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Spatial effects in Regional Tourism Firm Births and Deaths

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Abstract

Agglomeration economies are benefits that firms obtain when they locate close to one another or are constrained spatially. Tourism is heavily reliant on agglomeration economies rather than mere resource endowments. Policy formation requires an understanding of how tourism agglomeration impacts entrepreneurship within regions. In this Chapter, we focus on how agglomeration economies impact enterprise birth and death rates within the tourism sector in Ireland using a comprehensive dataset on tourism firm births and deaths. Agglomeration economies have been studied in the area of regional economic growth and prosperity but less is known about the extent to which spatial agglomeration economies affect regional firm births and deaths in the tourism sector. Our results provide evidence of positive spatial dependence in regional tourism enterprise births and deaths. Co-location of a diverse set of complementary enterprises fosters greater tourism enterprise births. Greater local specialisation rather than diversity lowers regional tourism enterprise deaths.

Keywords: Tourism Entrepreneurship, Agglomeration Economies, Tourism Firm Deaths, Tourism Firm Births

1. Introduction

Tourism is one of the largest and fastest growing economic sectors in the world, providing 292 million jobs and accounting for 1 in 10 jobs in the global workforce (WTTC, 2017). While traditionally the sector was considered to be stable with little innovation (Hjalager, 2002, 2010; Sundbo, Orfila-Sintes, & Sørensen, 2007), this is no longer the case (Walsh, Lynch, & Harrington, 2011). Shifts in the global economy along with changing consumer demands mean that the industry has become extremely competitive and is now characterised by continuous transformation (Buhalis & Costa, 2006; Camisón & Monfort-Mir, 2012; Cooper & Wahab, 2005; Martínez-Román, Tamayo, Gamero, & Romero, 2015). Entrepreneurship is receiving increased attention within tourism research (Carmichael & Morrison, 2011; Solvoll, Alsos, & Bulanova, 2015) largely due to the vital role entrepreneurs, firm start-ups and business failures play within the tourism industry.

Since 2000 growth in the travel and tourism sector has outpaced that of the global economy. In 2016, for example, this sector contributed 3.1% to direct GDP growth while the global growth rate was lower at 2.5% (WTTC, 2017) thus prompting researchers and policy makers to explore the idea of tourism as a tool for regional development (Briedenhann & Wickens, 2004; Keeble & Wever, 2016; Mose, 2007; Müller & Jansson, 2006; OECD, 2016). In the context of a depressed national economy, tourism growth is regarded as a reasonable choice for regional economic development (Hohl & Tisdell, 1995), allowing peripheral and/or marginalized areas to take advantage of their unique tourism-related resource endowments. Tourism-led development plans, however, might not be entirely successful in these regions, as tourism growth is heavily reliant on agglomeration economies rather than mere resource endowments (Capone & Boix, 2008). By opening up regions to market forces and globalisation tourism can generate economic benefits resulting in increased wealth and opportunities, however it can also exacerbate inequalities, increase competition and lead to firm failure (Sharpley & Telfer, 2014). Policy formation requires an understanding of how tourism agglomeration impacts entrepreneurship within regions. In this Chapter we focus on how agglomeration economies impact enterprise birth and death rates within the tourism sector.

Agglomeration economies describe the benefits that firms obtain when they locate close to one another (Cortinovis & Van Oort, 2015; Glaeser, 2010; Gouveia, Santos, & Fernandes, 2017; Neffke, Henning, & Boschma, 2011). These economies result from internal economies of scale within a firm (Krugman, 1991), and from external economies resulting from network benefits. We focus on the latter which are spatial in nature. Frenken, Van Oort, and Verburg (2007) and others such as Rosenthal and Strange (2003) and Beaudry and Schiffauerova (2009) examine external economies like localization, diversification and urbanization economies. Localisation economies occur when firms benefit from the presence of other firms within the same industry, diversification economies occur when firms benefit from the clustering of a large variety of industries (either related or unrelated), while positive urbanisation economies occur when firms benefit from the size and density of an urban centre. In the latter case the benefit is from the scale of the entire urban economy rather than the scale of the industry.

The empirical application of our research refers to the Irish economy. Tourism has become one of Ireland's greatest economic success stories. European Union funds, along with public and private sector investments have helped to improve and develop infrastructure, accommodation and visitor attractions (Hurley, Archer, & Fletcher, 1994), while increased competition in the airline industry along with technological innovation has dramatically

improved access (ITIC, 2013). The period under investigation, 2007 to 2009, was a dynamic period in the Irish economy. During this period tourism receipts fell from €6.45 billion to €5.36 billion, even though they continued to account for a relatively constant share of Gross National Product (accounting for 3.7% in 2007 and 3.8% in 2009). Travers (2003) argues that tourism is a powerful instrument of national and regional development in Ireland. It is a particularly important source of economic activity in rural areas (ITIC, 2010). Scenic rural areas in Ireland tend to be areas of agricultural disadvantage and look towards tourism as a source of supplementing income and as a source of direct and indirect employment (Gorman, 2005). Many areas have developed strong tourism industries and particular places have become synonymous with the word tourism. Following the financial crisis demand from the domestic market proved to be resilient while international visitors, particularly from the United Kingdom fell sharply (ITIC, 2010). In this Chapter we use a comprehensive dataset to examine the effect of spatial agglomeration economies on firm births and deaths in the Irish tourism industry. For comparative purposes we also present the results for all firms in Ireland. Our results are estimated at Electoral Division level. There are over 3,000 electoral divisions in Ireland, each having a low geographical size (average = 23km) thus making them ideal for comparing regions. Agglomeration economies have been studied in the area of regional economic growth and prosperity (Capone & Boix, 2008; Frenken et al., 2007; Hartog, Boschma, & Sotarauta, 2012; Yang, 2012; Yang & Fik, 2014) but less is known about the extent to which spatial agglomeration economies affect regional firm births and deaths, particularly in the tourism sector (Hjalager, 2010; Yang, 2012).

The rest of this Chapter is organised as follows: Section 2 describes recent literature about the effects of agglomeration on firm births and deaths; Section 3 outlines our data and methods; Section 4 presents and discusses the empirical results and Section 5 concludes.

2. Literature Review

While a large body of tourism literature has examined the demand for tourism and the factors contributing to tourist flows and revenues, few have considered the supply side and issues such as infrastructure, agglomeration and market access (Yang & Fik, 2014). Those papers that have examined the issue are complex and cover a diverse range of topics from the firm level to the industry and market level (Song, Dwyer, Li, & Cao, 2012). Early studies considered whether tourism, when studied from a supply perspective, is an industry or a market (see Leiper (2008) for an overview). Nowadays it is commonly recognised that tourism is neither a single industry nor a single market (Dwyer, Forsyth, & Dwyer, 2010; Stabler, Papatheodorou, & Sinclair, 2009), it is a composite product that involves a combination of a variety of goods and services provided by different sectors, such as transport, accommodation, tour operators, travel agencies, visitor attractions, and retailing. Since local and regional factors play a role in determining the potential success of tourism in any given region (Yang & Fik, 2014) further supply side investigations are needed so as to help governments identify the destination-specific attributes that explain regional variability in tourism growth.

Unquestionably, the birth of tourism firms contributes to the economic and social well-being of a community. Tourism entrepreneurs are responsible for the birth of these firms (Koh & Hatten, 2002) and without these entrepreneurs beautiful landscapes, waterways, buildings and cities might not be viewed as tourism resources. Some authors argue that since entrepreneurs stimulate entrepreneurship, the presence of entrepreneurs can lead to a certain level of tourism development even without government intervention or a development plan (Barr, 1990; Victurine, 2000). Without these entrepreneurs it is likely that even the most sophisticated

development plans will fail (Koh & Hatten, 2002). The most common routes into tourism entrepreneurship are to start a new business from scratch or to purchase an existing business. One of the key ingredients for a successful business is location (Romanelli & Schoonhoven, 2001). Romo and Schwartz (1995), Saxenian (1994), amongst others, contend that firm location is influenced by an array of factors such as access to key networks, resources and an educated workforce.

Agglomeration provides notable cost savings and convenience for tourists thereby enhancing regional tourism growth. Examining the Italian market Capone and Boix (2008) and Lazzeretti and Capone (2009) find evidence that agglomeration is a crucial driver of regional tourism growth. As noted earlier these economies can be divided into localization [economies derived from the concentration of companies that develop the same economic activity in a specific area or region (Marshall, 1920)], urbanisation [economies derived from the concentration of companies that develop various economic activities in a particular area or region, (Jacobs, 2016)] and diversification [economies derived from the co-location of related or unrelated industries, see Frenken et al. (2007)].

Many authors have examined the impact of agglomeration on the development of the tourism industry. A number of these papers focused on the impact of tourism agglomeration on innovation (Go & Williams, 1994; Jackson & Murphy, 2002, 2006; Novelli, Schmitz, & Spencer, 2006; Saxena, 2005). Since information flows more easily between firms in a spatially proximate agglomeration, it was expected that the spill-overs of tacit knowledge would be common within a tourism cluster as spatial proximity facilitates social and economic networks. Jackson and Murphy (2002, 2006) and Sørensen (2007) found that when knowledge diffuses quickly it enhances tourism innovation and contributes to tourism development. While this has been recognised in other tourism sectors detailed empirical studies remain limited (Yang, 2012).

Saxena (2005) stresses that the importance of localised economies as the main characteristic of tourism destinations and development. Similarly, Capone and Boix (2008) note that the growth rate of local tourism depends more on the strength of localization economies than it does on the availability of natural resources. Hall (2004), on the other hand, in a study of food and wine firms in New Zealand, notes that networks and cluster relationships between firms are the primary "drivers" of a region's economy. Similarly Tinsley and Lynch (2001), in a study of networks between small tourism businesses in West Scotland, note the importance of cooperation between businesses. This is not surprising given the nature of the tourism industry and the buyer's market that exists today for tourism products and services. Firms must work together to create a unique regional identity, they must offer sufficient product variety to meet the diverse customer requirements, and they must stay current and respond to changing tourist demands (Page, 2003). Novelli et al. (2006) suggests that tourism agglomeration is the result of the co-location of complementary firms which collectively deliver a bundle of attributes to make up a specialised regional product experience.

Michael (2006) notes that by developing cooperative and complementary interactions, tourism firms are able to exploit synergies and create comparative advantage. Van Laere and Heene (2003) identify the capacity to work with others as a core competence of organisations. They argue that many of the skills and resources leading to a firm's success exist outside of the firm. The desirability of small tourism firms working together in a form of 'co-opetition' (Nalebuff, Brandenburger, & Maulana, 1996) is seen in a number of studies as well as in tourism economic policy initiatives. Lazzeretti and Capone (2009) comment on how embedded tourism firms are

within their community and how this can have advantages and disadvantages. In particular, it can help firms to maintain a line of differentiation between one another thus enabling each to survive and grow. Tinsley and Lynch (2008) note that if the fine balance between cooperation and competition is disturbed then the cooperative spirit can quickly disappear among those concerned, resulting in a break-down of business and social networks. At the extreme this can lead to intense competition and can result in some business failures.

Agglomeration economies play a critical role in explaining how spatial concentration comes about. The bigger the agglomeration, the more firms may benefit from a wider range of business services, a greater variety of potential suppliers and more specialised buyers, a larger and more diversified pool of (skilled and low-cost) labour etc. Few have examined the impact of agglomeration economies on firm births or deaths (see Basile, Pittiglio, & Reganati, 2017; Cainelli, Montresor, & Marzetti, 2014; Ferragina & Mazzotta, 2015), and this issue is under explored for the tourism industry. Localisation externalities impact firm birth and death rates by increasing / decreasing local competition and input prices. Huiban (2011) and Pe'er and Keil (2013) note that negative localization externalities increase firm death rates, while positive localization externalities lower death rates. Basile et al. (2017), Renski (2011), and Cainelli et al. (2014) find evidence that positive localisation externalities dominate the market. Greater related variety through sector knowledge spillovers is argued to positively influence the innovativeness, growth and performance and consequently the survival chances of the firm, see Basile et al. (2017), Brunelle and Dubé (2013) and Renski (2011). Greater unrelated variety also promotes the survival of a firm as the regional economy is less disturbed by sector specific shocks, see Basile et al. (2017). While urbanization externalities may increase tourism firm births through accessibility to a greater range of services and higher local demand, greater congestion costs (such as higher commercial lease rates, land prices etc.) may counteract this. Agglomeration economies have been studied in the area of regional economic growth and prosperity (Capone & Boix, 2008; Frenken et al., 2007; Hartog et al., 2012; Yang, 2012; Yang & Fik, 2014) but less is known about the extent to which spatial agglomeration economies affect regional firm births and deaths, particularly in the tourism sector (Hjalager, 2010; Li, 2008; Yang, 2012).

3. Data and Methods

Data

Business demography data (2007-2009) produced by the Central Statistics Office (CSO) in Ireland is used in our analysis. This business demography data is collected from administrative sources including business registers, tax sources and statistical surveys. Active enterprises, enterprise births and enterprise deaths are identified for inclusion in this dataset in agreement with the methodological approach delineated by the OECD and Eurostat for international comparability. Enterprises are defined as the smallest grouping of units generating goods and services which benefit administratively from some autonomy over their decision making like the allocation of resources. The enterprise is the sole legal unit. It can perform activities at one or more locations. Enterprises are classified as *active enterprises* if they pay indirect sales tax, referred to as Value Added Taxation (VAT) in Ireland, have registered employees or filed a corporation/income tax return (with over €50,000 turnover) in the reference year. *Enterprise births* involve the new formation of a combination of production factors. No other enterprise however can be involved in the event. Enterprise births therefore do not comprise of entries into the stock of businesses due to mergers, breakups, split-offs or the restructuring of a set of enterprises. Entries into the stock of businesses resulting from a change in activity are also not seen as an enterprise birth. In addition, reactivated enterprises (enterprises returning to the

sample within two calendar years of registering as inactive) are not recorded as births. In contrast, *enterprise deaths* involve the cessation of a combination of factors of production and the deletion of the enterprise from the business register. Enterprise deaths exclude exits from the stock of businesses due to mergers, acquisitions, divestments or the restructuring of a set of enterprises or enterprises which reactivated within two years (see Eurostat, 2007).

The business demography data is the most complete source of data on the stock of active enterprises, enterprise births and enterprise deaths in Ireland. It provides data on the employment and NACE Revision 2 classification of active enterprises, enterprise births and enterprise deaths from 2006. For the sub period 2007 to 2009 this database provides data on the location of a large proportion of the stock of active enterprises, enterprise births and enterprise deaths. The geographical location of each enterprise for this period is known to district electoral division (DED) level[1]. As stated earlier there are over 3,000 EDs in Ireland of low geographical size (average=23km). Of the 272,303 active enterprises in Ireland in 2009, 190,615 (70%) are geocoded to Electoral Division (ED) level. Aggregating the enterprise data to ED regions allows for an analysis of the effects of agglomeration on regional enterprise deaths and enterprise births.

The tourism sector is complex to measure. It is difficult to classify tourism activity if you have different types of tourists (e.g. inbound, outbound and domestic tourists, business and leisure etc.). MacFeely, Delaney, and O'Donoghue (2013) refer to the tourism sector as the invisible sector given its fragmented and heterogeneous nature. Nonetheless MacFeely et al. (2013) put forth a classification of tourism sectors based on 4 digit NACE Revision 2 codes following the (United Nations Statistics Division, 2010, p. 42) definition of tourism activities. Table 1 details the NACE Rev 2 sectors included in the classification of this sector. We aggregate tourism enterprise data to ED regions based on this classification to enable an analysis of the effects of agglomeration on regional tourism firm births and deaths. Note MacFeely et al. (2013) admit that this classification is not perfect as not all consumption of these products in these industries is by tourists and tourists may purchase products not included in this sectorial classification, however it is a useful classification for analysis using large business administrative data.

We also aggregate enterprise data for all sectors of the economy to enable us to identify differences if any of agglomeration measures on regional tourism enterprise births and deaths as opposed to their influence on births and deaths of all enterprises within each ED. The average annual tourism enterprise birth rate b_j in region j is the average proportion of tourism enterprise births in each ED in year t = 2007 to 2009. The average annual tourism enterprise death rate d_j in region j is the average proportion of tourism enterprise deaths in each ED in year t = 2007 to 2009. Figure 1 shows that higher rates of tourism enterprise births and tourism enterprise deaths are not just concentrated around urban centres. This pattern reflects that of higher rates of enterprise births and enterprise deaths across all sectors. Table 2 describes the demography data examined in the analysis below for the sub period 2007 to 2009 for which we have detailed data on the location of the enterprises. It shows that the tourism enterprise birth rate and death rate from 2007 to 2009 also mirrored these rates across all sectors of the economy with the tourism death rate slightly lower in the tourism sector than in the overall economy.

[1] DEDs are the second smallest legally defined administrative areas in Ireland for which small area population statistics are published from the Census. The matching of firms to the lowest level of spatial disaggregation, the small area population statistics division, is not possible as for confidentiality reasons the CSO will not provide this information.

[Insert Figure 1 near here]

[Insert Tables 1 and 2 near here]

Measures of Agglomeration

Common measures of agglomeration economies employed by Basile et al. (2017), Alkay and Hewings (2012) and Frenken et al. (2007) are used to approximate localization, diversification and urbanization economies. Localisation economies occur when firms in a region profit from the presence of other local firms within the same industry (Boschma & Iammarino, 2009; Frenken et al., 2007). We use location quotients to capture localization economies, entropy measures like related and unrelated variety to measure diversification economies, and population density as a proxy for urbanization economies. A location quotient relates the concentration of a sector in an ED to the concentration of the same sector nationally. We use the share of sectorial employment in the relevant spatial unit to capture concentration following Antonietti and Cainelli (2011) and Basile et al. (2017). Thus, the location quotient (LQ) of sector *s* (four-digit NACE classification code) in ED *j* is approximated by:

$$LQ_{s,j} = \frac{E_{s,j}/E_j}{E_{s,n}/E_n} \quad (1)$$

where $E_{s,j}$ is the employment in sector *s* in ED *j* and $E_{s,n}$ is the employment in sector *s* nationally (*n*). Location quotients greater than 1 suggest that there is a bigger share of employment in the ED than there is in that sector nationally. They indicate a regional concentration or specialisation or strength in that particular sector. Location quotients less than 1 indicate a potential opportunity to develop businesses in the local area to meet area demand.

Diversification externalities arise from the clustering of a large variety of sectors in the local economy (Jacobs, 1969). To capture diversity we follow Frenken et al. (2007) method, where related variety is approximated by the weighted sum of the entropy at the four digit NACE classification system within each two digit NACE classification system. If all four digit NACE sectors *s* fall solely under a two digit NACE sector *i*, the two digit shares P_i in ED *j* can be calculated by adding the four digit shares p_s in each ED *j* as follows:

$$P_{i,j} = \sum_{s\in(i,j)} p_s \quad (2)$$

Unrelated variety in ED *j* (UV_j) or entropy at the two-digit NACE classification level using equation (2) is given by:

$$UV_j = \sum_{i=1}^{I} P_{i,j} \log_2\left(1/P_{i,j}\right) \quad (3)$$

Related variety (RV_j) is calculated by the weighted sum of entropy within each two digit NACE code in equation (3) which is approximated by:

$$RV_j = \sum_{i=1}^{I} P_{i,j} H_{i,j} \quad (4)$$

where

$$H_{i,j} = \sum_{s\in(i,j)} \frac{P_s}{P_{i,j}} \log_2\left(\frac{1}{P_s/P_{i,j}}\right)$$

Urbanization effects tourism firm births through accessibility to a greater range of services (e.g. airports, institutions and government support bodies) and higher local demand. However,

greater congestion costs (e.g. higher commercial lease rates, land prices etc.) may counteract this. Urbanization externalities (UE_j) are captured by the population density in each ED. Urbanization externalities (UE_j) are calculated as follows in accordance with Antonietti and Cainelli (2011) and Alkay and Hewings (2012):

$$UE_j = \frac{POP_j}{Area_j} \quad (5)$$

where $Area_j$ is the area of the ED (Km^2). Figure 2 graphs these agglomeration measures by ED. The figure shows that higher location quotients are more spread out throughout the country. Greater related variety and unrelated variety are concentrated in urban centres such as Dublin, Cork and Limerick etc. These urban centres are more densely populated and thus greater diversity captured by related and unrelated variety, is evident.

Control Variables

We also include firm specific variables such as firm size and firm age at the ED level through computing the proportion of enterprises in different size and age categories in each ED. For industry specific variables, like the sectoral growth rate or concentration approximated using the Herfindahl Index, we include an average estimate of these measures across all enterprises within the ED over the period 2007 and 2009. These variables are defined and summarized in Table 3.

[Insert Figure 2 near here]

[Insert Table 3 near here]

Methods

The impact of agglomeration on regional tourism enterprise births and deaths is investigated using a cross-sectional spatial autoregressive model of the following form[2]:

$$b_j = \alpha_0 + \lambda_1 W b_j + \alpha_1 x_j + \varepsilon_{1j} \quad (7a)$$

$$\varepsilon_{1j} = \rho_1 M \varepsilon_{1j} + \mu_{1j} \quad (7b)$$

$$d_j = \beta_0 + \lambda_2 W d_j + \beta_1 x_j + \varepsilon_{2j} \quad (7c)$$

[2]Using a Cliff-Ord model (or Manski model) of the following form:

$$y = \lambda W y + X\beta + WX\gamma + \mu$$
$$\mu = \rho W \mu + \varepsilon$$

we imposed restrictions on this model test the appropriateness of alternative spatial models. The following alternative models were examined.

- $\gamma=0, \rho=0, \lambda\neq0$ -> Spatial Lag Model
- $\gamma=0, \rho\neq0, \lambda=0$ -> Spatial Error Model
- $\gamma=0, \rho\neq0, \lambda\neq0$ -> Spatial Autoregressive Model with Autoregressive Disturbances
- $\gamma\neq0, \rho=0, \lambda\neq0$ -> Spatial Durbin Model.

For tourism births, the robust Lagrange multiplier test shows both a spatial error process (LM statistic = 7.289, df=1, p-value =0.0007) and a spatial lag (LM statistic = 4.532, df=1, p-value =0.033) implying that our SARAR model is robust. For tourism deaths, the Lagrange multiplier test also shows both a spatial error process (LM statistic = 8.673, df=1, p-value =0.003) and a spatial lag (LM statistic = 17.052, df=1, p-value =0.0001) implying that our SARAR model is robust. We conduct these estimations at the higher level regional aggregation (e.g. local electoral area) due to the high level of computations required with 2,856 DEDs. Note as there are only 128 of these in our sample for Ireland this simplifies the computation techniques considerably.

$$\varepsilon_{2j} = \rho_2 M\varepsilon_{2j} + \mu_{2j} \quad (7d)$$

Spatial dependence, also referred to as regional spillovers, is captured by an endogenous spatial lag ($\lambda_1 Wb_j$ in the birth equation and $\lambda_2 Wd_j$ in the death equation). A spatial autoregressive error term is present in both models (ε_{1j} and ε_{2j}) and is included to capture nuisance spatial dependence in unobserved factors. Our first dependent variable b_j in equation (7a) is a vector of the average tourism enterprise birth rate in electoral district *j* over the period 2007 to 2009 and analogously our second dependent variable d_j in equation (7c) is a vector of the average death rate in electoral district *j* over the same period. α_0 and β_0 represent the vectors of intercept coefficients, x_j is the matrix of independent variables (which is constant across both the birth and death equations), α_1 and β_1 are the associated coefficients and ε_{1j} and ε_{2j} are the respective error terms in equations (7a) and (7c). *W* and *M* are spatial weighting matrices of dimensions *N*N*. They are calculated using the row normalised inverse of distance between the centroid of each region. The W matrix is row standardised so that the rows sum to 1. The values Wb_j and Wd_j are therefore a spatially weighted value of b_j and d_j. The spatial error process represented in equation (7b) and (7d) as infers that shocks to a region proliferates this effect through the error term to other regions. In equation (7b) and (7d) ρ_j is a spatial autoregressive coefficient and μ_j is a standard spherical error term. We estimate our spatial model using the method developed by Kelejian and Prucha (1998) where M=W.

4. Results

The results of the spatial autoregressive estimations are presented in Table 4 for tourism enterprise births and deaths (Columns I and II respectively) and for comparison purposes enterprise births and deaths across all sectors of the economy (Columns III and IV respectively). We find that tourism enterprise births and deaths at the ED level exhibit positive spatial dependence.[3] This implies that bordering regions experience similar patterns in tourism enterprise birth and death rates. Our estimates of lambda (λ_j) in equation 7(a) and 7(c) are positive and significant for all the estimations presented in Table 4, Columns 1 to IV. Consequently increased tourism enterprise births, and analogously tourism enterprise deaths lead to further tourism enterprise births and enterprise deaths in neighbouring regions. This positive spatial dependence in tourism enterprise births and enterprise deaths is evident after we control for measures of agglomeration economies such as localization economies, related and unrelated variety, urbanization economies and other factors such as the characteristics of firms in the ED and the industries in which they operate in. It is reflective of a pattern of positive spatial dependence in enterprise births and enterprise deaths across all sectors of the economy and highlights how tourism enterprise births in one region presents opportunities for further tourism enterprise births and tourism development in neighbouring regions. However, a spate of tourism enterprise deaths in one ED can also propagate further tourism enterprise deaths throughout neighbouring regions. Thus, there is positive externalities for local tourism firms and those in neighbouring regions in recognising this dependency and an onus to act

[3]Positive spatial dependence was found in tourism births and deaths using the (Moran, 1950) I test at local electoral area level confirming the findings of positive spatial dependence in the cross-sectional spatial autoregressive estimations found at ED level above. We estimated Moran's I at local electoral area level which are larger spatial units for ease of computation. There are 128 of these in our sample for Ireland. For tourism births Moran's I was 0.308 with a Z value of 5.440 and an associated p-value less than 0.0001. For tourism deaths Moran's I was 0.519 with a Z value of 9.130 and an associated p-value less than 0.0001.

cooperatively in supporting, growing and developing their tourism product and associated tourism enterprise births.

Turning now to the impact of agglomeration economies on tourism enterprise births, we find that the coefficients on population density and local diversity more specifically unrelated variety were positive and significant in explaining regional tourism enterprise births. Thus, population density and greater local diversity (or unrelated variety) significantly raises regional tourism enterprise births. While greater tourism enterprise births are expected in urban centres, diseconomies set in with increasing levels of population density providing some evidence of nonlinearities in urbanisation economies supporting arguments put forth by De Silva and McComb (2012). It is likely that congestion effects and higher land and property prices, commercial lease rates etc. can inhibit tourism enterprise births in these circumstances. We also find that a more varied industry composition promotes greater regional tourism enterprise births providing suggestive evidence that knowledge spillovers through local collaborations and networks across a more diverse set of local businesses fosters greater tourism enterprise births. The findings for the effects of spatial agglomeration economies on tourism enterprise births were reflective of enterprise births for urbanisation externalities. However greater diversity captured by unrelated variety has a negative and significant effect on enterprise births across all sectors of the economy. Thus, there is difference in the effect of diversity on tourism enterprise births in comparison with enterprise births across all sectors of the economy. Policy measures which support diversity assist the development of the tourism industry but do not encourage enterprise births in general.

Counterintuitively but similar to regional enterprise deaths across all sectors local diversity (this time related and unrelated) significantly raise regional tourism enterprise deaths. Thus, greater diversity facilitating knowledge spillovers and the cross fertilisation of knowledge does not shield regions and tourism enterprises operating in those regions against idiosyncratic demand shocks. While there was no evidence that regional specialisation has an impact on tourism enterprise births there is evidence that greater local specialisation lowers regional tourism enterprise deaths. The coefficient on the location quotient was negative and significant. The benefits of regional specialisation in tourism were therefore found to outweigh the associated diseconomies (vis. costs of local inputs, tougher competition) increasing the survival rate of tourist firms during a macroeconomic shock. This is consistent with other evidence which explores the impact of localization economies on regional enterprise deaths rates, see Cainelli et al. (2014) and Ferragina and Mazzotta (2015). This effect is negative and significant after controlling for industry concentration in the region. Positive spatial dependence transmits this effect across proximate regions. The effect of agglomeration economies on regional enterprise deaths across all sectors was largely similar to that on regional tourism enterprise deaths except the effect of localisation economies though negative in sign was not significant for regional enterprise deaths across all sectors.

We find regions with a higher proportion of micro enterprises (1-4 or 5-9 employees) relative to the proportion of small enterprises (10-49 employees) had higher regional tourism enterprise birth rates and higher regional enterprise birth rates across all sectors. Comparatively, regions with a higher proportion of large firms (50+ employees) relative to the proportion of small firms (10-49 employees) had lower regional enterprise birth rates across all sectors however this effect was not significant for regional tourism enterprise birth rates. We also find regions with a higher proportion of younger enterprises (firms trading less than two years and between 3 to 5 years) relative to the proportion of more established enterprises (trading for 6-10 years) had higher regional tourism enterprise birth rates and higher regional enterprise birth rates

across all sectors. Thus, it seems that developing regions with a higher proportion of younger and smaller enterprises lead to greater tourism enterprises birth rates. This effect then proliferates through neighbouring regions.

Regions with a higher proportion of micro enterprises (zero or 1-4 employees) and large firms (50+ employees) relative to the proportion of small firms (10-49 employees) had higher regional tourism enterprise deaths rates and higher regional enterprise death rates across all sectors. We also find regions with a higher proportion of older enterprises (11+ years in the case of all enterprises deaths and 20 years + in the case of tourism deaths) relative to the proportion of established enterprises (6-10 years trading) had significantly lower regional tourism enterprise death rates and lower regional enterprise death rates across all sectors.

Examining structural features of the region, we find greater average sectoral growth raises regional tourism enterprise birth rates and lowers regional tourism death rates. The coefficient on the Herfindhl index is negative and significant suggesting that a higher concentration within the sector in the region reduces the proportion of enterprise births and deaths in the region (tourism or otherwise) in line with expectations from the literature (Strotmann, 2007; Tveterås & Eide, 2000).

[Insert Table 4 near here]

5. Conclusions and Discussion

This study finds clear evidence of positive spatial dependence in regional tourism enterprise births and deaths. Like Yang (2012) across Chinese provinces we find that the provincial tourism industry exerts a significant influence on the further development of this industry. Tourism enterprise births in local regions present opportunities for further tourism enterprise births and tourism development in neighbouring regions. Tourism enterprise deaths in local regions lead to further tourism enterprise deaths in neighbouring regions. Given the proliferation of these effects it is important that tourism enterprises recognise the complementary nature of their services and their independency. Tourist destinations should take complete advantage of positive regional spill-over effects in tourism births through collaborative marketing.

We find support also for the co-location of a diverse set of complementary enterprises like Novelli et al. (2006). Knowledge spillovers through local collaborations and networks across a more diverse set of local complementary businesses foster greater tourism enterprise births. Michael (2003) argues that mutually complementary enterprises generate a collectively specialized regional tourism product or experience enhancing the local tourism industry's competitiveness and development. It is also in line with Porter's (1998) definition of tourism agglomeration as "geographic concentrations of interconnected tourism enterprises, firms in related industries, and associated institutions in related fields that cooperate but also compete".

Greater local specialisation rather than greater diversity lowers regional tourism enterprise deaths. Benefits from such regional specialisation in tourism can derive from shared or complementary resources, knowledge and institutions. For example, access to larger, mobile, and dedicated labour, cost reductions from the sharing of inputs and spatial proximity to customers and the creation of specialised suppliers assist enterprises in overcoming scale disadvantages raising their productivity and increasing their survival chances relative to similar firms lacking access to such externalities in other regions, see Basile et al. (2017). It also

enhances knowledge transfer between different tourism firms and therefore encourages tourism innovation.

Indeed the use of tourism as a tool for regional development in rural and peripheral regions is common in recent years (e.g. Brouder & Eriksson, 2013; OECD, 2014). The revealed spatial effects supports local policymakers in understanding the localized pattern of tourism enterprise births and deaths and offer more appropriate suitable and targeted strategic plans for local tourism development. Proximate regions to tourist destinations should internalize the spill-over to catch up with their neighbours through supporting new tourism births and local development and marketing plans.

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Table 1. A Map of Tourism Industries to NACE Rev.2 codes

Activity	NACE Rev.2	Activity	NACE Rev.2
1 Accommodation services for visitors		**7 Transport equipment rental services**	
Hotels and similar accommodation	55.10	Renting and leasing of cars and light vehicles	77.11
Holiday and other collective accommodation	55.20		
Recreational vehicle parks, trailer parks and camping grounds	55.30	**8 Travel agencies and other reservation services**	
Other accommodation	55.90	Travel agency activities	79.11
		Tour operator activities	79.12
2 Food and beverage serving services		Other reservation service and related activity	79.90
Restaurants and mobile food service activities	56.10		
Event catering activities	56.21	**9 Cultural services**	
Other food services	56.29	Performing arts	90.01
Beverage serving activities	56.30	Support activities to performing arts	90.02
		Artistic creation	90.03
3 & 4 Railway & Road passenger transport services		Operation of arts facilities	90.04
Passenger rail transport, interurban	49.10	Library and archives activities	91.01
Urban and suburban passenger land transport	49.31	Museums activities	91.02
Taxi operation	49.32	Operation of historic sites and buildings and similar visitor attractions	91.03
Other passenger land transport n.e.c.	49.39	Botanical and zoological gardens and nature reserves activities	91.04
5 Water passenger transport services		**10 Sports and recreational services***	
Inland passenger water transport	50.10	Operation of sports facilities	93.11
Inland passenger water transport	50.30	Fitness facilities	93.13
		Other sports activities	93.19
6 Air passenger transport services		Activities of amusement parks and theme parks	93.21
Passenger Air Transport	51.10	Other amusement and recreation activities	93.29
		Renting and leasing of personal and household goods	77.21

* *Activities of sports clubs (93.12) excluded. Source: Adapted from* MacFeely, S. Delaney, J., and O'Donoghue,F. (2013)

Table 2. Business Demography in Ireland *(NACE Rev 2 Sectors A-U)*

Year	2007	2008	2009	Average (2007-2009)
Active Enterprises	292,794	293,247	272,303	286,099
Active Tourism Enterprises	23,084	32,197	32,162	29,147
Enterprise Births	31,195	26,955	28,525	28,892
Birth Rate (%)	10.7%	9.2%	10.5%	10.1%
Tourism Enterprise Births	2,401	2,646	2,995	2,680
Tourism Birth Rate (%)	7.7%	9.8%	9.3%	8.9%
Enterprise Deaths	30,585	36,723	36,741[a]	34,683
Death Rate (%)	10.4%	12.5%	13.5%	12.1%
Tourism Enterprise Deaths	2,283	2,411	3,030	2,574
Tourism Death Rate (%)	9.8%	7.5%	9.4%	8.9%

Source: Business Demography in Ireland *(NACE Rev 2 Sectors A-U),* Central Statistics Office, Ireland.

Table 3. Descriptive Statistics of Variables

Variables	Tourism Enterprises		All Enterprises	
	Mean	**Standard Deviation**	**Mean**	**Standard Deviation**
Proportion of firms in ED with Zero employees	0.0769	0.1527	0.0916	0.0657
Proportion of firms in ED with 1-4 employees	0.6823	0.2885	0.7887	0.1013
Proportion of firms in ED with 5-9 employees	0.1351	0.2107	0.0676	0.0564
Proportion of firms in ED with 10-49 employees (reference)	0.0464	0.0443	0.0461	0.0441
Proportion of firms in ED with 50+ employees	0.0141	0.0602	0.0057	0.0152
Proportion of firms in ED age less than 2 years	0.2578	0.2704	0.2365	0.0922
Proportion of firms in ED age 3 to 5 years	0.1002	0.1800	0.1413	0.0832
Proportion of firms in ED age 6 to 10 years (reference)	0.1988	0.0914	0.1985	0.0914
Proportion of firms in ED age 11 to 20 years	0.2772	0.2778	0.2569	0.1017
Proportion of firms in ED age 21 to 30 years	0.1957	0.2613	0.1505	0.0921
Proportion of firms in ED age 30+ years	0.2247	0.0937	0.0176	0.0264
Sectorial Growth Rate	-0.3432	1.9403	-0.81144	2.2539
Herfindahl Index	0.4729	0.4145	0.4607	0.4106
Location Quotient	3.2243	9.4005	6.2895	40.7656
Related Variety	0.4701	0.3773	0.4304	0.3735
Unrelated Variety	2.6309	0.8499	2.4707	0.9220
Population Density	4.2805	1.9977	4.0440	1.9434

Note:[a]*Sectorial growth rate is measured by logarithmic difference in industry employment in each NACE Rev. 2 4 digit sector code in each ED between 2007 and 2009.*

[b]*The Herfindahl Index as measured by* $\sum_{i=1}^{N} z_i^2$ *where* z_i *is the number of employees in each firm divided by total employment in its NACE Rev. 2 four digit sector code in each ED averaged over the period 2007 to 2009 and N is the number of establishments within the industry similar to Pe'er and Keil (2013).*

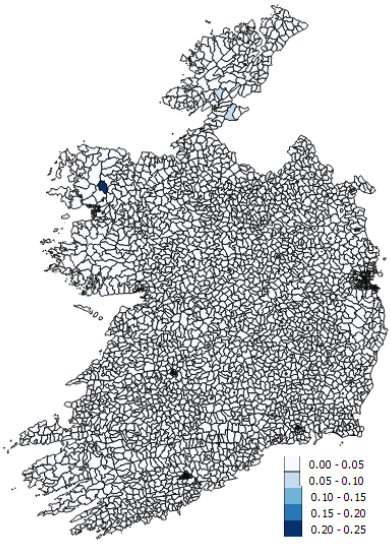
[c]ED is an acronym for Electoral District

Table 4: Cross-sectional Spatial Autoregressive Estimates

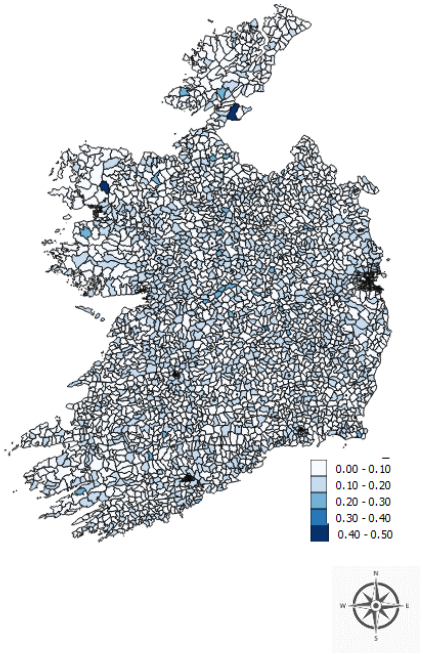
Variables	Tourism Enterprises		All Enterprises	
	Births	**Deaths**	**Births**	**Deaths**
Proportion in ED with Zero employees	0.0090 (0.0137)	0.0724*** (0.0129)	0.0193 (0.0153)	0.1400*** (0.0193)
Proportion in ED with 1-4 employees	0.0376*** (0.0096)	0.0346*** (0.0092)	0.0278** (0.0129)	0.0895*** (0.0159)
Proportion in ED with 5-9 employees	0.0192* (0.0114)	0.0030 (0.0109)	0.0441*** (0.0163)	-0.0249 (0.0206)
Proportion in ED with 10-49 employees (reference)				
Proportion in ED with 50+ employees	-0.0302 (0.0276)	0.0570** (0.0258)	-0.1954*** (0.0374)	0.2380*** (0.0468)
Proportion in ED age less than 2 years	0.1494*** (0.0085)	0.0011 (0.0079)	0.2168*** (0.007)	0.0523*** (0.0095)
Proportion in ED age 3 to 5 years	0.1400*** (0.0105)	0.0038 (0.0099)	0.0694*** (0.0081)	0.0083 (0.0101)
Proportion in ED age 6 to 10 years (reference)				
Proportion in ED age 11 to 20 years	-0.0057 (0.0081)	-0.0078 (0.0076)	0.0066 (0.0071)	-0.0233*** (0.0086)
Proportion in ED age 21 to 30 years	-0.0108 (0.0083	-0.0249*** (0.0079)	-0.0002 (0.0076)	-0.0453*** (0.0090)
Proportion in ED age 30+ years	-0.0041 (0.0176)	-0.0406*** (0.0166)	0.0030 (0.0212)	-0.0397 (0.0261)
Herfindahl Index	-0.0081* (0.0042)	-0.0048 (0.0040)	-0.0043*** (0.0014)	-0.0038** (0.0016)
Related Variety	0.0124 (0.0137)	0.0528*** (0.0127)	-0.0049 (0.0047)	0.0136** (0.0056)
Unrelated Variety	0.0175** (0.0082)	0.0382*** (0.0078)	-0.0088*** (0.0024)	0.0078*** (0.0029)
Location Quotient	0.0005 (0.0004)	-0.0006* (0.0004)	-1.91e-06 (3.09e-05)	-2.71e-05 (3.87e-05)
Related Variety Squared.	-0.0104 (0.0103)	-0.0208** (0.0094)	-0.0019 (0.0037)	-0.0020 (0.0042)
Unrelated Variety squared.	-0.0016 (0.0016)	-0.0062*** (0.0015)	0.0014*** (0.0005)	-0.0018*** (0.0006)
Location Quotient Squared	-3.91e-06 (3.63e-06)	3.31e-06 (3.43e-06)	-3.95e-09 (2.33e-08)	-3.50e-08 (2.91e-08)
Population Density	0.0221*** (0.0058)	0.0031 (0.0047)	0.0111*** (0.0020)	0.0016 (0.0019)
Population Density Squared	-0.0021*** (0.0005)	0.0004 (0.0004)	-0.0012*** (0.0002)	0.0000 0.0002
Sectorial Growth Rate	0.0015* (0.0008)	-0.0062*** (0.0008)	0.0021*** (0.0002)	-0.0029*** (0.0003)
Constant	-0.0770*** (0.0186)	-0.0700*** (0.0167)	-0.0105 (0.0146)	-0.0677*** (0.0172)
Lambda (λ_j)	0.0938* (0.0532)	0.5101*** (0.0405)	0.0987*** (0.0383)	0.7138*** (0.0193)
Rho (ρ_j)	-0.0280 (0.0586)	-0.3814*** (0.0575)	0.0687* (0.0417)	-0.5981*** (0.0410)
N	2856	2856	3390	3390

[a]Standard errors in parentheses. [b]***p<0.01, ** p<0.05, * p<0.1

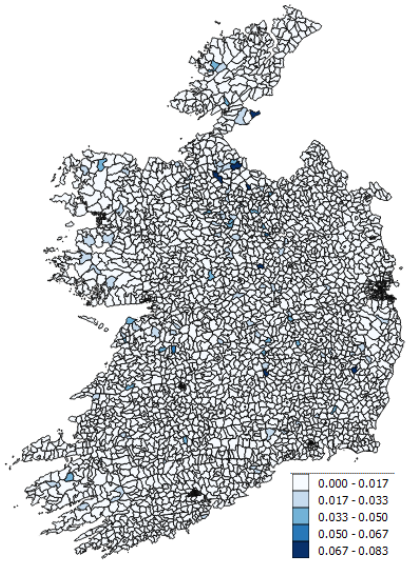
Figure 1: Average Irish Tourism Enterprise Birth and Deaths Rates 2007 to 2009 by Electoral District



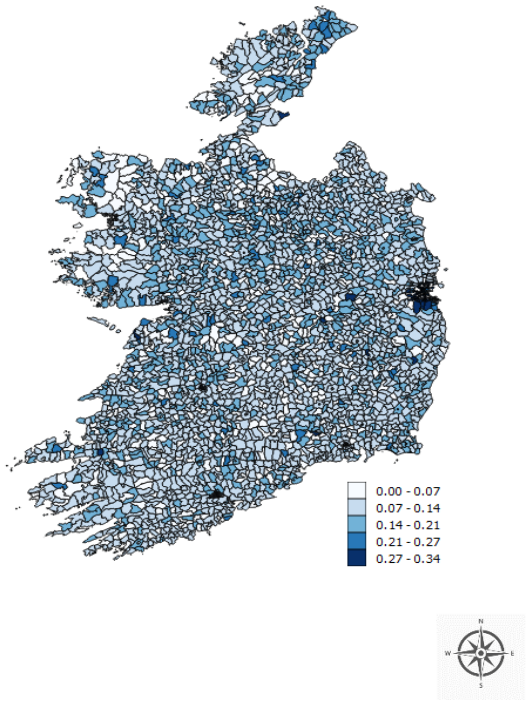
(a) Tourism Enterprise Birth Rates



(b) All Sectors Enterprise Birth Rates



(c) Tourism Enterprise Death Rates



(d) All Sectors Enterprise Death Rates

Figure 2: Average Annual Irish Agglomeration Measures 2007 to 2009 by Electoral District

