurial diversification of related activities. A more in-depth answer can only be achieved through further studies on this mainly unexplored research topic.

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Declaration of competing interest

None.

Appendix 2

Table A1
Variables and definitions in average values (2009–2016)

Variables	Min.	Max.	Mean	Std.Dev.
<i>All neighbourhoods (n = 69596)</i>				
Share new firms (dependent variable)	0	1	0.05	0.07
(Nr. new firms)	0	8158	6.35	57.24
Population density (inh per square km)	0.2	2496.4	368.23	795.27
Share high edu. (>3 years higher edu)	0	1	0.106	0.108
Related diversity (Equation (1))	-1.46	0.53	0.15	0.23
Unrelated diversity (Equation (3))	0.35	1.30	1.19	0.08
Support (sum SEK)	0	9.64e+08	334297.9	6208205
Average temperature (celsius)	-2.6	8.4	5.76	1.96
Average precipitation (ml)	344	1192	638.30	116.19
Lakes (share)	0	0.41	0.04	0.17
Coastline (dummy)	0	1	0.16	0.36
Open space (share)	0	1	0.02	0.09
Built heritages (number)	0	240	0.98	240
LQ agriculture (Equation (3))	0	3.36	0.14	1.06
LQ retail	0	7.12	0.52	1.01
LQ manufacturing	0	6.61	0.04	1.05
<i>Rural neighbourhoods (n = 29434)</i>				
Share new firms	0	1	0.04	0.06
(Nr. New firms)	0	7158	5.01	57.24
Population density	0.2	277.6	29.49	26.25
Share high edu.	0	1	0.13	0.12
Related diversity	-1.15	0.43	0.04	0.23
Unrelated diversity	0.35	1.28	1.16	0.08
Support	0	5.50e+08	409025	4417700
Average temperature	-2.6	8.3	5.09	2.15
Average precipitation	344	1076	641.43	113.30
Share lakes	0	0.39	0.17	0.35
Coastline	0	1	0.26	0.44
Open space	0	1	0.03	0.09
Built heritages	0	240	1.51	7.24
LQ agriculture	0	9.91	5.87	6.56
LQ retail	0	7.12	0.13	0.21
LQ manufacturing	0	6.61	0.48	0.12
<i>Urban neighbourhoods (n = 40162)</i>				
Share new firms	0	1	0.06	0.08
(Nr. new firms)	0	8158	7.33	57.23
Population density	10.4	5496.4	616.49	974.55
Share high edu.	0	1	0.07	0.07
Related diversity	-1.46	0.53	0.24	0.18
Unrelated diversity	0.57	1.30	1.22	0.06
Support	0	9.64e+08	279531	7244250
Average temperature	5.09	8.3	5.09	2.15
Average precipitation	344	1076	641	113
Share lakes	0	0.23	0.09	0.26
Coastline	0	1	0.08	0.27
Open space	0	1	0.02	0.09
Built heritages	0	54	0.59	2.81
LQ agriculture	0	3–56	0.78	6.56
LQ retail	0	7.12	0.81	0–91
LQ manufacturing	0	6.61	0.99	1.33

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