

REGIONAL SPREAD OF HIGH-GROWTH ENTERPRISES IN NEW ZEALAND

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ABSTRACT: High-growth enterprises are ascribed a key role in regional development and yet are highly concentrated in core regions. Enterprise-level analysis understates the spread of such firms into peripheral regions. Spatial analysis at the establishment-level reveals the regional spread of high-growth enterprises across New Zealand. The study covers over 28 000 establishments created by the 2005, 2011, and 2014 cohorts of high-growth enterprises, dichotomising regional differences between actual and expected numbers of establishments into industry structure and local regional effects. The development of high-growth enterprises merely exacerbates inter-regional differences. Urban centres dominate in terms of their shares of high-growth enterprises and establishments, although two of the peripheral regions do attract higher than expected numbers of such establishments. While the regional spread of high-growth establishments is greater than that of high-growth enterprises, this will not redress the chronic regional disparities within New Zealand.

KEY WORDS: High-growth enterprises; establishments; agglomeration; regions; New Zealand.

1. INTRODUCTION

It is paradoxical that high-growth enterprises (HGEs) are ascribed a key role in regional development when they are highly concentrated in core regions (Brown and Mason, 2012; Brown and Mawson, 2016). In the New Zealand context, Hong *et al.* (2016, p. 5392) argue that New Zealand has a preponderance of very small firms and that economic development now depends on the performance of the country's HGEs, although there is still no official HGE policy (MBIE, 2013a, p. 5). The regional spread of these enterprises into peripheral areas requires analysis at the establishment level. We investigate the geographic distribution of over 28 000 establishments created by three annual cohorts of HGEs (2005, 2011, and 2014). We adopt the definitions used by Statistics New Zealand (2014), distinguishing between an 'enterprise' and an 'establishment'. An 'enterprise' is an institutional unit corresponding to a legal entity, typically a limited liability company. The 'establishment' (or geographic unit) is a separate operating unit of an enterprise, engaged in one, or predominantly one, kind of economic activity from a single physical location or base.

As agglomeration forces draw enterprise and innovation into the larger urban centres (Gordon and McCann, 2005, pp. 541-542; Li *et al.*, 2016, p. 100; McCann, 2009, p. 293; McCann and Ortega-Argilés, 2015; Moretti, 2014: p. 3; Wood, 2017, p. 25), the wider regional impact of HGEs depends increasingly on the spread of their establishments into peripheral areas. Many founders set up in the areas where they live or work (Arauzo-Carod *et al.*, 2010, pp. 704-705; McCann and Folta, 2008, p. 550), making locational choices only when seeking to accommodate growth by creating new establishments. Enterprise-level analysis of headquarter locations cannot capture the geography of HGEs when much of their growth will be located elsewhere. Despite this, researchers continue to focus on the unitary enterprise when in fact each enterprise, and especially growing ones, will spawn multiple establishments in a variety of geographic locations (Acs and Mueller, 2008; Davidsson and Henrekson, 2002; Gordon and McCann, 2005; McCann and Folta, 2008: 552; Westhead and Wright, 2011). To illustrate this point, we anticipate some data that we return to later in the paper (Tables 1 and 2). In our 2005 cohort, HGEs averaged 8.4 geographic units (HGUs) each, while non-HGEs had less than two establishments. The 2014 cohort of HGEs averaged 8.9 HGUs compared to less than one establishment per non-HGE. Thus, we answer calls for more research on the significance of HGEs in different regional settings (Brown *et al.*, 2017, p. 17; Lee and Cowling, 2014; Li *et al.*, 2016; Mason *et al.*, 2015).

The next two sections summarise the country's regional policy settings and the relevant literature, respectively. We then explain the primary data used in this study and confirm the significance of multiple establishments in understanding how HGEs grow. Where HGU's are located across the New Zealand regions is then revealed, with a shift-share method explicating the spatial spread of each cohort. With few notable exceptions, these enterprises choose to locate units in already-prosperous regions, particularly Auckland and Wellington, with favourable industry structures and high population densities. The findings are discussed and we conclude with some policy implications.

2. THE NEW ZEALAND SETTING

The New Zealand setting is one of contrasts in development between the core urban regions and a depopulating periphery. Figure 1 below shows the 16 Regional Council areas of the country and Appendix 1 profiles these regions.

The Auckland, Wellington and Canterbury (Christchurch) regions represent almost 60 per cent of national employment (MBIE, 2014). Regional unemployment rates are an ongoing issue: in 2014, the unemployment rates ranged from 3.8 per cent in Canterbury to 8.6 per cent in Northland. The low rate in Canterbury is due to the rebuild activity following the 2010 and 2011 earthquakes. These regional disparities are predicted to widen over the next 30 years. (Wood, 2017, pp. 10-11). There is considerable variation in population densities ranging from 272.7 people per square kilometre in Auckland to levels as low as 2.8 in Southland and only 1.4 on the West Coast of the South Island. Average household incomes (2014) also vary from a high of \$99 900 in the Wellington region to a low of \$70 000 in rural Northland. The unemployment rates are highest in parts of the North Island (Northland 8.6 per cent; Gisborne, 8.4 per cent and Hawke's Bay 7.8 per cent) and lowest in the South Island regions of Canterbury, Marlborough, and across the West Coast, Tasman and Nelson.



Figure 1. New Zealand showing Regional Council boundaries. Source: <https://getthru.govt.nz/who-to-contact/>.

Regional policy settings in New Zealand must contend with the growing forces of globalisation and agglomeration, compounding the inexorable demographic trends affecting all the regions, depopulating many while congesting others (Grimes *et al.*, 2016; Jackson, 2016). Policy is overtly place-based following OECD (2009). It seeks to counter regional decline by stimulating growth in each region and encouraging local entrepreneurship that builds on the heterogeneous resources and varied social capitals in the regions (McMillan, 2016, p. 235). Individuals pushed into rural entrepreneurship tend to emerge feeling successful (Jack and Anderson, 2002), especially when they benefit from high levels of bridging social capital (Besser and Miller, 2013; Malecki, 2012). In recent years, the main policy vehicle has been the Regional Growth Programme, delivered as part of a broader Business Growth Agenda (BGA) seeking to

raise economic growth across the country through major investments in high-speed and rural broadband; new roads; tourism infrastructure, and initiatives to bring new private investment into the regions. In February 2018, the new government launched the Provincial Growth Fund, pledging \$1 billion per year for three years to support regional development. This fund continues to support the major infrastructure projects and the planting of one billion trees. Selective support will also continue for research, innovation, and business feasibility studies. However, as Wood (2017, p. 25) points out, space-neutral innovation initiatives are almost inevitably urban-centric, exacerbating regional discrepancies. Countering this, support continues for specific local initiatives, enabling government and local stakeholders to address specific problems in their regions (see Cheyne, 2016).

3. LITERATURE REVIEW

Most studies have the HGE as the unit of analysis and these are important as the progenitors of HGUs. Since the seminal findings of Birch (1981; 1987), it is accepted that recurring annual cohorts of HGEs, each representing no more than 3-6 per cent of all enterprises in that year, contribute most to net job creation (Henrekson and Johansson, 2010). This finding continues to engage policy makers as an emphasis on new firm formation wanes (Trettin and Welter, 2011). The HGE has become a prominent actor in initiatives seeking to bring employment opportunities to disadvantaged areas, with local employment multipliers being much higher when the initial job creation involves higher levels of human capital or high technology firms (Moretti and Thulin, 2013). Satterthwaite and Hamilton (2017, pp. 255-256), while affirming the transience of the high-growth phase, also find that surviving New Zealand HGEs do maintain their employment numbers for many years following what is typically their sole high-growth phase.

The seminal paper by Vaessen and Keeble (1995) confirms that such growth-oriented enterprises can operate and survive in disadvantaged areas if they maintain high rates of research and development (R&D) spending and investment in staff training, thus overcoming the inherent weakness of their location. Brown and Mason (2012, pp. 40-41) argue that HGEs now play a disproportionate role in the economic vitality of regional economies and suggest that public support for potential HGEs be targeted to those with growth ambition who already have a growth track record. In a later contribution (Brown and Mawson 2016, p. 220), the likely size of the local

employment footprint becomes another important factor in deciding the allocation of public funds to HGE development.

Agglomeration economies based on sharing infrastructure and accessing pools of skilled labour explain why enterprises are located in more urbanized areas with higher population densities (Arauzo-Carod *et al.*, 2010, p. 702; Bade and Nerlinger, 2000; Puga, 2010). With most employment-based HGEs known to be in service industries (Coad *et al.*, 2014; Daunfeldt *et al.*, 2016; OECD, 2011, pp. 74-75), any technical benefits of agglomeration are reinforced by the concentration of customers in the larger urban areas. In the case of HGEs, this extends to their co-location with other businesses, given the frequency with which HGEs are operating in business-to-business relationships (Hinton and Hamilton, 2013; Mason and Brown, 2010, p. 41, Mason *et al.*, 2015). In this regard, the combination of large firms and higher population densities attract HGEs to particular locations (Li *et al.*, 2016, p. 111). McCann and Ortega-Argilés (2015, p. 1294) also have it as a ‘stylized fact’ that the innovation and entrepreneurship that one associates with HGEs is higher in cities and areas with higher population densities. Larger globally connected cities are the main loci of innovation and the driving force of many successful economies (McCann, 2009; McCann and Acs, 2011; Moretti, 2014; Puga, 2010). These urban centres offer substantial agglomeration economies (Moretti, 2014, p. 7) that serve to raise urban *per capita* productivity to levels that enable enterprises to overcome the higher cost of wages and space in these more-densely populated areas. Regional innovativeness determines regional growth (Beugelsdijk, 2007) and core areas provide the best conditions for the creation of new development paths (Brekke, 2015, p. 203). Auckland has long been the most productive place in New Zealand (Lewis and Stillman, 2007; Spoonley, 2016, p. 31) but has lagged behind *per capita* productivity of all the major cities in Australia and most others in the OECD (McCann, 2009, pp. 297-298). Regional policies are needed because enterprises, and especially HGEs, are unlikely to be attracted to unfavourable regional environments such as those endowed with the wrong industry structure (Audretsch, 1998, p. 25), lacking entrepreneurship capital or culture (Audretsch, 2007, pp. 71-72; Stuetzer *et al.*, 2018), or insufficiently buoyant to support HGEs?

So why would a HGE set up establishments in peripheral areas? Proximity to customers will be important for those in service industries or dealing with perishable products. Similarly, peripheral locations may also be necessary to ensure access to essential resources or access to raw materials. Enterprises can choose to locate either themselves or their establishments in peripheral areas to obtain lower wages and cheaper

premises. Rapid organic growth at the urban site may eventually be hampered by the very high cost of private and commercial accommodation in major cities such as Auckland and Wellington (Cox and Pavletich, 2017), and the incremental cost of attracting the required staff away from other businesses and from other regions. Other negative externalities arise such as traffic congestion and pressure on social provision of health and education (Alañón-Pardo and Arauzo-Carod, 2013). Hence, high-growth entrepreneurs may choose to spread their growth by locating HGUs in areas where space is more available and wages are lower. Arauzo-Carod *et al.* (2010, p. 703) find that the more attractive regions are those with larger labour pools and an above-average level of education, but lower levels of pay. The size of the labour pool is critical as skills shortages in rural labour markets can emerge quickly as enterprises seek to expand in such locations (Lee and Cowling, 2014), although labour turnover is lower in thin regions (Isaken, 2015, p. 596). Brouwer *et al.* (1999) suggest that rapid urban entry by imitators may also push incumbent HGEs to relocate some activities to more remote areas, where the risk of failure is also lower (Hettihewa and Wright, 2018; Staber, 2001). Innovation is still possible at remote branch establishments, especially those with high proportions of professional, managerial and sales staff (Gordon and McCann, 2005). Moreover, their inability to access the short-range knowledge transfers available to more tightly clustered businesses may not disadvantage more remote establishments if both intra-regional and intra-enterprise knowledge networks are effective (Gordon and McCann, 2005; Huggins and Thompson, 2017).

4. DATA

There are no official data available on enterprise location as only geographic units carry spatial markers in the Statistics NZ business demography database. To compensate for this, we traced the head office locations of 209 individual winners of the Deloitte Fast 50 competition for each year from 2011 through 2015 (Forty-one of these HGEs won this award in more than one year at the same location.). Some 97 per cent of winners were located in the main urban centres: Auckland (52 per cent), Wellington (18 per cent), Christchurch (13 per cent), Dunedin (7 per cent), and Hamilton (7 per cent), confirming the highly concentrated nature of HGE activity.

The data on the regional spread of HGUs come from the business demography database of Statistics New Zealand, with a specific focus here on the 2005, 2011, and 2014 cohorts of HGEs. These enterprises meet the

Eurostat-OECD (2007) definition of high growth, viz., employee numbers growing at an annual average rate of at least 20 per cent in the preceding three years, equivalent to growth of 72.8 per cent over the three-year period. They are also enterprises that had at least 10 employees when they commenced this high-growth phase. Employment numbers were the only *numeraire* available, but this seems appropriate given the importance of employment opportunities in regional development. Figure 2 shows the number of HGEs for each year from 2005 through 2014, and their incidence expressed as a percentage of all enterprises in each year (10 or more employees). We attribute the marked dip in HGE numbers and shares to the impact of the Global Financial Crisis (GFC).

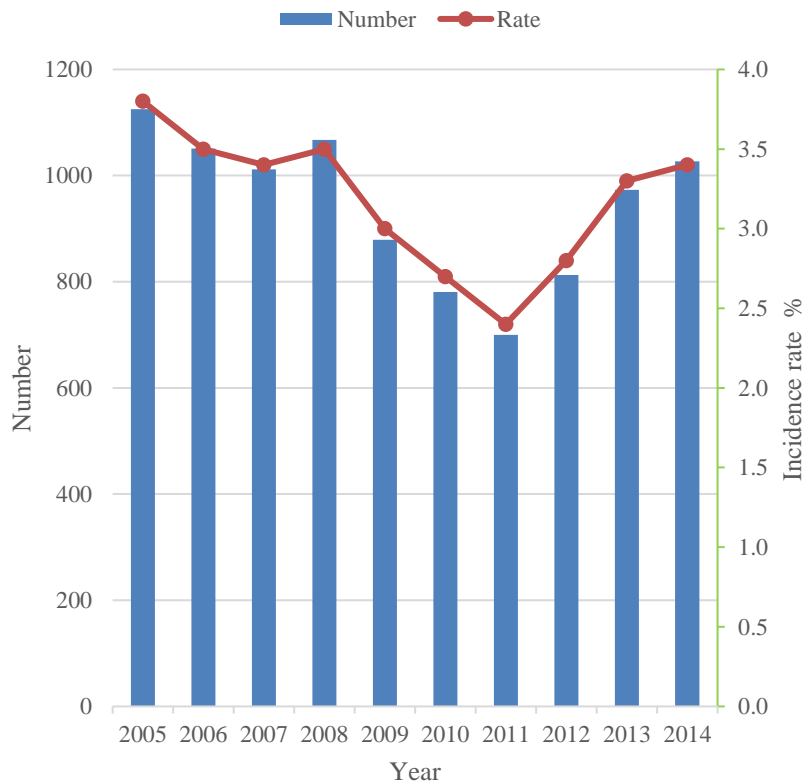


Figure 2. HGE Numbers and Incidence Rates, New Zealand 2005-2014.
Source: the Authors.

The overall incidence of HGEs in New Zealand is relatively low at between 2-4 per cent, when in the UK these enterprises generally make up the ‘vital 6 per cent’ of the population (Anyadike-Danes *et al.*, 2015, p. 18). In 2011, the OECD (2011, pp. 74-75) gave the typical share of HGEs in countries they monitor as 3.5-6.0 per cent of all enterprises (10 or more employees). By 2016 however, the OECD (2016, pp. 98-101) range widens to 2.5-6.0 per cent, enough to accommodate these New Zealand rates. We attribute the marked fall in HGE number and share to the impact of the GFC.

Among the data provided are the number of high-growth enterprises by year and by industry sector; the number of establishments created and owned by high-growth enterprises; and the regional distribution of these establishments across New Zealand, broken down to the sixteen Regional Council areas of the country, as illustrated above (Figure 1). Our analysis of establishment location uses variables measured at the administrative (Regional Council) level, the level at which these issues are debated in New Zealand. Further studies could introduce space-related variables not defined by administrative areas, but considerable micro-geographic data will be required (see Arauzo-Carod and Manjón-Antolín, 2012).

5. HOW DO HIGH-GROWTH ENTERPRISES GROW?

Enterprise growth has organisational and spatial dimensions. First, we confirm that HGEs grow through the development of multiple establishments. As noted above, HGEs have been observed to grow by adding new units (Acs and Mueller, 2008; Davidsson and Henrekson, 2002), so releasing the constraints of the single business unit (Westhead and Wright, 2011, p. 721). In Table 1 we show for the 2005 cohort, the number of HGEs in each sector (employing 10 or more people) and their establishments (HGUs), computing the ratio of units per non-HGE enterprise. We report an average of 8.4 operating units per HGE in 2005. Applying the same procedure to all non-HGEs in each sector gives an average of only 1.8 units per non-HGE.

Table 1. Number of Establishments Per Enterprise: HGEs Versus Non-HGEs, 2005.

ANZSIC Divisions	HGEs >10 employees 2005	HGUs 2005	HGUs per HGE 2005	Non-HGEs > 10 employees 2005	Non-HGEs: Units 2005	Non-HGE: Units per enterprise 2005
A Agric., Forestry, Fishing	84	775	9.2	2 116	2 587	1.2
B+D Mining, Elec, Gas, Water, Waste Services	8	91	11.4	166	407	2.5
C Manufacturing	176	858	4.9	4 082	6 021	1.5
E Construction	145	665	4.6	2 017	2 341	1.2
F Wholesale Trade	87	593	6.8	1 938	3 869	2.0
G Retail Trade	98	1428	14.6	2 878	6 815	2.4
H Accommodation and Food services	73	489	6.7	3 228	4 103	1.3
I Transport, Postal, Warehousing	64	507	7.9	1 052	1 996	1.9
J Information media, Telecoms	14	111	7.9	299	628	2.1
K Financial and Insurance Services	24	268	11.2	355	1791	5.1
L Rental, Hiring, Real Estate	34	286	8.4	547	1112	2.0
M Professional, Scientific, Technical Services	72	676	9.4	1992	2507	1.3
N Admin and Support Services	85	582	6.9	927	1 460	1.6
O Public Admin and Safety	11	141	12.8	270	4 169	15.4
P Education and Training	60	910	15.2	2 692	3 649	1.4
Q Health Care and Social Assistance	47	607	12.9	1 892	3 665	1.9
R Arts and Recreational Services	23	207	9.0	588	701	1.2
S Other Services	20	252	12.6	1 152	1 846	1.6
TOTAL	1125	9446	8.4	2 8191	4 9667	1.8

Source: the Authors.

Similar computations are available for the other cohorts. Table 2 summarises how these 2005 differences change between cohorts in the eight industries with the highest and lowest number of establishment units per HGE in 2014, noting that we are comparing cohorts of different HGEs at these two points. The non-HGEs continue to operate with relatively few establishments with ratios often less than one, while high growers create many more establishments per enterprise. The most dramatic examples in Table 2 are for HGEs in industry G (Retail), averaging 31 units per HGE. We conclude that high-growth is associated with the development of multiple establishments.

Table 2. Establishments per HGE and non-HGE, 2005 and 2014.

Industry (Definitions as in Table 1)	2005		2014	
	HGUs per HGE	Units per non-HGE	HGUs per HGE	Units per non-HGE
G	14.6	2.4	31.4	1.0
L	8.4	2.0	22.5	0.7
P	15.2	1.4	13.7	1.4
K	11.2	5.1	13.6	0.8
B+D	11.4	2.5	6.2	0.8
J	7.9	2.1	6.2	0.8
M	9.4	1.3	6.0	0.8
H	6.7	1.3	3.7	0.9
<i>Mean (all)</i>	8.4	<i>1.8</i>	8.9	0.8

Source: the Authors.

6. WHERE DO HIGH-GROWTH ENTERPRISES GROW?

The previous section argues that any regional impact of HGEs must include the spread of their numerous HGUs, as these locate away from the focal enterprise (Li *et al.*, 2016, p. 106). The task now is to identify where and why these establishments are located across the regions. Shift-share analysis is applied across the sixteen Regional Councils areas – see Appendix 2. This technique has a long history in regional studies (Merrifield, 1983). Here it provides a basis for comparing the actual spread of HGUs with the hypothetical spread if all regions were identical in terms

of industry structure and other influences. It also separates the effect of industry structure from other local factors influencing the actual spread of HGUs into the regions. However, the method is *ex poste* descriptive, with no causal aspect. The first analysis explains the distribution across regions of the 9 446 establishments operated by the 1 125 HGEs in 2005.

Table 3 presents the full 2005 analysis. The first column lists the actual number of HGUs operated by high-growth enterprises by region, A_r , as supplied. The second column (NS_r) is the number of HGUs that would be in each Region if (i) the structure of that region's industry had been the same as the country as a whole and (ii) each industry in the region had the national rate of HGU formation. The ratio of A_r to NS_r identifies those regions that have more or less than their national share of HGUs.

Table 3. Spatial Analysis of HGUs, 2005.

Region	Actual HGUs (A_r)	'National standard' HGUs (NS_r)	A_r/NS_r (ratio)	Structure component (S_r)	Formation component (F_r)
Northland	218	391	0.56	-33	-140
Auckland	3 281	2 968	1.11	+179	+134
Waikato	742	972	0.76	-85	-145
Bay of Plenty	650	631	1.03	-28	+47
Gisborne	69	95	0.73	+8	-34
Hawke's Bay	429	345	1.24	-18	+102
Taranaki	187	268	0.70	-23	-58
Manawatū-Wanganui	448	498	0.90	-22	-28
Wellington	1 171	952	1.23	+61	+158
West Coast	57	73	0.78	+8	-24
Canterbury	1 259	1 178	1.07	+211	-130
Otago	452	464	0.97	-17	+5
Southland	154	258	0.60	-37	-67
Tasman	104	121	0.86	-15	-2
Nelson	99	103	0.96	+9	-13
Marlborough	126	129	0.98	-12	+9
TOTAL	9 446	9 446	-	-	-

Source: the Authors.

We now focus on the fourth and fifth columns in Table 3. From Appendix 2, S_r is the difference in HGU numbers because of industry structure, not in regional formation rates. If a region has more than the national share of industries with higher numbers of HGUs, its S_r will be positive, otherwise negative. The final column (F_r) is the effect of differences between national and regional formation rates for each industry. We summarise this analysis in Table 4 showing how the regions perform in terms of their structural and formation components. Two regions in the lower North Island, Hawke's Bay (1.24) and Wellington (1.23), have the highest ratios of actual to expected rates of HGUs in 2005. The two regions with the poorest ratios are at opposite ends of the country, the largely rural regions of Northland (0.56) and Southland (0.60). Analyses of the 2011 (9 992 HGUs) and 2014 (9 228 HGUs) cohorts largely confirms these 2005 findings – see details in Appendix 3. Tables 5 and 6 are analogous to Table 4, showing the pattern of HGU spread across the regions in terms of structure and formation effects in 2011 and 2014.

Table 4. Regional Spread of HGUs, 2005.

	Structural component (S_r):	
Formation component (F_r):	$S_r > 1.00$	$S_r < 1.00$
$F_r > 1.00$	Auckland Wellington	Hawke's Bay Bay of Plenty Marlborough Otago
$F_r < 1.00$	Gisborne West Coast Canterbury Nelson	Waikato Northland Taranaki Manawatū-Wanganui Tasman Southland

Source: the Authors.

Table 5. Regional Spread of HGUs, 2011.

	Structural component (S_r):	
Formation component (F_r):	$S_r > 1.00$	$S_r < 1.00$
$F_r > 1.00$	Auckland Wellington	Hawke's Bay Bay of Plenty Waikato
$F_r < 1.00$	Gisborne West Coast Canterbury Nelson	Otago Marlborough Northland Taranaki Manawatū- Wanganui Tasman Southland

Source: the Authors.

Table 6. Regional Spread of HGUs, 2014.

	Structural component (S_r):	
Formation component (F_r):	$S_r > 1.00$	$S_r < 1.00$
$F_r > 1.00$	Auckland Wellington	Canterbury Hawke's Bay Marlborough
$F_r < 1.00$	Gisborne West Coast Nelson	Otago Waikato Bay of Plenty Northland Taranaki Manawatū- Wanganui Tasman Southland

Source: the Authors.

Comparing Tables 4 and 5, there is no change between 2005 and 2011 in the regions in the S_r column. This is expected as industry structures change very slowly if at all (McCann and Ortega-Argilés, 2015, p. 1296). It is again the highly developed urban areas of Auckland and Wellington that continue attract most HGUs with both S_r and $F_r > 0$. However, the Hawke's Bay region stands out as a non-core region attracting higher than expected numbers of HGUs. Hawke's Bay (see Appendix 1) is below average in population density and household incomes, and above average in unemployment and primary sector employment. This region specialises in food and wine production exported from the region's port of Napier and is home to a number of international food processing firms. One of the country's leading business incubators was also expanding into Hawke's Bay (MBIE, 2013b, p. 26). In 2005 and 2011, the four other regions evidence strong industry structure effects—Gisborne, West Coast, Canterbury, Nelson—but all four had lower formations rates than Auckland and Wellington, i.e., not justifying higher regional formation rates of HGUs despite a favourable industry structure. These six regions persist in 2005 and 2011 as the only ones with a favourable industry mix. Structure change at the regional level is unlikely to happen quickly, especially in a country like New Zealand with a strong agricultural base.

This pattern breaks in 2014 (Table 6), with the Canterbury region leaving the set with favourable industry structures. This region now has the highest ratio of A_r/NS_r (1.37), due to a much higher local formation rate (F_r). This reflects the dramatic changes in the Canterbury region, following the devastating earthquakes of September 2010 and February 2011. These caused serious damage to 50 per cent of the buildings in Christchurch's central business district (Hall *et al.*, 2016, p. 9). Our data show in 2014 that Canterbury had more than the expected number of establishments ($a_{ir} > e_{ir}$ – see Appendix 2) in agriculture (mainly intensive dairying), manufacturing, and construction. Conversely the region had many fewer establishments ($a_{ir} < e_{ir}$) in education/training, professional services, and retailing. Others have confirmed these changes in the industry structure of this region (Brown *et al.*, 2015, pp. 67-69; Dalziel and Saunders, 2012; Prayag and Orchiston, 2016) and very similar changes at the industry level are reported for the regions of the United States devastated by Hurricane Katrina in 2005 (Corey and Deitch, 2011; Deitch and Corey, 2011). The strong regional effect for Canterbury in 2014 (+465) reflects strong ongoing activity to repair and rebuild following the earthquakes, supporting more HGUs in the region and underpinning this region's relatively low rate of unemployment in 2014. As the issue of regional resilience permeates the literature (Martin and Sunley, 2015; Martin *et al.*, 2016), it will be

interesting to follow Canterbury's future development focusing on the relative importance of region-specific influences, and if these influence new, more resilient, industry structures and development paths (Brekke, 2015; Dalziel and Saunders, 2012; Isaken, 2015).

Regions such as Waikato, Otago, and Marlborough, perform differently on the F_r component across 2005, 2011, and 2014. The Marlborough region in particular performs well in 2014. This region had become New Zealand's largest wine growing area, and a range of ancillary service industries had emerged to cater for this and other primary industries such as aquaculture (MBIE, 2013b, p. 38). However, there are five regions with $S_r < 1.00$ and $F_r < 1.00$ in all three cohort years—Northland, Taranaki, Manawatū-Wanganui, Tasman, Southland. These five regions make up almost one-third of the land area of New Zealand but have only 15 per cent of the resident population (from Appendix 1). In 2014, these five attracted 780 HGUs, only 55 per cent of their expected number—see Appendix 3. Nevertheless, these underperforming regions do of course attract many more HGUs than they do HGEs, supporting our contention that the regional spread of HGEs requires analysis at the establishment level.

7. DISCUSSION

Investigating regional development through the lens of high-growth entrepreneurship provides a new perspective on the challenges facing the regions of New Zealand. The purpose of this study was to trace the regional spread of those operating units (HGUs) set up by HGEs across New Zealand. The location of the focal enterprise is very much an urban phenomenon and hence the spread of HGUs into peripheral regions is much greater than the spread of the parent HGEs. This is important because it is on the creation of the HGUs that most owners will make conscious locational choices. However, in our data for 2005, 2011, and 2014, regional underdevelopment reflects their attractiveness to HGUs. Two highly urbanized regions, Auckland and Wellington, attract a disproportionate number of HGUs. These two regions are the only ones to maintain strong structural effects and high regional formation rates. Auckland and Wellington have negligible employment in the primary sector; the highest levels of household income; and relatively high population densities (see Appendix 1).

Regional policy in New Zealand involves place-based countering, now under the auspices of the Provincial Growth Fund, hoping to counteract the regional decline by supporting infrastructure development and selective growth opportunities outside the main urban centres. The prioritisation of

regional opportunities by adapting the smart specialisation concept may help but with some caveats. For the more isolated regions or areas thereof, smart specialisation may have limited applicability beyond promoting ventures based on the environment or tourism (see McCann and Ortega-Argilés, 2015, p. 1298) which have so far had limited success (McMillan, 2016, p. 226). It is also problematic if the traditional industries embedded in New Zealand's declining regions, such as agriculture and forestry, can become the basis for related technology-led innovation. We identify five regions where industry structure and regional effects conspire consistently to reduce the spread of HGUs into their economies—Northland, Taranaki, Manawatū-Wanganui, Tasman, and Southland. These regions have common profiles that contrast with those of Auckland and Wellington, viz., above average proportion of their labour forces in the primary sector; below average household incomes; and below average population densities. Taranaki is the only one of the five where household incomes are above the national average, and Northland and Manawatū-Wanganui have the highest rates of labour force unemployment. An influx of HGUs, if not the parent HGEs, would clearly benefit these regions by diversifying the industry mix and bringing in higher paying jobs. However, left to the normal market-based decision-making, the wealthier urban regions of Auckland and Wellington will continue to grow as their industry mix and population density ensure strong flows of HGEs and HGUs (see Wood, 2017, pp. 10-11).

8. CONCLUSIONS

This study focuses on the regions from a perspective of the owners of HGEs, more of which are necessary to raise productivity per head and economic growth (Hong *et al.*, 2016). New Zealand is not alone with its chronic problem of decline in peripheral regions and growing population pressures on the main urban centres. However, even Auckland is smaller, less connected, and less productive than other global cities including most in Australia (McCann, 2009; McCann and Acs, 2011). Arguable however, these endemic problems are now more deep-rooted than in other countries due to New Zealand's remoteness; small domestic economy; and over-dependence on being a price-taking commodity exporter (McCann, 2009). This lack of international competitiveness and economic growth reflects an economy with too many, under-productive small enterprises lacking R&D intensity and innovation (Casey and Hamilton, 2014; Frederick and Monsen, 2011; Hong *et al.*, 2016). HGE spread exacerbates the growing divide between the core urban centres and the less populated peripheral

areas. While regional development may not depend entirely on HGEs (Morris *et al.*, 2015), entrepreneurs and opportunities have to coexist in varied regional settings where entrepreneurship capital and culture are low. Activating this crucial nexus will be challenging, bearing in mind that these regional problems stem from the lack of opportunities and (hence) entrepreneurs. In terms of policy, following Wood (2017, p. 29) and McMillan (2016, pp. 236-237), it may be time to re-focus place-based approaches to include the social opportunities and quality of life needs of the people living away from the more affluent urban centres, rather than relying on the efforts of high-growth entrepreneurs.

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Appendix 1. Profile of the Regions of New Zealand 2014.

Measures:	Resident population (,000) 2014	Land area (km ²)	Population Density (per km ²) 2014	Unemployed (% labour force) 2014	Household income - (\$,000) 2014	% Primary labour force 2014
Region:						
Northland	166.0	13 941	11.9	8.6	70.0	9.3
Auckland	1 526.9	5 600	272.7	6.8	96.0	0.9
Waikato	430.8	25 598	16.8	6.4	76.4	10.6
Bay of Plenty	282.3	12 447	22.7	7.4	77.6	8.9
Gisborne	47.1	8 351	5.6	8.4	89.0	23.8
Hawke's Bay	158.9	14 164	11.2	7.8	73.2	17.8
Taranaki	114.8	7 273	15.8	5.7	88.4	7.7
Manawatū-Wanganui	232.5	22 215	10.5	7.5	70.1	9.5
Wellington	491.4	8 124	60.5	6.0	99.9	1.4
West Coast	32.8	23 336	1.4	*4.2	82.3	8.8
Canterbury	574.3	45 346	12.7	3.8	95.0	5.5
Otago	211.6	31 990	6.6	5.0	90.5	8.9
Southland	96.5	34 347	2.8	5.2	87.1	17.5
Tasman	49.1	9 786	5.0	*4.2	82.3	26.8
Nelson	49.3	445	110.8	*4.2	83.5	3.8
Marlborough	44.8	12 484	3.6	4.9	83.4	19.8
New Zealand	4509.1	275 447	16.4	6.1	89.0	5.9

Sources: (1) Resident populations extracted from New Zealand Statistics (NZS) INFO.Share service on 22 September 2017, Table DPE051AA. (2) Land areas used taken from NZ Department of Statistics (2009), Living Density: Table 1. (3) Unemployment rates in regional labour forces taken from MBIE (2014) and NZS INFO.Share service on 22nd September 2017, Table HLF0522AA, extracted on 22nd September 2017. * identifies regions where data are combined. (4) Household Income taken from MBIE (2015). (5) % Primary employment (Agriculture, Forestry, and Fishing) by region extracted from NZS INFO.Share on 24th September 2017, Table RNA001AA.

Appendix 2. Shift-Share Analysis.*Computing spatial distributions (NS_r , S_r and F_r)*

The primary data are the actual numbers of all units and HGUs by 18 industry divisions ($i = 1, \dots, 18$) and 16 Regional Council areas ($n = 1 \rightarrow 16$), for 2005, 2011, and 2014. We also have HGE numbers by industry division, but not by region.

First, we compute NS_r for each region, the expected number of HGUs in a region if regional industrial structures were identical to the national one. For each industry division, we take the national total of units and pro-rate this across the regions using each region's share of all establishments. Let this expected total number of units in a region be e_{ir} . The actual number of units in a region is a_{ir} , which is given. These data confirm that, at the industry level, the proportion of HGUs varies considerably. We compute these proportions, and label these f_{in} , for each industry (i) using national (n) level data. Thus, the computed f_{in} values do not reflect any regional level differences in the proportion of HGUs, i.e., the relative attractiveness of the different regions for HGU formation. We do not have data on f_{ir} , the industry proportions of HGUs by region.

Hence, with reference to say Table 3:

$$A_r = \sum a_{ir} \cdot f_{ir} \text{ (provided for each region)}$$

$$NS_r = \sum e_{ir} \cdot f_{in}$$

For any region r , and for convenience omitting the Σ signs:

$$A_r - NS_r$$

$$= a_{ir} \cdot f_{ir} - e_{ir} \cdot f_{in}, \text{ which can be expanded into two terms,}$$

$$= f_{in}(a_{ir} - e_{ir}) + a_{ir}(f_{ir} - f_{in})$$

The first term is S_r , the effect on the number of HGUs in a region due to its industry structure. The second term F_r , is the residual reflecting differences in the proportion of HGUs among each region's population of units, i.e., the relative attractiveness of the regions for establishing HGUs.

Appendix 3a. Spatial Analysis of HGUs, 2011 Cohort.

Region	Actual HGUs (A _r)	'National standard' HGUs (NS _r)	A _r /NS _r (ratio)	Structure component (S _r)	Formation component (F _r)
Northland	232	397	0.58	-20	-145
Auckland	3 404	3 177	1.07	+188	+39
Waikato	951	1 008	0.94	-77	+20
Bay of Plenty	700	655	1.07	-7	+52
Gisborne	82	98	0.84	+5	-21
Hawke's Bay	436	358	1.22	-11	+89
Taranaki	192	287	0.67	-26	-69
Manawatū- Wanganui	476	501	0.95	-17	-8
Wellington	1 281	1 020	1.26	+46	+215
West Coast	61	77	0.79	+8	-24
Canterbury	1 203	1 266	0.95	+8	-71
Otago	486	507	0.96	-13	-8
Southland	167	267	0.63	-46	-54
Tasman	98	126	0.78	-14	-14
Nelson	120	112	1.07	+10	-2
Marlborough	103	136	0.76	-21	-12
TOTAL	9 992	9 992	1.00	-	-

Source: the Authors.

Appendix 3b. Spatial Analysis of HGUs, 2014 Cohort.

Region	Actual HGUs (A_r)	'National standard' HGUs (NS_r)	A_r/NS_r (ratio)	Structure component (S_r)	Formation component (F_r)
Northland	192	346	0.55	-8	-146
Auckland	3 492	3 008	1.16	+65	+419
Waikato	759	917	0.82	-38	-120
Bay of Plenty	462	591	0.78	-8	-121
Gisborne	42	85	0.49	+6	-37
Hawke's Bay	321	321	1.00	-6	+6
Taranaki	198	261	0.76	-9	-54
Manawatū- Wanganui	231	443	0.52	-12	-200
Wellington	1 110	936	1.19	+12	+162
West Coast	48	74	0.65	+6	-32
Canterbury	1 629	1 190	1.37	-25	+464
Otago	396	475	0.83	-12	-67
Southland	69	238	0.29	-33	-136
Tasman	90	118	0.76	-4	-24
Nelson	51	103	0.50	+1	-53
Marlborough	138	122	1.13	-13	+29
TOTAL	9 228	9 228	1.00	-	-

Source: the Authors.