Working Papers

on Economic Geography

Online

Issue 2009-12
Volume 1

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Identifying Entrepreneurship Indicators for Regional Economic Growth in the New Zealand Context

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Keywords: entrepreneurship, entrepreneurial diversity, regional employment growth, New Zealand, structural equation modelling

Abstract

Despite a rapidly growing literature on spatial aspects of entrepreneurship, the knowledge base on the link between entrepreneurial activities and regional economic growth remains fragmented and incomplete. Using the Business Demography Statistics database by Statistics New Zealand the paper investigates entrepreneurship dynamics, entrepreneurial diversity (defined as immigrant entrepreneurship) and employment growth in 74 Territorial Authorities over the 2001-2005 period. Structural equation models with a set of measured (observed) variables and a set of latent (unobserved) variables are proposed. The empirical findings illustrate that differences in levels of entrepreneurial activity and diversity among entrepreneurs are positively associated with variations in regional employment growth rates, but time lags should be taken into account. Implications of the findings for economic policy makers and politicians are discussed.

Editor: Christine Tamásy
Managing Editor: Annika Neubauer
ISSN: 1869-6449
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Introduction

The regional economic contribution of entrepreneurship is clearly a subject of great interest for regional policy makers and local economic development practitioners in New Zealand. The **A**uckland **R**egional **D**evelopment **S**trategy for 2002-2020, for example, names an entrepreneurial economy as one key element of a regional "platform" which connects the Auckland region with the rest of the world. *Building an entrepreneurial culture is about creating an environment in which people are motivated to look for opportunities, are willing to take risks and are prepared to be flexible in pursuing these opportunities. Key initiatives require the Auckland region to: 1) Promote wider community awareness of entrepreneurship, 2) Support proactive programmes aimed at nurturing community based enterprises and partnerships, and 3) Support and promote the introduction of concepts of entrepreneurship into the education curriculum* (AREDS, 2002, p. 11). Several initiatives have been identified to foster entrepreneurship in the Auckland region, partly in youth, gender and community groups (AREDS, 2002, p. 40/41):

1. Industry New Zealand provides a range of programmes and support for new business concepts and to help existing businesses grow (eg Enterprise Awards Scheme, Business Growth Service and Fund, World Class New Zealanders, Enterprise Culture and Skills Activities Fund).

2. WINZ provides programmes for unemployed business start-ups and training (eg Enterprise Allowance, *Be Your Own Boss*).

3. A number of business incubators are currently operating in the Auckland region, including the following: AUT Technology Park; e-Centre Massey (Massey University's Albany Campus); High St Fashion Industry Incubator; Ideas to Business (i2b, Carter Holt Harvey new ventures team); Industrial Research; Southmarket Business Park Incubator; The Icehouse (University of Auckland); and WestSmart (Enterprise Waitakere).

4. Some central government agencies, all local EDAs, the Poutama Trust and the Pacific Business Trust support business awards. A variety of these awards recognise entrepreneurship, industry sectors and community groups (eg WestpacTrust New Zealand HiTech Awards, Pacific Arts Awards, Pacific Business Leaders Awards, Business Excellence Awards programme, Eco-City Business Awards, environmentally sustainable business awards etc).

5. The Poutama and Pacific Business Trusts undertake a number of initiatives to encourage an entrepreneurial culture among Māori and Pacific Peoples.

6. UNITEC's New Zealand Centre for Innovation and Entrepreneurship works closely with business, and is undertaking various initiatives and projects (e.g. the Global Entrepreneurship Monitor research initiative).

7. The Mira Szaszy Research Centre for Māori and Pacific Economic Development (University of Auckland) is currently developing a research project on mentoring and coaching of Māori and Pacific business entrepreneurs and leaders.

8. The Department of Internal Affairs manages the Community Organisation Grants Scheme (COGS) and also runs the Social Entrepreneurs Programme.

9. Training opportunities aimed at specific gender and cultural groups include the Tai Tamarikitanga National Certificate in Māori Business and Management and Taiohi Entrepreneurial Culture for Youth.

10. The Enterprise NZ Trust works with other agencies on various initiatives to encourage students to engage in enterprising business projects (eg Young Enterprise Scheme, and Enterprise Studies Programme).

11. The Secondary Tertiary Alignment Resource (STAR) helps students start tertiary study while still at secondary school.

All these initiatives are based on the assumption that entrepreneurship is beneficial, somehow, for local and regional economic development. As it seems to be plausible to expect a positive relationship between entrepreneurship and growth, policy makers and local economic development practitioners in New Zealand clearly believe that fostering entrepreneurship is one promising way for achieving economic progress. This widespread belief is the main motivation for this chapter. The second section reviews the international literature on entrepreneurship and regional economic growth in order to develop a conceptual framework for the empirical analysis. The third section deals with data and measurement issues. Empirical results on the relationship between entrepreneurship and regional economic growth in the New Zealand context are given in section four. Finally, the fifth section provides conclusions and proposes suggestions for future research.

Literature review on entrepreneurship and regional economic growth

What is the theoretical relationship between entrepreneurship, defined as the process of new venture creation (Gartner et al., 2004), and economic growth?[1] Entrepreneurship is expected to positively influence economic growth for three main theoretical reasons (Audretsch et al., 2006; Carree and Thurik, 2006). First, entrepreneurship can serve as an important mechanism for facilitating the spillover and commercialisation of knowledge. According to Acs et al. (2005a, 2005b) entrepreneurship is an endogenous response to investments in knowledge, which

1 Different concepts of entrepreneurship are discussed in Wennekers and Thurik (1999).

can lead to entrepreneurial opportunities. Their evolutionary model suggests that divergent opinions on the expected value of new ideas may forge an individual or team of individuals to set up a new venture in an attempt to commercialise knowledge that otherwise would not been commercialised. Because of the structural conditions inherent in new knowledge such as uncertainty, asymmetries and transactions costs, decision makers in established firms might decide not to commercialise new ideas that are economically valuable from the perspective of individual workers. By serving as a conduit for knowledge spillovers, entrepreneurship is therefore seen as the "missing link" between knowledge investments and economic growth (Acs et al. 2005b).

With respect to the spatial setting, entrepreneurial activities are expected to be higher in regions where knowledge inputs are relatively high and many opportunities for knowledge spillovers occur (Audretsch et al., 2006). Three key sets of regional factors are generally argued in the literature to enable and stimulate novel developments such as innovations and entrepreneurship (Gordon and McCann, 2005): (1) a rich "soup" of skills, ideas, technologies and cultures within which new compounds and forms of life can emerge; (2) a permissive context enabling unconventional initiatives to be brought to the marketplace; and (3) vigorously competitive and critical arenas operating selection criteria which anticipate and shape future markets. Audretsch and Keilbach (2004) have introduced the term "entrepreneurship capital" to describe a region's endowment with factors conducive to processes of new firm formation. This implies a positive entrepreneurial climate that encourages entrepreneurial activities, a high presence of individuals willing to take the risk to start new businesses and the activities of bankers and venture capitalists willing to invest in start-up companies. Such regions, which are rich in entrepreneurship capital, will, therefore, exhibit higher economic growth than regions with less entrepreneurship capital. According to van Stel (2006) and Varga (2006), however, empirical research on spatial dimensions of innovation, entrepreneurship and growth is still in its infancy.

Second, entrepreneurship can stimulate regional growth through an increasing number of firms and, therefore, rising competition that secures efficiency and stimulates productivity increases.[2] Under perfect competition, new businesses enter the market on the same terms as established firms. On the other hand, in a monopoly situation with a high concentration of market power in the hands of a few large firms, significant barriers to enter the market or industry may exist, such as legal restrictions, patents, cost advantages of superior technology and large sunk costs (Baumol and Blinder, 2006). Acs and Armington (2004) found empirical evidence that an increase in competition, as measured by the number of establishments within a city, is negatively associated with regional employment growth, while firm formation rates

2 Wennekers and Thurik (1999) argue that competition has to be interpreted in a broad sense as the contestability of markets, domestic rivalry and international competition.

have positive effects on economic outcomes. In particular entrepreneurs who are able to market new ideas are one step ahead of competitors, even if the innovation is not protected by property rights. Baumol and Blinder (2006, p. 412) discuss how the market system forces entrepreneurs to focus on the search for new ideas and their commercialisation, a process that lies "at the heart of the growth of the capitalist system. It is one of the secrets of its extraordinary dynamism".

Third, entrepreneurship is linked to regional economic growth by providing diversity. According to Audretsch et al. (2006) new market entries do not only increase the number of firms, but also generate a greater diversity of businesses in a location. Entrepreneurial diversity can be defined along a variety of dimensions such as industry, age, size and so on.[3] This chapter focuses in its empirical part primarily on the role of immigrant entrepreneurs as one relevant dimension of entrepreneurial diversity, in particular in the New Zealand context. Florida (2005) argues, for example, that creative and diverse regions are more likely to produce, attract, and retain innovators, including technological innovators. Accordingly, regions that produce, attract and retain technological innovators and combine them with Schumpeterian entrepreneurs are more likely to generate new firms and industries and, thus, to experience economic growth. As stated by Knudsen et al. (2008, p. 474), creativity (like diversity) "is not a stock with which regions are endowed, but a flow that depends on tolerance and openness". The importance of transnational entrepreneurship for regional economies has been recently emphasised by Saxanian (2006). She argues that so called "New Argonauts", foreign-born, technically high-skilled entrepreneurs who travel back and forth between Silicon Valley and their home countries, have become strategic economic agents for technology-based growth processes in once-peripheral regions. This chapter further develops this line of thinking, by arguing that entrepreneurial diversity and entrepreneurship work together to increase a region's capacity to generate economic growth. This suggests that New Zealand's regions with higher levels of entrepreneurial activity and greater entrepreneurial diversity should have higher rates of economic growth.

Nevertheless the hypothesised positive relationship between entrepreneurship and regional economic growth, time-lags have led in the past to unclear empirical evidence. Such lags are caused by the fact that new businesses can have both positive and negative employment effects in the short, medium and long run. Fritsch and Mueller (2004) illustrate that the impacts critically depend upon the period of time under examination, while the peak of the positive employment impacts in Germany is reached five to eight years after market entry. According to Fritsch (2008) this might indicate that direct employment effects are less important than indirect, supply-side effects such as the crowding out of competitors, improvements in the supply conditions and an

3 The heated debate in economics as to whether industry variety or specialisation of economic activity is in general more conducive for regional growth, has been critically reviewed by Desrochers (2001). Boschma and Immarino (2007) argue, however, that it is not a matter of having a diversified economy, but an economy that encompasses related competences (related variety) that induce knowledge spillovers and growth.

improved competitiveness. Acs and Armington (2004), however, find no evidence for the US that the strength of the relationship between new firm formations and employment growth differs as the period under investigation is extended. Van Stel and Storey (2004) find for the UK that for some periods the relationship is positive, but negative for some 'un-entrepreneurial' regions. However, the empirical results published in the special issue of *Small Business Economics* mainly support the wave pattern of the employment effects of new firm formations (e.g., Mueller et al., 2008).

Data and measurement approach

This chapter uses data from Statistics New Zealand's Business Demography Statistics Database (BDS), a series derived from the Annual Business Frame, which has been conducted in mid-February each year since 1987 (Statistics New Zealand, 2006b). Statistics New Zealand's primary source of information about business enterprises is Inland Revenue, the government department responsible for administering the tax system. The Business Frame is restricted to economically significant enterprises. Economically significant enterprises are generally defined as enterprises with annual GST expenses or sales of more than NZ$ 30,000, or which operate in a GST exempt industry. Business statistics are available on a range of different variables, including industry - based on the Australian New Zealand Standard Industrial Classification (ANZSIC) -, region, type of business and employment.

The Business Frame (BF) includes all enterprises beyond the farm-type agriculture sector. When businesses register for GST they are added onto the BF with a new reference number indicating a "birth". Any given reference number indicates a birth if the business appeared on the database for the respective year (t0) but not for the previous year (t0-1). A business is counted as "death" if it appeared on the database for the previous year (t0-1) but not for the following year (t0). The BDS includes information on business activity at both the geographic unit level and the enterprise level (with one or more geographic units). Statistics New Zealand defines a geographic unit as a separate operating unit engaged in one, or predominantly one, kind of economic activity from a physical location or base. An enterprise is defined as a business operating as a company, partnership, trust, estate, incorporated society, producer board, local or central government organisation, voluntary organisation or self-employed individual. The empirical analysis in this chapter is at the geographic unit level only. Some births and deaths of geographic units may be the result of strategies by multi-level enterprises shifting production of goods and services from one unit to another, though the contribution of this dynamic is likely to be relatively minor given the dominance of single-unit enterprises in the sample.

As of February 2005, 334,320 enterprises and 366,128 geographical units operated in New Zealand employing 1,726,199 employees. A significant change in the strategy to maintain the

Business Frame was introduced in 2004. The employment indicator of full-time equivalents (FTE) was replaced with the new measure employee count (EC). To enable economic trends to be studied, the EC measure can be traced back to the year 2000. The EC is sourced primarily from Inland Revenue's IR348 form, which is required to be completed by all employers in New Zealand every month (Statistics New Zealand, 2006b). Valid and reliable information on firm births, firm deaths and established firms (all industries covered) is available as customised data for the period 1998-2005. The present study uses Statistics New Zealand's BDS data for 2001-2005.

The regional unit of analysis for this study is Territorial Authorities (TAs). Territorial Authorities are the second tier of local government in New Zealand, below the 16 regional councils. New Zealand consists of 74 TAs: 16 city councils and 58 district councils. Under the Local Government Act councils are subject to planning and management disciplines including preparing annual plans and budgets in consultation with their communities. Several of the 74 TAs cut across the boundaries of regional councils, to better represent interests of local communities. The entire geographic pattern is built from meshblocks as the smallest area unit used by Statistics New Zealand to collect and analyse data. The 2006 Census of Population and Dwellings, for example, includes 41,376 meshblocks that built up the Territorial Authorities.[4]

Regional economic growth is measured as the average of annual employment growth rates (employment of t+1 relative to employment in t). Most interestingly, employment growth rates in the three largest Territorial Authorities, namely Auckland City, Christchurch City and Wellington City, are below the national mean of 3.87 % (2001-05).

Entrepreneurship as theoretical construct is measured with two variables: 1) the number of firm births per 100 established firms, and 2) the number of firm births per 1000 population (see Audretsch and Fritsch, 1994, for a discussion on both measurements). Higher birth rates are assumed to reflect higher levels of entrepreneurship. Despite a lack of conceptual clarity over "entrepreneurship" a broad consensus seems to exist in the international literature about firm births as being important dimensions of entrepreneurial dynamics or entrepreneurship capital (e.g., Acs and Armington, 2006; Acs and Storey, 2004; Audretsch and Keilbach, 2007; van Stel, 2006, Tamásy and Le Heron, 2008). To compensate for short-run fluctuations in regional economic growth, birth rates over a four year period (2001-05) and a two year period (2001-03) are used as indicators for entrepreneurship.

The spatial distribution of both measures of entrepreneurship in New Zealand is shown in Figure 1 and Table 1 in the Appendix. The average firm birth rate for the period 2001-05 is 13.88 firms per thousand of the population (in 2001). The "ecological" firm birth rate

4 In 2006, Banks Peninsula District merged into Christchurch City, resulting in 73 TAs.

(Audretsch and Fritsch, 1994) standardises firm births with the size of the whole business population in a region (in 2001) and is 17.05 firms per 100 established firms.[5] Note that New Zealand has some below average birth rates per establishment among those regions with high birth rates per population. However, the Queenstown-Lakes District stands out having both the highest firm birth rate per established firms (23.55) and the highest firm birth rate per population (37.75). In this chapter both measures will be combined to create a latent variable representing the theoretical construct ("entrepreneurship dynamics").

Insert Figure 1 about here

Entrepreneurial diversity is measured as the percentage of self-employed individuals who are foreign-born. In 2001, 19.5 % of New Zealand's entrepreneurs are foreign-born. As discussed in the theoretical section, it is assumed that more diverse regions with higher proportions of immigrant entrepreneurs have better growth prospects in the New Zealand context. They might be important ingredients of a rich "soup" of skills, ideas and cultures that stimulate novel developments and facilitate, in turn, regional growth, as discussed by Gordon and McCann (2005), and McCann (2006).

To adjust for differences in the structure of the business population in New Zealand's regions, two control variables are included. The concentration index measures the dominance of larger firms at a regional level. The location quotient measure includes all firms with 20 or more employees and relates them to the size of the total business population (in 2001). Firm size is measured as 2001 employment divided by the number of businesses in 2001 in a region. It considers all businesses (geographical units) with at least one employee (employee count). Regions with higher concentration indices and larger average firm sizes are expected to be disadvantaged with respect to economic growth, because new employment occurs more often in smaller businesses.

Empirical results

All variables are built up, as discussed above, from the Business Demography Statistics database and the 2001 Census of Population and Dwellings (Statistics New Zealand, 2006a, 2006b). Structural equation (SE) models are proposed as a multivariate statistical technique which combines econometric modelling and confirmatory factor analysis for the purpose of analysing hypothesised relationships among set of measured (observed) variables and a set of latent (unobserved) variables (Arbuckle, 2006; Byrne, 2001). The SE models examine how the latent

5 Garofoli (1994) discusses why different calculations of firm birth rates can result in very different spatial patterns of entrepreneurship.

variables as theoretical construct are measured by corresponding observed variables, describe the relationships between the latent variables and other observed variables in the model, indicate the amount of unexplained variance, and assess the reliability and validity of the observations. Structural equation modelling is confirmatory in nature and based on covariance structure analysis. Falsification of hypotheses is accomplished by comparing a computed covariance matrix implied by the SE model to the actual covariance matrix derived from empirical data (aggregate methodology).

Schumacker and Lomax (2004) identify at least two reasons why scientists use structural equation modelling. Firstly, researchers need to use multiple variables (unobserved *and* observed) to better understand social and economic phenomena. Second, a growing recognition given to the validity and reliability of observed scores from measurement instruments. In addition to handling measurement errors, SE models enable researchers to study both direct and indirect effects of variables (Raykov and Marcoulides, 2006). Directs effects go directly from one variable in the SE model to another variable, while indirect effects are mediated by one or more intervening variables. The combination of both direct effects and indirect effects makes up the total effects of the independent variables on the dependent variables. Although regression analysis can be used to estimate indirect effects, this is strictly appropriate only when there are no measurement errors involved in the independent variables. Such an assumption, however, is in general unrealistic in empirical research in the social sciences (Raykov and Marcoulides, 2006).

The estimation results for the hypothesised relationships between entrepreneurship dynamics, entrepreneurial diversity and regional employment growth are shown in Table 1. Regional employment growth (*G01-05*) is the annual average employment growth rate for the period 2001-05. Entrepreneurship dynamics (*Entre_Dyn*) as latent construct is measured with two observed indicator variables: a) the number of firm births in the period 2001-05 per 100 established firms in 2001 (*Entre1_0105*), b) the number of firm births in the period 2001-05 per 1000 population in 2001 (*Entre2_0105*). Entrepreneurial diversity (*Entre_M*) is measured as the percentage of self-employed individuals who are foreign-born (in 2001). The concentration index (*Con01*) and firm size (*Size01*) control for structural features of regional economies (in 2001). The table includes standardised estimates, so the relative size of the coefficients points to the relative size of the effects. Sixty-one percent of the variance in regional employment growth is explained by the overall model. The chi-square value is 4.348, with 3 degrees of freedom and a non-significant result (p=0.226), implying that the model fit is adequate.[6] The model is recursive as

6 The chi-square value should not be significant because it provides a "badness of fit" measure. A finding of significance means the given model's covariance structure is significantly different from the observed covariance matrix. A model chi-square of value of $p<0.05$ rejects the model implying imperfect model fit and possible rejection of the proposed model.

it can be seen that no reciprocal linkages are hypothesised among the endogenous variables.

Insert Table 1 about here

Three important results can be extracted from the statistical analyses. Firstly, the confirmatory factor analysis part in the SE model confirms the meaningfulness of entrepreneurship dynamics as latent construct and of the two observed indicator variables. This analysis, therefore, overcomes the limitation of most empirical studies to focus on one single measure of entrepreneurial activity. Secondly, there are significantly positive paths from entrepreneurship dynamics and entrepreneurial diversity to regional employment growth. Therefore, the main hypothesis of this chapter, that entrepreneurship dynamics and entrepreneurial diversity are positively associated with regional growth, cannot be falsified. However, it is important to note that entrepreneurship has a much stronger effect on employment growth than entrepreneurial diversity. Third, the coefficients on the control variables are both significant. The concentration index is positive, while the average firm size has a negative effect on regional employment growth. This supports the hypothesis that regions with a higher average firm size are expected to have lower growth rates. On the other hand, a higher geographic concentration of larger firms apparently has positive growth impacts. In New Zealand, however, only 4.68 % of firms have 20 or more employees in 2001.

One might argue that the causality between entrepreneurship and growth is unclear because economic performance is an important driver of entrepreneurial activities and vice versa. The usage of lagged firm birth rates helps to overcome to some degree the simultaneity problem between entrepreneurship and economic growth (e.g., Acs and Armington, 2004, 2006). The second SE model (Table 2) allows a closer examination of possible time lags in the New Zealand context. It averages growth rates over two two-year periods (2001-03, 2003-05) using employment growth figures for two subsequent time intervals. The latent construct entrepreneurship dynamics now refers to the 2001-03 period. The extended structural equation model indicates, once again, that entrepreneurship dynamics and entrepreneurial diversity are positively associated with regional economic growth. There are significantly positive paths from entrepreneurship dynamics and entrepreneurial diversity to regional employment growth. However, the highest positive impacts occur in the period 2003-05, indicating lagged employment growth rates in the New Zealand context.

Insert Table 2 about here

Summary and conclusions

In this chapter the relationships between entrepreneurship dynamics, entrepreneurial diversity and regional employment growth have been examined. Using the Business Demography Statistics database structural equation models have been developed to explain spatial variations in employment growth in New Zealand's Territorial Authorities over the period 2001-2005. Entrepreneurship dynamics and entrepreneurial diversity have been hypothesised to have a direct, positive effect on regional employment growth. The findings suggest that entrepreneurship dynamics and entrepreneurial diversity both are beneficial for employment growth in the New Zealand context.

This research has two major implications. First, policy initiatives in New Zealand focusing on enhancing entrepreneurship might stimulate regional employment growth. This confirms earlier research results for the US and Europe (e.g., Acs and Armington, 2004, 2006; Audretsch et al. 2006). However, it is out of the scope of this chapter to investigate and discuss why entrepreneurship varies between New Zealand's regions and what could and should be done to foster processes of new venture creation in this particular contextual setting. I leave this for other research activities and publications (e.g., Tamásy and Le Heron, 2008), although the New Zealand policy arena seems to prefer a "pick-and-mix approach" (Acs and Storey, 2004, p. 876) that uncritically adopts policy initiatives from overseas in an alien context.[7] Second, and more interestingly, entrepreneurial diversity is also positively associated with regional employment growth. This result suggests that the rising number of immigrant entrepreneurs play a vital role within the New Zealand economy and should be seen as an integral part of competitive market processes. However, New Zealand's regions differ in their levels of immigrant entrepreneurship and in regard to the contributions of entrepreneurial diversity to regional growth. But we don't know much yet about the geographies of immigrant entrepreneurship in New Zealand. The present research is just a start to investigate this issue in the New Zealand context. Therefore, I would like to encourage more theory-based empirical research that focuses on the role of entrepreneurship for regional economic growth and the way this relationship is affected by entrepreneurial diversity and immigrant entrepreneurs.

Acknowledgements

This research is supported by a Heisenberg Fellowship of the German Research Foundation (Grant No Ta 277/2-1). I would like to thank Igor Drecki, Geographics Unit Manager at the School of Geography, Geology and Environmental Science (SGGES), who produced the figure for this chapter.

7 See Tamásy (2007) for the development of the business incubation industry in New Zealand.

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Tables and Figures

Table 1: Structural equation modelling results at TAs – basic model

	Estimates	*Est.(stand.)*	*S.E.*	*C.R.*	*P*
Entrepreneurship construct and measurement items					
Entre1_0105 <- Entre_Dyn	1.000	0.802			
Entre2_0105 <- EntreDyn	1.854	0.737	0.300	6.172	***
Effects on regional employment growth 2001-2005					
G0105 <- Entre_Dyn	1.126	0.840	0.278	4.051	***
G0105 <- Entre_M	0.099	0.288	0.037	2.677	0.007
G0105 <- Size01	-0.616	-0.620	0.156	-3.952	***
G0105 <- Con01	6.759	0.764	1.784	3.788	***
Squared multiple correlations					
Entre1_0105	0.544				
Entre2_0105	0.644				
G0105	0.607				
Overall model fit:					
Chi-square = 4.348 (3df), P = 0.226, GFI = 0.981, CFI = 0.992, RMSEA = 0.078					

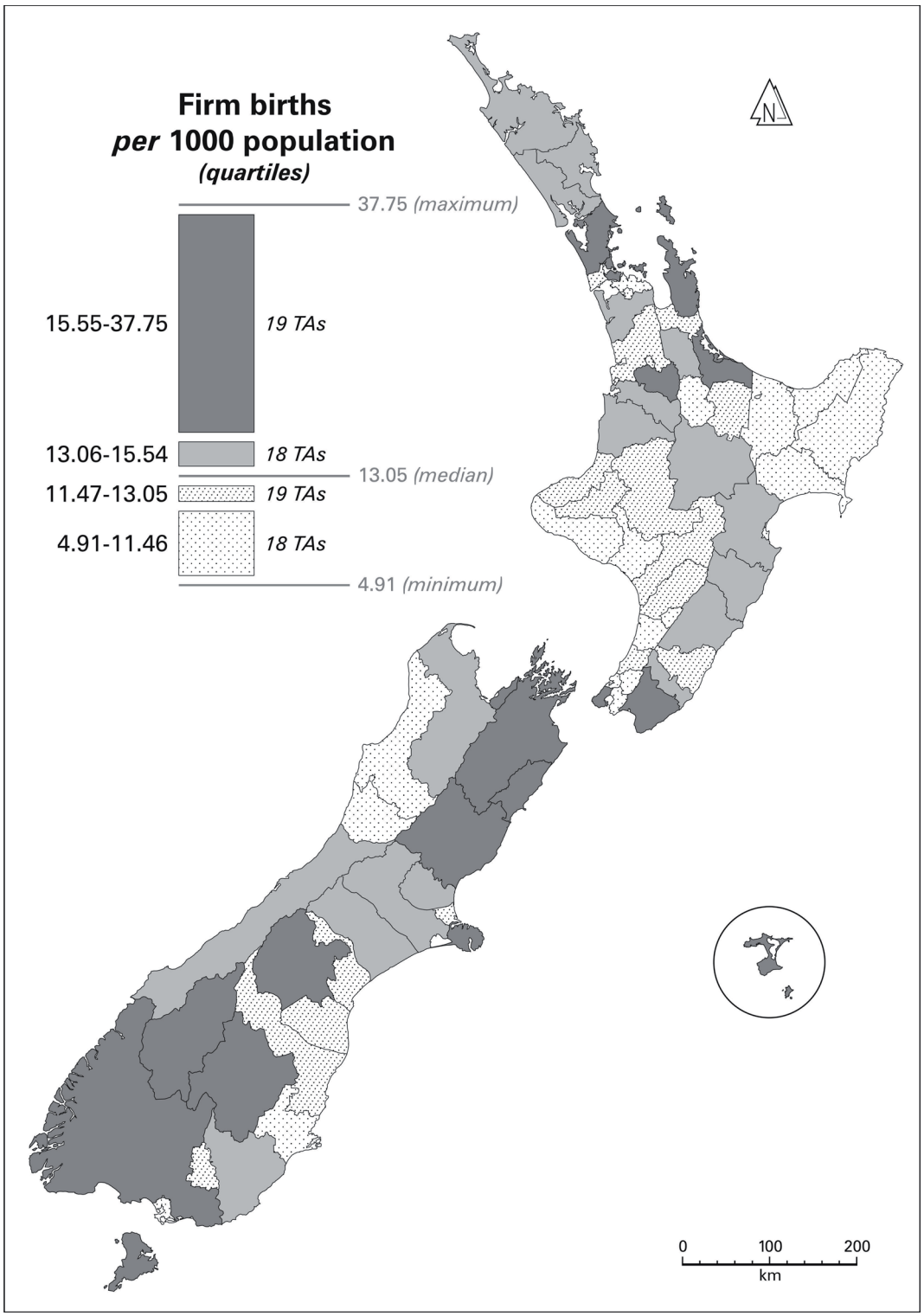
Estimates = regression weights, Est. (stand) = standardised regression weights, S.E. = standard error of regression weight, C.R. = critical ratio for regression weights, P = level of significance for regression weights, *** P < 0.001

Table 2: Structural equation modelling results at TAs – extended model

	Estimates	*Est.(stand.)*	*S.E.*	*C.R.*	*P*
Entrepreneurship construct and measurement items					
Entre1_0103 <- Entre_Dyn	1.000	0.839			
Entre2_0103 <- EntreDyn	1.609	0.704	0.275	5.855	***
Effects on regional employment growth 2001-2003					
G0103 <- Entre_Dyn	0.722	0.462	0.309	2.339	0.019
G0103 <- Entre_M	0.053	0.125	0.053	1.002	0.316
G0103 <- Size01	-0.512	-0.420	0.230	-2.228	0.026
G0103 <- Con01	5.284	0.487	2.495	2.118	0.034
Effects on regional employment growth 2003-2005					
G03-05 <- G0103	-0.048	-0.045	0.116	-0.413	0.680
G0305 <- Entre_Dyn	1.158	0.703	0.349	3.322	***
G0305 <- Entre_M	0.180	0.405	0.047	3.857	***
G0305 <- Size01	-0.922	-0.717	0.215	-4.285	***
G0305 <- Con01	7.923	0.692	2.519	3.145	0.002
Squared multiple correlations					
Entre1_0103	0.495				
Entre2_0103	0.703				
G0103	0.179				
G0305	0.527				
Overall model fit:					
Chi-square = 5.020 (4df), P = 0.284, GFI = 0.981, CFI = 0.994, RMSEA = 0.059					

Estimates = regression weights, Est. (stand) = standardised regression weights, S.E. = standard error of regression weights, C.R. = critical ratio for regression weights, P = level of significance for regression weights, *** P < 0.001

Figure 1: Firm births per 1000 population (2001-2005) by TAs



Appendix

Table A1: TAs ranked by firm births per 100 established firms (2001-2005)

	Territorial Authority	*Firm births*
1	Queenstown-Lakes District	23.55
2	Western Bay of Plenty District	21.81
3	Southland District	21.23
4	Selwyn District	20.34
5	Waimakariri District	20.08
6	Banks Peninsula District	20.00
7	Hurunui District	19.84
8	Waimate District	19.74
9	Otorohanga District	19.64
10	Waikato District	19.52
11	Waipa District	19.48
12	Mackenzie District	19.09
13	Central Otago District	19.00
14	Manawatu District	18.89
15	Franklin District	18.74
16	Rodney District	18.63
17	Hastings District	18.52
18	Central Hawke‘s Bay District	18.44
19	Tasman District	18.43
20	South Wairarapa District	18.34
…		
55	Rotorua District	15.75
56	Gisborne District	15.60
57	Napier City	15.48
58	Horowhenua District	15.42
59	Westland District	15.41
60	Wellington City	15.41
61	Masterton District	15.36
62	South Waikato District	15.33
63	Upper Hutt City	15.27
64	Palmerston North City	14.92
65	Buller District	14.83
66	Wanganui District	14.76
67	Ruapehu District	14.64
68	Lower Hutt City	14.50
69	Dunedin City	14.33
70	Invercargill City	13.94
71	Wairoa District	13.69
72	Grey District	12.25
73	Chatham Islands Territory	11.86
74	Kawerau District	11.54
	New Zealand Total	17.05