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Abstract: The regional variation of entrepreneurship and self-employment within and across nations has been carefully studied over the past 20 years. A multitude of papers covering more than a dozen countries have examined what economic and social factors drive local entrepreneurship. This paper both adds to this literature by examining the sources of regional variation of self-employment in Canada as well as critiques it by discussing the challenge of applying findings from one country to others. Through a meta-analysis of 34 previous studies of regional entrepreneurial variation, several common factors are identified and then examined in a Canadian context. Using data from the 2006 Census of Canada, the paper uses OLS regression to test the role of economic, demographic, and social factors on non-agricultural self-employment in Canadian census metropolitan areas. Population growth, migration, unemployment, firm size and structure all play a significant role in rates of self-employment in Canada.

Keywords: entrepreneurship; self-employment; regional variation; geography; Canada.

Biographical notes: Ben Spigel is a PhD candidate in the Department of Geography at the University of Toronto. His research focuses on the relationships between local social and economic environments and the technology entrepreneurship process.

1   Introduction

Entrepreneurship is one of the most important factors in both regional and national economic development. The number of entrepreneurs and new firms in a region are two of the main explanatory variables for economic growth and job creation (Fritsch and Schindele, 2011). Given this importance to economic development, there has been a sustained research interest in identifying which economic and social conditions most effectively foster entrepreneurship. It is no surprise then that over the past 20 years a multitude of papers and reports from more than a dozen countries have examined these conditions. This research revolves around both the factors that account for increased entrepreneurship as well as what policy options governments have to support it.

However, the extent to which findings from one country can be applied to other countries with different economic, legal, and cultural institutions remains an open question; the factors which encourage entrepreneurship are often dependent on national contexts.

This question is especially important to the development of Canadian entrepreneurship policies. Little is known about the factors that encourage or discourage high levels of regional entrepreneurship and firm formation in Canada. This in turn makes it difficult to craft policies designed to increase entrepreneurship in underperforming regions and foster it in growing areas. Given Canada's close ties to the USA, it is important to determine the extent to which Canada's entrepreneurial geographies are similar or different from its neighbour. While Canada has a very open market and liberal labour laws similar to the USA, its social welfare system is closer to that of many European countries.

Like every nation, Canada has certain hubs for entrepreneurship while other regions lag behind. This is especially true of Canada's many peripheral areas and First Nations reserves, where entrepreneurship is one of the few paths for development. But unlike other countries such as the USA, the UK, and Germany, the geography of Canadian entrepreneurship is critically understudied. Despite the lack of research, entrepreneurship is a crucial part of the Canadian economy. Small firms account for over 50% of Canada's economic output and employ 48% of its labour force (Fisher and Ruber, 2010). The past decade has seen an entrepreneurship boom in Canada. The country's entrepreneurial conditions were recently ranked second globally (Acs and Szerb, 2010), but these supportive conditions are not evenly spread across the country. Rather, large parts of the country have relatively low rates of entrepreneurship and self-employment, while a few regions enjoy sustained entrepreneurial activity.

This paper examines the regional social and economic determinants of Canadian self-employment. Using a dataset based on the 2006 Canadian census, it examines how economic, demographic, and financial factors influence regional self-employment. The paper first discusses Canadian entrepreneurship and how it differs from entrepreneurship in other developed countries. The next section reviews previous work on the regional sources of entrepreneurship, with a particular attention towards works that specifically identified which variables positively or negatively affected entrepreneurship at a regional level. Section 4 introduces the data and methods while Section 5 reviews and discusses the results. The paper concludes by arguing for the need for further meta-analysis and comparison of national studies of regional entrepreneurship.

2 Entrepreneurship and self-employment in Canada

As a multi-cultural country based on a history of colonisation and resource exploitation, Canada is a unique context for entrepreneurship. With 20.7% of its population foreign born, the fifth highest of any OECD country, entrepreneurship by immigrants and visible minorities is of paramount concern. Recent immigrants, many without the human or social capital and credentials needed for employment in the general labour market turn to entrepreneurship or co-ethnic employment for survival (Dana, 1993; Sanders and Nee, 1996; Hiebert, 2002). Canadian immigration policy specifically privileges

entrepreneurship by providing a path for foreign-born entrepreneurs to obtain expedited citizenship by investing more than $400,000 (CAD) in starting or buying a business in Canada. However, the effectiveness of this programme at creating sustainable businesses is questionable at best (Ley, 2003). While Canada's liberal immigration system has encouraged business migration from Asia and elsewhere, it has shown less success in creating entrepreneurial communities (Ley, 2010). Both the pull factors of a favourable immigration system and the push forces of labour market barriers have lead to higher rates of entrepreneurship among immigrants, 18.6% of whom were self-employed in 2006 compared to 10.9% of those born in Canada (Statistics Canada, 2006a). Like in other countries, immigrant and ethnic entrepreneurs in Canada must navigate a complex array of ethnic, cultural, economic, and industrial milieus as that start, operate, and grow their firms (Dana, 1997).

While Canada has seen measured success in encouraging entrepreneurship among ethnic minorities and new immigrants, entrepreneurship among the country's indigenous population remains limited (Anderson and Giberson, 2004). While the goal of most entrepreneurship is to improve the economic and social position of the entrepreneur or their family, entrepreneurship among Canada's indigenous groups is primarily concerned with social goals like community improvement or the sustainable development of traditionally owned land (Anderson et al., 2006). These goals are particularly relevant when First Nations groups consider deals to exact resources from tribal lands. The potential immediate economic gains are weighed against the deal's long term social impact (Anderson et al., 2005; Dana et al., 2009). This difference in entrepreneurial intentions is not a result of the rural or peripheral location of the bulk of indigenous entrepreneurship; even within the same communities, First Nations people are more likely than non-indigenous residents to cite social rather than economic goals for their decision to engage in entrepreneurial pursuits (Dana, 2007). While this type of entrepreneurship makes up only a small proportion of total entrepreneurial activity in Canada, it represents an important new frontier of economic activity that blends contemporary notions of social entrepreneurship with traditional forms of community organisation.

Canada's historical ethnic and economic regionalism has lead to deep differences in both the level and form of entrepreneurship throughout the country (Ensign, 2008). The geography of Canadian entrepreneurship is marked by the country's historic regional divides between rural and urban areas, Western, Central, and Eastern Canada, as well as Francophone and Anglophone areas. Federally funded organisations such as Western Economic Diversification Canada and the Atlantic Canada Opportunities Agency work directly to promote innovative entrepreneurship in specifically targeted regions, while other programmes specifically target linguistic minorities. However, the intended purpose of many of these programmes is not necessary economic or entrepreneurial development, but rather to further political integration within a country still deeply divided along several different social and ethnic fault lines (Doloreux et al., 2010).

These persistent regional differences can be explained in part by the lack of a unified federal entrepreneurship policy. Scattered programmes exist to encourage entrepreneurship among certain groups (such as youths and First Nation peoples), regions (Quebec and rural Ontario) and key industries. However, federal policies have been largely inadequate, without a coherent scope or defined strategy. Canadian policies are ranked 11th out of 13 major industrial countries (Lundström and Stevenson, 2005). The

lack of a centralised federal entrepreneurship policy has lead to a proliferation of provincial policies with multiple focuses and priorities (Langford et al., 2003; Mallet, 2004; Lucas et al., 2009). Individual provinces have wide latitude over investment regulation and tax policy, in turn exacerbating the regional differences in entrepreneurship by creating a variable rules for risk capital (Riding, 1998).

Furthermore, unlike the USA, with its thousands of local and regional banks, Canada has only five major nationally chartered banks, which account for over 90% of all small business loans (Industry Canada, 2003). These banks are volume lenders with nationally homogeneous lending standards, as opposed to the USA where regional banks have heterogeneous standards. In the USA, local banks and credit unions can consider entrepreneurs' intangible aspects, such as their 'character' and business prospects, when providing business loans for entrepreneurs without sterling credit ratings or high net worth (Blake, 2006). Canadian banks rely almost exclusively on credit scores and personal net worth in the loan decision process; they do not routinely consider the businesses' value proposition.

This standardised banking system should push Canadian entrepreneurship to be roughly uniform across the country. But it is not. Entrepreneurs in Ontario and British Columbia are significantly less likely to borrow from banks than entrepreneurs in other provinces, and urban entrepreneurs borrow almost three times as much as their rural counterparts (Human Resources Development Canada, 2002). Some of these differences can be attributed to different provincial tax regimes and government policies, but others seem more connected to local business cultures and practices and the different types of opportunities pursued in different parts of the country.

Canada's reliance on ethnic and minority entrepreneurs, its focus on encouraging entrepreneurship among First Nations peoples, its regional and linguistic divides, and homogenous banking system make entrepreneurship in the country a unique process. While on the surface Canada's economy appears similar to the USA's, these factors contribute to a distinct pattern of regional variation in both the levels of entrepreneurship and forms of entrepreneurship across the country.

3 The causes of regional variations in entrepreneurship

The study of the geography of entrepreneurship emerged out of the rejection of a Schumpeterian view of the singular entrepreneur who brought about innovative new firms and processes independent of her larger economic and social environment. Moving beyond simple psychological profiles of risk tolerance, a new research agenda instead distinguished entrepreneurs from the rest of the population by their ability to identify potential market opportunities and gather the resources needed to exploit them (Shane and Venkatraman, 2000). These opportunities can be as diverse as believing a new genetic breakthrough has the potential to be a billion-dollar medicine, to thinking that a suburban strip mall could use a Subway restaurant in addition to a McDonald's. To exploit these opportunities, entrepreneurs must acquire the appropriate set of resources, including financial resources raised from their own savings, their family and friends, banks, or outside investors like angels or venture capitalists, as well as the appropriate knowledge and skills to form the new enterprise (Shane, 2003).

Entrepreneurship is fundamentally a local event (Feldman et al., 2005). Knowledge of possible opportunities generally flows through entrepreneurs' social and business networks (Owen-Smith and Powell, 2004; Arenius and de Clercq, 2005) which are themselves place-based (Thorton and Flynn, 2003; Westlund and Bolton, 2003). Though personal networks can and do span the globe, entrepreneurs have access to 'local buzz' that provides them with better knowledge about the resources and opportunities available in their community than outsiders (Bathelt et al., 2004).

The quantity of entrepreneurial opportunities in a region are affected by the local industrial and economic structure. Industrial clusters have a tendency to develop a local supply-base, which, in turn, creates a host of entrepreneurial opportunities throughout the supply chain (Rocha and Sternberg, 2005). Others, however, have argued that diverse local economies with a diverse array of industries and sectors are more conducive to entrepreneurship because they are not dependent on one sector or one central firm (Audretsch and Keilbach, 2004, 2005).

While the debate over what industrial structure is best for entrepreneurship remains unsettled, it is clear that certain economic structures are harmful to entrepreneurship. For instance, dependency on branch plants limits entrepreneurial opportunities because they rarely source supplies and services locally nor are employees able to develop the important business or technical skills needed to start spin-off firms (Malecki, 2009). While sudden crises have the potential to break regional monopolies and spur entrepreneurship (see Feldman et al., 2005), more often these regions lack existing supportive institutions and are unable to reposition themselves as entrepreneurial areas, leading to long-term economic decline (Young, 2010).

Even more than opportunities, entrepreneurial resources are closely tied to an entrepreneur's location. Like knowledge about opportunities, resources are often accessed and acquired through social networks. Entrepreneurs gather start-up capital from their own savings and through informal sources like their family and friends. These resources are obtained "…almost entirely via a network of personal, and *local* contacts" [Malecki (1997), p.78, emphasis in original]. While personal networks can and do extend beyond the region, the strong ties that are required to access tangible resources are most often local (Thorton and Flynn, 2003). Venture capitalists and angel investors show a preference to invest in nearby firms, both to better oversee their investments as well as because they have a better knowledge about local investment opportunities (Steier and Greenwood, 2000; Griffith et al., 2007).

Entrepreneurial opportunities and resources are unequally spread over geographic and economic space. Regions like California's Silicon Valley or Canada's Technology Triangle are famous for their entrepreneurial success stories and large numbers of high-tech start-up firms (Saxenian, 1994; Mason et al., 2002; Bathelt et al., 2010). Many of these places are hotbeds of technology entrepreneurship because of high levels of human capital, research-driven universities, the presence of local sources of venture and risk capital, and a business culture that supports the risk taking necessary for entrepreneurship. A local history of successful entrepreneurship creates a virtuous cycle that supports and fosters future entrepreneurship. Successful entrepreneurs can mentor and finance the next generation of small business owners (Lafuente et al., 2007). A series of formal and informal institutions and support networks emerge around a community of successful entrepreneurs, ranging from informal coffee meetings between entrepreneurs to the presence of accountants and lawyers specialising in the unique needs of entrepreneurs and small businesses (Kenney and Patton, 2005).

Entrepreneurship is fundamentally a geographic phenomenon. Unique social and economic factors in particular places contribute to different locally available resources, opportunities, and network compositions. These differences lead to regional variations in both the rates of entrepreneurship as well as specific entrepreneurial practices and activities. However, research showing regional variations in entrepreneurship has proven challenging to operationalise. This is due to the difficulty of finding quantitative variables that closely proxy the more nebulous social and economic factors theorised to affect entrepreneurship. But, the development of new data sources and methods over the past ten years have allowed for an expansion of this type of research.

3.1 *Empirical evidence for regional rates of entrepreneurship*

The past three decades have seen a sustained interested in identifying the economic and social variables that contribute to high levels of regional entrepreneurship and self-employment. While this has been a global research project, the USA and Germany have been the most carefully studied, with little attention paid to developing and peripheral countries, largely because of the lack of regional entrepreneurial data. The majority of the articles studying regional entrepreneurship employ data that examine the economic and demographic conditions associated with above average entrepreneurship rates. Table 1 summarises the variables used in these studies and country-specific findings.

Demographic variables were often found to be significant factors for predicting entrepreneurship. The population density and population growth of a community are consistently associated with higher levels of entrepreneurship. While individual studies in Germany (Fritsch and Mueller, 2007), the USA (Reynolds, 1994) and Ireland (Hart and Gudgin, 1994) found this not to be the case, the balance of the research points towards the role of urbanisation in fostering entrepreneurship. The importance of population density points to the importance of clusters to entrepreneurship. Large and dense regions not only have more market opportunities, but urban regions foster wider social networks from which entrepreneurs can draw resources.

Other demographic aspects such as human capital have a less consistent affect. In Germany (Audretsch and Fritsch, 1994), South Africa (Naudé et al., 2008), France (Guesnier, 1994), Italy (Garofoli, 1994), and several studies in the USA (Acs and Armington, 2004; Lee et al., 2004), educated populations increased entrepreneurship. However, other studies in the USA (Glaser and Kerr, 2008), Norway (Rotefoss and Kolvereid, 2005) and Ireland (Hart and Gudgin, 1994) among other countries found the opposite. A negative relationship between human capital and entrepreneurship was often found in studies which focused on manufacturing entrepreneurship, where skills picked up on the job are more important than those acquired in school. While an educated population is more likely to have the skills necessary to start a new firm, this population is also more likely to be able to find stable employment, potentially decreasing their desire for entrepreneurship.

Table 1   Significant findings of past research on regional entrepreneurial determinates

Type of variable	Germany[a]			UK[b]			USA[c]			Other[d]			Total		
	+	0	–	+	0	–	+	0	–	+	0	–	+	0	–
Population density	2	2	1	1	1	0	1	0	1	1	2	1	5	5	3
Population growth	1	0	0	1	0	0	6	0	0	3	3	1	11	3	1
Total population	0	1	0	0	0	0	3	1	0	2	0	1	5	2	1
Human capital	5	3	1	0	0	0	4	1	5	3	3	1	12	7	7
Other urban characteristics	1	4	0	0	0	1	10	5	2	1	5	1	12	14	4
Diverse economy	1	0	1	0	0	0	3	0	4	2	9	4	6	9	9
Unemployment	3	3	0	1	2	0	3	2	3	4	1	3	11	8	6
White collar labour force	1	2	0	3	0	0	2	0	0	2	3	2	8	5	2
GDP/income growth	1	1	1	0	1	0	3	3	1	0	1	1	4	6	3
Start-up intensity	0	2	1	1	0	0	3	0	1	4	1	0	8	3	2
Average firm size	0	0	2	0	0	0	1	0	2	2	3	1	3	3	5
Tax rate	0	2	1	0	0	0	0	0	0	2	5	2	0	2	1
Clustering/agglomeration	2	0	0	0	0	0	3	1	0	3	1	1	7	6	2
Other economic characteristics	2	1	0	0	0	0	3	7	2	3	12	3	8	9	3
Individual beliefs	1	2	0	0	0	0	0	5	1	2	2	0	4	19	4
Entrepreneurial experience	4	0	0	0	0	0	0	0	0	5	3	3	6	2	0
Personal wealth/wages	1	5	0	1	1	1	3	2	1	3	4	2	10	11	5
Age/male/etc.	1	5	1	0	0	0	3	1	2	0	0	0	7	10	5

Notes: Articles included in this table explicitly examine the relationship between regional
       variables and overall rates of entrepreneurship. The numbers refer to the total
       amount of variables found to be significantly positive (+), negative (–) or that
       were insignificant (0). When multiple dependent variables were used, the results
       for models based on the number of entrepreneurs per capita were used when
       possible. When papers included multiple models, the results from the most
       specified model were recorded. Some papers that did consider regional
       characteristics (for example, Tamasy, 2010) were not included because they did
       not specifically use regions as their unit of analysis or the region was only used as
       a control variable. Articles were identified through a literature search of major
       entrepreneurship and regional science journals along with citations provided in
       Breitenecker and Harms (2010).

   Source: [a]Audretsch and Fritsch (1994, 1999), Audretsch and Keilbach (2008),
             Bergmann and Sternberg (2006), Harhoff (1999), Mueller (2006) and
             Rocha and Sternberg (2005)
             [b]Keeble and Walker (1994), Love (1995) and Whittington (1984)
             [c]Acs and Armington (2004), Armington and Acs (2002), Delgado
             et al. (2010), Gabe (2003), Glaser and Kerr (2008), Glaser et al.
             (2010), Krichhoff et al. (2007), Lee et al. (2004), Osoba (2009),
             Reynolds (1994), Reynolds et al. (1995) and Sutaria and
             Hicks (2004)
             [d]Audretsch and Vivarelli (1996) (Italy), Beugelsdijk and
             Noorderhaven (2004) (international comparison), Campi et al. (2004)
             (Spain), Davidsson et al. (1994) (Sweden), Garofoli (1994) (Italy),
             Guesnier (1994) (France), Hart and Gudgin (1994) (Ireland), Naudé
             et al. (2008) (South Africa), Rotefoss and Kolvereid (2005)
             (Norway), Tamasy and le Heron (2008) (New Zealand), van Oort and
             Atzeme (2004) (The Netherlands) and van Soest et al. (2006)
             (The Netherlands)

High rates of unemployment also signalled increased levels of entrepreneurship. While this is initially counterintuitive, extended unemployment encourages entrepreneurship, if only as a last resort (Armington and Acs, 2002). The loss of a job, while often traumatic, can present an opportunity to start a business (Faber, 1999; Tamasy, 2010). Because entrepreneurs typically have lower wages than the traditionally employed, the higher wages at existing firms increase the opportunity cost of entrepreneurship. Indeed, when unemployment rates are extremely low, wages will increase to a rate that discourages self-employment (Rotefoss and Kolvereid, 2005). However, in the absence of available paid labour, self-employment may the only available source of income. However, persistent and high unemployment suggest a rapidly declining economy that decreases the amount of entrepreneurial opportunities and overall entrepreneurship in a region.

Several papers (e.g., Lee et al., 2004; Audretsch and Keilbach, 2008) found that GDP and income growth are closely linked with entrepreneurship. It is likely that others would have come to similar conclusions if reliable data for regional GDP were more widely available. Strong economies present multiple entrepreneurial opportunities and increase the amount of resources locally available. However, other papers, such as Bergmann and Sternberg (2006) find a link between declining regional per capita GDP and entrepreneurship. It is likely that this is true for the same reason that unemployment is linked to entrepreneurship: Declining GDP signals an economy in transition between industrial structures, where entrepreneurship emerges as a reaction to shifting employment opportunities. Even when reliable regional GDP data are available, it is difficult to assign casual direction to the connection: Does entrepreneurship increase because of a growing economy, or is the economy growing because of a vibrant entrepreneurial environment?

Several studies have found a connection between the presence of clusters and higher than average rates of entrepreneurship (Rocha and Sternberg, 2005; Delgado et al., 2010). However, it is difficult to study cluster dynamics using large and imprecise datasets. The main challenge is differentiating between regions with a high concentration of firms in the same industry or production chain but which lack evidence of collaboration or knowledge sharing between firms, and those regions with true clusters filled with knowledge spillovers and inter-firm cooperation. Most papers identify clusters based on a high density of firms in a particular sector, but Rocha and Sternberg (2005) employ a mix of qualitative and quantitative assessments to identify German industrial clusters. This method, which lacks statistical rigor, is still superior to simply defining clusters based on above-average concentrations of industries. Based on the existing research it is difficult to conclude if entrepreneurship is encouraged by firm density or cluster-based knowledge spillovers.

Economic diversity, expressed both in the division between industrial and service firms and white and blue collar workers, has a mixed relationship with entrepreneurship. These outcomes reflect the larger debates on the relative importance of Marashal-Arrow-Romer economics (regions with heavy concentration in one industry) verses Jacobs economics (regions with a mixture of industries) for local economic growth. In some cases, such as Delgado et al.'s (2010) study of entrepreneurship and clusters in the USA, regions without one dominant industry had higher rates of self-employment because barriers to entry were lower. However, several studies show that specialised economies breed more entrepreneurs (e.g., Harhoff, 1999; Armington and Acs, 2002; Campi et al., 2004). Given the large number of studies that found an

insignificant effect, more research is needed to understand the connection between industrial diversity and entrepreneurship.

Results from several countries clearly point to the importance of existing entrepreneurship in supporting future entrepreneurs. With few exceptions, studies found that smaller average firm size results in higher rates of entrepreneurship in a region. Furthermore, the higher overall percentage of new firms also unequivocally increases rates of future entrepreneurship. A community of small business owners helps create the entrepreneurial environment that is so critical to fostering new business development in the region (Malecki, 2009).

However, we must be cautious when applying the lessons from this type of research in crafting local entrepreneurship policies. It is questionable what lessons about encouraging entrepreneurship in Germany or Sweden, with their large social safety nets and unique economies can be applied to the USA, Australia, or the Philippines. For instance, unemployment is thought to encourage entrepreneurship because being unemployed lowers the opportunity cost for starting a small business (Black et al., 1996). Social welfare programmes raise the opportunity cost for entrepreneurship and help ensure that the unemployed are not 'forced' into entrepreneurship because they have no other options. On the other hand, in countries like the USA that lack a strong social safety net, the high price of private heath care can discourage entrepreneurship (Holtz-Eakin et al., 1996). Beyond structural economic factors, regional and national historical factors can affect both the occurrence of entrepreneurship as well as the entrepreneurship process (Lee and Peterson, 2000; Dodd and Patra, 2002). Careful consideration must be given not only to the statistical results of these studies, but the theoretical relationships between dependent and independent variables within a variety of different contexts.

The studies discussed above were carried out at a particular time in a particular nation and focus on a particular set of economic and social variables that are themselves embedded in deeper contexts. The ability of any such study to make generalisable claims about the larger nature of entrepreneurship is questionable. As Table 1 demonstrates, only a few near-universal trends can be established, such as the predictive value of population growth and density. However, the role of the majority of commonly studied economic and demographic variables are nationally specific, making it difficult to transplant particular findings from one context to another.

4   Data and methods

Like many other countries, Canada has little data available on the prevalence of regional entrepreneurship. While several nationwide surveys of entrepreneurship have been carried out, they do not provide detailed information about the location of entrepreneurial activity. This study uses data from the 2006 Canadian census (Statistics Canada, 2006a, 2006b), combined with aggregate firm data from the Canadian Business Patterns survey (Industry Canada, 2006).[1] The dependent variable is non-agricultural self-employment. While farm ownership is certainly a form of self-employment, it is not entrepreneurship as scholars traditionally understand it. Government regulation, high capital requirements, and low turnover make farming fundamentally different from other types of entrepreneurship.

Self-employment is an imperfect measure of entrepreneurship. It represents the total stock of the (non-farm) self-employed, from those who have just started a business to

those who have running one for decades. This is a subtle, but crucial, difference from entrepreneurship. Annual firm formation rates – which the majority of prior research uses – provide an immediate view of what factors caused more firms to be created in a given year. However, we rarely have information about firm survival (with exceptions like Reynolds et al., 1995). Self-employment data is more stable because the number of newly self-employed people is overwhelmed by the existing stock of the self-employed. As such, it does not capture year-on-year variation in the number of new firms created. The self-employment data show what economic and demographic conditions create long-term environments favourable to small-business ownership, rather than temporary environments for firm creation. The results of this study therefore point to those factors that create contexts that allow small firms to start and thrive, rather than just the factors that encourage firm formation.

Similar to studies in the USA, the data is analysed at census metropolitan area (CMA) scale. CMAs are a useful unit of analysis because they are specifically delineated by a common labour market and regional economy, instead of pre-existing and porous political boundaries. However, almost 25% of the population and 22% of firms are located outside of Canada's 144 CMAs. While the CMA scale covers the vast majority of the Canadian economy and population, it ignores self-employment occurring in rural and peripheral areas, including the majority of entrepreneurship on First Nations reserves.

4.1 Research hypotheses

Previous research has identified population growth as a key factor in entrepreneurship. To test if this holds true in Canada, the population growth rate between 2001 and 2006 is used. Population growth reflects a growing economy that is attractive to new migrants. As Table 1 shows, population growth has proved to be a good indicator of entrepreneurship. Unemployment is also thought to be a critical factor in predicting entrepreneurship and self-employment. Unlike many other countries, in Canada, there is a generally linear, negative correlation between unemployment and self-employment. Unemployment in Canada therefore likely has a negative influence on overall entrepreneurship.

Hypothesis 1   Population growth will increase rates of self-employment.

Hypothesis 2   Higher rates of unemployment will lower rates of self-employment.

Post-secondary education provides entrepreneurs both the skills needed to realise what opportunities exist and contributes to their ability to learn how to operate a business. It is not a purely linear phenomenon, while evidence suggests that having the equivalent of a bachelor's degree increases entrepreneurial potential, post-graduate education has no significant impact (Kim et al., 2006). However, in manufacturing-heavy economies higher education has a limited or even negative influence because skills learned on the job are more important than those learned in a university. In this paper, higher education is defined as the percentage of the population with a bachelor's degree.

Hypothesis 3   A higher percentage of the population with bachelor degrees will increase self-employment rates.

The number of new migrants to a region should have a similar influence to overall population growth. Migration is measured as the overall percentage of the population that

has moved to the CMA within the last one or five years, including both international and domestic migrants. Regional in-migration suggests a growing economy attractive to newcomers, which in turn signals an economy full of potential entrepreneurial opportunities (Tiebout, 1956). In this sense, migration is a good, though imperfect, proxy of regional economic growth. However, because newcomers to a region know fewer local people their networks are consequently much smaller and less useful than natives' networks (Dahl and Sorenson, 2010). This makes it more difficult for newcomers to successfully gather the network-embedded resources they need to start and grow a small firm. As they spend more time in the region, migrants' local networks expand, increasing their access to potential local resources. Therefore, it is expected that regions with a high number of very new residents (those who have lived there for less than a year) to have lower rates of self-employment and those with high levels of residents who have moved within the past five years to have greater rates of self-employment.

Hypothesis 4   Higher one-year in-migration rates will lower self-employment rates.

Hypothesis 5   Higher five-year in-migration will increase rates of self-employment.

The percentage of firms with more than 500 employees and the average firm size are used to test the role of the existing entrepreneurial economy on self-employment. CMAs with a high percentage of large firms are likely to have lower self-employment rates because these larger firms dominate their local economy and reduce the number of opportunities entrepreneurs can pursue. Previous research has found a strong link between smaller average firm sizes and higher levels of entrepreneurship. Some of this connection is no doubt due to the tautological link between high rates of entrepreneurship which necessarily drives down the average firm size. Nevertheless, the strength of this connection in the literature suggests that regions with many small firms have lower barriers to entry for new entrepreneurs than those with a few dominant employers. Because of data limitations, data on firm size in seven, mostly peripheral CMAs, is not available.

Hypothesis 6   The percentage of firms with more than 500 will decrease rates of
                  self-employment.

Hypothesis 7   Lower average firm sizes will increase the self-employment rate.

The diversity of regional economies has a split influence on entrepreneurship and self-employment. In the USA, three studies found that a diverse economy increased firm formation, while four others suggested that an economy concentrated in one particular sector saw higher rates of entrepreneurship. A similar divide is seen in results from other countries. In Canada, it is expected that economies with a heavy manufacturing concentration will see less self-employment, due to the increased upfront capital costs of manufacturing start-ups, as opposed to service or consumer oriented firms. This hypothesis is tested using the proportion of each CMA's labour force that is employed in manufacturing occupations.

Hypothesis 8   Higher levels of manufacturing employment will lower the
                  self-employment rate.

CMAs' median household income is used to test the influence of personal wealth on self-employment and entrepreneurship. There is little direct evidence to suggest what influence income has on entrepreneurship. On one hand, financial resources are an

important part of the overall entrepreneurial process, so high incomes would allow potential entrepreneurs to save the necessary start-up capital needed to create and grow a firm. But, most entrepreneurial endeavours require very little initial financing (Robb and Robinson, 2008), implying that average income will have very little predictive value since entrepreneurs can easily bootstrap their start-up financing from other sources besides savings. It still stands to reason, however, that higher incomes provide more financial resources that can drive self-employment.

Hypothesis 9   Median household income will have positive affect on the self-employment rates.

Finally, the ratio of commercial property taxes to residential property taxes is used to test the role of tax policy on self-employment. A larger ratio reflects higher commercial taxes, which should discourage entrepreneurial growth and expansion. While not all self-employed people own commercial property, we would still expect that higher commercial tax rates would push down overall self-employment rates.[2] The data was collected by the Canadian Federation of Independent Businesses, a trade group representing Canadian small businesses (Mallet and Wong, 2010).

Hypothesis 10   Higher commercial tax rates will reduce rates of self-employment.

Table 2   Description of variables

Variable	Description	Hypothesised sign	Minimum	Mean	Maximum	Standard deviation
Non-agricultural self-employment	Percentage of the labour force engaged in non-agricultural self-employment	NA	0.02	0.05	0.12	0.02
Population change	Percent population growth between 2001 and 2006	+	–12.6	3.89	46.7	6.63
Unemployment	Unemployment rate in 2006	–	1.9	5.64	20.3	2.65
External migrants (one-year)	Percentage of the population that has lived in the CMA for <1 year (logged)	–	–4.60	–4.27	–3.31	0.24
External migrants (five-year)	Percentage of the population that has lived in the CMA for <5 years (logged)	+	–4.55	–3.82	–2.40	0.49
Bachelor's degree	Percentage of the population with a bachelor's degree or higher	+	4.4	10.64	24.32	3.61

Table 2   Description of variables (continued)

Variable	Description	Hypothesised sign	Minimum	Mean	Maximum	Standard deviation
Firms with >500 employees	Percentage of firms with more than 500 employees (logged)	–	–4.61	–4.36	–3.86	0.13
Average firm size	Number of firms divided by total population	–	4.62	16.03	38.86	3.7
Manufacturing employment	Percentage of manufacturing workers in labour force (logged)	–	–0.7	1.66	2.9	0.69
Median household income	The 2006 median pre-tax income of census households ($10,000s CAD)	+	$35.22	$52.51	$120.94	$11.62
Commercial tax ratio	Ratio of commercial taxes to residential taxes	–	1.19	2.4	4.42	0.55

5   Results and discussions

Table 3 reports the results of an OLS regression of non-agricultural self-employment. The results illustrate what factors create regions that are supportive of long-term entrepreneurship. As predicted, Model 1 shows that population change and the unemployment rate alone explain approximately 36% of regional self-employment. This confirms hypothesises one and two and contributes more evidence to the powerful explanatory role of population growth and unemployment. Unemployment's negative sign is partially connected to the problem of regressing self-employment: in regions with a high unemployment rate there are simply fewer people who are employed, either self-employed or employed by someone else. This drives down the self-employment rate. But beyond this statistical artefact, there is a clear negative theoretical and empirical relationship between unemployment and self-employment, pointing to a lack of effective policies to help the unemployed transition to entrepreneurship.

Higher education had a statistically insignificant influence on self-employment. Several previous studies have identified positive connections between an educated population and entrepreneurship rates and between a white-collar or creative workforce (which is highly correlated with education) and entrepreneurship rates. This is not the case in Canada, where there is no evidence to support hypothesis three. This is in part due to the fact that many small businesses, such as restaurants, retail stores or small industrial firms do not require skills acquired in a university. Those with university educations have more opportunities within the paid labour market, which acts as a deterrent to becoming self-employed. Despite overall increases in self-employment over the past twenty years, the percentage of university-educated Canadians becoming entrepreneurs has remained relatively unchanged (Finnie et al., 2003). This decline is concerning because university-educated entrepreneurs are more likely to create the export-oriented, fast-growing firms that contribute the most to economic growth.

Table 3 Regression results of non-agricultural self-employment in Canadian census metropolitan areas

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Intercept	5.745*** (0.264)	5.126*** (0.498)	5.376*** (0.558)	5.541*** (0.581)	7.614*** (0.519)	7.483*** (0.664)	8.118*** (0.885)	7.717*** (0.924)
Population change	0.078*** (0.022)	0.069*** (0.021)	0.065*** (0.021)	0.057** (0.019)	0.063*** (0.019)	0063*** (0.21)	0.07*** (0.024)	0.095*** (0.024)
Unemployment	-0.205*** (0.034)	-0.197*** (0.033)	-0.193*** (0.034)	-0.169*** (0.035)	-0.112** (0.046)	-0.111** (0.047)	-0.119** (0.047)	-0.125** (0.046)
Bachelors degree		0.057 (0.049)	0.044 (0.051)	0.009 (0.061)	0.004 (0.03)	0.009 (0.03)	0.002 (0.03)	-0.047 (0.038)
Log external migrants (one-year)			0.085 (0.067)					
Log external migrants (five-year)				0.373** (0.136)	0.174* (0.097)	0.170* (0.097)	0.199* (0.101)	0.393*** (0.126)
Log firms with >500 employees					-1.77*** (0.518)	-1.784*** (0.528)	-1.54*** (0.467)	-1.336** (0.442)
Average firm size					-0.119*** (0.018)	-0.12*** (0.017)	-0.119*** (0.018)	-0.099*** (0.018)
Log manufacturing employment						0.052 (0.128)	-0.004 (0.133)	-0.052 (0.141)
Median household income							-0.001 (0.000)	-0.001 (0.000)
Tax ratio								0.333* (0.139)
Adjusted R^2	.360	.372	.376	.401	.631	.629	.632	.662
n	144	144	144	144	137	137	137	92
F-statistic	41.184	29.270	22.513	24.292	39.76	33.898	30.167	20.813

Notes: Heteroscedastic-consistent standard errors in parenthesis.
$*p < .1$, $**p < .05$, $***p < .01$

The one-year in-migration rate had an insignificant affect on self-employment, disproving hypothesises four. However, in support of hypothesis five, the five-year in-migration rate had a substantial and significant role in self-employment. The strength of the five-year rate demonstrates the importance of in-migration as a signal of economic dynamism, more so than overall population change. This also suggests the importance of strong local networks. While both the one-year and five-year migration rates can be taken as proxies of economic vitality, it is very difficult for new migrants to quickly start new firms due to the need to acquire local resources that are only available through social and business networks. Over time, as new residents become more deeply embedded in their local economy and entrepreneurial environment they gain increased access to network-based entrepreneurial resources.

The number of large firms and the average firm size have their expected negative influence, confirming the sixth and seventh hypotheses. The proportion of large firms in a region decreases the local self-employment rate, suggesting larger firms crowd out entrepreneurs by either paying higher wages that discourage self-employment or creating a dominant presence that leaves few opportunities for entrepreneurship. Without a doubt, large stores like Wal-Mart or Home Depot harm smaller retailers (Basker, 2005). Model 6 further shows that as the average size of local firms increase, the self-employment rate declines.

These results point to the importance of the pre-existing entrepreneurial environment. Regions with many large firms had significantly lower rates of self-employment than those with a variety of small firms. While the role of the existing entrepreneurial environment is important to these models, it is hardly useful from a policy standpoint. Regions with a few large, dominant firms are rarely in a position to transition to a more diverse and open economy; this change usually happens through a sudden shock. But while municipal governments cannot drastically change their region's economic structure, they can work to create a foundation of supportive entrepreneurial institutions. This not only diversifies the economy, it helps produce entrepreneurial role models and mentors that are key ingredients in producing resilient entrepreneurial environments.

The proportion of the labour force in manufacturing occupations had no significant influence on self-employment, suggesting that neither sectoral diversity nor concentration has a major affect on Canadian self-employment. Thus, while firm structure has an important role in determining the self-employment rate, industrial structure has little if any influence. Median household income was also insignificant. Because many start-up firms require little to no initial capital or investment, an entrepreneur's prior savings or income has little impact on their decision to become self-employed. These results disprove hypotheses eight and nine.

The tax ratio had a surprising positive affect on self-employment. This may be due to the correlation between non-agricultural self-employment and population size. Larger CMAs have higher commercial tax rates than smaller regions, which help the larger areas support entrepreneurial education and support programmes. This connection might also indicate the role of government support in the entrepreneurship process. These results contradict findings from Germany that suggest low tax rates and a lack of government regulation contribute to higher rates of nascent entrepreneurs (Tamasy, 2010), suggesting that the role of taxes is nationally specific. Given the lack of theoretical explanations for this result, further research on the connection between taxation and self-employment is needed.

In general, the findings suggest that two categories of variables have a major influence on self-employment rates in Canada: regional economic vitality and local economic structure. Variables like population growth and in-migration, which signal a growing economy, increase self-employment. Smaller average firm sizes and a lack of large, dominant firms indicate the presence of a supportive entrepreneurial environment. These results indicate that national-level economic factors like the size of the welfare state or financial regulation have little impact on regional levels of self-employment and entrepreneurship. In modern, developed economies, entrepreneurship is found in regions with strong economies, regardless of programmes designed to encourage entrepreneurship in declining economies.

The Canadian data discussed here resemble prior results from the USA. The similarities are not surprising: despite Canada's larger social safety net, it shares the USA' liberal market economy. But substantial differences remain. The largest difference between the models presented here and results from US studies is the role of personal wealth. Three studies in the USA (Reynolds, 1994; Reynolds et al., 1995; Sutaria and Hicks, 2004) found that higher wages or personal wealth spurs local entrepreneurship. Only one study in the USA (Gabe, 2003) found a negative connection between wealth and entrepreneurship. There appear to be no such connection in Canada. This could suggest that Canadian entrepreneurs need less start-up capital than their US counterparts, but no existing evidence supports or refutes this. Further research is needed, however, to determine if the role of tax rates and in-migration have a similar role in the USA.

6   Conclusions

The quantity of papers written on the determinates of regional entrepreneurship over the past three decades raises the question of how results from one country can be compared to others. To what extent is regional entrepreneurial success the result of national economic structures, legal systems, and cultures as opposed to the more general features of entrepreneurship that are similar between most (developed) countries? More work is needed to determine if regional entrepreneurial patterns are similar between different economic and production systems – for instance, using Hall and Soskice's (2001) varieties of capitalism typology – or between the Eurozone, North America and Asia. Such meta-analyses will help establish the aspects of the entrepreneurial process are tied to the local environment and which are more general outcomes of global economic systems. Is there one generic form of entrepreneurship that is slightly modified in each country, or are there separate, national (or even regional) forms of entrepreneurship that defy comparison? However, this type of analysis is hampered by the lack of research and reliable regional entrepreneurship data in Asian counties and countries in the Global South.

This paper presented a model of regional Canadian entrepreneurship. Even though many researchers have examined some aspect of regional entrepreneurial determinants in other countries, this is the first that examines the topic from a Canadian perspective. The results show that self-employment is primarily driven by a growing, vibrant economy and a pre-existing entrepreneurial environment within a region. Self-employment is aided by open economies that contain multiple opportunities for new ventures. The amount of financial resources in the region and the tax structure is less important than having a

growing economy. This is similar to previous findings in the USA, where the role of economic growth overshadows government policies or demographic considerations.

This suggests it is counter-productive to base regional development policies on increasing local entrepreneurship, at least in Canada. Entrepreneurship is dependent on the provision of local economic opportunities. In areas with declining economies, there are simply fewer of these opportunities to go around and fewer available resources to exploit those that do exist. As the results show, Canadian entrepreneurship is driven by economic growth opportunity. Regional development policies can and should certainly include entrepreneurship promotion and support plans, but larger policies are needed to help drive overall economic growth and development.

Further work is also needed on Canadian entrepreneurship in general. While economically and geographically Canada is a peripheral player in the global economy, Canada's strong ties to the USA and diverse regions make it an interesting case study. Certainly, more specialised statistical tests and datasets will reveal a more detailed story about what regional factors encourage entrepreneurship. But individual case studies are also needed to better appreciate the complex linkages between economic and social institutions and entrepreneurship.

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References

Acs, Z.J. and Armington, C. (2004) 'The impact of geographic differences in human capital on service firm formation rates', *Journal of Urban Economics*, Vol. 56, No. 2, pp.244–278.

Acs, Z.J. and Szerb, L. (2010) 'Global entrepreneurship and the United States', Report SBAHQ-09-M-0288, Small Business Administration, Office of Advocacy, Ruxton, Maryland.

Anderson, R.B. and Giberson, R.J. (2004) 'Aboriginal entrepreneurship and economic development in Canada: thoughts on current theory and practice', in Stiles, C. and Galbraith, C. (Eds.): *Ethnic Entrepreneurship: Structure and Process*, pp.141–167, JAI Press, Stanford.

Anderson, R.B., Camp, R.D., Dana, L.P., Hoing, B., Nkogolo-Bakenda, J.M. and Peredo, A.M. (2005) 'Indiginious land rights in Canada: the foundation for development?', *International Journal of Entrepreneurship and Small Business*, Vol. 2, No. 2, pp.104–113.

Anderson, R.B., Dana, L.P. and Dana, T.E. (2006) 'Indignous land rights, entrepreneurship and economic development in Canada: 'opting-in' to the global economy', *Journal of World Business*, Vol. 41, No. 1, pp.44–55.

Arenius, P. and de Clercq, D. (2005) 'A network-based approach on opportunity recognition', *Small Business Economics*, Vol. 24, No. 3, pp. 249–265.

Armington, C. and Acs, Z.J. (2002) 'The determents of regional variation in new firm formation', *Regional Studies*, Vol. 36, No. 1, pp.33–45.

Audretsch, D.B. and Fritsch, M. (1994) 'The geography of firm births in Germany', *Regional Studies*, Vol. 28, No. 4, pp.359–365.

Audretsch, D.B. and Fritsch, M. (1999) 'The industry component of regional new firm formation processes', *Review of Industrial Organization*, Vol. 15, No. 3, pp.239–252.

Audretsch, D.B. and Keilbach, M. (2004) 'Entrepreneurial capital and economic performance', *Regional Studies*, Vol. 38, No. 8, pp.949–959.

Audretsch, D.B. and Keilbach, M. (2005) 'Entrepreneurship capital and regional growth', *The Annals of Regional Science*, Vol. 39, No. 3, pp.457–469.

Audretsch, D.B. and Keilbach, M. (2008) 'Resolving the knowledge paradox: knowledge-spillover entrepreneurship and economic growth', *Research Policy*, Vol. 37, No. 10, pp.1697–1705.

Audretsch, D.B. and Vivarelli, M. (1996) 'Determinates of new-firm startups in Italy', *Emperica*, Vol. 23, No. 1, pp.91–105.

Basker, E. (2005) 'Job creation or destruction? Labor market effects of Wal-Mart expansion', *Review of Economics and Statistics*, Vol. 87, No. 1, pp.174–183.

Bathelt, H., Kogler, D.F. and Munro, A.K. (2010) 'Social foundations of regional innovation and the role of university spin-offs', *Technovation*, Vol. 30, Nos. 9–10, pp.519–532.

Bathelt, H., Malmberg, A. and Maskell, P. (2004) 'Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation', *Progress in Human Geography*, Vol. 28, No. 1, pp.31–56.

Bergmann, H. and Sternberg, R. (2006) 'The changing face of entrepreneurship in Germany', *Small Business Economics*, Vol. 28, Nos. 9–10, pp.205–221.

Beugelsdijk, S. and Noorderhaven, N. (2004) 'Entrepreneurial attitude and economic growth: a cross-section of 54 regions', *Annals of Regional Science*, Vol. 38, No. 20, pp.199–218.

Black, J., de Meza, D. and Jefferys, D. (1996) 'The supply of collateral and the enterprise economy', *The Economic Journal*, Vol. 106, No. 434, pp.60–75.

Blake, M. (2006) 'Gendered lending: gender, context and the rules of business lending', *Venture Capital*, Vol. 8, No. 2, pp.183–201.

Breitenecker, R.J. and Harms, R. (2010) 'Dealing with spatial heterogeneity in entrepreneurship research', *Organizational Research Methods*, Vol. 13, No. 1, pp.176–191.

Campi, M.T.C., Blasco, A.S. and Marsal, E.V. (2004) 'The location of new firms and life cycle of industries', *Small Business Economics*, Vol. 22, Nos. 3/4, pp.265–281.

Dahl, M.S. and Sorenson, O. (2010) 'Home sweet home: entrepreneurs location choices and the performance of their ventures', Working paper, *SSRN eLibrary*, available at http://ssrn.com/abstract=1596810 (accessed on 5 July 2011).

Dana, L.P. (1993) 'An inquiry into culture and entrepreneurship: case studies of business creation among immigrants in Montreal', *Journal of Small Business and Entrepreneurship*, Vol. 10, No. 4, pp.16–31.

Dana, L.P. (1997) 'The origins of self-employment in ethno-cultural communities: distinguishing between orthodox entrepreneurship and reactionary enterprise', *Canadian Journal of Administrative Sciences*, Vol. 14, No. 1, pp.52–68.

Dana, L.P. (2007) 'A comparison of indigenous and non-indigenous enterprise in the Canadian sub-artic', *International Journal of Business Performance Management*, Vol. 9, No. 3, pp.278-286.

Dana, L.P., Anderson, R.B. and Meis-Mason, A. (2009) 'A study of the impact of oil and gas development on the Dene First Nations of the Shatu (Great Bear Lake) region of the Canadian Northwest Territories (NWT), *Journal of Enterprising Communities,* Vol. 3, No. 1, pp.94–117.

Davidsson, P. Lindmark, L. and Olofsson, C. (1994) 'New firm formation and regional development in Sweden', *Regional Studies*, Vol. 4, No. 4, pp.395–410.

Delgado, M., Porter, M.E. and Stern, S. (2010) 'Clusters and entrepreneurship', *Journal of Economic Geography*, Vol. 10, No. 4, pp.495–518.

Dodd, S.D. and Patra, E. (2002) 'National differences in entrepreneurial networking', *Entrepreneurship and Regional Development*, Vol. 14, No. 2, pp.117–154.

Doloreux, D., Rangdrol, D. and Doinne, E. (2010) 'Franophone minority economic development in Canada: addressing political or economic issues?', *Economic Development Quarterly*, Vol. 24, No. 2, pp.143–153.

Ensign, P. (2008) 'Small business considerations in Canada: the resurgence of regionalism', *Journal of Entrepreneurship*, Vol. 17, No. 1, pp.37–47.

Faber, H.S. (1999) 'Alternative and part-time employment arrangements as a response to job loss', *Journal of Labor Economics*, Vol. 17, No. 4, pp.S142–S169.

Feldman, M., Francis, J. and Bercovitz, J. (2005) 'Creating a cluster while building a firm: entrepreneurs and the formation of industrial clusters', *Regional Studies*, Vol. 39, No. 1, pp.129–141.

Finnie, R., Laporte, C. and Rivard, M. (2003) 'Setting up shop: self-employment amongst Canadian college and university graduates', *Relations Industrielles/Industrial Relations*, Vol. 58, No.1, pp.3–29.

Fisher, E. and Ruber, R. (2010) 'The state of entrepreneurship in Canada', report, Small Business and Tourism Branch: Industry Canada, Ottawa.

Fritsch, M. and Mueller, P. (2007) 'The persistence of regional new business formation-activity over time – assessing the potential of policy promotion activities', *Journal of Evolutionary Economics*, Vol. 17, No. 3, pp.299–315.

Fritsch, M. and Schindele, Y. (2011) 'The contribution of new businesses to regional employment – an empirical analysis', *Economic Geography*, Vol. 87, No. 2, pp.153–180.

Gabe, T. (2003) 'Local industry agglomeration and new business activity', *Growth and Change*, Vol. 34, No. 1, pp.17–39.

Garofoli, G. (1994) 'New firm formation and regional development: the Italian case', *Regional Studies*, Vol. 28, No. 4, pp.381–393.

Glaser, E. and Kerr, W.R. (2008) 'Local industrial conditions and entrepreneurship: how much of spatial distribution can we explain?', Working Paper 09-055, Harvard Business School, Cambridge, Mass.

Glaser, E., Kerr, W.R. and Ponzetto, G.A. (2010) 'Clusters of entrepreneurship', *Journal of Urban Economics*, Vol. 67, No. 1, pp.150–168.

Griffith, T., Yam, P. and Subramaniam, S. (2007) 'Silicon Valley's 'one-hour' distance rule and managing return on location', *Venture Capital*, Vol. 9, No. 2, pp.85–106.

Guesnier, B. (1994) 'Regional variations in new firm formation in France', *Regional Studies*, Vol. 4, No. 4, pp.347–358.

Hall, P.A and Soskice, D. (2001) 'An introduction to varieties of capitalism', in Hall, P.A and Soskice, D. (Eds.): *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, pp.1–68, Oxford University Press, Oxford.

Harhoff, D. (1999) 'Firm formation and regional spillovers – evidence from Germany', *Economics of Innovation and New Technology*, Vol. 8, No. 1, pp.27–55.

Hart, M. and Gudgin, G. (1994) 'Spatial variations in new firm formation in the Republic of Ireland, 1980–1990', *Regional Studies*, Vol. 28, No. 4, pp.367–380.

Hiebert, D. (2002) 'The spatial limits to entrepreneurship: immigrant entrepreneurs in Canada', *Tijdschrift voor Economische en Sociale Geografie,* Vol. 92, No. 2, pp.173–190.

Holtz-Eakin, D. Penrod, J.R. and Rosen, H.S. (1996) 'Heath insurance and the supply of entrepreneurs', *Journal of Public Economies*, Vol. 62, Nos. 1–2, pp.209–235.

Human Resources Development Canada (2002) *Results from the Survey of Self-Employment in Canada*, Industry Canada, Ottawa.

Industry Canada (2003) *Small and Medium Sized Enterprise Financing in Canada*, Industry Canada, Ottawa, Canada.

Industry Canada (2006) *Canadian Business Patterns*, Electronic Database, Industry Canada, Ottawa.

Keeble, D. and Walker, S. (1994) 'New firms, small firms and dead firms: spatial patterns and determinants in the United Kingdom', *Regional Studies*, Vol. 28, No. 4, pp.411–427.

Kenney, M and Patton, D. (2005) 'Entrepreneurial geographies: support networks in three high-technology industries', *Economic Geography*, Vol. 81, No. 2, pp.201–228.

Kim, P.H., Aldrich, H.E. and Keister, L.A. (2006) 'Access (not) denied: the impact of financial, human and cultural capital on entrepreneurial entry in the united states', *Small Business Economics*, Vol. 27, No. 1, pp.5–22.

Krichhoff, B.A., Newbert, S.L., Hasan, I. and Armington, C. (2007) 'The influence of university R&D expenditures in new business formations and employment growth', *Entrepreneurship Theory and Practice*, Vol. 31, No. 4, pp.543–559.

Lafuente, E., Valliant, Y. and Rialp, J. (2007) 'Regional differences in the influence of role models: comparing the entrepreneurial process of rural Catalonia', *Regional Studies*, Vol. 41, No. 6, pp.779–795.

Langford, C.H., Wood, J.R. and Ross, T. (2003) 'Origins and structure of the Calgary wireless cluster', in Wolfe, D.A (Ed.): *Clusters Old and New: The Transition to a Knowledge Economy in Canada's Regions*, pp.161–186, McGill-Queen's University Press, Montreal and Kingston.

Lee, S.M. and Peterson, S. (2000) 'Culture, entrepreneurial orientation, and global competitiveness', *Journal of World Business*, Vol. 35, No. 4, pp.401–416.

Lee, S.Y., Florida, R. and Acs, Z.J. (2004) 'Creativity and entrepreneurship: a regional analysis of new firm formation', *Regional Studies*, Vol. 36, No. 8, pp.879–891.

Ley, D. (2003) 'Seeking homo economicus: the Canadian state and the strange story of the business immigration program', *Annals of the Association of American Geographers*, Vol. 93, No. 2, pp.426–441.

Ley, D. (2010) *Milonaire Migrants: Trans-Pacific Life Lines*, John Wiley & Sons, Chichester.

Love, J.H. (1995) 'The measurements of entry rates: reconsideration and resolution', *Emperica*, Vol. 22, No. 2, pp.151–157.

Lucas, M., Sands, A. and. Wolfe, D.A. (2009) 'Regional clusters in a global industry: ICT clusters in Canada', *European Planning Studies*, Vol. 17, No. 2, pp.189–209.

Lundström, A. and Stevenson, L.A. (2005) *Entrepreneurship Policy: Theory and Practice*, Springer, New York.

Malecki, E.J. (1997) 'Entrepreneurs, networks, and economic development: a review of recent research', in Katz, J. (Ed.): *Advances in Entrepreneurship, Firm Emergence, and Growth*, Vol. 3, pp.57–118, JAI Press, Greenwich, CT.

Malecki, E.J. (2009) 'Geographical environments for entrepreneurship', *International Journal of Entrepreneurship and Small Business*, Vol. 7, No. 2, pp.175–190.

Mallet, J.G. (2004) 'Silicon Valley North: the formation of the Ottawa innovation cluster', in Shavinina, L.V. (Ed.): *Silicon Valley North: A High-Tech Cluster of Innovation and Entrepreneurship*, pp.21–32, Elsevier, Amsterdam.

Mallet, T. and Wong, Q. (2010) *Communities in Boom: Canada's Top Entrepreneurial Cities*, Canadian Federation of Independent Businesses, Toronto, Canada.

Mason, C.M., Cooper, S. and Harrison, R.T. (2002) 'The role of venture capital in the development of high technology clusters: the case of Ottawa', in Oakey, W.D and Kauser, S. (Eds.): *New Technology-Based Firms in the New Millennium*, Vol. 2, pp.261–278, Pergamon, Oxford.

Mueller, P. (2006) 'Entrepreneurship in the region: breeding ground for nascent entrepreneurs?', *Small Business Economics*, Vol. 27, No. 1, pp.41–58.

Naudé, W., Gries, T., Wood, E. and Meintjies, A. (2008) 'Regional determinates of entrepreneurial startups in a developing country', *Entrepreneurship and Regional Development*, Vol. 20, No. 1, pp.111–124.

Osoba, B.J. (2009) 'Culture and entrepreneurial activity in the United States: a quantitative analysis', *Innovation: The European Journal of Social Science Research*, Vol. 22, No. 3, pp.341–370.

Owen-Smith, J. and Powell, W. (2004) 'Knowledge networks as channels and conduits: the effects of spillovers in the Boston biotechnology community', *Organization Science*, Vol. 15, No. 1, pp.5–21.

Reynolds, P. (1994) 'Autonomous firm dynamics and economic growth in the United States, 1986–1990', *Regional Studies*, Vol. 28, No. 4, pp.429–442.

Reynolds, P., Miller, B. and Maki, W.R. (1995) 'Explaining regional variation in business births and deaths: U.S. 1976–88', *Small Business Economics*, Vol. 7, No. 5, pp.389–407.

Riding, A. (1998) 'Financing entrepreneurial firms: legal and regulatory issues', Research paper: Task Force on the Future of the Canadian Financial Services Sector, Ottawa.

Robb, A. and Robinson, D.T. (2008) 'The capital structure decisions of new firms: second in a series of reports using data from the Kauffman firm survey', *SSRN eLibrary*, available at http://ssrn.com/paper=1292552 (accessed on 5 July 2011).

Rocha, H.O. and Sternberg, R. (2005) 'Entrepreneurship: the role of clusters theoretical perspectives and empirical evidence from Germany', *Small Business Economics*, Vol. 24, No. 3, pp.267–292.

Rotefoss, B. and Kolvereid, L. (2005) 'Aspiring, nascent and fledgling entrepreneurs: an investigation of the business start-up process', *Entrepreneurship and Regional Development*, Vol. 17, No. 2, pp.109–127.

Sanders, J.M. and Nee, V. (1996) 'Immigrant self-employment: the family as social capital and the value of human capital', *Annual Sociological Review*, Vol. 61, No. 2 pp.231–249.

Saxenian, A. (1994) *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*, Harvard University Press, Cambridge, Mass.

Shane, S. (2003) *A General Theory of Entrepreneurship*, Edward Elgar Publishing, Cheltenham, UK.

Shane, S. and Venkatraman, S. (2000) 'The promise of entrepreneurship as a field of research', *Academy of Management Review*, Vol. 25, No. 1, pp.217–226.

Statistics Canada (2005) 'Definitions and concepts used in the business register', Ottawa, Canada, available at ivt.crepuq.qc.ca/industries/documentation/brengl3.pdf.

Statistics Canada (2006a) 'Census of Canada', (computer file), Ottawa, Canada.

Statistics Canada (2006b) 'Census of Canada', Topic Based Tabulation 97-559-xcb2006009 (computer file), Ottawa, Canada.

Steier, L. and Greenwood, R. (2000) 'Entrepreneurship and the evolution of angel financing networks', *Organization Studies*, Vol. 21, No. 1, pp.163–192.

Sutaria, V. and Hicks, D.A. (2004) 'New firm formation: dynamics and determinates', *The Annals of Regional Science*, Vol. 38, No. 2, pp.241–262.

Tamasy, C. (2010) 'Nascent entrepreneurs and the regional context', *International Journal of Entrepreneurship and Small Business*, Vol. 10, No. 2, pp.205–223.

Tamasy, C. and le Heron, R. (2008) 'The geography of firm formation in New Zealand', *Tijdschrift voor Economische en Sociale Geografie*, Vol. 99, No. 1, pp.37–52.

Thorton, P.H. and Flynn, K.H. (2003) 'Entrepreneurship, networks, and geographies', in Acs, Z. and Audretsch, D. (Eds.): *Handbook of Entrepreneurship Research: An Interdisciplinary Survey and Introduction*, pp.401–433,Springer, Berlin.

Tiebout, C.M. (1956) 'A pure theory of local expenditures', *Journal of Political Economy*, Vol. 64, No. 5, p.416.

van Oort, F.G. and Atzema, O.A.L.C. (2004) 'On the conceptualization of agglomeration economies: the case of new firm formation in the Dutch ITC sector', *The Annals of Regional Science*, Vol. 38, No. 2, pp.263–290.

van Soest, D.P., Gerking, S. and van Oort, F.G. (2006) 'Spatial impacts of agglomeration externalities', *Journal of Regional Science*, Vol. 46, No. 5, pp.881–899.

Westlund, H. and Bolton, R. (2003) 'Local social capital and entrepreneurship', *Small Business Economics*, Vol. 21, No. 1, pp.77–113.

Whittington, R.C. (1984) 'Regional bias in new firm formation in the UK', *Regional Studies*, Vol. 16, No. 3, pp.253–256.

Young, N. (2010) 'Globalization from the edge: a framework for understanding how small and medium-sized firms in the periphery 'go global'', *Environment and Planning A*, Vol. 42, No. 4, pp.838–855.

Notes

1 Because of policy changes, the 2011 census did not include questions on self-employment or labour force status, further reducing our knowledge of Canada's entrepreneurial economy.

2 The data reflect 2009 tax rates. The tax rates have been fairly stable over the past five years and do not significantly differ from the 2006 rates. Unfortunately, the data are only collected for the top 100 CMAs, and due to changes in census boundaries, only 95 CMAs are covered. The majority of the CMAs excluded have populations less than 25,000.