Entrepreneurship and the Spatial Context: Evidence on the Location of Continuing Entrepreneurial Activity in Scotland.

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Declaration

I declare that the work presented in this thesis was conducted by myself, unless otherwise stated.

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I take this opportunity to thank my supervisors.

I also express thanks to the local authority representatives' who contributed to the qualitative phase of the research.

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Abstract

Small growing firms are widely recognised to be a key determinant of economic growth, regional prosperity and sustainable development. This thesis investigates the role of continuing entrepreneurial activity, defined by the annual rate of new VAT registered businesses within Scotland in an attempt to identify the key determinants that underpin its development and hence the contribution of small growing firms to the Scottish economy.

A review of the theoretical and empirical literature reveals that the role of continuing entrepreneurship within Scotland is imperfectly understood, particularly at sub-regional level, and the empirical analysis undertaken in this thesis represents a step towards greater understanding in this area.

The role of the regional environment is investigated by testing a number of hypotheses reflecting the local socio-economic characteristics of a region and the extent to which these factors are able to explain variation in rates of continuing entrepreneurial activity. Panel data models are constructed for 32 regions over a 10 year period from which a variety of hypotheses are tested and conclusions drawn.

On the basis of the quantitative results and supporting qualitative interviews the research findings show that differences in rates of continuing entrepreneurial activity can most significantly be explained by population growth an indicator of local demand conditions and by the number of existing small businesses an indicator of attitudes and culture towards entrepreneurship. Human capital, access to finance and the presence of urbanisation economies were also found to significantly explain rates of continuing entrepreneurship across Scottish regions.

On the basis of the results reported in this study, enterprise policy should attempt to address the entrepreneurial deficit that exists between regions and be focussed on the creation of a positive culture towards entrepreneurship in Scotland. This should involve the continued development of institutions and levers that are capable of providing an environment which encourages and actively supports an entrepreneurial culture in order to promote economic growth, job creation and higher levels of investment.

Contents

List of Tables

List of Figures

1. Introduction

1.1 Introduction and Background

As long as entrepreneurship continues to make a contribution towards economic growth there is a continued need to understand the causes and environments that enhance entrepreneurial activity, especially given that levels of economic growth and future prosperity in both regions and countries appear to be increasingly related to levels of entrepreneurship. This is particularly the case in Scotland where despite distinct differences in rates of entrepreneurial activity between regions few studies have explicitly addressed empirical determinants of entrepreneurship or attempted to explain why some Scottish regions have higher (lower) rates of entrepreneurial activity than others. Therefore, the focus of this research is to identify a set of predictors which can help explain regional variation in rates of entrepreneurial activity in Scotland.

Future prosperity is driven by economic growth and the extent of this growth is largely determined by the level of entrepreneurship that exists within a society. Indeed, following publication of the Bolton Report (1971) and the work of Birch (1981) which drew attention to the impacts that small firms play in job creation, entrepreneurship has become a key feature of modern market economies (OECD, 2008a). Therefore, it is not surprising that a number of studies have identified links between economic growth and corresponding levels of entrepreneurship (Audretsch and Keilbach, 2004a; Lee *et al.*, 2004; Valliere and Peterson, 2009). Wennekers and Thurik (1999, p51) argue "[e]ntrepreneurship matters. In modern open economies it is more important for economic growth than it has ever been". Indeed, following the seminal work of Birch (1981, p8) who stated "whatever else they are doing, large firms are no longer the major provider of new jobs for Americans" entrepreneurship has been recognised as a key determinant of economic growth and placed high on the agenda of both national and regional authorities throughout the world. The US Department of Commerce (2007, p3) state "entrepreneurs are the engine for

America's economic growth, and innovation [is] the fuel for that engine." The US Department of Commerce (2007, p7) further substantiate the work of Birch (1981) reporting that "small businesses provide approximately 75% of the net jobs added to the American economy, and represent over 99% of all our employers. The growth in our economy is in very large part due to entrepreneurs-that's where the job growth is coming from...it's not from big companies". The UK Department for Business, Innovation and Skills (2010, p1) claim small businesses "create jobs, stimulate innovation and provide a competitive spur to existing businesses". Scottish Enterprise (2008) highlight that there are positive links between high levels of entrepreneurship and more rapid levels of growth, while the OECD (2009, p5) report "entrepreneurs play a significant role in all economies and are key agents of employment, innovation and growth". As a result of these actual and perceived impacts, governments throughout the world have sought to use entrepreneurship as a tool to address the problems of uneven regional development. The creation of an entrepreneurial spirit can stimulate competitiveness and thus create dynamic national, regional and provincial economies. Crucially, therefore, while entrepreneurship continues to make a contribution towards economic growth, job creation and innovation, there is a continued need to understand theoretically, empirically and from a policy perspective the causes and environments that enhance entrepreneurial activity given that levels of economic growth and future prosperity in both regions and countries appear to be increasingly related to levels of entrepreneurship.

Past studies assessing the importance of entrepreneurship have tended to concentrate on employment, innovation and growth effects. In relation to employment empirical studies have generally found that smaller entrepreneurial firms grow faster and generate higher levels of employment than older larger firms (Botham and Graves, 2011). Moreover, countries with higher rates of entrepreneurship have tended to show greater decreases in unemployment rates (Audretsch, 2002) and recent studies at the regional level have identified that higher start-up rates lead to higher employment creation directly and indirectly in the long run (Acs and Mueller, 2008; Fritsch and Mueller, 2007; Baptista *et al.,* 2007; Van Stel and Suddle, 2008). Furthermore, empirical studies suggest small entrepreneurial firms provide a positive contribution to economic growth in terms of value added, whereas firm size relates

negatively to value added growth (Brouwer *et al.*, 2005; Rodriguez *et al.*, 2003; Robbins *et al.*, 2000; Carree, 2002; Carreee and Thurik, 2008) which might explain why small firms have become increasingly dominant in economic activity and why a shift towards small firms has led to higher levels of growth (Carree, 2002). Finally, although the contribution of small firms to innovation is less evident than the effects associated with employment and economic growth there is reason to suggest new and small firms stimulate technological progress and drive economic development (Love and Ashcroft, 1999; Yang and Huang, 2005; Van Praag and Versloot, 2007). Therefore, entrepreneurship can foster a spirit of innovation and competition when firms enter a market with a new product or service. If these firms are more efficient, than existing firms, then productivity will increase and existing firms will be compelled to innovate or imitate new firm's practices or face becoming uncompetitive and ultimately replaced.

Therefore, starting and growing businesses is critical to innovation and growth in modern economies (Audretsch *et al*., 2010) and while high rates of entrepreneurship are not an absolute necessity for economic development increasing attention is being given to the impacts and important role that entrepreneurship can play in economic development (Wennekers and Thurik, 1999; Audretsch and Keilbach, 2004a; Lee *et al.*, 2004; Valliere and Peterson, 2009; Audretsch *et al.*, 2010; Brown and Mason, 2012). As Reid (1992, p2) highlights "we are interested in enterprise… because it makes us better off, in that it fosters an accumulation of wealth…[and] enterprise is a characteristic of a growing economy". Indeed, Reynolds *et al.* (1994, p455) states "a region or a country without a vigorous entrepreneurial sector is unlikely to have a promising future… [and] given the evidence that is accumulating, it would take a great deal of courage for any government to ignore the need for a healthy level of entrepreneurship". Therefore, while entrepreneurship continues to make a contribution towards economic growth there is a continued need to understand the environments that enhance entrepreneurial activity.

That said, while entrepreneurship is widely accepted to be an important driver of both economic growth and development, empirical studies strongly suggest that rates of entrepreneurial activity differ significantly between regions and within countries (Reynolds *et al.*, 1994; Keeble and Walker, 1994; Audretsch and Fritsch, 1994; Kangasharju, 2000; Armington and Acs, 2002; Tamasy and Le Heron, 2008; Naude

et al., 2008; Audretsch *et al.*, 2010; Cheng and Li, 2011; Ross *et al*., 2012). That means rates of entrepreneurship are not uniform across countries or regions, yet given the important role entrepreneurship plays in economic growth, job creation and innovation it is extremely important from a policy perspective to understand why certain regions are more entrepreneurial than others given that levels of economic growth and future prosperity in both regions and countries appear to be increasingly related to levels of entrepreneurship. Therefore, spatial research into determinants of entrepreneurial activity is required in each country.

This is particularly the case in Scotland where despite distinct differences in rates of entrepreneurship between regions within Scotland (Scottish Enterprise, 2008) and given that the Scottish Government is responsible for economic development and regeneration, it is somewhat surprising that there has been a distinct lack of empirical research addressing spatial determinants of entrepreneurial activity in Scotland, given that small enterprises account for 99% of all enterprises and 53% of employment (Scottish Corporate Sector Statistics, 2012). Indeed, the aforementioned empirical links between entrepreneurship and economic growth may also help explain why the Scottish economy has underperformed relative to both the UK and smaller benchmark countries including Ireland and Norway. Over a 30 year period Scotland's annual average growth rate in GDP was 1.8%, significantly below the UK average of 2.3%, while growth in Ireland has been three times as high and twice as high in Norway (Scottish Government Economic Strategy, 2007). Moreover, recent data shows rates of entrepreneurial activity in Scotland have only been 80% of the UK level and 55% and 60% of those experienced in Ireland and Norway (Levie, 2009). Indeed, the Scottish First Minister states "a low growth economy is a concern… [i]t affects our job opportunities, our incomes and the aspirations of our young people" (Scottish Government Economic Strategy, 2007, p5). Therefore, as a consequence of the role entrepreneurship plays in economic growth, job creation and investment entrepreneurship can have a much wider impact on the social fabric that underpins a society and, therefore, polices to promote and encourage dynamic innovative driven regions are crucial for future prosperity and sustainable development in Scotland.

Furthermore, the small number of studies which do implicitly address spatial aspects of entrepreneurship in Scotland are limited, given that they tend to regard Scotland as

a region or self-administering nation region within the UK, thereby ignoring sub-regional differences and detailed analysis of the entrepreneurs local environment and, therefore, fail to appreciate that most entrepreneurs are embedded within their local communities (Sorensen and Audia, 2000).

Secondly, and most importantly in the case of this study previous research has focussed attention almost entirely on those factors that determine start-up activity or what in many cases is referred to as new firm formation. None have sought to address or understand locational determinants of small growing firms or what can be referred to as continuing entrepreneurship, which is rather surprising given the positive impact that growing businesses (Botham and Graves, 2011) are likely to have on economic development and the emphasis that is now being placed on growing small firms by governments and enterprise agencies. Indeed, NESTA (2009) highlighted that while young firms are more likely to be growth orientated, the majority of growth firms (70 per cent) are at least five years old. Furthermore, a detailed examination by NESTA of almost a quarter of a million UK start-ups founded in 1998 shows that the majority don't survive ten years (62 per cent), and of those that do, most remain small. Only 10 per cent of surviving businesses had more than ten employees ten years later and fewer than 5 per cent had more than 20 employees. The implication being that simply encouraging start-ups or new firm formation is unlikely to lead to dramatic growth if they fail to expand. This is a simple yet important observation implying regions that are not conducive to small growing businesses run a greater risk of lower economic growth, employment, and regional competitiveness. Therefore, the 'dilemma' that is faced by both politicians and policy makers is to better understand why regions with similar characteristics and size vary so significantly in terms of continuing entrepreneurial activity.

What is more, the embedded nature of the entrepreneur makes the region rather than nation the most appropriate unit of analysis for understanding differences in rates of entrepreneurial activity. Therefore, given that most entrepreneurs tend to undertake entrepreneurial activity in the places they were born, live or have worked (Boswell, 1973; Haug, 1995; Dahl and Sorensen, 2009) and this is where "his first customers usually are; this is where most of the members of his private network live and this is where, in most cases, he was previously in dependent employment" (Sternberg, 2009, p10) this study specifically argues that differences in regional rates of

entrepreneurial activity are a reflection of region-specific characteristics and, therefore, entrepreneurial activity in the form of small growing firms is predominately a regional event, whereby rates of entrepreneurship or the propensity to grow a business are not only a reflection of individual preferences, but that those decisions are also shaped and influenced by region-specific factors. Therefore, the focus of this study is to develop for the first time a new robust framework which can explain variation in regional rates of continuing entrepreneurial activity in Scotland.

1.2 Research Aim and Objectives

The principal aim and contribution of this research study is to investigate and identify locational determinants of continuing entrepreneurial activity, as defined in section 1.3 across local authority regions in Scotland given the importance placed on entrepreneurship and especially small growing firms as a driver of economic growth. The study specifically argues that differences in regional rates of continuing entrepreneurial activity are a reflection of region-specific characteristics and, therefore, entrepreneurial activity is largely a regional event, whereby rates of entrepreneurship or the propensity for firms to grow are not only a reflection of individual preferences, but that those decisions are also shaped and influenced by region-specific factors.

The role of the local environment is investigated by testing a number of hypotheses reflecting the local socio-economic characteristics of a region and the extent to which socio-economic region-specific factors are able to explain variation in rates of continuing entrepreneurial activity in Scotland. In doing so the research study is able, for the first time, to provide a more advanced understanding about the causes of munificent and sparse environments for continuing entrepreneurship and contribute to the limited body of existing knowledge addressing spatial aspects of entrepreneurship more generally within Scotland.

It is hoped the research findings will be able to provide guidance for government, local authorities and other associate organisations involved in the design and implementation of enterprise policy and services at the local level, as part of an

attempt to foster an environment that is conducive and more attuned to growing small businesses in Scotland.

1.3 Definition of Entrepreneurial Activity Used in this Study

It is necessary to recognise that, while widely accepted that entrepreneurship is a vital driver of economic growth given its contribution to job creation, innovation and productivity, there is little or no consensus as to what constitutes entrepreneurship (Audretsch, 2002; Sutaria, 2001). Peneder (2009) suggests the difficulty in precisely defining entrepreneurship is a result of the weight of the functions for which it is held responsible and that a given definition of entrepreneurship will always be dependent upon the particular scholarly perspective or emphasis on which it is being examined at any given time. Similarly, in this study we are concerned with a sub-set of the overall entrepreneurial population. In particular we are interested in regional factors that determine the location of small growing firms or what may also be referred to as continuing entrepreneurship. That is, we are concerned not with the broad concept of start-up entrepreneurship, but with a narrow sub-set of existing small businesses demonstrating signs of small firm growth.

Therefore, the definition of entrepreneurial activity adopted in this study is the annual rate of firms transitioning to VAT registered status, with these firms acting as a proxy measure of continuing entrepreneurial activity and small business growth. With over 2 million listed businesses VAT registration data represents nearly 99% of UK economic activity (Office of National Statistics, 2011). As discussed further in Section 3.5.1 VAT registration data is not without its limitations, yet remains the most comprehensive measure of continuing entrepreneurial activity available in the UK and is officially recognised as a measure of entrepreneurial activity by the Scottish Government and local authorities. The main advantages of using VAT data as the measure of continuing entrepreneurial activity in this study is that the data is collected regularly, is spatially disaggregated and can provide comparative and contextual data for a reliable and generalizable statistical comparison of differences in regional rates of entrepreneurial activity in Scotland.

1.4 Research Design

A sequential mixed method explanatory design is employed to examine locational determinants of continuing entrepreneurial activity across all 32 local authority regions in Scotland. In the first (quantitative) phase of the study, a series of econometric models are tested based on the theoretical framework developed in Chapter 2 to identify any statistical relationships between socio-economic region-specific factors and their impact on regional rates of continuing entrepreneurial activity. A subset of statistically significant variables was then identified for further exploration using qualitative methods. The second (qualitative) phase of the study explored and sought to validate the explanatory factors perceived to underlie these variables with at least one person of authority from each local authority in Scotland. This was achieved through 39 semi-structured interviews carried out with a sample of local authority representatives from each of Scotland's 32 local authorities. Findings from the quantitative and qualitative phases of the study were then synthesised to provide a comparative and more comprehensive understanding of locational determinants of continuing entrepreneurial activity in Scotland.

Combining both quantitative and qualitative methods allowed the researcher to test the validity of the theoretical framework and follow-up the significant statistical findings in order to gain a more advanced understanding about the influence of those variables in the context of Scottish continuing entrepreneurship, which is not possible from the quantitative analysis alone or existing empirical literature related to entrepreneurial activity in Scotland.

1.5 Structure of Thesis

Chapter 2 is a review of the literature. Given that the definition of entrepreneurial activity adopted in this study is the transition of a firm to VAT registered status and is, therefore, a proxy measure of continued and growing small businesses the review concentrates on the two major schools of thought that address entrepreneurial activity. This involves reviewing the Entrepreneurship School which addresses the individual traits, role and functions of the entrepreneur and the Regional Economics School which is able to provide a spatial context for addressing regional patterns of entrepreneurial activity. The overview of theory is followed by a review of empirical studies addressing determinants of entrepreneurship. Finally, we introduce a new robust model of locational determinants of continuing entrepreneurial activity than has until now been developed thus far in the theoretical and empirical literature.

Chapter 3 is the methodology chapter and describes the research approach and methods used. The chapter provides a detailed overview of the sequential mixed methods design employed. This is followed by a comprehensive overview of the data and variables used to empirically test the research hypotheses and model regional variation in continuing entrepreneurial activity in Scotland.

Chapter 4 is a statistical analysis of regional determinants of continuing entrepreneurial activity in Scotland. Regional rates of entrepreneurial activity are mapped based on VAT registration data. This is followed by the empirical results and diagnostic tests of the quantitative analysis and research hypotheses outlined in Chapter 2. The quantitative results reported in this chapter are used to inform the follow-up qualitative interviews in Chapter 5.

Chapter 5 presents the results from the semi-structured qualitative interviews. The purpose of the interviews is to inform and strengthen the initial quantitative analysis in Chapter 4 by asking local authority respondents to comment on those variables identified as significant by the econometric modelling. The qualitative interviews enhance the validity and robustness of the research findings by providing a more

detailed understanding relating to spatial aspects of continuing entrepreneurial activity in Scotland.

Chapter 6 is a discussion and interpretation of the research results. The quantitative and qualitative results are discussed in the context of the theoretical and empirical literature outlined in Chapter 2, as a precursor to the policy recommendations and conclusions in Chapter 7.

Chapter 7 provides the conclusion and policy recommendations based on the findings reported in the study. Limitations and recommendations for future research are also outlined.

2. Literature Review (Theoretical Background)

2.1 Introduction

The aim of this chapter is to review the theoretical literature addressing entrepreneurial activity and to provide the theoretical basis of the model developed in Section 2.6 to explain patterns of continuing entrepreneurial activity in Scotland.

As will be discussed and highlighted throughout this chapter there is an increasing awareness that entrepreneurial activity is not solely contingent on individual people, but takes place among a wide range of environmental and contextual factors, which make spatial proximity and the region increasingly important.

Given that the definition of entrepreneurial activity adopted in this study is the transition of a firm to VAT registered status and is, therefore, a proxy measure of continued and growing small businesses, the review concentrates on the two major schools of thought that address entrepreneurial activity: The Entrepreneurship School and the Regional Economics School.

By reviewing the Entrepreneurship School (Section 2.2), which addresses the individual traits, role and functions of the entrepreneur, we are able to contextualise and highlight the importance of the entrepreneur to the function of market economies. However, while theories within the Entrepreneurship School place our study of entrepreneurship in context in terms of outlining the importance of the entrepreneur to the economy, these theories are revealed to be too abstract in order to explain spatial dimensions of entrepreneurial activity, given, that the focus of the Entrepreneurship School is on the individual entrepreneur, as the main unit of analysis. Therefore, by revealing the limitations of entrepreneurship theories in terms of addressing spatial issues we then turn our attention to the necessary inclusion of

spatially orientated theories, such as those offered by the Regional Economics School.

The review of theories from the Regional Economics School in Section 2.3, moves our study from the important, but broad and abstract context of what entrepreneurship is and the important functions that entrepreneurs perform in the economy, towards spatially orientated theories, which unlike the Entrepreneurship School are able to provide a locational context and thus offer an explanation for regional differences in levels of economic activity. The Regional Economics School is particularly relevant because it uses the region rather than the individual as the main unit of analysis, placing greater influence on patterns of economic activity and the environmental factors that influence those patterns.

Nevertheless, while our review of both the theoretical and empirical literature provides a locational context we show that the vast majority of studies addressing the location of entrepreneurial activity have focused on the locational determinants of new firms (see section 2.4) or the location of existing industry. In other words we clearly highlight that both the theoretical and empirical literature have mainly failed to address locational determinants of continuing entrepreneurial activity and/or what may also be referred to as small growing firms.

Finally, in Section 2.6 of this chapter we are able to introduce a new robust model of locational determinants of continuing entrepreneurial activity than has been developed thus far in the theoretical and empirical literature, which is important given the increasing emphasis that is now being placed on growing small firms by government and enterprise agencies.

2.2 The Entrepreneurship School

The following sections provide an overview of the theories that form the basis of the Entrepreneurship School. These theories are important because they form the starting point for the study in terms of where the study of entrepreneurship emanates from and its historical context and thus provide a review of the key theoretical developments in the study of entrepreneurship.

Within the Entrepreneurship School the study of entrepreneurial activity has traditionally addressed the individual characteristics, role and function of the entrepreneur, and therefore, the characteristics that distinguish the entrepreneur from a non-entrepreneur. However, despite the wide range of theories that have been used to study the entrepreneur including neo-classical economics, market dynamics, socio-economic influences and non-economic perspectives the Entrepreneurship School fails to explain spatial aspects and therefore, the location of entrepreneurial activity.

However, theories from the Entrepreneurship School are relevant to this study because they allow the author to provide an initial context for the study by explaining and highlighting the different roles and functions that have been 'assigned' in economic theory to the entrepreneur.

Therefore, while it is important to realise the importance of the Entrepreneurship School as a necessary starting point for the study of entrepreneurship in this study, we must also acknowledge that we are not testing these theories of entrepreneurship, given their abstract nature about who and what entrepreneurship is, but rather our study will be moving towards a framework and hypotheses (developed in section 2.6) that can explain regional differences in rates of entrepreneurial activity, which means that our own theoretical model will be more deeply rooted in theories and empirical literature originating from the Regional Economics School (reviewed in section 2.3 and 2.4), as they are able to provide a locational context for addressing uneven patterns of economic activity.

2.2.1 Entrepreneurship in Neoclassical Economics

The term 'entrepreneur' meaning to 'undertake' is attributed to the French writer Richard Cantillon (1755); the first writer to give economic meaning to the concept of entrepreneurship. Cantillon viewed the entrepreneur as someone who was prepared to bear risk and operate in uncertain environments. The entrepreneur was someone who bought at a certain price and sold at an uncertain price, with the balance being the profit or loss. In an uncertain environment the entrepreneur is constantly required to exercise his/her business judgement, making decisions about obtaining and co-

ordinating resources while constantly assuming the risk of enterprise. Yet Cantillon's weakness is that in a hierarchical economic system, he excludes certain economic agents from uncertainty, however, it is not possible that the owner of any means of production can remain untouched from uncertainty (Hebert and Link, 1989). It is apparent therefore, that Cantillon's notion of entrepreneurship is restrictive and narrow and needs to be widened.

Yet before doing this we should acknowledge the contribution of Adam Smith, who is generally recognised as the founding father of modern economics. As Reid (1989) highlights, although Smith did not recognise entrepreneurship in his analysis of the division of labour it is possible to do so by natural extension of his work. For example, Smith placed emphasis on entrepreneurship by recognizing it as an important component of real markets. In his writings Smith attached importance to the formation and growth of new firms and industries, to the owners or managers who bear the risk of combining assets and labour into new products, and to the introduction of new production techniques. According to Smith, these dynamic forces shape a capitalist system and determine its income and growth distribution. Smith saw the individual entrepreneur-business owner or manager-as an agent of change in the market place that is characterized by perfect equilibrium between supply and demand, perfect competition and the division of labour (Kirchhoff, 1994).

Marshall (1890) reintroduced the entrepreneur, although he did not assign the entrepreneur a dominant role. According to Loasby (1982, p235) Marshall analysed the running of a businesses as entrepreneurship, but in general did "not for the most part, distinguish between entrepreneurship and the normal running of a business, though he does recognise that some businessmen are much more enterprising than others". Rather, under a partial equilibrium approach, Marshall's focus was to explain how an economy develops over time, suggesting that when change takes place uncertainty is created in markets. Marshall's analysis, therefore, tries to explain equilibrium conditions in markets under the assumption of perfect information, perfect competition, the existence of homogenous goods and free entry and exit (Newman, 1960). For Marshall the entrepreneur drives production and distribution, coordinates the supply and demand of capital and labour and undertakes the risks associated with production. These entrepreneurial abilities are scarce making the supply of entrepreneurship expensive. Therefore, the entrepreneur is both the

manager and employer, with the entrepreneur continually seeking opportunities to minimize costs and make more efficient use of resources rendering them innovators and industry leaders.

Indeed, in his book *Industry and Trade* Marshall specifically acknowledges the importance of managerial capabilities and leadership qualities required by the heads of business whereby "he must have some of the chief qualities that are required of the commander of an army. He is not a 'captain' of industry; he is a 'general' in control of several regiments" (Marshall, 1919, p173). Therefore, although, Marshall does not give a dominant role to individual entrepreneurs but rather sees the firm as the central unit of analysis (Loasby, 1990), he does recognise that businessmen have different levels of abilities, whereby the vigour of the individual (entrepreneur) and the life cycle theory of a firm can be likened to trees in a forest, which have a cycle of birth, growth, decay and death, where "sooner or later age tells on them all… they gradually lose vitality; and one after another give place to others" and that this is likely to lead to and explain similar life cycle patterns for their firms (Marshall (1961, p316). Within the context of this study the most salient part of this lifecycle is the growth phase, which broadly mirrors continued entrepreneurship as firms expand beyond the start-up or birth period.

However, there remain important problems in Marshall's analysis that generate controversy in his model. Firstly, the manufacturer producing for the general market is supposed to be represented by a perfectly competitive firm whereby there is no new products or methods, however, Marshall (1920, p280) states that "a characteristic task of the modern manufacturer [is] that of creating new wants by showing people something which they had never thought of having before; but which they want to have as soon as the notion is suggested to them". However, Marshall is contradicting his own competitive market theory by suggesting that the creation of new products and technologies will lead to monopoly power and rents. Secondly, Marshall's entrepreneur is expected to anticipate the actions of his rivals, yet in a perfectly competitive market where the price is given for each firm there is no need for each firm to anticipate the actions of other firms since their production decisions do not affect the market price. Thirdly, in Marshall's treatment of economies of scale, scale economies are related to knowledge and change; whereby the law of increasing returns implies that an increase in inputs (L, K) improves the organisation

of production, thus increasing the efficiency of these inputs. Therefore, the advantage of large scale is that it leads to innovation, not only in technology, but also in products. If this is true then the accumulation of capital leads to concentration in the market and the existence of imperfect market competition. Of course, as already touched upon Marshall's way out of this problem as explained by Newman (1960, p590) is to say that "industry output can be constant through time, even though some firms are growing and being "born," and others declining and "dying," provided that the gains in output from the one cause are balanced by the losses in output from the other. Long-run equilibrium for Marshall meant the equality of long-run demand and supply; just that and no more". That said, in light of his acceptance of managerial capabilities in accordance with neo-classical theory Marshall does not fully distinguish between the entrepreneur and manager. Furthermore, as Reid and Jacobsen (1988) highlight although Marshall's analysis of the 'representative firm' is useful, it is not identifiable with any one small entrepreneurial firm.

Knight (1921) is the first economist to set out a specific function for the entrepreneur within neo-classical economics, addressing the weakness of the general equilibrium approach, based on the assumption of perfect information and replacing this with uncertainty. According to Knight, the entrepreneur's function is to assume the uncertainty created within the economic system and shield others from it, essentially acting as an insurance agent (Iversen *et al.*, 2008). Knight believes entrepreneurs are responsible for their own actions and are prepared to take risks in uncertain environments. Like Cantillon, Knight identified the function of the entrepreneur as a risk bearer, but unlike Cantillon, Knight makes a clear distinction between risk and uncertainty, whereby risks can be quantified and insured against whereas uncertainty cannot. Therefore, the Knightian entrepreneur contributes to the economic development of society by shouldering the responsibility of economic uncertainty and guaranteeing the factors of production by supplying their remuneration. The entrepreneur is rewarded by profit and the level of profit an entrepreneur makes is dependent upon their own ability, confidence and strategic decision making.

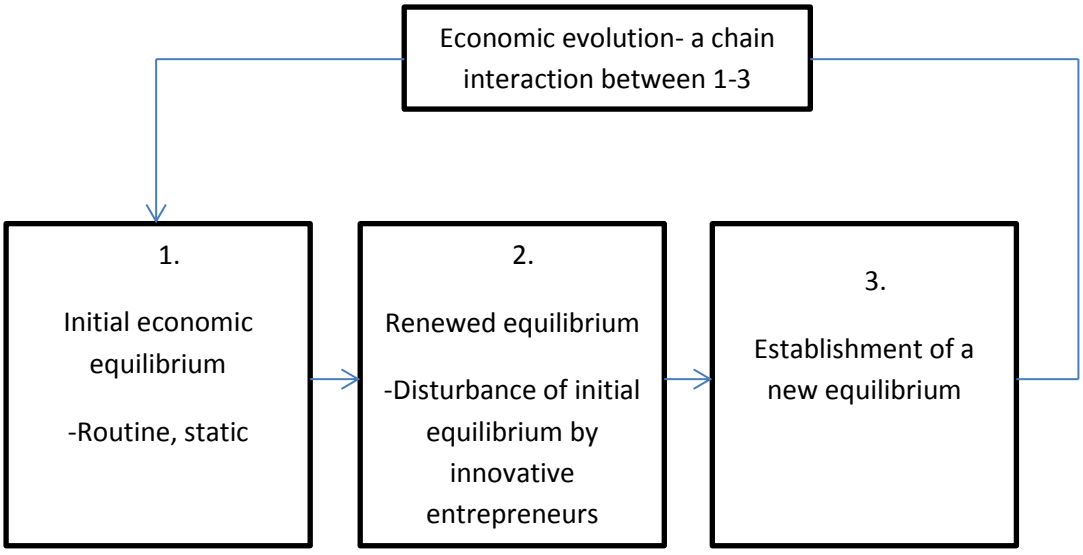
Therefore, it can be argued that with the introduction of neo-classical economics in the latter part of the nineteenth century the role of the entrepreneur became largely extinct, as a result of the assumptions of general equilibrium analysis leaving no room for entrepreneurship (Ripsas, 1998; Glancey and McQuaid, 2000; Casson,

2003). The "neo-classical model, with its production function, the logic of rational choice and perfect information; leaves no room for an active entrepreneur. This assumption reduces decision making to the mechanical application of mathematical rules for optimization. It trivializes decision making, and makes it impossible to analyse the role of entrepreneurs in taking decisions of a particular kind." (Casson, 2003, p9). As a result a neo-classical entrepreneur is nothing more than a co-ordinator and allocator of other factors of production.

2.2.2 Entrepreneurship and Market Dynamics

In contrast Schumpeter and Kirzner both identify a specific function for the entrepreneur when analysing the market operation of an economy albeit from very different perspectives. Schumpeter's (1934) model described in Figure 2.1 attempts to explain the process of economic development/evolution within the capitalist system. In Schumpeter's theory the entrepreneur disturbs the circular flow through the process of *creative destruction*, whereby the dynamic entrepreneur innovates and introduces new combinations in production (Reid, 1987). As Schumpeter (1934, p74) states "the carrying out of new combinations we call 'enterprise'; the individuals whose function it is to carry them out we call 'entrepreneurs'".

Figure 2.1 The Schumpeter Model



Uniquely Schumpeter, views change as endogenous; whereby economic development is a dynamic process driven from within the economic system. The starting point for this change is equilibrium, where all prices and technologies are known, allowing entrepreneurs to calculate the returns from any potential innovations. The entrepreneur (see Figure 2.1) through innovation disrupts existing incumbents in the market, causing disequilibrium, through the process of creative destruction, thus creating the opportunity for economic profit. Nevertheless, once levels of economic profit start to recede, the market will again return to equilibrium and a new wave of innovative activity and creative destruction will follow (Glancey and McQuaid, 2000). Therefore, Schumpeter views the cycle of innovation and creative destruction, as the basic underlying driving force in the capitalist economy.

By contrast the Austrian School associated with the work of Kirzner (1973, 1979, 1997) unlike Schumpeter views the entrepreneur as an equilibrating economic agent alert to profitable opportunities as a result of imperfect knowledge. More precisely, entrepreneurship requires differences to exist between people, of whom some have preferential access or ability to obtain information about opportunities (Shane, 2000). Therefore, unlike neo-classical economics Austrian economics rejects the idea of static equilibrium, impossible in an environment with imperfect information. Kirzner rejects the assumption that the economy is in equilibrium due to constantly occurring shocks in demand and supply conditions, although the entrepreneur is the most effective person to deal with these dynamic circumstances. As key agents of imperfect knowledge entrepreneurs "are better informed than anyone else-he knows where knowledge is to be obtained and how it can be usefully employed" (Kirzner, 1979, p8).

The mechanism through which the Kirznerian entrepreneur moves the market towards equilibrium is arbitrage, whereby the entrepreneur takes advantage of uncertainty in prices (price differentials) and imperfect information to create price convergence. For example, if we follow Littlechild and Owen's (1980) analysis letting $y_{ik}^{j}(t)$ denote the amount of good y that is bought in market i and sold in market k by entrepreneur j in time t and use a dot to represent the derivative with respect to time; assuming each entrepreneur takes the price as given and that the rate

at which good y is transferred from one submarket to another is proportional to the price discrepancy between submarkets(p_i, p_k) then we formally have:

$$\dot{y}_{ik}^{j}(t) = \sigma_j \, (p_i - p_k) \tag{2.1}$$

where σ_j is a speed adjustment coefficient. In 2.1 above the opportunity for arbitrage arises, as in disequilibrium some individuals are better informed than others about different prices in submarkets; while most don't exploit this knowledge "the daring alert entrepreneur discovers these earlier errors, buys when prices are too low and sells where prices are too high. In this way low prices are nudged higher, high prices are nudged lower; price discrepancies are narrowed in the equilibrative direction" (Kirzner, 1997, p70). Unlike Schumpeter, the Kirznerian entrepreneur is involved in a process of exchange and not of production, whereby the entrepreneur's superior knowledge leads to the opportunity for profit through price differentials and thus facilitating the market back towards equilibrium (Reid, 1987).

Therefore, while both Schumpeter and Kirzner demonstrate how entrepreneurs operate in dynamic markets, albeit from very different perspectives, their frameworks are dedicated to explaining growth at the national level with little recognition about the role of the entrepreneur in regional and local markets (Sternberg, 2009).

2.2.3 Socio-Economic Influences on Entrepreneurship

In this section we discuss the demand and supply for entrepreneurship within the context of the socio-economic environment. Casson (1982, 2003) attempts to synthesise elements from different theoretical approaches into a comprehensive theory of entrepreneurship. Operating within a static equilibrium model, assuming that entrepreneurs are rational profit maximisation agents, Casson is concerned with explaining the process of efficient resource allocation and identifies the entrepreneur as the key co-ordinator of these resources. Casson attributes these differences in economic success, not to differences in ownership, but to differences in the efficiency with which these resources are employed. According to Casson (2003,

p20) “an entrepreneur is someone who specialises in taking judgemental decisions about the coordination of scarce resources”.

Casson believes the best way for an entrepreneur to exploit market opportunities is to internalise market making activities by establishing a firm or acquiring control of an existing firm. Given that reward is dependent upon monopoly power Casson believes firms will try and protect knowledge by erecting barriers to entry by undertaking marketing and quality control procedures to prevent competition and profit erosion. However, within an equilibrium environment, this will lead to an inefficient allocation of resources and take the market longer to move closer to or reach equilibrium. Furthermore, as Reid and Jacobsen (1988, p17) highlight in “the long run these extra (monopoly) rewards will be entirely eliminated, and when this equilibrium state of the market is attained, the entrepreneur’s reward corresponds to what Casson (1982, p337) calls ‘compensation for time and effort spent identifying and making judgemental decisions’.”

Casson relates differences in economic performance directly to the quality and quantity of entrepreneurial supply, highlighting that resource use rather than ownership is most important, however, “[t]o undertake large projects, entrepreneurs need reputation, because they require access to resources they do not own-in particular other peoples funds.” (Casson and Wadeson, 2007, p288). Successful entrepreneurship is only sustainable, if it generates profits, which can be reinvested and reinforces reputation, however, an unsuccessful entrepreneur will lose both reputation and funds (Casson, 2005; Casson and Wadeson, 2007). To gain access to capital markets entrepreneurs must possess a proven track record, establishment connections or be born into a wealth bearing family who are in a position to provide capital and reputation most likely created through a family business. Therefore, a specialist in information analysis, entrepreneurs become owners and managers of firms in which others invest, however, the supply of potential entrepreneurs can change at any given time as a result of a change in the socio-economic environment or the entrepreneur’s socio-economic circumstances. The supply and demand for entrepreneurs will also depend upon the rate of change occurring within the economy. As the number of entrepreneurs increases the expected level of profit will also diminish and if the wage rate from employment is greater than the expected return from entrepreneurship, entrepreneurs will leave the market and seek

employment. The wage rate represents the opportunity cost of entrepreneurship, whereby the decision to become an entrepreneur is based on the expected utility derived from income and working conditions of employment vs. self-employment. For example, in Kihlstrom and Laffont's (1979) model of entrepreneurial choice all economic agents have the following production function: $Y = f(L, \varepsilon)$ where Y is output, L is labour and ε is a random variable. The decision to become an entrepreneur involves deciding whether to accept waged employment w or to opt for uncertain profit as an entrepreneur. If an individual decides to become an entrepreneur and hires the amount of L of labour at the wage rate w their entrepreneurial income will be:

$$f(L, \varepsilon) - wL. \tag{2.2}$$

Therefore, although, Casson highlights that entrepreneurs must possess foresight, and the ability to manage and delegate control over subordinates, unlike Schumpeter and Kirzner, Casson does not distinguish between managers who coordinate resources and those who innovate, although he does importantly recognise that the entrepreneur is influenced by their socio-economic environment, and that environment is subject to change and out-with the control of the entrepreneur. Casson also emphasises the importance of connections and role models, which are an important component of the theoretical framework developed in Section 2.6.

Further emphasising the socio-economic perspective Etzioni (1987) views entrepreneurship not as an individual attribute, but as part of a societal function, whereby the level of change entrepreneurship can generate within society is reflected by the extent to which it is accepted or legitimised within that society. Etzioni views entrepreneurship as an evolutionary process, whereby entrepreneurship soothes the transition process towards equilibrium and the more supportive a society is towards entrepreneurship the more frequent but less disruptive the process of entrepreneurship is. Therefore, as the empirical literature will show (section 2.4) Etzioni implies where a positive attitude towards entrepreneurship exists, it is much more likely to take place.

Schultz (1975) also recognises the wider societal implications of entrepreneurship, stressing the importance of human capital, but from an economic viewpoint. Schultz defines entrepreneurship as the ability to deal with disequilibria. Schultz's emphasis

is on the entrepreneur as an optimal resource allocator, helping the market move towards equilibrium, whereby the performance of the entrepreneur is a reflection of their ability, which in turn is reflected by their level of education or stock of human capital. Therefore, Schultz's argument is that the supply of entrepreneurship is a reflection upon a certain stock of human capital at one given point and resource allocation can be improved by raising educational standards amongst the general population. Schultz, therefore, is concerned with socio-economics, namely human capital and the effectiveness of the equilibrium approach in explaining economic performance and not with cultural factors like Etzioni. However, Schultz does not consider why disequilibria occurs, but only on increasing levels of human capital leading to economic progress.

Therefore, while the theories put forward by Casson, Etzioni and Schultz accept the operations of the entrepreneur are influenced by the wider socio-economic environment and raise a number of significant points including access to resources, institutions and levels of education, which are expanded upon throughout this thesis the aforementioned theories do not address in any detail how the socio-economic environment impacts the creation and development of entrepreneurial activity at the regional level.

2.2.4 Summary of the Entrepreneurship School

Having reviewed theories of entrepreneurship it is possible to observe the individual entrepreneur as the main unit of analysis. However, this is also the main limitation associated with the aforementioned theories, when attempting to explain locational determinants of entrepreneurial activity as is the case in this study. Unfortunately, theories of entrepreneurship only implicitly address spatial aspects of entrepreneurship, with the exception of the socio-economic theories reviewed in Section 2.2.3, which acknowledge the influence of wider environmental factors on entrepreneurial activity without applying it at a regional level. Rather the emphasis with theories of entrepreneurship has tended to concentrate on establishing what attributes distinguish an entrepreneur from a non-entrepreneur with little attempt to explain how those distinguishing attributes affect sub-regional levels of

entrepreneurial activity. This is not to say that individual supply-side characteristics highlighted by theories of entrepreneurship are not important, they are, and will inform important elements of the theoretical framework developed in section 2.6. However, there are a large number of other factors that vary spatially, which could influence an individual's propensity to start a business (Sternberg, 2009). Furthermore, an increasing amount of empirical literature (see section 2.4) demonstrates that national and regional data related to population, incomes, unemployment, education, the institutional environment and structure of industry can explain rates of entrepreneurship across space. Indeed, the lack of a detailed spatial aspect is a significant limiting factor of the theories of entrepreneurship reviewed and "is indicative of the fact that personal factors alone cannot explain the entrepreneurship event" (Sternberg, 2009, p14). Therefore, the limitation of entrepreneurship theories in terms of addressing spatial issues is one of the main arguments for the focus on spatially orientated theories in this thesis, such as those offered by the Regional Economics School in the following section.

2.3 The Regional Economics School

A review of entrepreneurship theories in Section 2.2 illustrated that theories of entrepreneurship are not sufficient for explaining regional variation in entrepreneurial activity and, therefore, it is necessary to review spatial theories from the Regional Economics School, which importantly provide a locational context for addressing patterns of entrepreneurial activity identified later in section (4.2). Unlike theories of entrepreneurship the Regional Economics School uses the region rather than the individual as the main unit of analysis, placing greater influence on patterns of economic activity and the environmental factors that influence those patterns (Sutaria, 2001). As will be discussed in the next chapter the implementation of the region, as the unit of analysis provides a locational context to explain regional differences in entrepreneurship that is not possible with theories of entrepreneurship.

The Regional Economics School draws on a range of regional development and location theories to explain regional inequalities incorporating elements of economic geography, regional science and economics. Therefore, this section provides a review

of the many different theories that offer an insight into spatial inequalities between regions including the work of Marshall (1890) to more recent on-going agglomeration and cluster developments including industrial districts, the literature associated with the New Economic Geography (Krugman, 1991a; Fujita *et al.*, 1999) and the industrial structure of developed nations developed by Porter (1990). Previous attempts to review the field include Harrison (1991), Markusen (1996), Martin (1999), Martin and Sunley (2003), Gordon and McCann (2000), Moulaert and Sekia (2003), Cortright (2006), Gupta and Subramanian (2008), Romero-Martinez and Montoro-Sanchez (2008) and Capello (2009).

Indeed, while theories of location and economic development underpin the Regional Economics School and suggest differences in environmental factors between regions explain regional inequalities in economic activity, it is important to remember that the Regional Economics School is not based on one theory, but the amalgamation of a number of different theories that identify a wide range of variables that can help explain inequalities across space, which is not possible with theories of entrepreneurship. The theoretical overview in this section also acts as a precursor to the review of empirical studies relating to variation in entrepreneurial activity in Section (2.4), which itself is an important forerunner to the development of the theoretical framework and research hypotheses in Section 2.6.

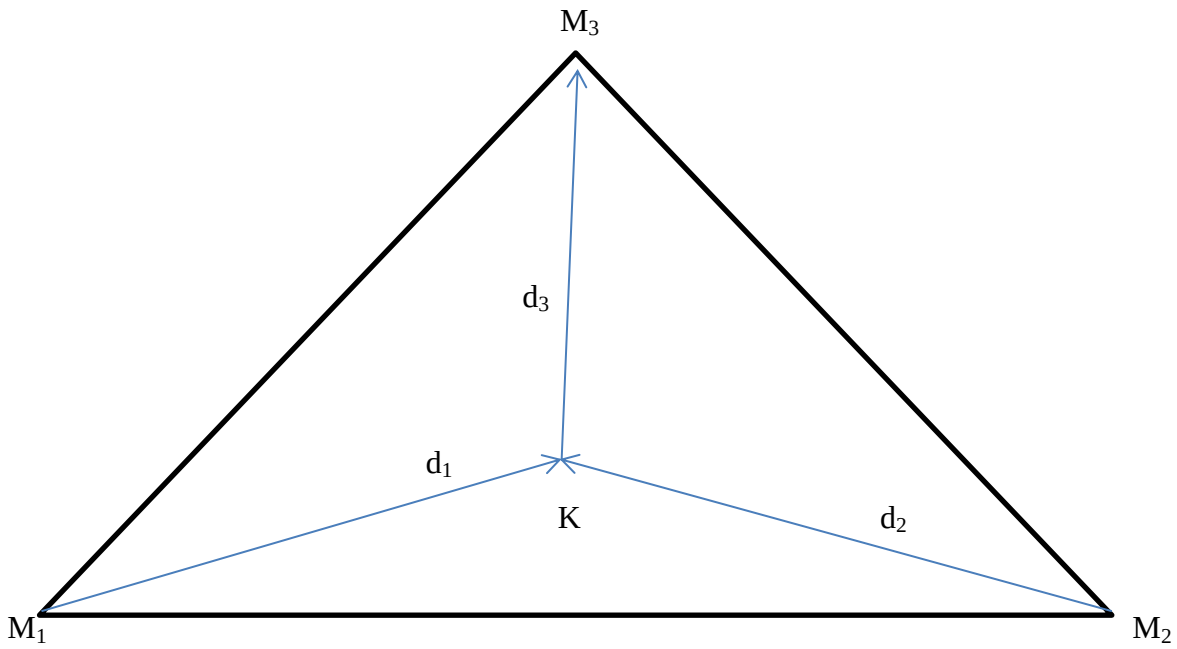
2.3.1 Agglomeration Economies (Location of the Firm and Industry)

Weber (1909) was the first location theorist to discuss agglomeration in depth, although, as we will see unlike Marshall, Weber was concerned with the location of the firm rather than industry. According to Weber (1909) the aim for a firm was to minimize the weighted sum of euclidean distances from a plant to a finite number of sites corresponding to the markets where the plant purchases its inputs and sells its outputs; the weights represent the quantities of inputs and outputs bought and sold by the plant, multiplied by the appropriate freight rates. The simple point stressed by the Weber model is that it would be more profitable for two or more firms to agglomerate at the same location, if the external economies gained there exceeded

the additional transport costs incurred, as a result of deviation from the minimum transport cost location. Following McCann (2002) it is possible to explain the Weber model using a simple two dimensional triangle. In the Weber model it is assumed that the firm is a single establishment located at a single point in space and that the firm aims to maximise profits and, therefore, the key consideration for a firm when choosing where to locate, becomes the question of at which location will a firm maximise its profits.

The Weber model described in Figure (2.2) often referred to as the location-production triangle, where the firm consumes two inputs 1 and 2, whose sources are located at M_1 and M_2, respectively, and which are combined by the firm at K in order to produce a single output good 3, which is sold at market located at M_3.

Figure (2.2) The Weber location-production triangle



The following assumptions must also be made. First, it is assumed that the coefficients of production are fixed, where there is a fixed relationship between the quantities of each input required in order to produce a single unit of output. This gives a production function with the general form:

$$m_3 = f(k_1 m_1, k_2 m_2) \quad (2.3)$$

In the simplest case, where $K_1 = K_2 = 1$, the production function becomes:

$$m_3 = f(m_1, m_2) \quad (2.4)$$

This represents a situation where the quantity of the output good 3 produced is equal to the combined weight of the inputs 1 and 2. Therefore for the purposes of this analysis, we can rewrite (2.4) as:

$$m_3 = m_1 + m_2 \quad (2.5)$$

Second, it is assumed that the firm is a price taker, where the prices per tonne of inputs 1 and 2 are given as p_1 and p_2, at the points of M_1 and M_2. The price per tonne of the output good 3 at the market location M_3 is given as p_3. Furthermore, it is assumed that the firm is able to sell unlimited quantities of output 3 at the given price p_3, as in perfect competition. Third the transport costs are exogenously given as t_1, t_2, t_3, and these transport costs represent the costs of transporting one tonne of each commodity 1, 2 and 3 respectively, over one mile or 1 kilometre. The distances d_1, d_2, d_3 represent the distances over which each of the goods 1, 2 and 3 are shipped. Finally, it is also assumed that the input production factors of labour and capital are freely available everywhere at factor prices and qualities that do not change with location, and that land is homogenous. Therefore, the price and quality of labour are assumed to be equal everywhere, as are the cost and quality of capital, and the quality of rental price of land.

With these assumptions the location behaviour of the firm can be determined by assuming that the firm is rational. If a firm is able to locate anywhere, it will locate at whichever location it can earn maximum profits. Given that the prices of all the input and output goods are set exogenously and the prices of production factors are invariant with respect to space, the only issue which will alter the relative profitability of different locations is the distance of any particular location from the input source and output market points. The reason being that different locations will

incur different costs of transporting inputs from their production points to the location of the firm, and outputs from the location of the firm to the market point. The location that ensures maximum profits are earned by the firm is the location at which the total input plus output transport costs are minimized, *ceteris paribus*. Finding this involves comparing the relative total input plus output transport costs at each location. Given the above the Weber optimum location will be the location at which the sum (TC) of these costs are minimized. The cost condition that determines the Weber optimum location can be given as:

$$TC = Min \sum_{t=1}^{3} m_i \, t_i d_i \qquad (2.6)$$

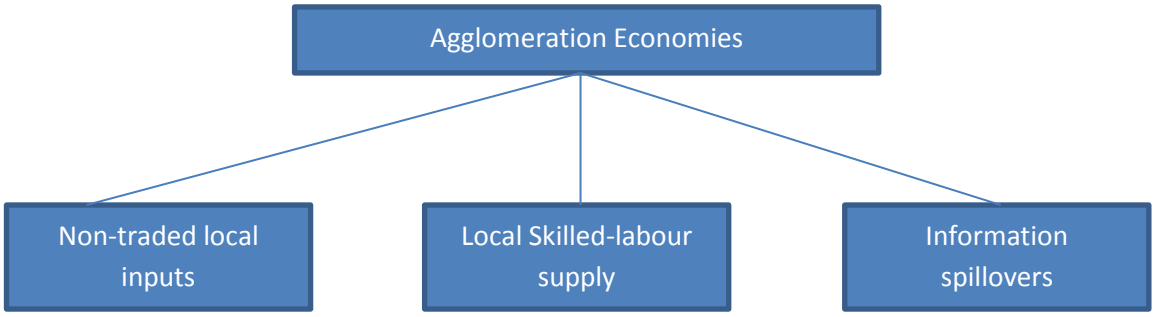
Where the subscript *i* refers to the particular weights, transport rates, and distances over which goods are shipped to and from each location point *K*. Given the assumptions that the firm will be seeking to maximise profits, the minimum cost location will be the actual chosen location of the firm. Other firms will therefore follow the same locational logic leading to agglomeration.

However, although early spatial analytical systems such as that suggested by Weber above acknowledged the existence of industrial clustering, the first attempt at a *formal* classification of the reasons for this phenomenon was made by Marshall (1920) whose analysis followed directly from Adam Smith's initial observation of labour specialisation (Blaug, 1985).

In particular Marshall's theory of industrial districts and triad of externalities, discussed further below and which subsequently become the theoretical basis for our decision to incorporate agglomeration benefits into our own theoretical framework in Section 2.6.3, sought to explain how industries become *'localised'* in the long-term. The theory of industrial districts is able to provide a number of suggestions about regional characteristics that can help explain differences in regional rates of entrepreneurial activity. However, it is also worth noting that Marshall's theory of

localised industry does not claim it is the original resource that causes a firm/industry to locate in a particular location in the first place, but rather a set of externalities. Marshall's work was followed by Weber (1929) who made the first specific reference to agglomeration economies in his book the *Theory of the Location of Industries*. Marshall and Weber's business structures were dominated by small locally owned firms taking advantage of a triad of externalities/agglomerations[1], arising as a result of their physical proximity to one and other. Both argued that these are based around the minimisation of costs, specifically transport and labour costs. The industrial district is characterised by a core industry, which is sustained by the development of other firms and minor industries, whereby both are able to realise economies of scale from factors external to the firm, but only as a result of spatial proximity in turn providing some indication about why firm location may be higher in some regions than in others. According to Marshall's theoretical framework, illustrated in Figure 2.3 there are three externalities that lead to higher levels of productivity than would be the case if firms were located separately.

Figure 2.3 Causes of Agglomeration Economies in the Marshallian Framework.



First, labour market pooling, a benefit accruing to a concentration of firms within a locality, leading workers to become specialised. Workers benefit from being in a locality where there are a number of alternative employers, minimizing the risk of unemployment and creating opportunities for promotion. Marshall (1890, p271)

[1] Marshall describes the benefits of industrial concentration as 'externalities', while Weber refers to these benefits as 'agglomerations'.

states “[e]mployers are apt to resort to any place where they are likely to find a good choice of workers with the special skill which they require; while men seeking employment naturally go to places where there are many employers who need such skill as theirs”. Labour pooling is advantageous for two reasons. Firstly, workers are freely mobile between firms and, therefore, can move from firm to firm as they are demanded, where “one firm’s bad times will be offset by the other firm’s good times, and the average rate of unemployment will be correspondingly lower.” (Krugman, 1991a, p40). Therefore, the localisation of industry can help cushion unemployment because of an increased number of employers, while also reducing the wage level reflected by the size of the labour market and the acceptance of lower wages by employees in return for increased stability over time. Second, the chances of a labour shortage are likely to be reduced while the hiring of a new employee with previous experience from a similar firm is likely to increase the performance of the new firm.

Secondly, the existence of specialised suppliers (non-traded local inputs) leads to the provision of non-traded inputs both in greater variety and lower costs. Created by the concentration of firms being sufficiently large enough to support specialised suppliers, economies of specialisation lead to “[s]ubsidiary industries devoting themselves each to one small branch of the process of production, and working it for a great many of their neighbours, are able to keep in constant use machinery of the most highly specialized character.” (Marshall, 1890, p271). Supplier specialisation works in both ways with suppliers having access to large markets where they can provide highly specialised products and services, while the client has the advantage of easy access to such services (Cortright, 2006).

Third, firms are drawn to locate in close proximity to their competitors because technological externalities or information spillovers are bounded by space, indicating that knowledge flows more easily locally than it does over great distances. The close proximity of individuals and organisations working on similar projects helps produce a shared understanding of an industry and the way it operates (Cortright, 2006). Marshall claims that such knowledge flows are ever-present or ‘in the air’. Marshall (1890, p271) comments “[w]hen an industry has thus chosen a locality for itself, it is likely to stay there long: so great are the advantages which people following the same skilled trade get from near neighbourhood to one another. The mysteries of the

trade become no mysteries; but are as it were in the air, and children learn many of them unconsciously".

Marshall is essentially claiming that the localisation of industry is a self-reinforcing process, whereby industry and individuals are both proponents and beneficiaries of a synergetic process created through localised concentration that would otherwise not be possible. Therefore, the industrial district leads to enhanced knowledge spillover through continued communication among firms about developments in inventions, improved production techniques and the general organisation of businesses, whereby the enhanced speed of innovation result in the creation and development of new and existing firms (Sutaria, 2001).

However, Jacobs (1969) disputes Marshall's idea of localisation arguing, that the most important knowledge spillovers are external to the industry in which a firm operates, believing diversity and not specialisation is the key engine of growth (Beaudry and Schiffauerova, 2009). Jacobs also maintained that the diversity of knowledge was greatest in cities creating interactions and driving ideas (Cortright, 2006).

Therefore, Marshall observes that the close proximity of similar firms leads to industrial concentration arising from the benefits of labour specialisation, the reduction of transport costs, proximity to specialised suppliers and the transmission of specialised knowledge. However, as will be highlighted by the empirical literature in section 2.4 the debate around agglomeration economies has generally centred on whether agglomeration is related to the degree of industrial concentration or to the size of a city (Rosenthal and Strange, 2004). This has given rise to the Marshall versus Jacobs or localisation (specialisation) versus urbanisation (diversity) debate. Localisation economies arise from the benefits of intra-industry agglomeration, while urbanisation economies create benefits through inter-industry concentration (Knoben, 2009). Marshall (1890) presented the idea of industrial agglomeration centred around a core industry with specialised inputs and subsidiary industries, while (Jacobs, 1969) proposed a more general type of agglomeration based on the diversity of a variety of industries.

On the basis of the aforementioned agglomeration theory and subsequent empirical literature outlined in section 2.4.3 agglomeration benefits clearly have a positive

effect on the location of economic activity. However, its main weakness is that existing agglomeration theory deals only with the location of industries, and has not yet been tested in a model to assess whether the benefits associated with location of industry are also applicable to the locational determinants of continuing entrepreneurial activity. The model presented in section 2.6 is an attempt to do just this.

2.3.2 Growth Pole Theory and Cumulative Causation

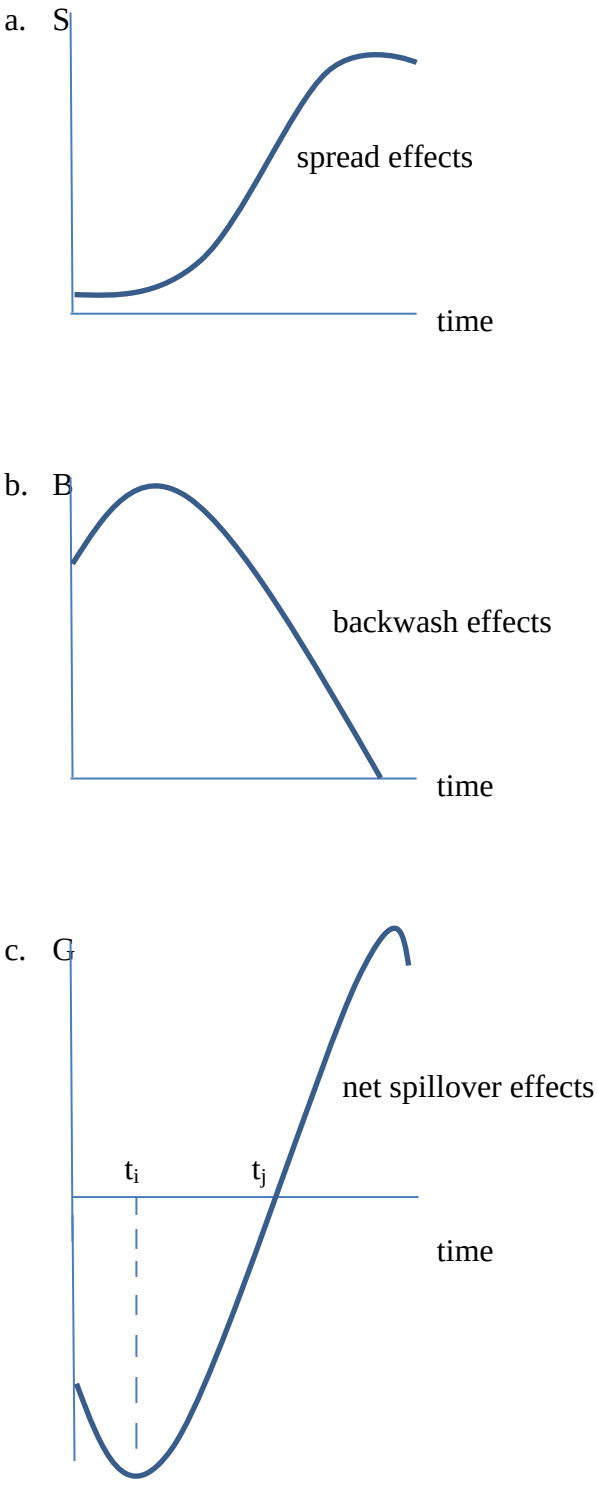
Growth pole theory is largely attributed to the work of Perroux (1950) while cumulative causation theory is accredited to Myrdal (1957). Richardson (1978, p164) describes a growth pole as "a set of industries capable of generating dynamic growth in the economy, and strongly interrelated to each other via input-output linkages around a leading industry". The leading or propulsive industry is a key driver of development, through its ability to innovate, stimulate and dominate other industries (Parr, 1999). Like Marshall, Perroux emphasises the role of centripetal and centrifugal forces in firm location. However, unlike the work of Marshall, Krugman and Porter who all link location to specialisation, growth pole argues that the concentration of economic activity is driven by both localisation and urbanisation economies, both of which are self-reinforcing. As "concentration proceeds, there will be a cumulative build-up of the various types of agglomeration economy, which will contribute to successive improvements in the locational competitiveness of the region, leading to further rounds of investment, both external and internal." (Parr, 1999, p1211).

Growth poles, therefore, act as a form of magnet, stimulating other firms to locate in close proximity, attracting educated and skilled workers and related services, who are all attempting to acquire higher returns. Migration and capital movements are key components in the development of a growth pole demonstrating that greater numbers of people and businesses will create increased demand, which in some cases will create opportunities for entrepreneurs to establish or expand businesses. This is an important observation which is discussed further in Sections 2.6 and 3.5.3

demonstrating that demand conditions are likely to differ between regions explaining different levels of entrepreneurial activity.

However, empirical realities and disillusionment with a lack of expected spillover effects led growth pole theory to be largely side-lined in the 1980's as a policy instrument. Richardson (1976), however, highlights that spread and backwash effects will only be realised in the longer term and as a result policy makers may have been too hasty in dismissing the growth pole as an effective regional development tool. Following Richardson (1978) Figure (2.4) illustrates this by showing how aggregate spread and backwash effects may vary over time. Spread can be treated as a diffusion process and may be represented as a logistic function of time (Figure 2.4a). The time path of spread is divided into three phases: a slow start; a 'bandwagon effect' (the momentum stage); and a slowing-down process associated with saturation.

Figure 2.4 Spread and backwash effects through time



As Richardson highlights in his model, these phases, when considered together are likely to take place over decades rather than years. The time path of backwash is more indeterminate. Backwash effects are initially high as resources are attracted towards the growth pole, yet do not reach a maximum until a number of years after the initial introduction of the pole, as a result of the natural build-up of agglomeration and urbanisation economies (Figure 2.4b). The net spillover function (Figure 2.4c) is derived by vertically subtracting the backwash effect from the spread effect. Mathematically, the spillover function G_t may be represented by a modified logistic function:

$$G_t = b[1 + ae^{-(c_2 t^2 - c1 t)}]^{-1} - d \qquad (2.7)$$

The above equation is obtained by adding a quadratic time term to the exponent of a logistic function and shifting the whole function downwards. The negative intercept $G_0 = -d + b/(1 + a)$, and the upper asymptote $G_\infty = b - d$. Its minimum point G_{min} (t_i in Figure 2.3c) occurs where $2c_2 t - c1$ =0. The critical point t_j, where $G_t = 0$, is obtained by transforming equation (2.7) to obtain:

$$c_2 t^2 - c1 t - y = 0 \qquad (2.8)$$

where $y = \log_e ad/(b-d)$. Solving for t_j:

$$T_j = \frac{C_1 + \sqrt{C_1{}^2 + C_2{}^y}}{2c_2} \qquad (2.9)$$

The Growth Pole model highlights that the actual size of the net spillover will differ from place-to-place, which is the result of different growth pole sizes, differences in

local economic and social conditions and differences in socio-cultural and political environments.

Nevertheless, further criticisms of growth pole theory include the inability to identify how a key industry develops and the length of time it takes (Richardson, 1978). Mckee (2008, p105) raises questions conceptually suggesting that in a globalised economy "growth poles can be local, regional, national or international in scope", which seriously questions the original assumptions made by Perroux that growth pole theory is one based on local forces. However, as will be discussed further in the context of our own theoretical model in section 2.6 Growth Pole Theory shows that when a region has a comparative advantage over another region the flow of factors of production will re-enforce that initial advantage and that entrepreneurial activity may be higher around the growth pole or lead region, as new and expanding firms service the additional demand generated by economic growth.

2.3.3 Krugman and the New Economic Geography

In his theory of economic geography Krugman (1991a, 1991b) is primarily concerned with the asymmetric distribution of economic activity. Combining mainstream economics and international trade theory to incorporate imperfect competition, increasing returns and transport costs under a general equilibrium model (known as the core-periphery model) the New Economic Geography (NEG) attempts to explain the uneven distribution of spatial development across regions (Fujita and Thisse, 2009). Krugman assumes that in a world of imperfect competition trade is driven as much by increasing returns and external economies, as by the traditional trade theories of comparative advantage (Martin and Sunley, 1996).

The core question the NEG addresses is why in the interaction between increasing returns and transportation costs do a given number of firms choose to locate in a certain location, which in turn can lead to a particular geographical production structure. Krugman (1991a, 1991c) develops his explanation by building upon the core-periphery (2x2x2) model and making the assumption of immobile resources, which lead producers to locate near to the largest market in order to minimise transport costs and exploit increasing returns.

The following briefly summarizes the basic two-region model of Krugman (1991a, 1991b). Individuals share the Cobb-Douglas type utility function of:

$$U = C_M^{\pi} C_A^{1-\pi} \tag{2.10}$$

where C_M is consumption of aggregate manufacturing goods, C_A is agricultural consumption, and π is the share of expenditures spent on manufacturing goods. The aggregate of manufacturing consumption is determined by the constant elasticity of the substitution function of:

$$C_M = [\sum_i C_i^{(\sigma-1)/\sigma}]^{(\sigma/(\sigma-1))} \tag{2.11}$$

where $\sigma > 1$ is the elasticity of substitution among manufacturing products. When *i* is sufficiently large, σ represents demand elasticity for manufacturing good *i* (Krugman 1980).

Agricultural production is assumed to have constant returns to scale technology, whereas manufacturing follows increasing returns. Costs in labour are determined by

$$L_{Mi} = \alpha + \beta_{Mi} \tag{2.12}$$

where *i* stands for individual firms, α is the fixed cost parameter, β is the parameter of marginal costs, and x_i is the good's output.

In equilibrium, the price of good *i* is determined in monopolistic competition as

$$P_i = [\sigma/\sigma - 1] + \beta_w \tag{2.13}$$

which implies that (since *Pi* = *ACi* and β*w* is marginal cost) *AC/MC* (as a measure of firm size) is represented by σ/(σ – 1). It follows that σ is an inverse index of the importance of increasing returns in the model.

After defining two of the crucial parameters (i.e., π and σ) of the model, transport cost is defined in the manner of Samuelson's iceberg cost formulation: as distance increases, the portion of the good delivered gets smaller. The fraction that arrives is denoted τ.

The basic model assumes that there are two regions: East, dominated by manufacturing, and West, a perfectly agricultural area. π is the portion of manufacturing workers in East, whereas agricultural workers are evenly distributed in space with (1 – π)/2 in each region.

Instead of modelling the emergence of the two regions within some complicated dynamic settings, prerequisites for a representative manufacturing firm to relocate from East to West are searched for. This approach is based on the assumption that parameter conditions for leaving an established manufacturing region are the same as the conditions for locating there. *K* stands for the ratio of shares from a West location of a representative firm to that from an East location. When *K* > 1, the firm will relocate. It is represented in the model as follows:

$$K = S_w\, \tau^{-\pi} / S_E\; 1/2\; \tau^{\pi\sigma}\; [(1+\pi)\tau^{\sigma-1} + (1-\pi)\tau^{-(\sigma-1)}\;] \qquad (2.14)$$

with *SW* and *SE* representing the value of sales in West and East and τ–π being the price index. Partial derivatives of *K* evaluated in the vicinity of *K* = 1 in (2.14) indicates the effects of parameter values on the representative firm's decisions. $\partial K/\partial\pi < 0$ shows that higher shares of expenditures on manufacturing goods urge firms to concentrate in space, whereas $\partial K/\partial\sigma > 0$ indicates that economies of scale have a positive effect on geographical concentration (i.e. the less important increasing returns are, the less strong is the incentive for firms to agglomerate).

Clearly the relationship between external economies and transport costs are the key variables explaining differences in regional core and peripheries (Martin and Sunley, 1996). Without low transport costs economies of scale cannot exist (Acs and Vagra, 2002). As Krugman (1991a, p98) puts it "[b]ecause of the costs of transacting across distance, the preferred locations for each individual producer are those where demand is large or supply of inputs particularly convenient-which in general are the locations chosen by other producers". Similarly this is where the majority of other firms wish to locate, and therefore, once an agglomeration has been established it tends to be self-reinforcing, however, this cumulative process is not a novel conception, as Krugman himself acknowledges, but rather a reflection of the earlier work undertaken by Pred (1966) and Myers (1983). Krugman's contribution is the way he combines his variables in a general equilibrium model (Acs and Vagra, 2002). The development of the core-periphery model allows Krugman to provide an explanation for the possibilities of convergence or divergence between regions that was not previously possible under the assumptions of perfect competition and constant returns.

However, Krugman's work has weaknesses. Krugman tends to ignore externalities that cannot be modelled including social and cultural aspects, which could inform policy makers about the local environment in which firms and entrepreneurs must operate. Krugman also dismisses knowledge and technological spillover widely accepted as indigenous drivers of growth (Romer, 1986). Finally the NEG does not say anything about the location of particular industries and has tended to focus on spatial analysis at the supra-national level, while there are substantial differences in economic performance within nations and at the sub-national level.

Nevertheless, Krugman's theory offers a powerful insight into the importance of demand conditions, for industries, as they attempt to achieve economies of scale, by which he means firms will wish to locate next to large markets where demand is greatest and costs (transport) can be minimised. Therefore, Krugman is able to explain why economic activity concentrates in the first place and is widely accepting of Marshall's externalities as the source of long-term lock-in for firms. We will act to complement Krugman's theory in our own theoretical model by assessing whether local demand conditions, help explain the asymmetric distribution of continuing entrepreneurial activity in Scotland.

2.3.4 Porter's Cluster Theory

One of the most influential advocates of economic localisation is Porter (1990, 1998a, 1998b, 1998c, 2000). Unlike Krugman's mathematical model of increasing returns discussed in the previous section, Porter's cluster concept is a descriptive theory of investment, innovation and industrial organisation (Motoyama, 2008). Porter's theory suggests industry clusters may enhance entrepreneurial activity, as well as the productivity of existing firms. In particular linkages within the cluster among firms and related institutions are likely to serve as a catalyst for the creation and expansion of new and existing firms, whereby the cluster offers entrepreneurs the ability to tap resources easier and faster than in isolated environments. In Porter's theory the local environment for competition is crucial in "that much of competitive advantage lies outside a given company or even outside its industry, residing instead in the locations of its business units (Porter, 1998a, p198).

According to Porter's theory new and expanding firms are induced to locate within existing clusters, as information about opportunities are more readily available, while "individuals working within a cluster can more easily perceive gaps in products or services around which they can build businesses." (Porter, 1998b, p84). Furthermore, "[p]roximity in geographic, cultural, and institutional terms allows special access, special relationships, better information, powerful incentives, and other opportunities for advantages in productivity and productivity growth that are difficult to tap from a distance." (Porter, 1998c, p11). In particular firms may be able to benefit from role models and existing networks, which are already present within a cluster. The importance of role models is discussed in further detail in section 2.6. Indeed, the spatial dimension is important because "proximity facilitates face-to-face contact, which makes it easier for firms to establish and maintain relationships." (Boshuizen *et al.*, 2009, p186). Furthermore, barriers to entry and exit are perceived to be lower, as access to capital is more readily available and risk premiums lower, while crucially increased competition drives firms to continually innovate.

Nevertheless, although cluster theory has become very influential at both academic and policy levels, Porter's theory has attracted strong criticism primarily based on its

static and descriptive nature (Martin and Sunley, 2003; Kitson *et al.*, 2004; Motoyama, 2008). At one level Porter argues clusters are very much dependent upon the local environment for success, yet at another stresses "[t]he geographic scope of a cluster can range from a single city or state to a country or even a network of neighbouring countries" (Porter, 1998a, p199). Martin and Sunley (2003, p13) describe Porter's clusters as having "no essential self-defining boundaries, while Porter (2000, p18) even states the "appropriate definition of a cluster can differ in different locations, depending on the segments in which the member companies compete and the strategies they employ".

However, for the purposes of this study and the development of our theoretical model, Porter is able to show how inter-related socio-economic conditions might influence entrepreneurial activity locally in terms of access to resources and networks including the influence of role models that may be more difficult for an isolated firm. The importance of role models is developed further in our own theoretical model of continuing entrepreneurial activity in Section 2.6

2.3.5 Summary of the Regional Economics School

This section has demonstrated that the Regional Economics School is an amalgamation of many different theories, which identify a number of variables that can be used to explain regional inequalities. However, it should be noted that many of those theories do not explicitly consider entrepreneurial activity, but are able to highlight a number of different environmental factors that can be used to account for differences in regional development and economic performance.

Indeed, the theoretical framework developed in section 2.6, is a synthesis of many of those factors identified by the Regional Economics School in an attempt to explain regional variation in continuing entrepreneurial activity. That is to say, we recognise that those theories we have reviewed from the Regional Economics School are not theories that individually or alone explain the asymmetric distribution of entrepreneurial activity. Indeed, such a theory does not exist, as it is not able to capture the complexity of the entrepreneurs regional environment and nor is that

what each of those respective theories were designed to achieve, as they are largely theories that explain regional growth and/or the concentration of industry. Nevertheless, those theories do importantly provide us with the opportunity to synthesise certain components of each of these respective theoretical works and adapt them to develop a model of continuing entrepreneurial activity in order to explain regional inequalities in the distribution of entrepreneurial activity in Scotland.

As a precursor to the development of our theoretical framework in section 2.6 a review of the empirical literature addressing regional determinants of entrepreneurial activity is provided in the following section. This helps provide a link between the existing theoretical literature and what has been written about the relationship between the explanatory variables found in the first part of this chapter and entrepreneurial activity.

2.4 Empirical Studies of Entrepreneurial Activity

In this section a brief overview of the literature on regional determinants of entrepreneurial activity is provided. The purpose is to identify the main determinants of entrepreneurial activity thus far in the literature. In the following section of this chapter we build on both the theoretical and empirical literature by formalising a model of continuing entrepreneurial activity.

As a result of spatial variation in entrepreneurial activity and the perceived importance of entrepreneurship to economic growth and employment, the last two decades has led research to focus increasingly on the spatial aspects of entrepreneurial activities and new firm formation. The majority of previous studies assessing determinants of new firm formation and the location of industry have applied regression analysis alone, as the principal method of analysis in order to establish causality between independent and dependent variables (Keeble and Walker, 1994; Reynolds *et al.*, 1994; Garofoli, 1994; Guesnier, 1994; Davidsson *et al.*, 1994; Tamasy and Le Heron, 2008; Audretsch and Fritsch, 1994; Kangasarju, 2000; Armington and Acs, 2002; Lee *et al.*, 2004; Sutaria and Hicks, 2004; Okamuro

and Kobayashi, 2006; Audretsch *et al.*,2010). Studies of new firm formation are largely categorised at the national (Storey, 1984; Reynolds *et al.*, 1994; Acs and Storey, 2004; Annual GEM reports), and regional levels (Parker, 2005; Bosma and Schutjens, 2007; 2009; Fritsch and Mueller, 2007; Audretsch and Keilback, 2004a; 2004b; 2005), while studies at the local level have only been implicitly addressed, which is quite surprising given that entrepreneurs often start and undertake entrepreneurial activities in close proximity to the areas in which they live or have worked (Tamasy, 2006; Dahl and Sorenson, 2009). Furthermore, empirical studies have often been varied and contradictory, likely reflected by the variety of variables selected for investigation and the number of differing research methods used (Sutaria and Hicks, 2004; Wang, 2006).

The following section provides a broad overview of studies addressing determinants of entrepreneurial activity, which help conceptualise the framework developed in section 2.6 to explain spatial determinants of entrepreneurial activity in Scotland. As already alluded to the determinants of entrepreneurial activity are wide and varied, however, on the basis of the theoretical review in sections 2.2 and 2.3 these factors can largely be categorised into four broad categories: (1) demand-side factors (2) supply-side factors (3) agglomeration effects and (4) cultural or policy determinants. Demand-side opportunities focus on the availability of entrepreneurial opportunities, linked to the structural features of a regional economy, while supply-side characteristics focus on a region's entrepreneurial capacity (Audretsch, 2002). Policy and cultural variables are important, as they often underpin the incentive structure of an economy and the extent to which an activity is legitimised by society.

2.4.1 Demand-Side Factors

Given that new businesses are largely dependent upon local markets, spatial differences in local market conditions are likely to be important (Bosma *et al.*, 2008). Several regional studies have considered the importance of demand on entrepreneurial activity. In a cross-national comparison of new firm formation sponsored by the OECD, growth in demand was one of the main factors found to

have a statistically significant effect in the majority of the eight developed countries included in the study (Reynolds and Storey, 1994).

Demand-side factors have been operationalized in a limited number of ways with some studies utilizing population size, some population growth and others considering income and changes in income. Studies analysing the effect of demand on entrepreneurial activity are discussed below.

Both population and changes in population have been used as measures of demand (Keeble and Walker, 1994; Reynolds et al., 1995; Armington and Acs). The studies are summarized in Table 2.1. In general the evidence suggests a positive relationship between population and changes in population on entrepreneurial activity. Reasons for which are explored in greater detail in our own theoretical model in Section 2.6.

Several studies have considered the effect of population size on new entrepreneurial activity. For example, in a panel data analysis of new firm formation in the United States over three different time periods, Bartik (1989) found that the size of market demand proxied by population is the most important factor in new firm formation. Davidsson *et al.* (1994) analysed 80 labour markets in Sweden finding population size to have a positive effect on new firm formation with Spilling (1996) similarly finding population to have a significant effect on new firms in Swedish planning regions.

Table 2.1: Demand-Side Variables Influence on Entrepreneurial Activity-Population Measures.

Measure	Study	Effect
	Bartik, 1989	+
Population	Davidsson et al., 1994	+
	Spilling, 1996	+
	Reynolds, 1994	+
	Reynolds et al., 1994	+
	Keeble and Walker, 1994	+
	Garofoli, 1994	-
Population Growth	Audretsch and Fritsch, 1994	+
	Davidsson et al., 1994	+
	Guesnier, 1994	+
	Spilling, 1996	+
	Armington and Acs, 2002	+
	Lee *et al.*, 2004	+
	Okamuro and Kobayashi, 2006	+
	Tamasy and Le Heron, 2008	+

Others have analysed the effect of changes in population on entrepreneurial activity. Reynolds (1994, p436) concluded "There is little question of the significance of population changes" finding in his study of 382 U.S. labour markets across three types of regions and four sectors that population growth was a significant factor in all 16 models. Furthermore, in a cross-national comparison of studies in six countries Reynolds *et al.*, (1994) found that growth in demand, measured by in-migration and population growth to be the most significant factor across all countries.

Other studies have also found that population growth influences levels of entrepreneurial activity. For example, Keeble and Walker (1994) analysed 11 UK regions in the 1980's highlighting the positive relationship between population growth and new firm formation while similar studies have also been found in

Germany (Audretch and Fritsch, 1994), Sweden (Davidsson et al., 1994; Spilling, 1996), France (Guesnier, 1994), Japan (Okamuro and Kobayashi, 2006) and New Zealand (Tamasy and Le Heron, 2008). Contrary to most studies Garofoli (1994) found a negative correlation between population growth and new firm formation although the effect was not significant. Therefore, both static (population) and dynamic (population growth) measures positively influence entrepreneurial activity and as a result differences among regions in population and population changes can help account for differences in regional rates of entrepreneurial activity.

The second way in which demand-side factors have been operationalized is through income and changes in income, with most studies using the dynamic measure of changes in income. The studies are summarized in Table 2.2.

Table 2.2: Demand-Side Variables Influence on Entrepreneurial Activity-Income Measures.

Measure	Study	Effect
Personal Income Index	Reynolds et al., 1995	+
Increases in Per Capita Income	Reynolds, 1994	+
Increases in Regional Gross Domestic Product	Reynolds et al., 1994	+

One study considered the effect of income on new firm formation. Reynolds *et al.*, (1995) using an index of personal income consisting of personal income per capita, income per household, dividend interest and rent per capita found a consistent positive impact on new firm formation across different two year time frames when analysing labour markets in the United States.

Other studies have used changes in income as a measure of demand. Increases in per capita income was included in seven of Reynold's (1994) models of different types of US regions and sectors and was found to be significant in six of those models. A

cross national comparison found evidence for the positive influence of demand as measured by growth in GDP, but was not as strong as when proxied by population measures.

Income and changes in income have a positive effect on entrepreneurial activity and demonstrate a strong positive relationship between demand side factors and entrepreneurial activity in an economy. Overall, therefore, studies have found that strong demand conditions more often than not have positive effects on levels of regional entrepreneurial activity.

Studies have also identified that supply-side factors are important determinants of entrepreneurial activity. These are discussed in the following section.

2.4.2 Supply-Side Factors

Unemployment

Much of the early work in regional studies addressing levels of entrepreneurial activity focussed on the effect of unemployment. However, the relationship between unemployment and entrepreneurial activity is not straightforward. Table 2.3 provides an overview of these studies. Storey (1991) suggests there is a relationship between entrepreneurship and unemployment, whereby a negative change in labour market status will push individuals into entrepreneurship. This is consistent with the unemployment 'push' hypothesis, which advocates that regions with high levels of unemployment will have higher rates of new firm formation, than regions with low levels of unemployment (Keeble and Walker, 1994; Reynolds *et al.*, 1994). Evans and Leyton (1990) support this assumption finding, that unemployed individuals in the USA are twice as likely to start a new business as those in salaried employment. Ritsila and Tervo (2002, p32) state "[w]ithout personal unemployment, a push-entrepreneur would not start a business". The push hypothesis may also be influenced by low incomes and income insecurity, as individuals who are pushed into self-employment may have no alternative or limited employment options. However, Garofoli (1994) like Audretsch *et al.*, (2010) disputes that high unemployment leads to higher levels of entrepreneurship, finding high levels of unemployment tend to

decrease firm formation rates in Italy and Germany respectively, as demand in high unemployment regions will be lower for local goods.

Table 2.3 Supply-Side Variables Influence on Entrepreneurial Activity-Unemployment Measures.

Measure	Study	Effect
	Storey, 1991	+
	Davidsson et al., 1994	-
	Guesnier, 1994	+
	Garofoli, 1994	-
Unemployment Rate	Audretsch and Fritsch, 1994	-
	Evans and Leyton, 1990	+
	Keeble and Walker, 1994	+
	Audretsch et al., 2010	-
	Audretsch, 1993	-
	Ritsila and Tervo, 2002	+

Ritsila and Tervo (2002) examine 'push' and 'pull' effects of unemployment in Finland across a number of different levels, finding significant evidence at the personal level to suggest unemployment encourages individuals to become entrepreneurs. However, at the regional level, no link between unemployment and business formation rates is established. A possible explanation for this is that the net effect is zero, as both push and pull effects are equally strong. At the national level, similar to Audretsch (1993) high unemployment was found to decrease the likelihood of new firm formation. Wang (2006) explored determinants of new firm formation in Taiwan, finding a positive correlation between unemployment rates and new firm formation. Although, this is in-line with the recession push hypothesis; simultaneously, however the study also identifies a positive correlation between economic growth rates and new firm formation suggesting that a prosperity pull hypothesis also applies.

Therefore, it is hard to conclude whether regions with higher unemployment have higher rates of entrepreneurial activity, given the contradictory findings that have been identified by the empirical literature. At one level unemployment may increase entrepreneurial activity, as individuals have no alternative, but at another high unemployment may indicate that the local environment is not conductive to firm entry (Grilo and Thurik, 2005). However, although there is, as of yet no precedent, as will be highlighted in Section 2.6 we propose that the relationship between unemployment and continuing entrepreneurship is less complicated.

Human Capital

In line with Schultz's (1975) theory the number of highly skilled workers in a region may also have a positive impact on regional levels of entrepreneurial activity. Indeed, Barkham (1992) noted that a large proportion of business founders come from skilled technical and managerial grades. In particular studies have identified that regions endowed with a higher number of university graduates are more likely to have higher levels of entrepreneurial activity than those regions with high concentrations of less skilled workers (Armington and Acs, 2002; Acs and Armington, 2004; Lee *et al.*,2004). Quantitative studies summarized in Table 2.4 have also found a managerial workforce to be an important element in new firm formation. For example, in a cross-national comparison of new firm formation Reynolds *et al.*, (1994) noted the percentage of managers in the workforce showed a positive effect in each country.

Table 2.4: Supply-Side Variables Influence on Entrepreneurial Activity-Human Capital Measures.

Measure	Study	Effect
Share of Managers in Workforce	Reynolds et al., 1994	+
	Fritsch, 1992	+
Share of Workforce in Non-Manual Occupations	Keeble and Walker, 1994	+
Share of Manual Workers	Audretsch and Fritsch, 1994	-
	Garofoli, 1994	-
	Garofoli, 1992	-
	Whittington, 1984	-
Share of Population with University Degrees	Armington and Acs, 2002	+
	Acs and Armington, 2004	+
	Lee *et al.*,2004	+

Keeble and Walker (1994) found that the percentage of the economically active population over 16 in non-manual socio-economic groups in the UK had a significant positive effect on new firms while Fritsch (1992) found that a large managerial workforce helped stimulate entrepreneurial activity in Germany. On the other hand Whittington (1984), Garafolio (1992; 1994) and Audretsch and Fritsch (1994) all found that lower levels of human capital had negative effects on levels of entrepreneurial activity. Therefore, overall studies have identified that higher levels of human capital proxied by level of education and managerial workforce lead to higher levels of entrepreneurial activity. Therefore, it is clear that empirical evidence supports Schultz (1975) theory reported earlier in this chapter linking levels of

education to entrepreneurship, where it is assumed that regions with higher levels of human capital are better environments for undertaking entrepreneurial activity.

Access to Finance

Finally, the socio-economic structure of a region and the availability of start-up capital are also important supply-side issues likely to influence levels of entrepreneurial activity (Reynolds *et al.*, 1994; Koo and Cho, 2011). Studies have consistently highlighted that personal savings and money borrowed from friends and family are often the most important source of start-up capital for entrepreneurs. Empirical analysis also highlights, a low level of wealth proxied by home ownership can have negative influences on people's ability to establish new small firms (Ashcroft *et al.*, 1991; Keeble and Walker, 1994). It is assumed that entrepreneurs in areas with high home ownership rates have more personal resources and greater access to capital (Storey 1982; Whittington 1984) as entrepreneurs can use their homes and other assets as collateral. Overall, the evidence suggests a positive relationship between personal wealth and entrepreneurial activity. These studies are presented in Table 2.5.

Several studies have used housing wealth, such as the percentage of owner-occupied housing or housing prices, as a proxy for wealth and access to capital, with evidence suggesting a positive relationship between home ownership and entrepreneurial activity (Whittington 1984; Ashcroft *et al.*, 1991; Guesnier, 1994).

Table 2.5: Supply-Side Variables Influence on Entrepreneurial Activity-Financial Capital Measures.

Measure	Study	Effect
Share of Owner Occupied Housing	Whittington, 1984	+
	Davidsson et al., 1994	+
	Guesnier, 1994	+
	Ashcroft *et al.*, 1991	+
	Fritsch, 1992	+
Average Value of Personal Property/House Value/Purchase Price	Spilling, 1996	+
	Keeble and Walker, 1994	+
	Reynolds, 1994	+
	Robson, 1998	+
Bank Deposits per Capita	Garofoli, 1994	+
	Sutaria and Hicks, 2004	+

Other measures of personal wealth have also been used. Average house price purchase or value (Keeble and Walker, 1994; Reynolds, 1994; Robson 1998; Spilling, 1996) and bank deposits per capita (Garofoli, 1994) have also been found to have a positive impact on levels of entrepreneurship. Furthermore, Williams and Williams (2011) identified that the fear of not being able to obtain finance was the most commonly cited barrier to entrepreneurship in deprived areas highlighting that access to financial capital is an important element in the entrepreneurial process.

2.4.3 Agglomeration Factors

As will become apparent in Section 3.5.3 the debate around agglomeration economies has generally centred on whether agglomeration is related to the degree of industrial concentration or to the size of a city (Rosenthal and Strange, 2004). This has given rise to the Marshall versus Jacobs or localisation (specialisation) versus urbanisation (diversity) debate. Localisation economies arise from the benefits of intra-industry agglomeration, while urbanisation economies generate benefits through inter-industry concentration (Knoben, 2009). Indeed, various studies (Henderson, 1986; Van der Panne and Van Beers, 2006; Boshuizen *et al.*, 2009) have attempted to identify whether Marshallian or Jacobain effects are strongest, however, the results have often been inconclusive (Beaudry and Schiffauerova, 2009).

Several quantitative studies summarized in Table 2.6 have addressed specialisation economies. Henderson (1986) finds significant evidence of localisation economies in both the United States and Brazil and little evidence of urbanisation economies. Cross (1981) found that sectoral specialisation is positively correlated with new firm formation. In a cross national comparison of regional variation in new firm formation Reynolds *et al.*, (1994) identified sectoral specialisation as one of two factors that consistently have a positive effect. Sectoral specialisation was measured by an index of sectoral concentration based on the share of the total workforce in major economic sectors. Reynolds (1994) analysis of labour market areas in the United States also highlighted the positive influence of sectoral specialisation using the same index for new firm formation in certain sectors.

Table 2.6. Agglomeration Variables Influence on Entrepreneurial Activity-Specialisation Measure.

Measure	Study	Effect
	Cross, 1991	+
	Reynolds et al., 1994	+
	Garofoli, 1992	+
Specialisation Economies	Garofoli, 1994	+
	Spilling, 1996	+
	Verheul *et al.*, 2009	+
	Arauzo-Carod and Viladecans-Marsal, 2009	+
	Tamasy and Le Heron, 2008	-

Other studies have considered industry rather than sectoral specialisation. For example, Spilling (1996) showed that a high share of regional employment in manufacturing, construction, retail, transportation and hotel and restaurant industries is positively correlated with new firm formation in that industry. Using a specialisation index measuring the concentration of employment in one subsector of manufacturing Garofoli (1992; 1994) found that specialisation had a positive influence on new firms in Italy. Similarly, Verheul *et al.,* (2009) found industrial districts in Italy have a significant effect on start-up rates in all industries reducing transaction costs and making firm entry easier than in other regions. Arauzo-Carod and Viladecans-Marsal (2009) report localisation economies have positive effects on new firms in all industries in Spain, while urbanisation economies only have positive effects on new firms in low and high technology industries. However, unlike Reynolds *et al.* (1994), Tamasy and Le Heron (2008) present mixed findings regarding the effects of specialisation in New Zealand. Specialisation economies had a negative effect on manufacturing firms but no effect on business services, indicating that the degree of competition in some instances may outweigh the advantages of agglomeration externalities.

As previously mentioned urbanisation economies are also an important determining factor related to the location of entrepreneurial activity. Urbanisation economies are the general advantage of large cities and, therefore, the advantages of inter-industry concentration, which include improved infrastructure, the wider range of commercial and financial consulting services and finally larger labour markets in comparison with industry or sector specific labour markets as is the case with specialisation economies. A number of quantitative studies have addressed the issue of urbanisation economies and are summarized in Table 2.7. Several studies have found that population density a proxy for urbanisation economies has a positive effect on entrepreneurial activity (Guesnier 1994; Keeble and Walker, 1994; Audretsch and Fritsch, 1994; Davidsson et al., 1994; Bosma *et al.,* 2008; Audretsch *et al.,* 2010). In their cross-national comparison of regional variation in new firm formation Reynolds *et al.,* (1994) concluded that urbanisation economies, measured by population density to be one of two variables that have a consistent significant positive effect among the six countries studied. In another cross-national comparison of eight countries Reynolds and Storey (1994) also identified urbanisation economies to have a positive significant effect on entrepreneurial activity in the majority of countries.

Table 2.7. Agglomeration Variables Influence on Entrepreneurial Activity-Urbanisation Measure.

Measure	Study	Effect
	Reynolds et al., 1994	+
	Reynolds and Storey, 1994	+
	Davidsson et al., 1994	+
	Guesnier 1994	+
Population Density	Keeble and Walker, 1994	+
	Audretsch and Fritsch, 1994;	+
	Bosma *et al.,* 2008	+
	Audretsch *et al.,* 2010	+

Therefore, although there is an acceptance that economic activity is not evenly distributed, there is significantly less agreement, as to the factors that cause the uneven distribution of economic activity. This is not surprising, as there are

considerable inconsistencies in the agglomeration literature reported in Section 2.3 with theories of specialisation, diversification and the level of competition all having been proposed as possible explanatory factors. Furthermore, empirical studies appear only to have confused matters further, having produced a number of inconsistent and contradictory findings. Nevertheless, clearly agglomeration in general terms is a significant factor influencing the location of economic activity and an area that we develop further in our own model in Section 2.6.

2.4.4 Policy and Cultural Factors

As a result of the perceived importance of entrepreneurship to dynamic innovative driven economies and the positive impacts entrepreneurship can have on economic growth, governments may try to influence the demand and supply for entrepreneurship. However, some studies suggest government intervention and interference with entrepreneurship policy does not always produce a positive relationship between the intended and actual outcomes. Reynolds *et al.* (1994) reports negative findings for policy initiatives proxied by local government expenditure, government assistance programmes and a separate but related variable 'political' ethos to hold little explanatory value. Nevertheless, Ashcroft *et al.* (1991) reveal a positive, but insignificant relationship between the number of enterprise agencies within a region and the number of new firm formations, while Keeble and Walker (1994) established that firm formation rates in the UK are higher in council areas with Conservative rather than Labour representatives. Nystrom (2008) empirically tested the effects of the regional institutional environment for start-ups in 286 Swedish municipalities finding that positive attitudes and municipalities governed by the right bloc have positive effects on entrepreneurial activity. Similarly, like Bjornskov and Foss (2008) and Okamuro and Kobayashi (2006) Nystrom also found that a large local government sector has a negative effect on new firm formation. The potentially limiting effect of Scotland's relatively large public sector on entrepreneurship is discussed further in section 3.5.3.

Table 2.8. Policy and Cultural Variables Influence on Entrepreneurial Activity-Policy Measures.

Measure	Study	Effect
Share of socialist run councils	Keeble and Walker, 1994	-
Local Government Expenditures	Reynolds et al., 1994	-
Number of Enterprise Agencies in Region	Ashcroft *et al.*, 1991	+
Size of Public Sector	Nystrom, 2008	-
	Bjornskov and Foss, 2008	-
	Okamuro and Kobayashi, 2006	-

Other than structural determinants of entrepreneurial activity, the environment in which new firms and current business is undertaken plays a vital role in promoting or weakening rates of entrepreneurship. Factors such as the fiscal environment, labour market regulations, administrative complexities, intellectual property rights, bankruptcy law, education and skills have all been highlighted as important determinants of entrepreneurial environments (Freytag and Thurik, 2007). While agglomeration, educational attainment, industry mix and access to capital have been widely explored in a number of the aforementioned studies, the entrepreneurial climate is essentially one dependent upon networks, personality and behaviour (Malecki, 1994).

Although "entrepreneurship has been regarded as a highly individualised and individualistic behaviour, individuals' decisions are shaped by societal and cultural institutions." (Aoyama, 2009, p496). Therefore, as this study argues the capacity for

entrepreneurship is influenced and shaped by an individual's local environment and the culture that exists towards entrepreneurship in that region. Moreover, according to Malecki (1994, p133) "the local entrepreneurial environment, or milieu, must be related to culture because there seems to be no other way to account for the fact some regions exhibit persistently lower levels of entrepreneurship". Stam (2009) argues the number of entrepreneurs within any locality is also a proxy indicating how well entrepreneurship is accepted. Indeed, one of the most widely recognized positive influences on entrepreneurial activity is regional firm size structure. The role of firm size structure is well documented in the literature (Keeble and Walker, 1994; Reynolds *et al.*, 1994; Garofoli, 1994; Guesnier, 1994; Davidsson *et al.*, 1994; Tamasy and Le Heron, 2008; Audretsch and Fritsch, 1994; Kangasarju, 2000; Armington and Acs, 2002; Lee *et al.*, 2004; Okamuro and Kobayashi, 2006; Audretsch *et al.*, 2010). The presence of a large number of small firms is the most commonly cited factor explaining regional variations in new firm formation (Allen and Hayward, 1990) and is likely to be explained by a higher spin-off rate for small rather than large firms (Johnson and Parker, 1996). Many entrepreneurs previously worked in small firms where they acquired relevant skills and gained exposure to role models in the form of other small business owners. Table 2.9 provides a summary of the studies addressing firm size structure.

Table 2.9. Policy and Cultural Variables Influence on Entrepreneurial Activity-Firm Size Structure.

Measure	Study	Effect
Small Firms as Percentage of All Firms	Reynolds, 1994	+
	Reynolds et al., 1994	+
	Guesnier, 1994	
	Audretsch and Vivarelli, 1996	+
	Audretsch *et al.*, 2010	+
Employment Share in Small Firms	Spilling, 1996	+
	Fritsch, 1992	+
	Garofoli, 1992	+
	Garofoli, 1994	+
Percentage Turnover in Legal Units of Less than £500,000	Keeble and Walker, 1994	+
Mean Establishment Size	Audretsch and Fritsch, 1994	-
	Kangasarju, 2000	-
	Armington and Acs, 2002	-
	Lee *et al.*, 2004	-

Most studies have detected a significant positive relationship between small firm dominance in a region and levels of entrepreneurial activity (Garofoli, 1992; Garofoli, 1994; Reynolds, 1994; Keeble and Walker, 1994; Fritsch, 1992; Spilling, 1996; Guesnier, 1994; Audretsch and Fritsch, 1994; Audretsch and Vivarelli, 1996). Conversely, Audretsch and Fritsch (1994) found the higher the mean establishment size the lower the firm formation rate is in a region. Comparative studies have also

highlighted the importance and the presence of small firms in new firm formation (Reynolds *et al.*, 1994). In a comparison of studies in France, Germany, Italy, Sweden, the United Kingdom and United States authors noted that in five out of six countries the proportion of small firms had a significant positive effect on the creation of firms. Overall, the presence of many small firms would appear to have a positive impact on entrepreneurial activity.

Furthermore, in line with Porter's cluster theory (Section 2.3.4) a number of recent studies identify the importance of networks to new firm formation, firm growth and survival (Hoang and Antoncic, 2003; Stuart and Sorenson, 2003; Parker, 2008; Lee and Jones, 2008; Morrison, 2008). These studies suggest the entrepreneurial capacity of a region is dependent upon people, especially those people who have access to external networks and role models. Access to networks is beneficial to the entrepreneurial process, as entrepreneurs are able to obtain key information and advice about local conditions (Hoang and Antoncic, 2003) and the ability to create opportunities in terms of their ability to acquire knowledge, finance and investment (Freeman, 1999). Moreover, in a study of regional variation in entrepreneurial activity and attitudes Bosma and Schutjens (2011) find that regional population density coincides with a low fear of failure among entrepreneurs, which suggests entrepreneurship is higher in climates where individuals know entrepreneurs, who in turn act as role models. We further develop the idea of role models and networks in relation to continuing entrepreneurial activity in section 2.6.

2.5 Summary

This section has provided a broad overview of the empirical literature addressing variation in entrepreneurial activity, which has helped provide a link between the existing theoretical literature and what has been written about the relationship between the explanatory variables found in the first part of this chapter and entrepreneurial activity. Regional differences in these factors are able to provide some explanation to help account for regional differences in entrepreneurial activity. These factors include demand-side variables including population, population changes, income and income changes. Supply-side factors include unemployment,

education/human capital and financial capital. Agglomeration factors such as localisation and urbanisation economies were also found to influence the location of economic activity, as were policy and cultural measures such as local government expenditures, number of enterprise agencies, size of the public sector and number of existing firms in a region.

However, almost all of the empirical studies surveyed in the previous section and the theoretical literature discussed in the first part of this chapter have focussed their attention on those factors that determine start-up activity or what in many cases they refer to as new firm formation. None have sought to address or understand locational determinants of growing small firms, which is rather surprising given the positive impact that growing businesses are likely to have on economic development and the emphasis that is now placed on growing small firms by governments and enterprise agencies. Therefore, in the next section a new more robust model of continuing entrepreneurial activity is advanced than has been developed thus far in the theoretical and empirical literature.

2.6 A Regional Model of Continuing Entrepreneurial Activity

There is an increasing awareness that entrepreneurial activity in not solely contingent on the individual, but takes place among a wide range of environmental and contextual factors, which make spatial proximity and the region increasingly important (Feldman, 2001; Sternberg 2009). Nevertheless, the review of both the theoretical and empirical literature in the previous sections has revealed that the vast majority of studies addressing the location of entrepreneurial activity have focused mainly on the locational determinants of new firms or the location of existing industry. Both the theoretical and empirical literature have mainly failed to address locational determinants of continuing entrepreneurial activity and/or what may also be referred to as small growing firms.

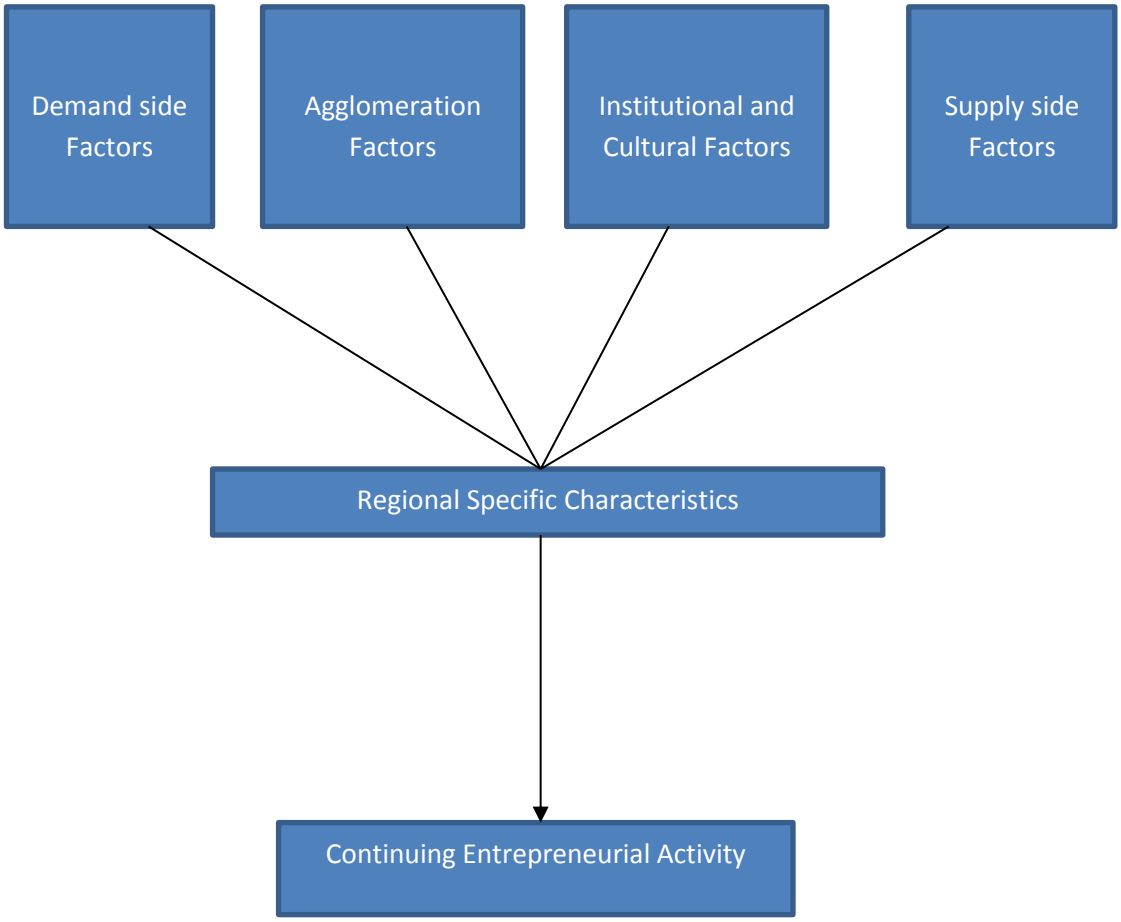
Therefore, in this section we are able to introduce a new robust model of locational determinants of continuing entrepreneurial activity than has been developed thus far in the theoretical and empirical literature. Of course, no one study could either

attempt or hope to achieve a unified theory of industrial/entrepreneurial location. Indeed that is why theoretical developments are generally the verdict of minor modifications and additions to existing theories and models rather than the result of a complete overthrow (Koestler, 1959; Kuhn, 1970). Therefore, true to this history of theoretical development, this study modifies and adds minor refinements to previous models of new firm formation by developing a theoretical model which can help explain regional variation in rates of continuing entrepreneurial activity in Scotland.

The model of continuing entrepreneurial activity developed in this study relates the emergence of growing firms to their local environment and the factors that influence that environment. By doing so the study is able to contribute by extending the current literature, which only addresses industrial location and new firm formation to include a model which can help explain the locational determinants of continuing entrepreneurial activity. This study specifically argues that differences in regional rates of continuing entrepreneurial activity are a reflection of region-specific characteristics and, therefore, entrepreneurial activity is predominately a regional event, whereby rates of entrepreneurship or the propensity for firms to grow are not only a reflection of individual preferences, but that those decisions are also shaped and influenced by region-specific factors.

The generalised version of the model discussed fully in section 3.5 consists of 4 major factors identified by the theoretical and empirical literature: (1) demand-side factors, (2) supply side factors, (3) agglomeration factors and (4) policy and cultural factors. In short continuing entrepreneurial activity is a function of socio-economic region-specific characteristics. The model is illustrated diagrammatically in Figure (2.5).

Figure 2.5 Model of Continuing Entrepreneurial Activity



The remainder of this section will outline each of the factors in the theoretical model outlined in Figure (2.5) describing and explaining their roles as determinants of continuing entrepreneurial activity in Scotland. A fertile economic environment for undertaking entrepreneurial activity is comprised of both demand-side and supply-side factors. Demand-side factors refer to market opportunities that exist for firms, while while supply-side characteristics focuses on a regions entrepreneurial capacity (Audretsch, 2002). Policy and cultural variables are important, as they often underpin the incentive structure of an economy and the extent to which an activity in legitimised by society.

2.6.1 Demand-side factors

As highlighted by the theoretical frameworks put forward by both Krugman (discussed in Section 2.3.3) and that of cumulative causation theory, which is closely aligned with Growth Pole theory (section 2.3.2) discussed earlier in this chapter demand conditions are likely to be important determinants of where any firm chooses to locate. Therefore, given firms generally tend to serve local markets, local market conditions are important, as entrepreneurs are likely to locate where markets are largest and where they can take advantage of economies of scale (Krugman, 1991). A number of factors will affect the level of demand for goods and services including the price of the goods and services, prices of related goods, consumer preferences, population and income (Samuelsson and Nordhaus, 1989). The first of these three factors are product specific. However, as highlighted by the earlier theoretical literature in this section the Regional Economics School has focused on two major factors: population and income, which are not product specific.

Researchers in the Regional Economic School have analysed the effects of demand in terms of population and income and changes in the level of demand on new firm formation. Therefore, in line with this approach, it is also possible to put forward the argument that high and increasing demand are likely to encourage not only individuals to start businesses, but also to take advantage of positive market conditions and create opportunities for the expansion of existing businesses. Accordingly, as Krugman's theory suggests individuals will look to pursue business expansion opportunities where demand conditions are good and their businesses are most likely to grow. Therefore, in line with the business cycle regions with growing demand conditions have more market opportunities and, therefore, more growing small firms than in regions with stagnant or depressed demand. To summarise this argument:

H1: High demand has a positive effect on the rate of continuing entrepreneurial activity.

2.6.2 Supply-side factors

Similar to new firm formation as reported by both the earlier empirical and theoretical literature regarding the location of industry the theoretical model put forward in this thesis also proposes that continuing entrepreneurial activity is likely to be affected by supply-side factors, which reflect the entrepreneurial capacity of a region. Regarding continuing entrepreneurial activity these factors include unemployment, levels of human capital and access to finance.

Unemployment

The relationship between unemployment and entrepreneurial activity is not clear. Indeed, there is considerable controversy in the Regional Economics School regarding the role of unemployment in relation to entrepreneurial activity, which can be best summarised by 'push' 'pull' theories.

On the one hand, 'push' theory suggest increasing levels of unemployment reduce the prospects for finding paid employment and as a result the expected returns from entrepreneurship become more attractive, pushing people into undertaking entrepreneurial activity (Storey, 1982; Storey and Johnson, 1987). Moreover, second hand capital becomes both cheaper and more readily obtainable, as business closures increase in a time of recession. Thus the recession-push hypothesis suggests that worsening economic conditions initiate previously dormant entrepreneurial ambitions, pushing individuals towards self-employment, as a result of an actual or likely negative change in labour market conditions.

On the other hand, according to 'pull' theory individuals are more likely to conduct entrepreneurial activity under conditions of economic expansion, when incomes are growing and opportunities are strong for market specialisation. Accordingly, therefore, there should be less confusion around the impact of unemployment on continuing entrepreneurial activity (the type of entrepreneurial activity under examination in this study). Put simply in line with push theory, high unemployment

will inhibit market demand for products, as low employment levels create less disposable income and, therefore, a lower level of demand for goods and services within a region. Similarly, higher unemployment will expose existing entrepreneurs to greater risk of falling incomes and possible bankruptcy. Therefore, our model dictates that:

H2: Increasing unemployment has a negative effect on the rate of continuing entrepreneurial activity.

Human Capital

Human capital has sometimes been viewed as the key variable that influences economic development (Lucas, 1988). Indeed, the supply of entrepreneurs has been strongly linked to the level of human capital that exists within a region, albeit there is far less agreement on what actually constitutes human capital given the wide number of measures of human capital that have been used in the empirical literature. Nevertheless, if we follow Schultz theoretical argument that human capital is viewed mostly as the capacity of the entrepreneur to adapt in order to deal with disequilibrium, as discussed in section (2.2.3) or more generally, with situations in which there is a changing environment, human capital is about return to ability, which in turn is reflected by an entrepreneurs level of education or human capital.

It is plausible, therefore, to make an argument that a regions stock of human capital is likely to influence both the propensity of an individual to start a business and the likelihood that firms will be attracted into regions with high skill levels and by definition a higher stock of human capital. Thus in our theoretical model of continuing entrepreneurial activity, if we follow Schultz argument, it is likely that more educated populations provide greater human capital, embodied in their general and specific skills, for implementing new ideas; not only for creating new business, but also growing existing businesses. Furthermore, regions with a rich stock of human capital can generate environments rich in local spillovers, which also support another mechanism by which existing businesses can grow and be sustained. Therefore, we can hypothesise that:

H3: Higher human capital has a positive effect on the rate of continuing entrepreneurial activity.

Access to Finance

Financial constraints on the growth of new ventures have received much attention, with access to finance an often-cited factor in entrepreneurial development (Shapero 1984, Gatewood and Hoy 1989). Indeed, the likelihood and practical reality of both starting and growing a business is often constrained by the availability of finance.

However, whereas most start-up funding comes from an entrepreneurs personal savings and bootstrap capital from family and friends (Morky, 1988; Mason 1991) debt capital is the most likely source of external financing among small growing firms, even though there are barriers associated with debt financing for small firms, such as collateral guarantees required in order to obtain financing from banks and the higher interest rates charged to smaller firms (CFIB, 2001). Nevertheless, despite these restrictions debt financing as opposed to equity financing is the preferred method of raising finance for business expansion, as small business do not want to lose control of their firms, even if that comes at the expense of the growth of the firm (Equinox, 2000).

Therefore, following resource based theory which argues that an entrepreneur will start a business when he has sufficient resources to do so (Cooper *et al*. 1994, Cooper 1992, Penrose 1959, Braunerhjelm, 2007) in our model of continuing entrepreneurial activity we reasonably argue that the wealthier a region is the easier it is to acquire capital to support business expansion. For example, regions endowed with relatively high levels of per capita financial assets are more likely to be areas where access to debt capital is comparatively easy (Garofoli, 1994: Sutaria and Hicks, 2004). Such pools of capital are available not only for new start-ups but also for the expansion of existing businesses. Therefore, given the positive links between wealth and the availability of start-up capital based on the collateral an entrepreneur can offer, there is strong reason to believe access to capital will influence the supply of continuing

entrepreneurial activity, whereby the wealthier a region is the easier it should be to obtain finance. Therefore, we hypothesise that:

H4: Rates of continuing entrepreneurial activity are higher in regions with greater levels of personal wealth.

2.6.3 Agglomeration Factors

Basic observation tells us that economic activities are clustered in space (Marshall, 1920; Schumpeter, 1934; Perroux, 1955; Krugman, 1991). Indeed, the large body of theoretical and empirical studies (emanating from the Regional Economics School) reviewed in the early part of this chapter clearly highlighted that both the location of industry and new firm formation is likely to be influenced by a range of external agglomeration factors. Our theoretical model similarly advocates that the benefits of agglomeration or centrifugal forces as Krugman (1991a) puts it will have a positive effect on continuing entrepreneurial activity, as growing firms will attempt to take advantage of pecuniary and non-pecuniary externalities such as access to a pool of well qualified labour, the existence of specialised suppliers and knowledge spillovers, thus allowing them to lower transaction and transportation costs and ultimately benefit from increasing returns in order to remain competitive. However, in addition to identifying whether agglomeration economies have a positive effect our model will for the first time attempt to identify whether continuing entrepreneurial activity is driven by (Jacobian) urbanisation economies; externalities arising from the variety of general economic activity in a location, or (Marshallian) specialisation economies, which are industry specific benefits arising from the close geographical proximity of firms in the same industry. Therefore, at this stage although our model predicts agglomeration economies have a positive effect on continuing entrepreneurial activity we cannot say whether continuing entrepreneurial activity is driven by specialisation economies or urbanisation economies. However, we hypothesise that:

H5: Economic agglomeration has a positive effect on rates of continuing entrepreneurial activity.

2.6.4 Institutional and Cultural Factors

Mason (1991) highlighted that culture is relevant to entrepreneurship from two perspectives. Firstly, it gives an indication of attitudes towards entrepreneurship among the local population and secondly the extent to which local institutions are supportive in terms of political leadership.

Similar, to Etzioni (1987) our theoretical model of continuing entrepreneurial activity advocates like Etzioni that the demand and supply for entrepreneurship in a region is a function of how well it is accepted and legitimised by society and, thereby, the more supportive a society is towards entrepreneurial activity the more frequent but less disruptive the process of entrepreneurship is.

Therefore, the institutional context is important as political and economic institutions underlie and determine the incentive structure of an economy (North, 1991) which in turn can either encourage or hinder an entrepreneurial culture. Given that 28%[2] of Scotland's workforce is employed in the public sector and, therefore, not in private sector profit seeking businesses, this makes it less likely that public sector workers will be exposed to the skills required to run and grow a small business and may help explain why Scotland has historically lagged behind other UK regions in both entrepreneurial activity and economic growth. Therefore, it can be expected that an institutional environment characterized by a large public sector will negatively impact the rate of continuing entrepreneurship.

H6: A large public sector will be negatively associated with the rate of continuing entrepreneurial activity.

Furthermore, social and cultural norms will also influence the number of people who have already undertaken entrepreneurial activity in a region (Etzioni, 1987). Therefore, it is likely that entrepreneurship will be influenced by the way the local

[2] Figures taken from the Annual Population Survey and Annual Labour Force Survey based on local Authority figures for those aged 16-64.

population perceives the economic climate with higher rates of entrepreneurship acting as an indicator of positive attitudes and opportunities for entrepreneurial activity, while lower rates of entrepreneurship is likely to reflect a negative and pessimistic views towards entrepreneurship. In particular, therefore, there is good reason to believe the presence of a large existing small business population will imply a positive attitude and culture towards entrepreneurship, whereby existing firms are able to act as seedbeds and incubators for entrepreneurs looking to grow their businesses. Furthermore, our theoretical model argues a large small business population allows growing businesses to build contacts and develop relationships which help facilitate the exchange of information relating to various aspects of their business with increased access to a variety of relevant and reliable information, thereby helping to improve the speed and quality of decision making processes within a business, and thus increasing their prospects for growth. Therefore, our model predicts that the number of existing entrepreneurs within a region acts as a proxy for entrepreneurial culture. It is expected, therefore, that a region with a positive culture towards entrepreneurship is more likely to have higher rates of continuing entrepreneurial activity. With these arguments in mind, it is hypothesised that:

H7: A large proportion of small firms have a positive effect on rates of continuing entrepreneurial activity.

This section has laid out the theoretical framework for explaining regional variation in rates of continuing entrepreneurial activity in Scotland. Figure 2.5 at the beginning of the section summarizes the theoretical model. With this in mind, the next chapter lays out the research design adopted in this study to explain regional variations in continuing entrepreneurial activity. It explains both the quantitative and qualitative methods used to test the hypotheses presented in this section.

2.7 Summary

In an attempt to better understand spatial determinants of continuing entrepreneurial activity this chapter provided a review of the theoretical and empirical literature addressing entrepreneurial activity. This included a theoretical review of both the Entrepreneurship (section 2.2) and Regional Economic Schools (section 2.3).

Following this review and from the empirical literature (reviewed in section 2.4), it was possible to identify a number of different variables that were subsequently developed into a theoretical framework (section 2.6) in order to help explain for the first time regional differences in rates of continuing entrepreneurial activity in Scotland. Further details of the methodology used to test the theoretical framework identified in section 2.6 can be found in Chapter 3.

3. Methodology

3.1 Introduction

As stated in Chapter 1 the principal aim of this thesis is to explain regional variation in rates of continuing entrepreneurial activity in Scotland. It is the aim of this chapter to describe the research approach and methods used in this study. Although this study adopts a deductive philosophy, which allows the researcher to empirically test the research hypotheses outlined in section 2.6 the study adopts a sequential mixed method approach to data collection and analysis by incorporating both a quantitative (Chapter 4) and qualitative phase (Chapter 5) to ensure the research findings are valid, replicable and generalizable. Moreover, adopting a mixed method approach allows the researcher to gain a more detailed understanding of the key issues influencing continuing entrepreneurial activity in Scotland and produce a set of results that are more robust than if either quantitative or qualitative methods had been used alone.

The forthcoming chapter discusses in detail the methodological choice and research design process of this study. Specifically, it explains why mixed method research is considered appropriate for the purposes of this study. This is followed by a discussion of the data and methods used to model and explain regional variation in rates of continuing entrepreneurial activity in Scotland.

3.2 Research Approach

Given the requirement of this study to identify a set of predictors on the basis of the theoretical and empirical literature in Chapter 2, which can explain spatial determinants of continuing entrepreneurial activity, the research methodology adopted in this study is deductive. A deductive methodology is most commonly

associated with scientific enquiry which is concurrent with the use of quantitative data and statistical analysis. Quantitative research is "the type of research that is based on the methodological principles of positivism...and adheres to the standards of a strict research design developed prior to the actual research. It is applied for quantitative measurement and hence statistical analysis is used" (Adams *et al.*, 2007, p26). Therefore, a research approach based on deduction allows the researcher to study the existing literature and on the basis of existing knowledge construct research hypotheses (section 2.6) which can be empirically tested to understand phenomena about which little is known and produce a set of results that are objective, valid and replicable. A deductive approach also allows the researcher to identify cause and effect linkages that are used to better develop and understand a particular research discipline (Merriam, 1991). Therefore, "one of the most important functions of empirical research is to contribute to the development and refinement of theory and that theory enhances the goals of science" (Frankfort-Nachmias and Nachmias, 1992, p36).

However, there is a danger of overreliance on quantitative approaches to explain complex phenomena, which could mean that important variables are ignored limiting the relevance of the research findings (Guba and Lincoln, 1994). Furthermore, the knowledge produced may be too abstract and general for direct application to local contexts and environments (Johnson and Onwuegbuzie, 2004). This is an important consideration in the context of this study given the very limited amount of literature analysing regional aspects of entrepreneurship in Scotland. In order to circumvent the weakness of only using quantitative methods to explain complex phenomena, it is common to combine both quantitative and qualitative methods of data collection (Creswell and Clark, 2007; Reid 1993; Reid 2007) to gain a more detailed understanding of a research problem. In this study the initial quantitative analysis (Chapter 4) is followed by 39 semi-structured qualitative interviews (Chapter 5) with individuals involved in the design, implementation and analysis of enterprise policy in Scotland. Combining both quantitative and qualitative methods allowed the researcher to test the validity of the theoretical framework (section 2.6) and follow-up the significant statistical findings in order to gain a more advanced understanding about the influence of those variables in the context of Scottish entrepreneurship,

which is not possible from the statistical analysis or existing empirical literature related to entrepreneurial activity.

Therefore, the purpose of the following chapter is to advance the argument for applying mixed methods to the analysis of locational determinants of continuing entrepreneurial activity in Scotland.

3.3 The Use of Mixed Method Research in this Study

In undertaking a piece of research, the researcher should make a methodological choice, which is influenced by his/her philosophical assumptions. More importantly, the methodological choice is determined by the nature and content of the research phenomenon, as well as the extent of the available resources (Gill and Johnson, 2002). In this study, the adoption of a mixed methods research design is influenced by the researcher's philosophical assumptions, outlined in the previous section and the observed gaps in the extant literature, namely that, as discussed in Chapter 2 although a relatively large amount of empirical research has been conducted in the field of entrepreneurship generally, there is a dearth of empirical evidence addressing locational determinants of continuing entrepreneurial activity, with no models thus far in the existing empirical literature that can serve the purpose of explaining regional variation in continuing entrepreneurship in Scotland.

Therefore, given that no model has been developed until this point in the study of continuing entrepreneurial activity the researcher believes that for the purposes of validity it is difficult to rely solely on quantitative approaches alone to explain complex, and as of yet, a relatively unexplored area. In order to circumvent the weakness of only using quantitative methods to explain complex phenomena, the researcher argues that it is better to use mixed methods research that combines quantitative and qualitative methods to investigate determinants of continuing entrepreneurial activity in this study. Thus, although it is less common by scholars in the field of economics to use mixed method research with a few exceptions such as Lerner and Merges (1998), Reid (1993; 2007) and Turney *et al.,* (2006), it is increasingly common to combine both quantitative and qualitative methods of data

collection (Creswell and Clark, 2007) to gain a more detailed understanding of a research problem, and this, therefore, is the same rationale for combining mixed methods in this research study.

Driven by this methodological viewpoint and motivated by the observed gaps in the entrepreneurial literature the researcher argues that knowledge about determinants of continuing entrepreneurial activity should be obtained in both quantitative and qualitative form to provide a more robust and comprehensive explanation of the research issue. Indeed, as Jogulu and Pansiri (2011, p688) point out, "divergent findings created through differing data collection and analysis techniques appear to lead to greater depth and breadth in overall results, from which researchers can make more accurate inference with increased credibility".

As will be discussed and described later in this chapter the quantitative phase of this study uses a number of proxy variables developed from the theoretical framework in section 2.6 in order to test the research hypotheses developed in the previous chapter. Following the quantitative phase a sequential qualitative phase is introduced in the form of follow-up semi-structured interviews to validate and gain additional depth about determinants of continuing entrepreneurial activity in Scotland.

3.3.1 Mixed Methods Rationale

The term 'mixed methods' can be defined as a procedure of collecting, analysing, and integrating both quantitative and qualitative data within a single investigation (Bryman, 2007; Tashakkori and Creswell, 2007). This definition, therefore, distinguishes mixed methods studies from multi-method studies incorporating only quantitative components or only qualitative components, and from studies which incorporate both quantitative and qualitative components but with no evidence of 'mixing' (Bryman, 2007; Teddlie and Tashakkori, 2009).

It is argued that both quantitative and qualitative research has strengths and weaknesses, and combining different approaches is likely to result in complementary strengths and non-overlapping weaknesses (Johnson and Onwuegbuzie, 2004). Greene *et al.* (1989) also maintain that all methods have inherent biases and

limitations, so use of different methods that have offsetting biases to assess a phenomenon has the potential to enhance the validity of inquiry results.

In practice, researchers who use different methods in a single study may have certain purposes. For example, a common purpose is to take advantage of triangulation (Greene *et al.*, 1989). As Jick (1979) has pointed out, triangulation provides researchers with opportunities such as allowing them to be more confident in their results; helping to refashion old theory or develop new theory by uncovering the deviant dimension of a phenomenon; and leading to integration of theory. Jogulu and Pansiri (2011) indicate that triangulation will strengthen the findings, and as a result, mixed methods researchers can make better inferences by employing multiple techniques.

However, apart from triangulation, there are other possible benefits of mixed methods research. Creswell (2003a) for example notes that mixed method design serves purposes beyond triangulation, to include the convergence of results across qualitative and quantitative methods. It involves strategies for collecting and analysing both forms of data in a single study. Creswell *et al*. (2003b, pp223-229) provide four main reasons for combining both qualitative and quantitative methods within a study. These include:

1. elaborating on or explaining quantitative findings with qualitative data
2. using qualitative data for developing a theory, or a new instrument for measurement
3. comparing both qualitative and quantitative data to come up with well-validated conclusions
4. enhancing a study with a set of supplemental data, either quantitative or qualitative.

In this study the rationale for adopting a mixed methods approach was driven by the need for both quantitative and qualitative methods to fully explore locational determinants of continuing entrepreneurial activity for the first time. The use of quantitative methods was chosen to first demonstrate ‘what’ determinants and more specifically what significant relationships exist between region-specific socio-economic factors and continuing entrepreneurial activity. The use of qualitative methods was then selected to validate and explore ‘how’ and ‘why’ these

relationships might exist and whether what was identified by the quantitative analysis is recognised by professionals/opinion formers working in the field at local authority level. Therefore, by using quantitative and qualitative methods in combination, the study sought to provide a more comprehensive understanding of the research topic than could be achieved having used either method alone (Morse, 2003; Creswell and Plano-Clark, 2007). Furthermore, the mixing of quantitative and qualitative methods in this study demonstrates how the contextual nature of qualitative findings can be used to complement the representativeness and generalizability of quantitative findings (Greene and Caracelli, 2003).

Therefore, by employing mixed methods, this study is able to compare findings obtained through different instruments and cross check these findings. Subsequently, it is possible to match the statistical relationships found from the quantitative hypotheses testing with subjective descriptions and explanations that are obtained from interviews with participants. By doing so, the researcher can "make inferences with confidence" (Jogulu and Pansiri, 2011, p689). It enhances the study with the advantages of both quantitative and qualitative data, as different perspectives can be gained from the different types of data.

3.3.2 Sequential explanatory mixed methods design

A great deal of attention has been paid to the classification of mixed methods design since the end of the 1980s (Creswell and Plano Clark, 2007)[3]. For example, Tashakkori and Teddlie (1998) generate three different types of mixed method designs: (1) equivalent status designs (sequential or parallel); (2) dominant/less dominant designs (sequential or parallel); and (3) multilevel use of approaches. Creswell and Plano Clark (2007) classify that there are four major types of mixed methods designs: triangulation design, embedded design, explanatory design, and exploratory design.

The various classifications of mixed method designs seem to suggest that there may be an infinite number of design options. However, although different features have been emphasized and different names have been given, there are more similarities than differences among these classifications, in which certain issues are involved in all of them (Creswell and Plano Clark, 2007). These issues are important for every piece of mixed methods study, and need to be carefully taken into account at the research design stage. Such issues include (1) the sequence of the data collection and analysis, (2) the priority or weight given to the quantitative and qualitative study, and (3) the stage/stages in the research process at which the quantitative and qualitative phases are connected and the results are integrated (Morgan, 1998; Ivankova *et al.*, 2006; Creswell and Plano Clark, 2007). In this section, the decision-making process of this study will be addressed in light of these issues, namely timing decision, weighting decision, and mixing decision.

As highlighted a wide range of approaches to combining quantitative and qualitative methods using mixed methods research has been identified in the literature (Tashakkori and Teddlie, 2003; Bryman, 2006). The mixed methods research design best suited to meet the research objectives of the current study was a sequential explanatory design (Ivankova *et al.*, 2006), also known as a sequential mixed design or qualitative follow-up design (Morgan, 1998; Teddlie and Tashakkori, 2009). The

[3] Creswell and Plano Clark (2007) summarize the range of previous classifications of mixed methods design, and provide a list of 12 classifications (see page 60 in their book).

purpose of this design is to use qualitative data to enrich and/or validate and expand upon findings generated using quantitative data (Creswell and Plano Clark, 2007).

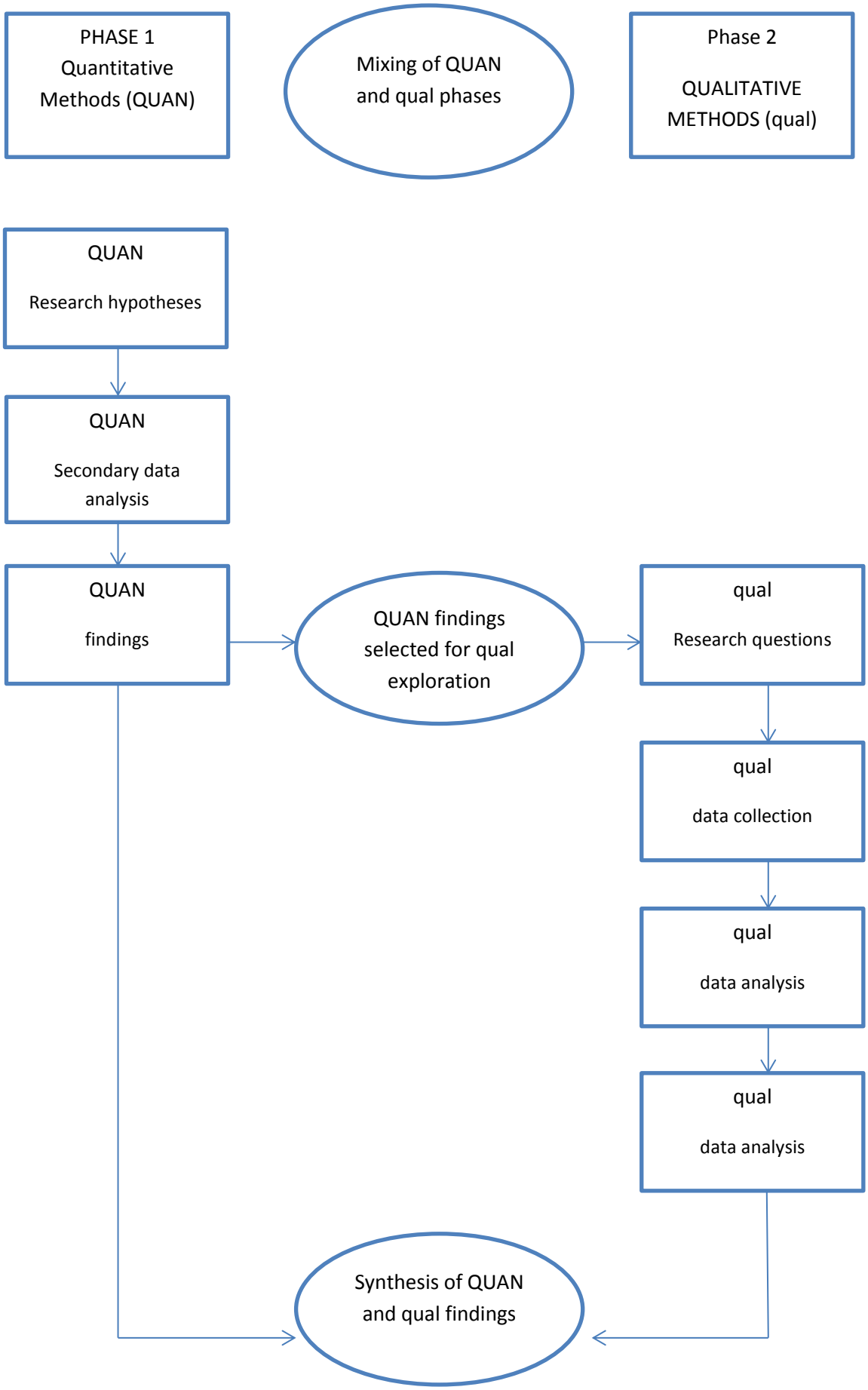
The sequential explanatory design incorporates two phases of data collection and analysis conducted in a quantitative, then qualitative sequence (Ivankova *et al.*, 2006). In the first phase of the study, quantitative data are collected and analysed to provide a general understanding of the research problem. In the second phase of the study, qualitative data are collected and analysed to provide validation and where possible further explanation of the findings identified in the initial quantitative phase (Teddlie and Tashakkori, 2009). The quantitative and qualitative methods are mixed at the intermediate stage between the two phases, where significant quantitative findings are selected for further qualitative explanation and used to inform the design of the qualitative phase. Further mixing then occurs following the collection and analysis of the qualitative data, where findings from both the quantitative and qualitative phases are synthesised to provide a more comprehensive picture of research problem.

In the current study, a sequential explanatory design was employed to examine locational determinants of continuing entrepreneurial activity across all 32 local authority regions in Scotland. In the first (quantitative) phase of the study, a series of econometric models are tested based on the theoretical framework outlined in section 2.6 to identify any relationships between socio-economic region-specific factors and their impact on regional rates of continuing entrepreneurial activity. A subset of statistically significant variables was identified for further exploration using qualitative methods. Building on these quantitative findings, the second (qualitative) phase of the study explored and sought to validate the explanatory factors perceived to underlie these variables with at least one person of authority/opinion former from each local authority in Scotland. As discussed further in Section 3.8 this was achieved through semi-structured interviews carried out with a sample of local authority representatives from each of Scotland's 32 local authorities who are involved in influencing and implementing entrepreneurial policy and services at a local level in Scotland. Findings from the quantitative and qualitative phases of the study were then synthesised to provide a comparative and deeper understanding of locational determinants of continuing entrepreneurial activity in Scotland.

A visual model of the study design is presented in Figure 3.1 to help illustrate the sequence of quantitative and qualitative methods and stages at which the methods were mixed (Ivankova *et al.*, 2006; Creswell and Plano Clark, 2007). The QUAN (quantitative) and qual (qualitative) terms incorporated in the model are derived from the mixed methods notation system developed by Morse (1991). Here, the use of uppercase and lowercase letters is used to signify whether one of methodological components has priority (e.g. QUAN → qual) or whether both have equal weighting (e.g. QUAN → QUAL). In sequential explanatory designs, the initial quantitative component of a study is typically given the dominant status (QUAN) over the smaller proceeding qualitative (qual) component, as is the case in the current study (Morgan, 1998; Ivankova *et al.*, 2006). However, depending on the research aims, researchers may instead give priority to the qualitative phase (Ivankova and Stick, 2007), or give equal priority to the quantitative and qualitative phases (O'Cathain *et al.*, 2007).

Reflecting the sequential design of this study, the quantitative and qualitative phases and mixing stage of the study are presented in the thesis in three consecutive chapters. Phase I of the study is presented in Chapter 4 and reports full details of the quantitative methods and outlines the quantitative findings identified for further qualitative exploration. Phase II of the study is then presented in Chapter 5 and reports full details of the qualitative data, followed by a synthesis of the qualitative and quantitative findings in Chapter 6.

Figure 3.1. Visual model of the current mixed methods study design.



This section has provided a broad overview of the research approach, purpose and the rationale for using mixed methods research in the current study. The central aim of the study is to identify locational determinants of continuing entrepreneurial activity in Scotland in order to better explain regional differences in rates of continuing entrepreneurial activity for the first time. Figure 3.1 highlighted the sequential explanatory design to be followed in this study, which incorporated two phases of data collection and analysis conducted in a quantitative, then qualitative sequence. The remainder of this chapter present the methods and variables for the initial quantitative phase (Chapter 4) and the sample and interview questions used in the qualitative phase (Chapter 5) of this mixed methods study.

3.4 The Quantitative Phase (Data and Methods)

This section of the thesis describes the quantitative research design and methods used to test the proposed model of continuing entrepreneurial activity identified in Section 2.6. The first half of this section provides an overview of the empirical variables to be tested including the operationalization of both the dependent and independent variables and data sources used. The second half of this section focuses on the data analysis strategy outlining the econometric techniques which are used to test our research hypotheses and more precisely concentrates on the panel data techniques employed in the quantitative phase in Chapter 4.

3.5 The Empirical Model

Here we develop and operationalize our theoretical framework of continuing entrepreneurial activity, outlined in Section 2.6 by describing and discussing the data and variables used to empirically test our research hypotheses.

Indeed, as revealed by our review of the literature in the previous chapter there have been a substantial number of studies addressing determinants of entrepreneurial activity. However, our review of the empirical and theoretical literature identified

that the vast majority of studies addressing the location of entrepreneurial activity have focused on the determinants of new firms or the location of existing industry. Moreover, it is quite apparent that the theoretical and empirical literature have mainly ignored and failed to address locational determinants of continuing entrepreneurial activity and/or what may also be referred to as small growing firms.

In order to address these shortcomings we put forward a theoretical framework in Section 2.6, which seeks to explain locational determinants of continuing entrepreneurial activity. In short our study argues that continuing entrepreneurial activity is a function of socio-economic region-specific characteristics. Thus our study is able to contribute by extending the current literature, which only addresses industrial location and new firm formation to include a model which can help explain the locational determinants of continuing entrepreneurial activity in Scotland for the first time.

The generalised version of the theoretical framework and research hypotheses outlined in Figure 2.5 consisted of 4 major factors identified by the theoretical and empirical literature: (1) demand-side factors, (2) supply-side factors, (3) agglomeration factors and (4) policy and cultural factors. The theoretical framework outlined in the previous chapter which we develop more robustly into an empirical model in this chapter can be expressed as:

Continuing Entrepreneurial Activity = f (demand-side factors, supply-side factors, agglomeration factors, institutional and cultural factors)

The following sections describe the dependent variable and independent variables used as proxies for those factors outlined in our theoretical framework (Section 2.6) in terms of the data and methods used.

The explanatory variables are represented by at least one specific indicator and reflect specific regional factors predicted to account for continuing entrepreneurial activity in the context of Scotland. Following a review of the literature (Reynolds (1994; Johnson and Parker, 1995; Sutaria and Hicks, 2004) it was deemed appropriate to include one-year lags into all variables, as decisions to start a business are in part a reflection of what has happened in the past. In other words entrepreneurship is a complex issue dependent upon a range of factors, whereby

entrepreneurs do not react or are not able to establish, grow and expand businesses instantly.

3.5.1 The Dependent Variable: Continuing Entrepreneurial Activity

The indicator of *continuing entrepreneurial activity* used in this study is the annual rate of new VAT registered firms for the period 1998-2007. The VAT registration data used in this study is publicly available from the Department for Business Innovation and Skills. While VAT data is available for 2008 onwards, it is excluded from this study for consistency purposes. From 2008 VAT data was subject to a methodological change, as a result of regulatory changes implemented by Eurostat, requiring the Office of National Statistics (ONS) to include PAYE firms. This means that the historical VAT register no longer exists and has now been replaced by the ONS 'Business Demography' publication, which must now include firms that are not only VAT registered, but that are also employers, even if they are below the VAT threshold. Similarly, the start period for the data (1998) is a reflection of data restrictions with many of the explanatory variables, which prevents the creation of a longer panel data set.

That said VAT registration statistics are the most comprehensive statistical measure of continuing entrepreneurial activity available in the UK and have been employed in a number of studies related to entrepreneurship (Ashcroft *et al.*, 1991; Keeble and Walker, 1994; Gleave and Mitra, 2010; Ross *et al.*, 2012). The number of VAT registrations in a region indicates the general health of a business population and in addition to being used in academic studies is widely used in regional and local planning (Ball, 2007). For the purposes of this study the VAT register provides annual data to map patterns and trends in rates of continuing entrepreneurship from 1998-2007 and acts as the dependent variable in all models.

With over 2 million listed businesses the VAT register represents nearly 99% of UK economic activity (Office of National Statistics, 2011). However, the Inter-Departmental Business Register (IDBR) estimates there are 4.3 million enterprises in

the UK. Therefore, while VAT registration and deregistration, do provide trends in levels of growing small businesses, they are likely to underestimate the total number of small growing businesses and as a result should be treated with some caution. A number of issues arise when using VAT registrations as a measure of continuing entrepreneurship. Firstly, and most significantly, a large number of growing firms will not pass the VAT threshold of £73,000 and will, therefore, not register for VAT and will not be classified as a growing business. This is an important observation given that some recent evidence suggests the majority of new jobs are created by small growing firms (Botham and Graves, 2011) and that small firms are the source of creative destruction (Derbyshire and Haywood, 2009), yet many of these small growing firms do not officially exist because they do not surpass the VAT threshold. Furthermore, firms also have an incentive not to register for VAT thus avoiding the cost of administering the collection and payment of such a tax and the idea of small firms underestimating their turnover by using cash payment are well established (Keen and Smith, 2007), which again is likely to underestimate the actual number of small growing firms. There are also issues around firms that trade in non-rated goods (e.g., book companies, the producers of food and children's clothing firms) and others whose business is focused primarily on the employment of labour, e.g. construction, as these firms often do not register for VAT (Keeble, 1990; Westhead and Moyes, 1992) and, therefore, may be excluded from the count of continuing entrepreneurial activity.

However, Johnson and Conway (1997, p413) do state the "relative comprehensiveness, their 'official' status, and the regularity with which they are collected, give them a powerful advantage, despite their limitations". Similarly, Keeble and Walker (1994, p413) acknowledge the limitations of the data but, also state the data "represents the most up-to-date, comprehensive, reasonably long-term and spatially disaggregated data source currently available for such investigation". The register also captures companies, which exceed a certain annual turnover threshold, which acts as a proxy for both company size and growth potential. In general the main advantage of making use of this data set is that it is unobtrusive and can provide comparative and contextual data at a number of disaggregated levels including: the UK, country, by Government Office Region and local authority level.

3.5.2 Standardising the Dependent Variable

As a result of differences in population and region size, it is necessary to standardise the dependent variable (Storey and Johnson, 1987; Ashcroft *et al.*, 1991; Keeble and Walker, 1994; Armington and Acs, 2002; Sutaria and Hicks, 2004; Gleave and Mitra, 2010; Ross *et al.*, 2012). The entry rate (dependent variable) can be standardised by two approaches: the *'labour'* market approach and by the stock of existing businesses, which is widely referred to as the '*ecological'* approach in the academic literature. The labour market approach standardises the number of new entrants relative to the size of a regions population and/or workforce. The benefit of this approach is that it can indicate a regions entrepreneurial potential, based on the assumption that entrepreneurial activity is most likely to arise from the actions of an individual/individuals within a given region (Sutaria and Hicks, 2004; Gleave and Mitra, 2010; Cheng and Li, 2010). Alternatively, the ecological approach standardises entrants relative to the stock of existing businesses. Selecting an appropriate method can be crucial, as alternative methods often produce differing results.

Indeed both the labour market and ecological approaches have attracted criticism, as a result of contradictory findings and a weak conceptual basis, depending upon which method of standardisation is used (Audretsch and Fritsch, 1994; Garofoli, 1994; Love, 1995). While Audretsch and Fritsch report the conflicting signals as '*disappointing'*, Love (1995, p154) is less concerned arguing "the results need not be considered discouraging, because the labour market approach can be shown to be completely and practically superior to the ecological approach".

The conceptual weakness of the ecological approach or standardising the entry rate by the existing business stock is the assumption that businesses arise as a result of existing ones. While this may be true to an extent, Ashcroft *et al.* (1991, p396) highlights a greater weakness in that if "the stock of existing businesses reflects the firm formation rate of the past, and thus if a particular region suffered from a low firm formation in the past, the use of [this] method would result in the present rate being artificially inflated". While Ashcroft makes a valid point regarding artificial

inflation a number of studies investigating path dependency (Mueller and van Stel, 2008; Andersson and Koster, 2011) in entrepreneurship reveal the stock of existing business serve as role models, acting as an important source of information for potential entrepreneurs during start-up and expansion.

However, the labour market approach also has a number of limitations (Ashcroft *et al.*, 1991; Audretsch and Fritsch, 1994; Garofoli, 1994; Love, 1995). First, while the labour market approach is appealing conceptually, based on the assumption, that each business will be started and developed by an individual (either employed or unemployed), its main weakness is the assumption that the entrepreneur grows their business in the same labour market within which the existing firm operates (Audretsch and Fritsch, 1994). However, this assumption is not entirely realistic given that it is not unlikely for an entrepreneur to run a business outside the region in which they live, especially when specialised inputs are required (Audretsch and Fritsch, 1995). Furthermore, it is not uncommon for entrepreneurs to spin-off businesses outside the industry in which they once worked.

While the labour market approach has some clear limitations, Ashcroft *et al.* (1991) and Love (1995) argue the alternative business stock approach is not appropriate conceptually, as the denominator fails to satisfy two criteria. First, there is no conceptual relationship with what is being researched and, therefore, the denominator does not represent the source from which firms are most likely to come (Ashcroft *et al.*, 1991). Second, Love (1995) highlights to be an objective indicator of scale the denominator should be exogenous to the numerator. While "it can be shown that the labour market… rate possesses both of these characteristics… the ecological approach possess neither." (Love, 1995, p156).

On the basis of the above critique and given that this study is concerned with the role of the regional entrepreneurial environment in influencing individuals to undertake an entrepreneurial act, it would be most appropriate to measure continuing entrepreneurial activity standardised by the labour market approach, as conceptually businesses are most likely to be created and grown by the actions of an individual/individuals. Yet the critique demonstrates that both the labour market and business stock approaches are limited conceptually, which is further emphasised by the contradictory findings of previous studies (Audretsch and Fritsch, 1994; Garofoli,

1994; Love, 1995). Therefore, it is inappropriate to simply dismiss either method of standardisation at this stage given what has been identified in previous findings, but more appropriate to apply both methods of standardisation in a Scottish context to identify any differences in results. This is appropriate because the research is concerned with identifying determinants of continuing entrepreneurship and, therefore, the causes of spatial variation in continuing entrepreneurial activity in Scotland, an area to date, which has received limited attention. Furthermore, given the conflicting results that are associated with both standardisation methods, dismissing one method may dismiss potential policy implications given each standardisation method is prone to producing different results. For this reason the regression models in Chapter 4 are run with rates of continuing entrepreneurial activity standardised by both the population (labour market approach) and stock of existing businesses.

The next section describes the explanatory variables and indicators used in the quantitative analysis. The following sections explore each of the explanatory variables and the different operationalization of each.

3.5.3 The Independent Variables

The generalised version of the theoretical framework outlined in Figure 2.5 and research hypotheses consisted of 4 major factors: (1) demand-side factors, (2) supply side factors, (3) agglomeration factors and (4) policy and cultural factors. The following section expands upon each of these underlying 4 factors and presents the specific indictors used in the empirical model presented in the previous chapter. In total 10 specific indictors summarised in Table 3.1 were used to assess the 4 major factors outlined in our theoretical framework in section 2.6. Their choice reflects both the availability of suitable data and informed judgement regarding processes likely to have a major impact on continuing entrepreneurial activity.

Demand-side factors

Local demand conditions

As highlighted by our theoretical framework (section 2.6) demand conditions are likely to be important determinants of where any firm chooses to locate. Therefore, it is reasonable to assume that expanding regional markets and demand for goods and services are considered important, as entrepreneurs are likely to locate where markets are largest and where they can take advantage of economies of scale (Krugman, 1991).

Two indictors of such growth conditions were utilized. In line with the business cycle, as regions with growing demand conditions have more market opportunities it can, therefore, be expected, that increasing demand for goods and services will be associated with higher rates of continuing entrepreneurial activity. As a result it may be expected that an increase in *population growth* will have a positive effect on entrepreneurial activity (Keeble and Walker, 1994; Reynolds *et al.*, 1995; Armington and Acs, 2002; Tamásy and Le Heron, 2008). Furthermore, income levels are also likely to affect demand for local businesses. As *wages* increase demand may also rise as a result of increased purchasing power, thereby having a positive impact on the rate of continuing entrepreneurial activity (Reynolds *et al.*, 1994). Therefore, spatial differences in the demand for goods and services are likely to influence the demand for continuing entrepreneurship and it is likely, that spatial variations occur as a result of differences or changes in local demand conditions.

Supply-side factors

Unemployment

Previous studies such as those discussed in Section 2.4.2 have shown the relationship between unemployment and entrepreneurial activity is not clear, as a result of

contradictory empirical findings and push- pull theories outlined by the theoretical framework in Section 2.6.

At one level a negative change in labour market conditions and the limited availability of waged employment may push individuals into entrepreneurial activity. For example 'push' theory suggests increasing levels of unemployment reduce the prospects for finding paid employment and as a result the expected returns from entrepreneurship become more attractive, pushing people into undertaking entrepreneurial activity (Storey, 1982; Storey and Johnson, 1987; Storey, 1991; Keeble and Walker, 1994; Evans and Leighton, 1990). For example, Tervo (2008) interprets high levels of entrepreneurship in rural areas to be the result of limited employment opportunities rather than opportunities presented by the market.

However, similar to pull theory our model argues that in the case of continuing entrepreneurial activity a higher level of unemployment will indicate an aggregate reduction in disposable income and thereby reduce demand throughout a region's economy, thus limiting the opportunities for growing a business. As a result, unlike start-up entrepreneurship, where there is considerable confusion around push-pull hypotheses there should be less confusion around the impact of unemployment on continuing entrepreneurial activity. Therefore, in line with pull theory we argue that, high unemployment will inhibit market demand for products, as low employment levels create less disposable income and, therefore, a lower level of demand for goods and services within a region. Furthermore, higher unemployment will expose existing entrepreneurs to greater risks of falling incomes and possible bankruptcy.

The *unemployment rate*, given by the number of unemployed workers as a percentage of the labour force is used to assess the effect of unemployment on continuing entrepreneurial activity. This measure reflects the existing status of an economy at a particular point and time in terms of the number of people unemployed and thus indicates the status of labour availability to support a regions capacity to generate and sustain growing businesses.

Human Capital

Following Schultz theoretical argument that human capital is viewed mostly as the capacity of the entrepreneur to adapt in order to deal with disequilibrium, as discussed in section (2.3.3) or more generally, with situations in which there is a changing environment, human capital is about return to ability, which in turn is reflected by an entrepreneurs level of education or human capital.

The indicator of human capital used in this study is the percentage of the population with a *National Vocation Qualification 4 or above (NVQ4+)*. This proxy indicator of human capital was employed in order to account for both skill based vocational qualifications, such as those gained by tradesmen, who are highly skilled in their field of work, often having served apprenticeships and acquired competence based qualifications, based on practical experience gained in the workplace, yet do not hold a tertiary qualification such as a degree; and to account for traditional academic qualifications including undergraduate and postgraduate qualifications which are more closely associated with knowledge acquisition.

Indeed, empirical studies such as Lee *et al.* (2004) and Armington and Acs (2002, 2004) discussed in section 2.4 have found that regions with a higher number of university graduates are more likely to have higher levels of entrepreneurial activity than those regions with less skilled workers. The number of people with a degree acts, as a proxy for the technical skills that an economy requires in terms of engineers and scientists, but also the skills needed to commercialise a business opportunity in terms of finance and marketing. It is plausible, therefore, to make an argument that a regions stock of human capital is likely to influence both the propensity of an individual to start a business and the likelihood that firms will be attracted into regions with a high skill base and by definition a higher stock of human capital.

Thus in our own theoretical model of continuing entrepreneurial activity, if we follow Schultz argument, it is more likely that regions that are more highly educated generate greater human capital embodied by their general and specific skills, for implementing new ideas; not only for creating new businesses, but also growing existing businesses. Furthermore, regions with a rich stock of human capital can generate environments rich in local spillovers, which is another support mechanism

by which existing businesses can grow and be sustained. Therefore, it should be expected that a higher level of human capital proxied by education and skill attainment among a region's population would be expected to have a positive impact on a regions rate of continuing entrepreneurial activity.

Access to Finance

Evidence has been published linking levels of entrepreneurial activity to local financial capital. Garofolio (1994) identified that regions with relatively high levels of per capita financial assets such as local bank deposits are more likely to be areas where access to capital is comparatively easy. Such pools of capital are available not only for new start-ups, but also for the expansion of existing businesses. It can, therefore, be expected that the wealthier a region is the easier it is to acquire capital for business expansion. However, unlike start-up capital the availability of capital for business expansion usually represents an amount larger than what is available to be financed through borrowing from family and friends or by using personal credit with debt capital the most likely source of external financing among small growing firms.

Indeed, access to finance has commonly been calculated via some measure of personal/household wealth (Whittington, 1984; Ashcroft *et al.*, 1991; Guesnier, 1994; Davidsson *et al.*, 1994; Garofoli, 1994; Keeble and Walker, 1994; Reynolds *et al.*, 1994.; Sutaria and Hicks, 2004) whereby the entrepreneur can raise finance against the value of their property. Accordingly in our own theoretical framework developed in Section 2.6 we believe there is strong reason to believe access to capital will also influence the supply of continuing entrepreneurial activity, whereby the wealthier a region is the easier it should be to obtain finance for business expansion.

In this study we adopt the dynamic indicator of *capital gains in house prices*. This allows that an individual may live in a residence, which on paper has a high net worth, yet the individual may bear the financial responsibility of a large mortgage making it less likely, that a bank will lend to a highly geared individual, whereas regions with an increasing growth rate in house prices indicate net gains in an individual's personal wealth and the greater likelihood of raising finance based on the value of their property. Of course, although our data does not cover any periods

of economic recession, such as that following the 2008 financial crisis, it would be expected that house prices are likely to fall during a recession and this may reduce the amount of capital that can be raised based in the value of one's house.

Agglomeration Factors

Agglomeration economies can be sub-divided into urbanisation economies and localisation economies, which has given rise to the Marshall versus Jacobs or localisation (specialisation) versus urbanisation (diversity) debate. Localisation economies arise from the benefits of intra-industry agglomeration, while urbanisation economies create benefits through inter-industry concentration (Knoben, 2009). Various studies (Henderson, 1986; Van der Panne and Van Beers, 2006; Boshuizen *et al.*, 2009) have attempted to identify whether Marshallian or Jacobain effects are strongest, however, the results have often been inconclusive (Beaudry and Schiffauerova, 2009) when assessing the uneven distribution of economic activity.

In our theoretical model developed in Section 2.6 we hypothesised that agglomeration benefits are likely to have a positive effect on continuing entrepreneurial activity, although we acknowledged that we cannot say whether continuing entrepreneurial activity is driven by specialisation economies or urbanisation economies. Therefore, in our empirical model we test for the presence of both specialisation and urbanisation economies. One indicator is used to represent specialisation and one indicator to represent urbanisation economies.

Specialisation Economies

Specialisation economies are industry specific benefits including access to a pool of well qualified labour, the existence of specialised suppliers, and knowledge spillovers arising from the close proximity of firms in the same industry (Marshall, 1890). In theory the more specialised a local economy is the more firms can benefit from specialisation economies. Following Stam, 2005; Tamásy and Le Heron, 2008; and Daskalopoulou and Liargovas, 2009 we test for the presence of specialisation

economies using a location quotient (LQ) index. Given that sectorial data is available we test for the presence of specialisation economies in both manufacturing and businesses services. To calculate the location quotients the following formula is applied:

$$LQ = \frac{n_r}{n} \; / \; \frac{N_r}{N}$$

Where:

n_r = number of new VAT registered firms (in given sector) 1998-2007 in local region.

n = total number of new VAT registered firms in local region 1998.

N_r = number of new VAT registered firms (in given sector) 1998-2007 in national economy.

N = total number of new VAT registered firms in national economy 1998.

The location quotient provides a simple index of how well represented continuing entrepreneurial activity is in a given sector within a specific region, when compared with the national level. A location quotient larger than 1 indicates, that a regions share in attracting entrepreneurial activity in a given sector: in this case manufacturing or business services is correspondingly larger than the national share of entrepreneurial activity in that sector. In other words they are more specialised.

Urbanisation Economies

Urbanisation economies are the externalities arising from the variety and density of general economic activity (Jacobs, 1969). While specialisation economies promote the idea of industrial districts and clusters, urbanisation economies stress the general advantage of large cities, whereby the concentration of people and firms can lead to lower search costs for individuals and suppliers (Porter, 1998; Reynolds, 1994).

Therefore, although externalities play an important role in both specialisation and urbanisation economies; the difference is that urbanisation externalities arise, as a result of the emphasis placed on a critical mass of inter-industry spillover rather than intra-industry spillover, supporting the idea that diversity and variety of industry is likely to be greatest in more densely populated regions and cities where firms can benefit from improved and advanced infrastructure, large labour markets and the support provided by access to a wide range of consulting and financial support firms. The density of economic activity in a region is typically found to have a positive impact on entrepreneurial activity (Reynolds *et al.*, 1994; Armington and Acs 2002; Fritsch and Falck 2007).

This indicates a diverse economic environment, rather than one based on economic specialisation provides a greater explanation of continuing entrepreneurial activity, suggesting firms are attracted into regions where economic activity and knowledge spillover are most diverse, as this is where the entrepreneur is likely to be presented with the greatest economic opportunities for business expansion, but also access to a variety of knowledge that can be commercially exploited.

In order to capture the impact of urbanisation economies the indicator used is *population density,* measured as inhabitants divided by regional area (km^2).

Institutional and Cultural Factors

Size of the Government Sector

In addition to the aforementioned structural determinants set out in our model the local environment in which businesses operate is likely to influence the level of entrepreneurial activity. In particular the institutional environment is important because it underlies the incentive structure of an economy and its capacity to generate economic growth.

Indeed, one of the key aspects of product market institutions is the level of competition. However, competition refers not only to competition between firms in the private sector, but also between private firms and the public sector. For example,

in specific sectors such as health and education the main competitor for any entrepreneur is the public sector. Indeed, previous studies have found that a large government sector can have a negative impact on entrepreneurship (Bjornskov and Foss, 2008; Okamuro and Kobayashi, 2006; Nystrom, 2008). Therefore, an institutional environment characterised by a large public sector workforce may indirectly act as a disincentive for entrepreneurship and may also be more likely to crowd out private sector firms as a result of competition. More specifically, our own model argues, given that 28%[4] of Scotland's workforce is employed in the public sector and, therefore, not in private sector profit seeking businesses, this makes it less likely that public sector workers will be exposed to the skills required to run and grow a small business and that it may be expected that a large public sector is also likely to crowd out private sector firms as a result of competition.

We capture the effect of the institutional environment on continuing entrepreneurial activity by using the proxy measure of the *proportion of the work force employed in the public sector* in each region to assess the influence of the institutional environment on continuing entrepreneurial activity in Scotland.

Culture

In section 2.6 our theoretical model advocated, that the level of continuing entrepreneurial activity in a region is a function of how well it is accepted and legitimised by society.

In particular, there is reason to believe the presence of a large existing small business population will imply a positive attitude and culture towards entrepreneurship, whereby existing firms are able to act as seedbeds and incubators for entrepreneurs looking to grow their business. Moreover, our theoretical model also argued a large small business population allows growing businesses to build contacts and develop relationships which help facilitate the exchange of information relating to various aspects of their business with increased access to a variety of relevant and reliable

[4] Figures taken from the Annual Population Survey and Annual Labour Force Survey based on local Authority figures for those aged 16-64.

information, thereby helping to improve the speed and quality of decision making processes within a business, and thus increase their prospects for growth.

Therefore, we predict that the number of existing small businesses measured, as the *proportion of small businesses with < 50 employees* in the overall business population within a region acts as a proxy for a positive entrepreneurial culture and it is expected, therefore, that a region with a positive culture towards entrepreneurship is more likely to have higher rates of continuing entrepreneurial activity.

Summary

In an attempt to explain causes of regional variation in continuing entrepreneurial activity in Scotland; ten explanatory variables corresponding with the research hypotheses outlined in our theoretical framework developed in section 2.6 were introduced.

The aforementioned variables are the indictors used to test our model of continuing entrepreneurial activity. The indicators incorporated in our empirical analysis and their predicted effects are summarized in Table (3.1). As already alluded to their selection reflects both the availability of suitable data and informed judgement regarding processes likely to have a major impact on continuing entrepreneurial activity in Scotland. The next section in this chapter will explain the econometric methods used to examine regional variation in continuing rates of entrepreneurial activity.

Table 3.1 Explanatory Variables.

Explanatory Variable	Operational Definition	Expected Effect	Data Source
Demand and Supply factors			
Wage Growth	Annual wage growth change	+	Office of National Statistics
Population Growth	Annual population growth change	+	General Register Office for Scotland
Unemployment Rate (log)	Annual % of unemployed	-	Office of National Statistics
Education	% of population with NVQ 4 or higher	+	ONS: Annual population Survey
Access to Finance	Annual growth in House Prices	+	Scottish Neighbourhood Statistics
Agglomeration factors			
Specialisation Economies (Manufacturing)	Number of firms in manufacturing sector relative to the total business population (Location Quotient)	+/-	IDBR: VAT register
Specialisation Economies (Business Services)	Number of firms in the business sector relative to the total business population (Location Quotient)	+/-	IDBR: VAT register
Urbanisation Economies	Population density, measured as inhabitants divided by regional area (km^2)	+/-	General Register Office for Scotland
Institutional and cultural factors			
Size of Public Sector	% of work force employed in the public sector	-	ONS: Annual population Survey
Small Business Population	% of small businesses with < 50 employees in the overall business population	+	IDBR: VAT register

3.6 Panel Data

The majority of previous studies assessing determinants of entrepreneurship apply regression analysis, as the principal method of analysis in order to establish causality between independent and dependent variables (Keeble and Walker, 1994; Reynolds *et al.*, 1994; Garofoli, 1994; Guesnier, 1994; Davidsson *et al.*, 1994; Tamasy and Le Heron, 2008; Audretsch and Fritsch, 1994; Kangasarju, 2000; Armington and Acs, 2002; Lee *et al.*, 2004; Sutaria and Hicks, 2004; Okamuro and Kobayashi, 2006; Audretsch *et al.*, 2010). Adopting the same approach in this study allows our results to be compared with previous studies. Furthermore, in addition to producing reliable results the independent variables selected ensure the results are also generalizable. Moreover, the results in this study are enhanced by utilising a panel data set with respect to Scottish entrepreneurship.

Panel data is a combination of cross section and time series data involving the repeated measurement of a unit (e.g. individual, firm, region, country) over two or more time periods. The amalgamation of cross sectional and time series data produces two types of information: a cross sectional element, which reflects differences between regions and the time series element which reflects differences within regions overtime. In this study panel data enables cross sectional units (Scottish regions) to be modelled over a 10 year time period providing a greater number of observations than is possible, if cross-sectional or time series analysis were used alone. Indeed, no previously published work to the best of the author's knowledge has employed panel data in the Scottish context and very few studies with the exception of Sutaria and Hicks (2004) and Kangasharju (2000) have utilized panel data in studies of entrepreneurial activity. This most likely reflects the difficulties encountered by researchers' when attempting to construct a balanced cross section time series. As highlighted studies of entrepreneurship have tended to concentrate on the country as the main unit of analysis in the UK, overlooking region-specific factors and the local environment of the entrepreneur. Moreover, regional variation in studies of Scottish entrepreneurial activity has often been overlooked with Scotland largely being regarded as an administrative region of the

UK, preventing detailed analysis of region-specific factors that influence entrepreneurship. This is why this study, as discussed in section 3.8.1 adopts local council regions as the main unit of analysis allowing us to incorporate a regional dimension.

That said, although not used in this study and nor has it been widely used in other spatial studies of entrepreneurship, largely as a result of its complexity; multilevel/hierarchical modelling could potentially under the correct circumstances and where sample sizes are sufficiently large be used to further extend 'sub'-regional analysis of entrepreneurial activity. For example, because it is a reasonable assumption to make that the characteristics of a population in a particular region differ from those in another region multi-level analysis seeks to control for a set of independent variables which operate at the lower level (i.e., urban regions, rural regions and city region etc.) and those which operate at a 'higher level' (i.e. local authority council region or country). However, as cited many times by the literature small sample sizes of lower level units (known as level 2) often lead to biased estimates and standard errors. Indeed, studies have shown that a small sample size at lower level units (meaning a sample of 50 or less) leads to biased estimates of the second-level standard errors (Busing, 1993; Van Der Leeden and Busing, 1994, Snijders, 2005). Therefore, in small countries such as Scotland where there are only 32 local authority regions under investigation in total (the highest level) with a maximum lower level sample size of 18 urban regions and as low as 4 city regions multilevel modelling would have been unlikely to produce reliable estimates.

Nevertheless, despite not using multi-level/hierarchical modelling the use of panel data has a number of advantages over a simple cross section analysis. First, cross sectional data is taken at one point in time, whereas panel data is taken at a number of points in time allowing the researcher to infer relationships among variables over time if required. Second, given the pooled nature of panel data, panel models are better able to infer causality than more simple cross sectional models. Pooling cross sectional units with time series data also creates a larger number of observations. Third, parameter estimates are more efficient as a result of smaller standard errors, while a greater number of observations are also able to reduce the potential problems associated with collinearity among variables. Fourth, a larger number of observations allow for more independent variables to be included than in a simple cross-sectional

model, which mitigates for over-parameterisation, as a result of increased degrees of freedom and, therefore, also provides more robust parameter estimates. Finally, it is possible to control for individual heterogeneity, which a standard cross section analysis may not pick up. For example, making the assumption that regions are homogenous may result in spurious parameter estimates. Therefore, the combined power of both cross sectional and time series elements should allow panel data to offer more in depth and reliable estimates. The following section reviews the alternative panel models, their key assumptions and appropriateness for analysing determinants of entrepreneurial activity in Scotland.

3.7 Panel Models

In this section we discuss how the individual effects model is used to model unobserved effects in panel data. There are two individual effect models that are common to panel data: the fixed effect and random effect models. The remainder of this chapter will analyse both models, their assumptions, justification for their selection and the relative strengths and weaknesses of each model before discussing the qualitative phase of the study.

When deciding what individual effect model to use the key issue involving α_i is whether or not it is uncorrelated with the observed explanatory variables (Wooldridge, 2006). Identifying whether the individual/unobserved effect is correlated with the explanatory variables is a crucial differentiating factor between the fixed and random effect models and, therefore, what model will be the most appropriate for the given data. The random effect model is said to have zero correlation between the observed explanatory variables and the individual/unobserved effects: where Cov $(X_{it},a_i) = 0$, t= 1,2,...,T. Therefore, in the random effect model the α_i is importantly assumed to be uncorrelated with X_{it}. The alternative fixed effective model differs significantly in that the fixed effect model allows for correlation between the α_i and the observed explanatory variables. The remainder of this section discusses the different panel data models available and the methods used by the researcher to decide on the most appropriate model for this study.

3.7.1 The Pooled Panel Model

Panel data estimation differs from regular cross section and time series estimation in that panel data is a combination of both cross section and time series, signified with variables having a double subscript. The basic OLS pooled panel model can be written as:

$$Y_{it} = \alpha + X_{it}\beta + \mu_{it} \qquad i = 1,2,...,N;\ t = 1,2,...,T \tag{3.1}$$

where *i* denotes the individual region and *t* denotes time. The individual unit *i* denotes the cross section and *t* the time series. α is a common intercept, β is k x 1 and X_{it} the it^{th} observation on K explanatory variables. The error term is written simply as $\mu_{it,}$ assuming the classical OLS assumptions are met. The pooled OLS model assumes that the error term μ_{it} is independent and uncorrelated with the predictor variables X_{it}. Therefore, if X_{it} is correlated with the error term μ_{it} the OLS estimator will be biased and inconsistent. Additionally for the pooled OLS model to be consistent standard errors must be homoscedastic: Var ($\mu_{it} = \sigma^2_{\nu}$). When OLS estimation does not meet these assumptions then parameter estimates and significance values may be misleading and indicate it is more appropriate to estimate parameters using an individual effect model to account for individual heterogeneity.

When significant differences exist between individual regions, it is more appropriate to model heterogeneity using an individual effects model:

$$Y_{it} = \alpha_i + X_{it}\beta + \mu_{it} \qquad i = 1,2,...,N;\ t = 1,2,...,T \tag{3.2}$$

where α_i is the only differentiating factor between an individual and pooled model. However, major differences exist in the way α_i is assigned and the assumptions made

between the fixed and random effect models. Furthermore, in the individual effect model the error component is decomposed where:

$$\mu_{it} = \mu_i + \nu_{it}$$

Following Baltagi (2005) μ_i denotes the unobserved individual specific effect and ν_{it} denotes the remaining disturbance. μ_i is time invariant and absorbs any individual unit effect, that is not in the estimated regression, such as the regional climate, crime rate or religion. ν_{it} is the remaining disturbance, which varies with individual units and time, and is regarded as the normal disturbance in a regression. Therefore, the key differentiating factor between the fixed and random effect models is the way the individual specific error component is modelled. In the fixed effect model it is assumed to be part of the intercept, while in the random effect model it forms part of the error variance. Therefore, the crucial distinction between a fixed or random effect model is whether the unobserved individual effect embodies elements of correlation with the regressor or whether they are treated as stochastic (Greene, 2007).

3.7.2 The Fixed Effect Model

In the fixed effect model the individual effect is captured by the intercept term α_i, which means each region has its own individual intercept and that the individual effect will vary across groups. The fixed effect model can be expressed as:

$$Y_{it} = (\alpha + \mu_i) + X_{it}\beta + \nu_{it} \qquad i = 1,2,...,N;\ t = 1,2,...,T \tag{3.3}$$

where in the fixed effect model μ_i are assumed to be fixed parameters, ν_{it} is the remaining stochastic disturbance, which is assumed to be independent and identically distributed IID $(0\ \sigma_\nu^2)$. In the fixed effect model the individual effect $(\alpha + \mu_i)$ is allowed to be correlated with the independent variables X_{it}, while assuming that X_{it} remains uncorrelated and independent of the idiosyncratic error (ν_{it}) for all *i* and *t*. Therefore, given that each individual region has unique characteristics, that may or

may not influence the predictor variables, the fixed effect model controls for this by removing any time invariant factors (ν_{it} - μ_i) in order to assess the predictors' net effect. This suggests if the unobserved effect does not change over time, it must follow, that any change in the dependent variable must be due to influences other than the fixed effects (Stock and Watson, 2003). The fixed effect model allows for differences across regions to be captured by differences in the constant. As a result, any fixed effect(s) across time or regions can be absorbed by the intercept leading to unbiased and efficient estimates.

Therefore, in order to estimate parameters of a fixed effect model, equation (3.3) must remove any fixed effect (α + μ_i). The fixed effect is removed via a within transformation whereby mean differencing is applied to model (3.3) by averaging the model so that:

$$\bar{Y}_i = X_i\beta + \alpha_i + \bar{u}_i \qquad (3.4)$$

where $\bar{Y}_i = T^{-1}\sum_{T=1}^{T} Y_{it}$, $\bar{X}_i = T^{-1}\sum_{T=1}^{T} X_{it}$, and $\bar{\mu}_i = T^{-1}\sum_{T=1}^{T} \mu_{it}$, which leads to the within or mean differenced model, when model (3.4) is subtracted from (3.3) leaving the within transformation as:

$$Y_{it} - \bar{Y}_{it} = \beta_i(X_{it} - \bar{X}_{it}) + \mu_{it} - \mu_i,\ t = 1, 2, \ldots T \qquad (3.5)$$

Crucially equation (3.5) has removed α_i, the unobserved individual effect, allowing equation (3.5) to be estimated using OLS. As a result of α_i (the fixed effect) being removed, OLS leads to consistent parameter estimates of β even when α_i is correlated with X_{it}.

Therefore, the fixed effect model implies that for each time period the idiosyncratic error μ_{it} should be uncorrelated with the explanatory variables across all time periods and the unobserved effect α_i is zero: $E(\mu_{it}|X_i,\alpha_i) = 0$ or Cov (X_{it}, U_{it}) . Furthermore, for OLS to be valid the errors μ_{it} are homoskedastic Var= ($\mu_{it} = \sigma_u^2$) for all t = 1, …,T

and the idiosyncratic errors are serially uncorrelated $Cov(\mu_{it},\mu_{is}|X_i,\alpha_i) = 0$ across all time periods. Given that the fixed effect estimator allows for correlation between α_i and the explanatory variables across all time periods Cov (X_{it}, U_i) $\neq 0$, this must be offset by the inability of the fixed effect model to include time constant/invariant regressors as these are removed by the within transformation. As a result the within estimator (equation 3.5) may be imprecise where time varying regressors vary little overtime. Moreover, there is a danger that the fixed effect model may have too many cross sectional units requiring a large number of dummy variables leading to a substantial loss in the degrees of freedom for sufficiently powerful statistical tests. As a result the fixed effect model may be subject to high levels of multicollinearity, resulting in higher standard errors, which in turn reduce the statistical power of any parameter estimates. While the within transformation (equation 3.5) avoids the inefficiency of estimating unique intercepts for each individual unit the within transformation is still unable to include time constant variables. Finally, because the fixed effect model uses a within transformation, it may be more appropriate for estimating changes within a region rather than differences across regions.

3.7.3 The Random Effect Model

In the fixed effect model, μ_i is fixed but can be correlated with the regressors Cov (X_{it}, U_i) $\neq 0$. However, in the random effect model μ_i is assumed to be randomly distributed with a constant mean and variance, but crucially μ_i is uncorrelated with the regressors Cov (X_{it},a_i) = 0, for all *t*. Therefore, in the random model the individual effect is treated as a random component forming part of the error structure and not the intercept as in the fixed effect model. The random effect model can be written as:

$$Y_{it} = \alpha + X_{it}\beta + (\mu_i + \nu_{it}) \qquad i = 1,2,...,N;\ t = 1,2,...,T \tag{3.6}$$

where the only difference between the fixed effect model (equation 3.3) is that μ_i is now part of the error term and not the intercept. The result being, the random effect model meets all of the same assumptions as the fixed effect model plus the additional

requirement that the individual effect μ_i is uncorrelated with the regressors in all time periods (in other words the individual effect is constant). This is the key assumption that rules out any correlation between the individual effect and the regressors. Additionally, because it is assumed that the individual effect is uncorrelated with the regressors then time invariant regressors can be included in the random effect model. Therefore, ν_{it} are independent random variables with $N(0, \sigma_v^2)$ distribution, with Var (ν_{it}) = σ_v^2. Similarly, μ_i are independent variables with $N(0, \sigma_u^2)$ distribution with Var (ν_{it}) = σ_u^2. Finally, it is assumed that ν_{it} and μ_i are uncorrelated with each other and the regressors. Therefore, given that in the random effect model the error structure is comprised of $\mu_{it} = \mu_i + \nu_{it}$, combined with the assumption that that both ν_{it} and μ_i are normally distributed with constant variance, because μ_i is part of the error term, the combined error μ_{it} is correlated over time, highlighting that the cross sectional errors for the same individual region are correlated with each other Cov ($\nu_{it,}$ ν_{is}) $\neq 0$ and as a result the regression errors violate the assumption that errors should be uncorrelated with each other, which again indicates that OLS would not be appropriate and as a result the random effect model estimates parameters using GLS. Therefore, the random effect model assumes:

$$\text{Corr}\ (\nu_{it,}\ \nu_{is}) = \sigma_a^2/(\sigma_a^2 + \sigma_u^2),\ t \neq s \qquad (3.7)$$

from (equation 3.7) it clear that ν_{it}, do not satisfy the classical assumptions of OLS.

3.7.4 Selecting a Fixed or Random Effect Model

Panel data has many benefits over cross sectional data yet, if heterogeneity between regions is not accounted for results may be misleading. It is necessary, therefore, to test whether data should be estimated using a pooled panel model or whether heterogeneity between different regions is best captured by an individual effect model. Depending on which individual effect model is selected; hypothesis testing can be applied to test the validity of the standard OLS pooled model. In this study

both fixed and random effect models are estimated. Hypothesis testing in the fixed effect model tests whether individual coefficients are the same. The hypothesis test is $H_0 : \alpha_i = \cdots = \alpha_n$. The F-statistic can be written as:

$$\mathrm{F} = \frac{(R^2_{UR} - R^2_R)/(\mathrm{N}-1)}{(1-R^2_{UR})/(\mathrm{TN}-\mathrm{N}-\mathrm{K})} \tag{3.8}$$

where R^2_{UR} is the coefficient of determination in the fixed effect model and R^2_R is the coefficient of determination in the pooled model. The null hypothesis that individual coefficients are the same should be rejected if the F-statistic is larger than the F-critical statistic, indicating that the data is not poolable. Results of the hypothesis test are reported in Chapter 4, indicating that the individual coefficient is not zero and that a standard OLS pooled model would not provide adequate parameter estimates of the explanatory variables.

In the random effects model we test the hypothesis that individual error variances across cross sectional entities are zero:$H_0 : \sigma^2_u = 0$. The Breusch-Pagan (1980) Lagrange multiplier test is used to test for the presence of random effects. The test statistic is:

$$\mathrm{LM} = \frac{\mathrm{TN}}{2(\mathrm{T}-1)}\left(\frac{\sum_{t=1}^{T}(\sum_{t=1}^{T}\hat{\varepsilon}_{it})^2}{\sum_{i=1}^{N}\sum_{t=1}^{T}\hat{\varepsilon}^2_{it}} - 1\right)^2 \tag{3.9}$$

Where $\hat{\varepsilon}_{it}$ for $i = 1,\ldots N$ and $t = 1,\ldots T$ are OLS residuals from the pooled model. A resulting p-value of less than 0.05 rejects the null hypothesis that error variances across cross sectional units are zero and rejects the use of the pooled model in favour of a random effects model. Results of the hypothesis test are reported in Chapter 4.

If individual effects are present it is not appropriate to use an OLS pooled panel model. In such circumstances the researcher must decide between a fixed or random

effect model. Given that fixed and random effect models are liable to produce different results, selecting either the fixed or random effect model is crucial (Kangasharju, 2000). While the assumptions of both the fixed and random effect models are outlined in Sections 3.6.2 and 3.6.3 the key differential is to understand whether the unique individual effect (u_i) is correlated with the explanatory variables (Baltagi, 2005; Cameron and Trivedi, 2010). The common method of establishing whether correlation exists between the individual effect and explanatory variables is the Hausman (1978) specification test, which tests the null hypothesis that the unique errors are not correlated with the explanatory variables. Results of the hypothesis test are reported in Chapter 4. In the case that the null hypothesis is rejected, the random effect model would be biased because of correlation between u_i and the X_{it}. In such a case a fixed effect model is the preferred option compared with an inconsistent random effect model. Equally, should the Hausman statistic report that u_i are uncorrelated the fixed effect model remains consistent but inefficient, while the random effect model is both consistent and efficient. The Hausman specification test can be written as:

$$H = \left(\hat{\beta}^{FE} - \hat{\beta}^{RE}\right)' \quad \left[Var\left(\hat{\beta}^{FE} - \hat{\beta}^{RE}\right)\right]^{1} \left(\hat{\beta}^{FE} - \hat{\beta}^{RE}\right) \sim x^2\,(k) \qquad (3.10)$$

3.8 The Qualitative Phase

This section of the chapter presents the second phase of the sequential mixed method research outlined in Figure 3.1.

As highlighted in Section 3.2 there is a danger when using quantitative analysis alone that important variables or information related to the specific research environment may be unintentionally excluded and, therefore, it is not uncommon to follow the initial quantitative phase of a research study with a supplementary qualitative phase to ensure the robustness of the research findings. In this study semi-structured qualitative interviews informed by the initial quantitative analysis were undertaken with individuals involved in the design and implementation of enterprise services in Scotland. An overview of the interview sample is provided in the following section.

The purpose of the interviews was to follow-up the initial quantitative analysis and identify whether interviewees were aware of the significant explanatory variables and the emphasis they placed on those findings as determinants of continuing entrepreneurial activity. Therefore, the qualitative element was able to act as both a complement and supplement to the initial quantitative analysis and was intended to gain a better understanding of what local authority representatives believe the determinants of continuing entrepreneurial activity are in Scotland. Furthermore, the advantage of combining quantitative and qualitative methods is the ability to mitigate against insights and understandings that may have been missed when only quantitative methods are used (Johnson and Onwuegbuzie, 2004).

The qualitative interviews were particularly useful, as responses were able to inform the policy recommendations that are subsequently provided in Chapter 7, not only in relation to the quantitative results, but also in terms of the way opinion formers at local authority level perceive continuing entrepreneurial activity and its determinants. Ultimately, the combination of both quantitative and qualitative methods creates a more detailed understanding of the spatial determinants related to continuing entrepreneurship in Scotland, thus adding validity to the reliable and generalizable statistical results. Therefore, the follow-up interviews are able to

strengthen the research findings, not only enhancing reliability, but increasing validity making the study more robust and accurate rather than relying on one method alone (Creswell and Clark, 2007). Furthermore, because this research study is in the field of public policy, it was also useful to canvas the viewpoint of opinion formers and analysts in order to inform and strengthen the policy recommendations in Chapter 7. An overview of the sample frame and semi-structured interviews is provided in the following two sections.

3.8.1 Sample Frame and Unit of Analysis

The sample frame for the qualitative phase of this research study was all 32 existing Scottish local authorities. A map of the 32 local authorities is provided in Appendix A. Local authorities were deemed to be an appropriate population from which to draw a sample of authoritative persons and opinion formers, as local authority council areas correspond fully with the concept of the local environment in which firms must operate and are responsible for the economic development and regeneration of their respective regions.

Furthermore, local authority regions are the most disaggregated level at which VAT data (the dependent variable) is available and represent the local environment of the entrepreneur. Located in the northern periphery of both the UK and Europe, Scotland is a small country with a total population of 5.14 million and a working age population of 3.38 million[5]. A constituent part of the UK since 1707, Scotland is currently governed under a system of joint sovereignty between the UK government and the Scottish Parliament (Brown and Mason, 2012). Scotland is sub-divided into 32 council regions ranging in size, the number of inhabitants and in population density. Glasgow City (582,000) is the most populous region and the Orkney Islands (20,000) the least populous. The Highlands region is the largest in size (25,659 km^2) and Dundee City the smallest (60 km^2). Scotland is also one of the least densely populated countries in Europe, ranging from 8 people per km^2 in the Highlands region to 3316 individuals per km^2 in Glasgow City. Overall 70.1% of the population

[5] Data from the National Online Manpower Information System (NOMIS).

live in urban areas with 29% of the population living in the two largest cities Glasgow and Edinburgh.

Further justification for the use of local authority regions as the principal unit of analysis include that they are responsible for the economic development and regeneration of their respective regions and have responsibility for delivering Business Gateway services, which provide soft support to all businesses at a local level. Moreover, while Government Office Region (GOR) data is useful for national comparison in the UK, spatial analysis of Scottish entrepreneurial data in Chapter 4 reveal GOR level data is not sufficient for analysis at a local level due to a lack of disaggregation. Similarly, the major limitation in utilising NUTS 2[6] data in Scotland is the failure to account for the entrepreneur's local environment due to the degree of aggregation. Scotland is comprised of four NUTS 2 regions, making the space economy of Scotland difficult to interpret; demonstrated by the NUTS 2 Eastern Scotland region having a northern border touching the North Eastern Scotland region best approximated by the location of Aberdeen and a Southern Border tangentially resting on the Scotland England border. Alternatively, Scotland's 23 NUTS 3 regions would offer a more appropriate geographical level at which to investigate the local environment of the entrepreneur, however, NUTS 3 data does not correspond fully with VAT registration data and, therefore, council regions are the most appropriate unit of analysis. One potential limitation relating to the degree of disaggregation at the local authority level may mean, while one region appears to have low levels of entrepreneurship relative to the region's population; this may not actually be the case, as entrepreneurs may live in one region yet run their business in another.

In total 39 follow-up interviews were undertaken during the qualitative phase of the study. As already highlighted the sample population for the qualitative phase of this research study were all 32 existing Scottish local authorities. At least one interview was conducted with a local authority representative. Seven local authorities provided two respondents, as originally requested by the author, thus taking the sample size to 39 from an original sample frame of 64. Therefore, the sample can be regarded as

[6] The NUTS classification (Nomenclature of territorial units for statistics) is a hierarchical system for dividing up the economic territory of the EU for the purpose of (1) the collection, development and harmonisation of EU regional statistics (2) socio-economic analyses of the regions and (3) framing of EU regional policies.

representative given that it includes at least one interview with an opinion former from each local authority in Scotland.

In terms of selection and gaining access to opinion formers at the local authority level the researcher undertook extensive internet desk based research in order to construct a database of names and opinion formers. The first step was to identify the names of relevant opinion formers within each local authority. It was decided to target, where possible, the names of two individuals in order to give the best possible opportunity of securing an interview with a least one opinion former from each local authority. In most cases this initially involved targeting the Head of Economic Development and where possible the individual responsible for the delivery of business support services within each local authority. This was in many cases a Principal or Senior Economic Development Officer. Locating those people was something of a challenge given the limited information and personal contact details available on the internet. Nevertheless, through the researchers drive and persistence involving emails and in some cases phone calls to relevant local authorities it was eventually possible to identify the required list of contacts.

The second step involved making contact with the targeted interviewees'. To begin with, an email was sent to the 64 target interviewees' explaining why the researcher wished to interview them and with a brief explanation of the research. This was also accompanied by a more formal attachment outlining the research in more detail, should the individual require some additional information. A copy of this attachment can be seen in Appendix B. Combined the email and accompanying attachment explained briefly the researcher's background, his research project, the potential benefits from this research, and a guarantee of confidentiality for persons willing to be interviewed.

Following the first email about 60% of individuals responded to the letter expressing a willingness either to take part in the research themselves or that they would refer the researcher to a more relevant person or subordinate who would participate on behalf of the local authority. For those potential interviewees who did not respond a reminder email was sent two weeks after the initial email. This again increased the number of individuals prepared to participate. One issue that arose during this period was related to the time of year: it was the summer holiday season and many people

were away from their office, which in many cases delayed responses. Nevertheless, by the first week of September from the sample frame of 64 targeted interviewees' (2 for each local authority) at least 1 person from each of Scotland's 32 local authorities, with the exception of one local authority, (who would subsequently, albeit at a much later period in the year make contact) had agreed to participate in the research study. The other issue worthy of note during this period of the research was that although the sample frame consisted of two individuals from each local authority; and that being able to secure participation from all 32 local authorities was an extremely positive outcome, 25 individuals from the original sample frame of 64 made contact to say that because another individual/colleague was going to participate, they would not.

The two main reasons cited for this decision was that the other person was better placed and more qualified to answer any questions posed by the researcher and secondly that resources were limited and that two participants could not be justified. This was an inevitable implication of colleagues discussing the researchers approach within each local authority for interview. Nothing could be done to prevent this. Nevertheless, as already alluded to 39 follow-up interviews were undertaken in total with at least one interview conducted with a local authority representative from each of Scotland's 32 local authorities. Seven local authorities provided two respondents, as originally requested by the author, thus taking the sample size to 39 from an original sample frame of 64. Therefore, the sample can be regarded as representative given that it includes at least one interview with an opinion former from each local authority in Scotland.

A list of the respondents' job titles is provided in Appendix G. However, to ensure complete confidentiality to the individuals in return for their participation these job titles are not accompanied by the name of the local authority for who the individual is employed, but rather is more an indicative list of the type and level of person interviewed, as in some cases this could lead to their identification. For example, in many cases the person interviewed was a 'Head of Department' or a 'Principal Development Officer' for which there is only one such position within each local authority and combining both job title and local authority would in many cases reveal the identity of the respondent. Indeed, as Reid (1993) highlights in his mixed method study, qualitative and more precisely qualitative interview participation usually

require a *quid pro-quo*. In this study the *quid pro-quo* was that the interview participant's confidentiality would be protected at all times and secondly the findings of the study would be made available on completion.

3.8.2 Semi-structured Interviews

Given that the interview themes naturally evolved, as set out by the sequential explanatory mixed method design in Section 3.3 on the basis of the quantitative results, and that the aim of the interviews is to gain an understanding about how and why interviewees' believe the variables identified in the statistical analysis influence continuing entrepreneurial activity in Scotland, the follow-up interviews were suited to a semi-structured rather than structured or unstructured approach.

A structured interview would not have been appropriate, given the rigidity that a set of closed questions would place on respondents, thus preventing them from discussing how or why they believe a variable may or may not be influential (Rubin and Rubin, 2005). Furthermore, "in structured interviews, interviewees may be forced into giving responses which do not reflect their true feelings" (Klenke, 2008, p125) given the limited range of available response options. Therefore, structured interviews lack the required flexibility that is afforded by a semi-structured interview when the researcher is required to gain detailed answers about a specific topic (Bryman and Bell, 2007). Contrastingly, while unstructured interviews do allow respondents to provide in-depth responses via open-ended questions, a set of pre-defined questions does not usually exist, but rather the interview addresses general areas or topics at some point during the interview process (Saunders *et al.*, 2009). Therefore, unstructured interviews are likely to lack reliability and generalizability, as each interview will have progressed differently, asking related but different questions, and is, therefore, not the type of interview process, which lends itself to the comparison of answers between respondents, as is the required case in this study.

Therefore, the benefits of using a semi-structured approach to interviewing combine the benefits of both structured and unstructured interviews, while mitigating against their relative weaknesses. That said, the semi-structured approach allows the

researcher to conduct follow-up interviews based on the significant variables, which emerge from the quantitative analysis using a set of standardised questions, yet ensuring the answers provided can be compared in order to identify any significant differences in responses between respondents. In addition, a common set of open-ended questions allows respondents the opportunity to express their opinion based on their experience, rather than limiting those responses to only closed answers as is the case in a structured interview. By contrast open-ended questions allow respondents to provide extensive developmental answers (Grummitt, 1980) and afford the researcher the flexibility to probe when required for increased richness and depth of answers (Klenke, 2008). Moreover, semi-structured interviewing "has the advantage of allowing participants to describe what is meaningful or important to them, using their own words rather than being entirely restricted to pre-determined response categories." (ibid, 2008, p130).

Therefore, a semi-structured approach was adopted in this study, as it allowed respondents the time and flexibility to express their opinion in relation to each variable and provided in-depth information about why they believed a variable is or is not relevant, than is possible to detect in the quantitative analysis alone. Furthermore, the open-ended nature of the interview questions were beneficial in that unlike the quantitative analysis, open-ended questions do not just provide a result, but allow respondents to provide reasons for why they believe those results may have occurred.

3.8.3 Data Collection and Analysis of Semi-structured Interviews

Following the quantitative analysis and based on the statistically significant findings the researcher was able to prepare a set of pre-defined questions for the follow-up interviews. The 39 interviews were conducted over a three month period between September and December. The three month interview period is a consequence of the respondents' limited availability, which prevented the interviews from being completed at an earlier stage.

To ensure consistency and enable comparison of answers between respondents all interviews were conducted in the same format using a pre-established interview guide (Appendix C). As a matter of courtesy interviewees' were asked a number of weeks in advance of the interview, whether they would like to preview the interview schedule. The majority of interviewees felt this was not necessary, although a small number did express a wish to view the questions pre-interview. As a matter of convenience the interviews were undertaken at the time most convenient to the interviewee in person by the researcher at the interviewees' place of work or by phone. The interviews were conducted by the researcher in order to clarify any points regarding the interview process that may have been unclear. Each interview lasted between 20 minutes and one hour dependent upon how much detail the respondent was prepared to provide. Although, respondents were able to provide a significant amount of detailed information during this time, given that the interviews were time limited, as a consequence of the respondents busy schedule and corresponding diary commitments this potentially limited the amount of information that could be provided. All 39 interviews were digitally recorded in order to enable the researcher to sift through the data after the interview, thus allowing the researcher to add additional notes to those that had been taken by the researcher during the interview. That said, although it is recommended that interviews be digitally recorded, Reid (1993) highlights, in addition to the obvious advantages of using this technique to record information there are also potential disadvantages including:

1. The respondent may not be willing to talk if the interview is to be recorded.
2. Respondents may behave in a guarded way if they believe the data collected may be used without proper regard for its context.
3. Comments are not listened to carefully affecting the structure of the interview and reducing the quality of the data gathered.
4. Data redundancy. Some data is not needed, but acquisition is not interrupted to prevent the flow of the interview.
5. The volume of information obtained makes the development of generalizations and detection of relationships difficult.

Nevertheless, on the basis of the number of interviews (39) in this study and given that respondents were satisfied that their confidentiality would be protected by the

researcher, it was decided that in addition to the researchers own notes, interviews' would also be digitally recorded.

Given that the aim of the follow-up interviews was to validate whether the findings in the quantitative analysis are recognised by persons of authority/opinion formers in relation to continuing entrepreneurship at the local authority level and, therefore, individuals that are familiar with and able to comment on what is happening 'on the ground' and 'in the field' the second part of our sequential study (the qualitative phase) as outlined in Figure 3.1 was relatively straightforward to implement once the relevant contacts had been identified and agreed to take part in the study.

For example, the interview agenda and questions were developed based on the significant statistical findings: local demand, culture, education, unemployment, finance and agglomeration. The interview agenda and questions based on the six statistically significant variables identified by the quantitative analysis can be viewed in Appendix (C). There were 7 interview questions in total. An introductory question and one question based on each of the 6 significant factors that emerged from the initial quantitative analysis.

At the start of each interview the researcher took time to introduce themselves and to explain in addition to the initial correspondence with respondents what the research study was about, what the purpose of the interview was for and how the data would be used. Interviewees were also asked if they had any questions or needed any further clarification before the interview started.

The interviews then proceeded with respondents firstly being asked 'what they believed the key determinants of continuing entrepreneurial activity are in Scotland?'. This was an important question for a number of reasons. Firstly, it acted as a means of introduction preceding the specific questions which address the earlier quantitative results and secondly it allowed respondents to discuss any factors they personally believed were important determinants, independent of the quantitative results and, therefore, was able to mitigate against any insights and variables that were not highlighted by the quantitative analysis.

Each of the subsequent questions (questions 2-6 in the interview schedule ((Appendix C)) specifically addressed the significant findings identified in the

quantitative analysis. The respective questions were used to identify whether respondents recognised the significant statistical findings and whether any major differences existed between respondents. This was achieved in two ways. Firstly, respondents were asked the question related to the applicable theme under investigation at that point in the interview. For example, Question 2 relates to the demand hypothesis and sought to understand how important respondents believe local demand conditions are in explaining regional variation in continuing entrepreneurial activity. Respondents were asked "in your opinion how important is local demand in explaining regional variation in entrepreneurial activity?" Firstly, as per the interview schedule (Appendix C) respondents were provided with a possible 5 point likert scale response option (i.e. Strongly Agree, Disagree, Not sure, Agree and Strongly Agree). Following, the response interviewees were then asked to qualify and explain their answer. This method was particularly useful, as it allowed some degree of measurement and standardisation to be introduced into the qualitative phase of the research, which was also supported by a detailed explanation of the respondents answer. This was the format that was employed for subsequent questions in each of the 39 interviews.

Question 3 related to Hypothesis 7 and addressed the concept of culture and role models in Scottish entrepreneurship. Respondents were asked two questions relating to the broad concept of entrepreneurial culture. This was necessary in an attempt to validate the statistical findings and establish whether respondents believe a culture of continuing entrepreneurial activity exists in Scotland and how much importance respondents place on the influence of role models.

Question 4 relates to Hypothesis 3 and addressed the perceived importance of Human Capital and its perceived impact on regional levels of continuing entrepreneurial activity given the positive correlation between education and entrepreneurial activity identified in the quantitative analysis.

Question 5 relates to Hypothesis 2 addressing the impact of unemployment on continuing entrepreneurial activity. Respondents were asked 'to what extent they believe unemployment has a negative impact on levels of continuing entrepreneurial activity'.

Question 6 relates to Hypothesis 4 and assesses the perceived importance of access to finance among respondents for continuing entrepreneurship in Scotland.

Question 7 relates to Hypothesis 5 and addresses whether respondents believe enterprise zones are an appropriate method of generating agglomeration economies, given the positive links between agglomeration and entrepreneurial activity identified in the quantitative results.

Therefore, the purpose of the aforementioned questions was to follow-up the initial quantitative analysis and to a greater extent validate whether respondents were aware of the significant explanatory variables and the emphasis they placed on those findings as determinants of continuing entrepreneurial activity.

Subsequently, once the interviews were complete the researcher began the process of organising, validating and analysing the data collected during the follow-up interviews. De Vos (2005, p334) states that qualitative data analysis "is a search for general statements about relationships among categories of data". This entails transforming the data by reducing the amount of raw data, sifting out relevant information, identifying significant patterns and developing a framework for conveying the essence of what is revealed in the data (De Vos, 2005; Flick, 2004; Creswell, 2003; Wilkinson and Birmingham, 2003).

The interview data were analysed using an adapted version of the Framework Approach (Ritchie and Spencer, 1994). A notable strength of the Framework Approach is in its systematic and transparent approach to organising and synthesising qualitative data (Ritchie *et al.,* 2003). In practice, Ritchie and Spencer's Framework Approach comprises five stages of analysis: (i) familiarisation, (ii) identifying a thematic framework, (iii) indexing, (iv) charting, and (v) interpretation. In reality given the nature of this study and what we were trying to achieve the data analysis was adapted and divided into three main stages (1) familiarisation (2) indexing and (3) interpretation. Details of how these stages were applied in the current study are outlined in the sections below.

Familiarisation

The aim of the familiarisation stage was to achieve 'immersion in the raw data' in order to draw out key ideas and any recurrent themes (Pope *et al.*, 2000, p197). Familiarisation with the qualitative data was achieved initially through the processes of conducting the interviews, but also by listening and re-listening to the recorded interviews and supplementing the initial notes taken at the time of the interview and thus adding greater accuracy of the interview account. The researcher tried to undertake the familiarisation stage immediately after each interview was conducted. The interview notes were then read and reread. This was to ensure that the researcher was familiar with the details of each interview. The findings from the familiarisation exercise were then used to inform the second stage of our data analysis, which in our study involved reflecting and indexing the interviewees' responses.

Reflection and Indexing

Given that the interviews had been centred around the six significant factors that had emerged from the initial quantitative phase of the research, and which were natural themes for the secondary qualitative phase of the research, it was a relatively straightforward, yet long process to index the data.

Before, indexing the data is was necessary for the researcher to reflect upon the data. This process was carried out by comparing and critically evaluating individual interview data and responses with other interviews conducted during the study. During this process, some important questions were asked, such as do the responses in this interview differ to other interviews? Are there any new ideas emerging from the interview data, that was not detected from in the initial quantitative phase? By asking and answering these questions, similarities and differences among respondents' responses could be detected.

Constant comparison was an important technique used in the data analysis (Goulding, 2002; Strauss and Corbin, 1998). Corbin and Strauss (1990) state that making comparisons can assist the researcher in guarding against bias and help to achieve greater precision and consistency. Moreover, notes that recorded the

researcher's early thoughts, memories and reflections with the interview data, were continuously used throughout the entire process of data analysis and writing.

Interpretation

Finally during the interpretation stage the aim is to provide descriptive and explanatory accounts of the data by using the information that had been collated during the reflection and indexing stage.

In the current study to facilitate this exploration and indexing of the interview data, a series of simple bar charts were incorporated into the data analysis in Chapter 5 related to the initial likert scale responses that respondents had provided for each question during the interviews. This proved to be a beneficial way to index, build a picture and establish a pattern of whether the respondents validated the significant explanatory variables and the emphasis they placed on those findings as determinants of continuing entrepreneurial activity, before analysing the more in depth explanation given by respondents to support their answers.

The interpretation of the data and charts was supported with detailed quotations selected to demonstrate descriptions of the explanatory and contextual factors identified and to highlight where necessary interesting similarities and differences that occur between the respondents accounts. To preserve the authenticity of the data, the quotations use the original wording of the respondents, with additional words inserted in square brackets where clarification of the subject under discussion is needed.

A full account of the qualitative results in presented in Chapter 5.

3.9 Summary

The principal aim of this study is to explain regional variation in rates of continuing entrepreneurial activity in Scotland. This chapter has provided an overview of the research design employed in the current study.

The study adopted a mixed methods approach and employed a sequential explanatory design to complement the quantitative and qualitative nature of the research objective. The design incorporated two phases, conducted in a quantitative, then qualitative sequence. The first phase of the study comprised a quantitative analysis to identify regional determinants of continuing entrepreneurial activity using VAT registration data as a proxy measure. A subset of statistically significant variables from the quantitative findings was then identified for further exploration using qualitative methods. The second phase of the study comprised a qualitative analysis of interview data to explore the contextual and explanatory factors perceived to underlie the determinants identified in the quantitative analysis. Here, semi-structured interviews were conducted with a sample drawn from Scotland's 32 local authorities in order to reflect the views of opinion informers at local authority level in relation to the quantitative results.

The following two chapters of the thesis present the findings for the quantitative phase (Chapter 4) and qualitative phase (Chapter 5) of this mixed methods study, before a discussion and interpretation of those results in Chapter 6.

4. Quantitative Results

4.1 Introduction

This chapter reports the findings from the first phase of the sequential mixed methods investigation into determinants of continuing entrepreneurial activity across local authorities in Scotland. To meet this objective, data from the VAT registration database was modelled using panel data techniques in order to test for the effects of a number of socio-economic region-specific variables outlined in Table 3.1 of the previous chapter.

Results of the econometric modelling based on rates of continuing entrepreneurial activity standardised by the population, working population and by the stock of existing businesses are presented in Section 4.3. The quantitative results reported in this chapter are then used to inform the follow-up qualitative interviews in Chapter 5, before a discussion and interpretation of both quantitative and qualitative results in Chapter 6 in the context of the theoretical and empirical literature reviewed in Chapter 2.

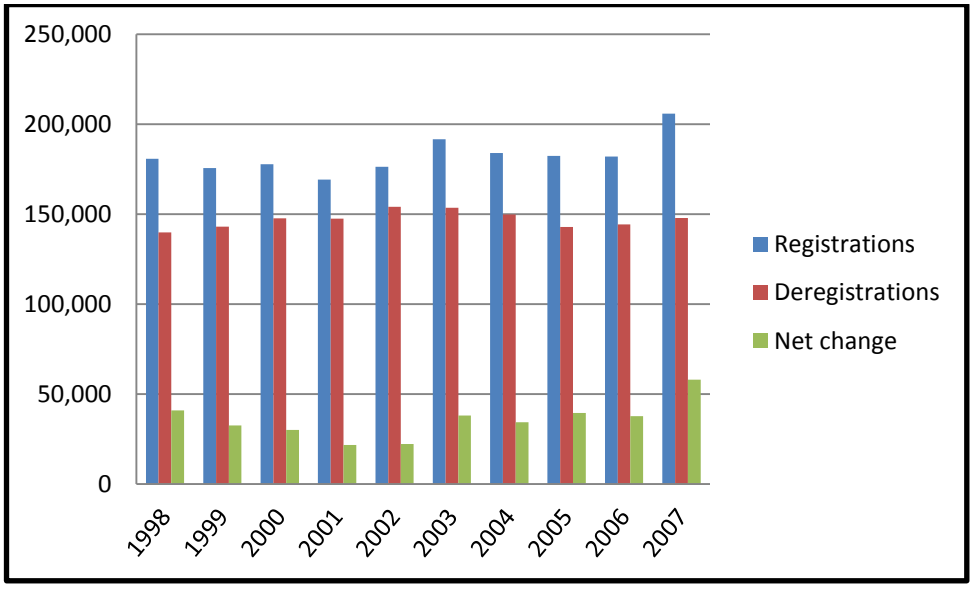
However, before the econometric results are presented an overview of spatial patterns of continuing entrepreneurship for the period 1998-2007 is provided in Section 4.2. Mapping spatial patterns of continuing entrepreneurship identifies regions with high (low) rates of this type of entrepreneurial activity and provides the rationale for the hypotheses testing, which attempts to identify regional determinants of continuing entrepreneurial activity in Scotland. While the research is primarily focussed on Scottish continuing entrepreneurial activity, it is important to contextualise continuing entrepreneurial activity in Scotland. Therefore, spatial patterns of continuing entrepreneurship are initially compared with other regions and countries of the UK.

4.2 Spatial Patterns of Continuing Entrepreneurial Activity

4.2.1 Total Net New Annual VAT Registrations in UK and Scotland

While the focus of the study centres on Scotland, it is useful to contextualise levels of continuing entrepreneurship in Scotland with overall levels of continuing entrepreneurial activity in the UK and other constituent regions. Between 1998 and 2007 VAT registrations in the UK rose from 180,000 to 205,000 with an annual average of 182,527. Figure 4.1 highlights that throughout this period there was a degree of fluctuation in both annual registrations and deregistrations.

Figure 4.1 VAT Registrations, Deregistrations and Net Change, 1998-2007 for UK.



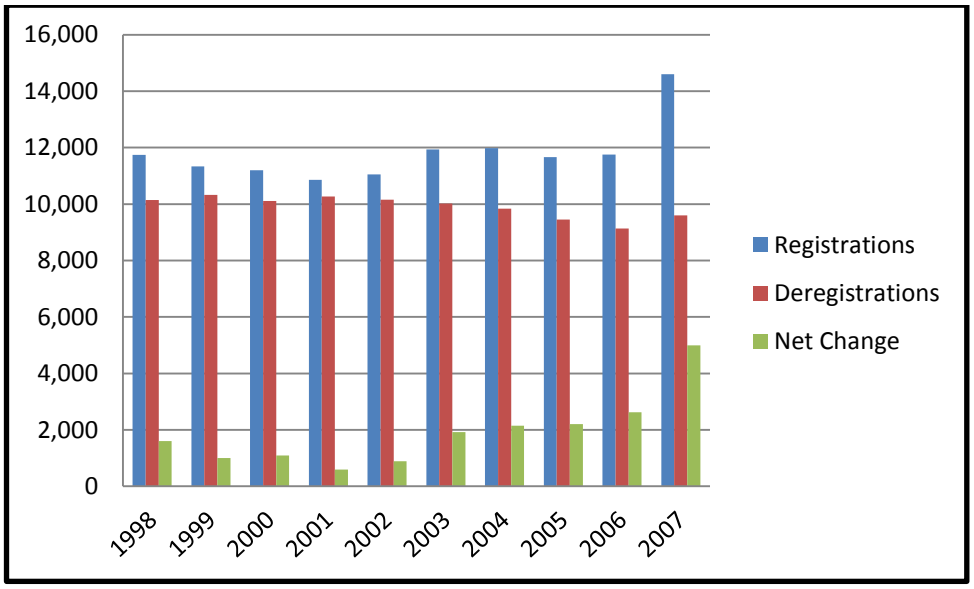
Source: VAT Register

Clearly, while gross business births are important, deaths are also crucial in understanding the net position. Therefore, annual registrations should also be contextualised with deregistrations in a given year. While deregistrations have also been high, net business registration has continually been above deregistration,

resulting in an a net increase in the UK business stock of small growing firms from 1.7 million in 1998 to over 2.0 million by the end of 2007, an increase of 17.6%.

Figure 4.2 summarises total new VAT registrations in Scotland over the period 1998-2007. It displays a similar trend to that of the UK experience over the same period with a peak of 14,595 in 2007, a low of 10,855 in 2001 and a yearly average of 11,811.

Figure 4.2 VAT Registrations, Deregistrations and Net Change, 1998-2007 for Scotland.



Source: VAT Register

Similar to the UK the stock of small growing firms in Scotland has also increased. The stock of businesses increased from 124,000 in 1998 to 142,000 in 2007, albeit at a lower growth rate of 14.5% compared with 17.6% at the UK level.

However, while the stock of both UK and Scottish VAT registered businesses has increased, it is necessary to examine rates of continuing entrepreneurship across regions, allowing us to identify regions with particularly high or low rates of continuing entrepreneurship. Moreover, comparing standardised rates of continuing entrepreneurship in addition to the total number of VAT registered businesses will account for regional heterogeneity in terms of both region and population size.

4.2.2 Rates of Continuing Entrepreneurship at UK Government Office Regional Level

In this sub-section a comparison of VAT registration rates across all 12 UK Government Office Regions (GOR) is provided. There are nine Government Office Regions in England plus the countries of Scotland, Wales and Northern Ireland. Scotland, Wales and Northern Ireland are all devolved administrations with different degrees of autonomy. The data reveals over the 1998-2007 period Scotland averaged 23.3 registrations per 1000 of total population (Table 4.1), 35.9 registrations per 1000 of working population (Table 4.2) and 9.04 registrations per 100 of existing business stock (Table 4.3). The data clearly demonstrate that rates of continuing entrepreneurship in Scotland are well below the UK average irrespective of the way the entry rate is standardised[7]. Those regions with above average VAT registration rates are located in the South of England and particularly in the South East of England: London, the South East, East and the South West. The London GOR has considerably higher rates of continuing entrepreneurship than any other region in England and more so when compared with Scotland, Wales and Northern Ireland. Again irrespective of how the rate of continuing entrepreneurship is standardised GOR data draws attention to Scotland's low rate of continuing entrepreneurship and its position in the bottom third of UK regions comparable with the North East, Northern Ireland and Wales; three regions which have some of the lowest regional rates of continuing entrepreneurship in the UK. The data also reveals a clear North-South divide, with continuing entrepreneurial activity concentrated in the most economically prosperous parts of the UK, shown by the London GOR having rates of continuing entrepreneurial activity double those of the North East and Wales, the least entrepreneurial regions in the UK. It is also noteworthy that rates of continuing entrepreneurship standardised by the existing business stock (ecological approach) display some variation in comparison with rates standardised by the total and working population methods. Although, London and the South East continue to dominate their position at the top, under the business stock approach (Table 4.3) the

[7] Refer back to Chapter 3, Section 3.5.2 for a more in-depth discussion on standardising entry rates.

North West region of England is identified as having an above average rate of continuing entrepreneurship, yet this is not the case when the entry rate is standardised by either the total or working populations. It is also apparent that elements of a core-periphery exist, with a nucleus in the south and south east when the entry rate is standardised by the stock of existing businesses.

However, while mapping rates of continuing entrepreneurship at the GOR level is useful in that it provides a broad overview of continuing entrepreneurship at a UK level, as a result of aggregation it fails to account for the local environment of the entrepreneur and is not, therefore, able to advise about continuing entrepreneurial activity within regions of a country, which is the aim of this study. Therefore, the remainder of this section maps spatial variation in rates of continuing entrepreneurship at the local authority council level in Scotland as discussed in Section 3.8.1. Council regions are the most disaggregated level at which VAT data is available representing the local environment of the entrepreneur.

Table 4.1 VAT Registrations, 1998-2007 per 1000 of Total Population.

Region	Rate
London	48.0
South East	36.3
East	32.8
South West	31.5
East Midlands	28.5
West Midlands	27.7
North West	26.4
Yorkshire and The Humber	25.4
Scotland	**23.3**
Northern Ireland	23.2
Wales	22.4
North East	18.0
UK	30.7

Source: VAT Register

Table 4.2 VAT Registrations, 1998-2007 per 1000 of Working Age Population.

Region	Rate
London	70.4
South East	56.9
East	51.7
South West	50.5
East Midlands	44.6
West Midlands	43.8
North West	41.2
Yorkshire and The Humber	39.8
Northern Ireland	36.6
Scotland	**35.9**
North East	28.1
Wales	27.7
UK	47.9

Source: VAT Register

Table 4.3 VAT Registrations, 1998-2007 per 100 of Existing Business Stock.

Region	Rate
London	12.32
North West	10.13
South East	9.99
North East	9.76
West Midlands	9.55
East Midlands	9.54
Yorkshire and The Humber	9.53
East	9.51
Scotland	**9.04**
South West	8.91
Wales	7.94
Northern Ireland	6.37
UK	9.83

Source: VAT Register

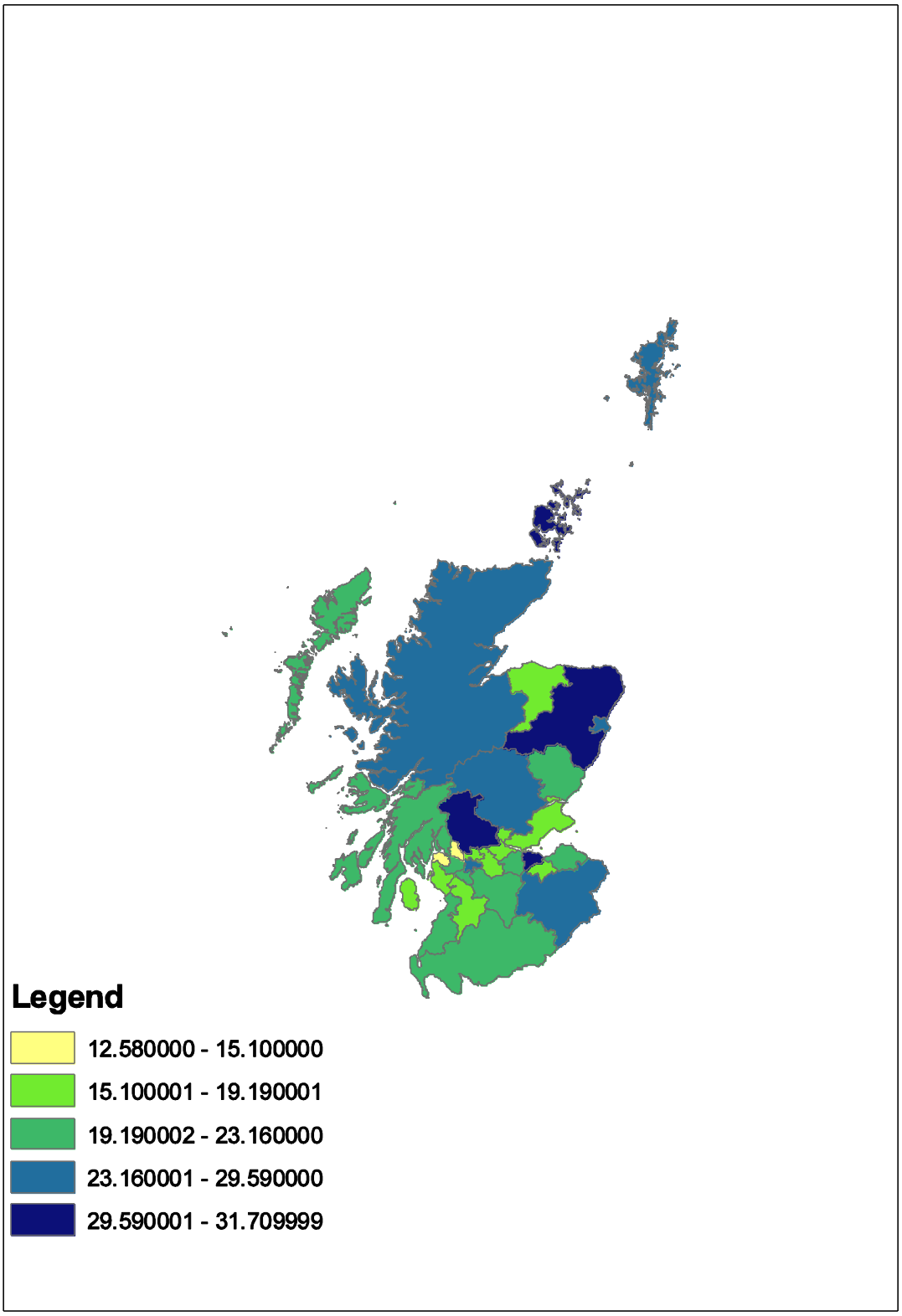
4.2.3 Local Authority Rates of Continuing Entrepreneurship Standardised by Total Population

Appendix D shows rates of continuing entrepreneurship measured by VAT registration data over the period 1998-2007 standardised by a regions *total population*. In addition Figure 4.3, highlights that there is considerable spatial variation in continuing entrepreneurial activity across Scottish regions. However, a Shapiro-Wilk test for normality at the 0.05 level produced a p-value of 0.28, which does not reject the null hypothesis that the dependent variable came from a normally distributed population. The average VAT registration rate in Scotland ranges from a low of 12.5 (West Dunbartonshire) to a high of 31.7 (Aberdeenshire) with a Scottish average of 23.3 registrations per 10000 of total population. Overall there are 12 regions with above average rates of continuing entrepreneurial activity. The highest rate of continuing entrepreneurship is in the North East of Scotland: Aberdeenshire (31.7) followed by Stirling (31.6) and the city of Edinburgh (30.8). Those regions with the lowest rates of continuing entrepreneurial activity: West Dumbartonshire (12.5), Inverclyde (15.1) and North Ayrshire (16.5) are all are situated west of Glasgow. Figure 4.3 also shows that some of the highest rates of continuing entrepreneurial activity are located in more northern regions of Scotland, particularly in rural regions reflected by 9 of the 12 above average regions being considered rural[8]. However, there is no evidence of a core-periphery relationship in Scotland, as was the case at the UK GOR level; with many of the most entrepreneurial Scottish regions located in the periphery and classified as rural, while some of the least entrepreneurial regions are located in the urban and more densely populated regions of the central belt and south west of Scotland. However, it is worth highlighting that both of Scotland's major cities, located at the eastern and western ends of the central

[8] The Randall definition of rural is based upon population density within a unitary authority (council region). Where a unitary authority has a population density of less than one person per hectare it is considered rural. On this basis there are 14 rural unitary authorities. Unitary Authority data is readily available and it is, therefore, very easy to apply the definition to a wide range of data sources. One disadvantage, however, is since it is unitary authority based, some urban areas, including Stirling and Inverness, are classified as rural. Using the Randall definition of rural 89% of Scotland's landmass and 29% of its population is classified as rural (Scottish Government, 2009).

belt have above average rates of continuing entrepreneurial activity: Edinburgh (30.8) and Glasgow (26.9). However, only Edinburgh is above the UK average of 30.7 registrations per head of population. Edinburgh is Scotland's most entrepreneurial city with regards to continuing entrepreneurial activity, while Dundee City (17.5) is the least entrepreneurial.

Figure 4.3 Spatial Variation in Rates of Continuing Entrepreneurial Activity per 10000 of Total Population 1998-2007.

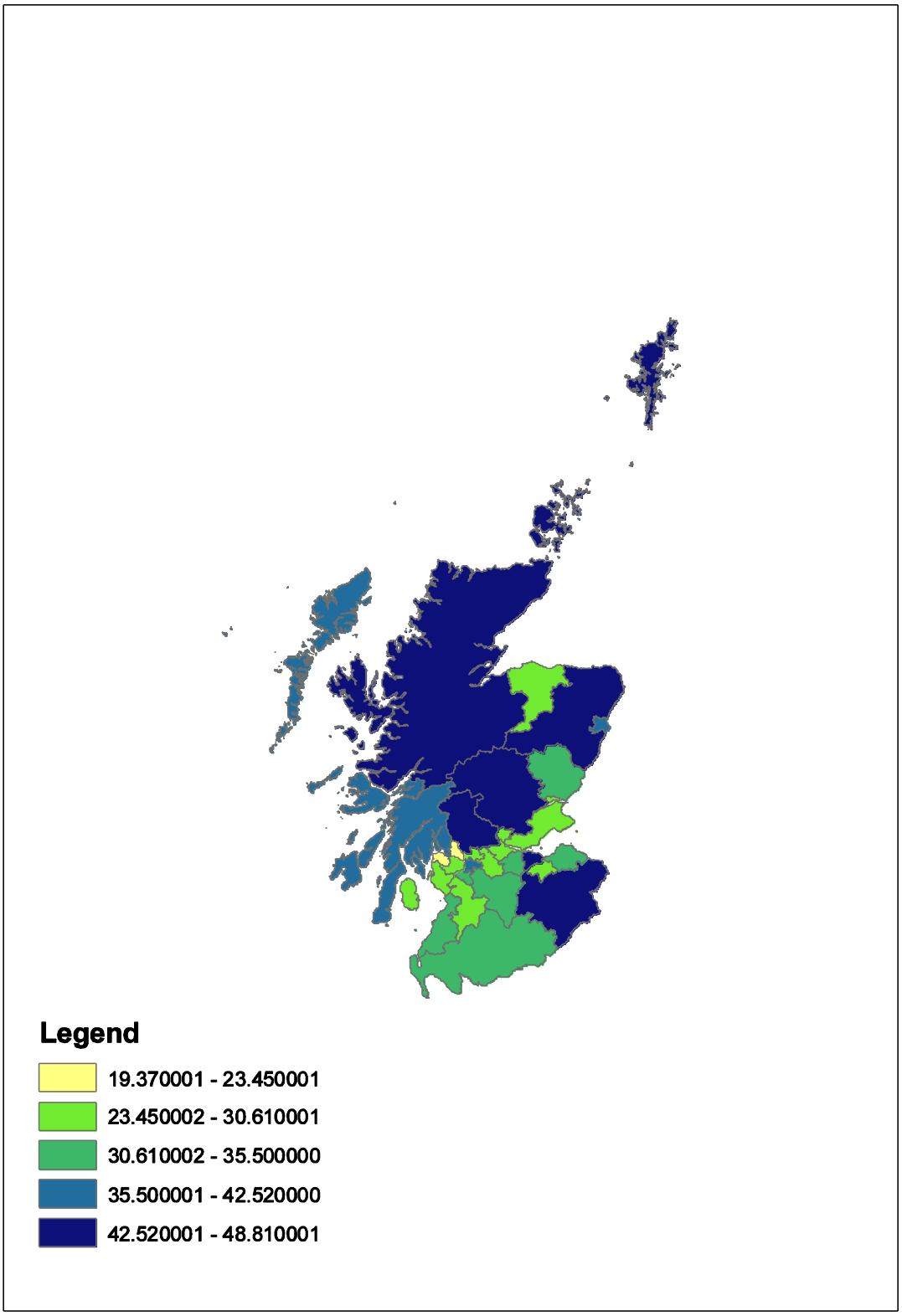


4.2.4 Local Authority Rates of Continuing Entrepreneurship Standardised by Working Population

Appendix D shows rates of continuing entrepreneurial activity measured by VAT registration data over the period 1998-2007 standardised by a regions *working population*. Like Figure 4.3, Figure 4.4 also shows that there is considerable spatial variation in rates of continuing entrepreneurial activity across Scottish regions[9]. The average rate of continuing entrepreneurial activity in Scotland ranges from a low of 19.3 (West Dunbartonshire) to a high of 48.8 (Aberdeenshire) with a Scottish average of 35.9 registrations per 10000 of working population. Given the aforementioned similarities between standardisation of the total and working populations, as outlined in Section 3.5.2, it is unsurprising, that the 12 above average regions are the same, as those identified when the entry rate is standardised by the total population in Figure 4.3. The highest rates of continuing entrepreneurship are in Aberdeenshire (48.8), Stirling (48.5) and the Orkney Islands (48.1). These are the only regions with above UK average rates of continuing entrepreneurship. Those regions with the lowest rates of continuing entrepreneurship are the same as those identified when the entry rate is standardised by the total population: West Dunbartonshire (19.3), Inverclyde (23.4) and North Ayrshire (25.8). Similar to the total population data, Figure 4.4 shows that the highest rates of continuing entrepreneurship are predominantly found in rural rather than urban regions. Similarly, there is no core-periphery pattern. Both of Scotland's major cities continue to have higher than average rates of continuing entrepreneurial activity in Scotland: Edinburgh (44.7) and Glasgow (40.2) although both are below the UK average of 47.9 reported in Table 4.2. Aberdeen City (42.5) also has an above average rate of continuing entrepreneurship in Scotland, while Dundee City (27.0) continues to be Scotland's least entrepreneurial city. Overall, there is very little difference in spatial patterns of continuing entrepreneurship when the dependent variable is standardised by either the total or working population.

[9] As with the dependent variable in section 4.2.3 a Shapiro-Wilk test for normality at the 0.05 level produced a p-value of 0.09, which does not reject the null hypothesis that the dependent variable standardised by the working population came from a normally distributed population.

Figure 4.4 Spatial Variation in Rates of Continuing Entrepreneurial Activity per 10000 of Working Population 1998-2007.



4.2.5 Local Authority Rates of Continuing Entrepreneurship Standardised by Existing Business Stock

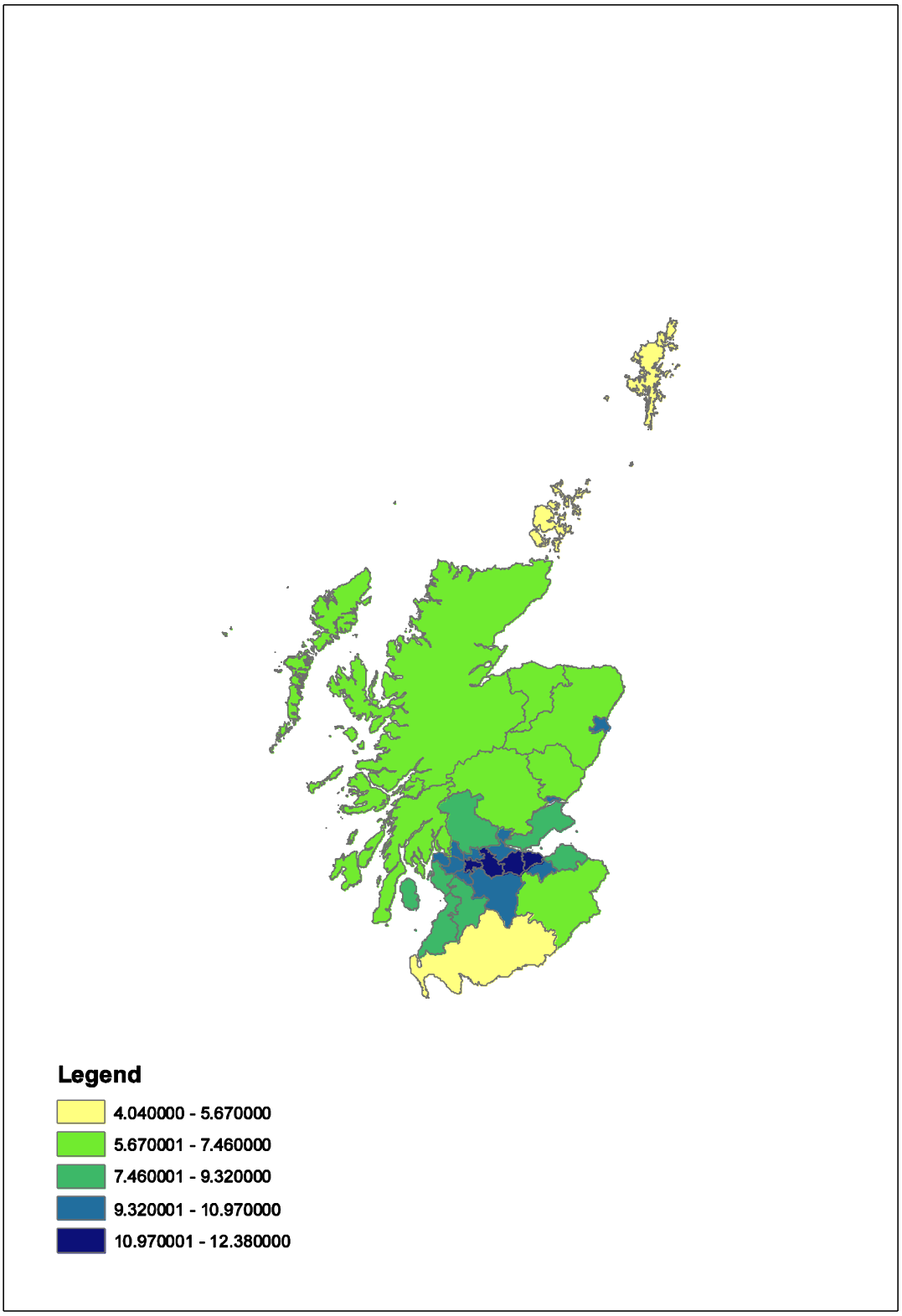
Appendix D shows rates of continuing entrepreneurial activity measured by VAT registration data over the period 1998-2007 standardised by a regions stock of existing businesses. Furthermore, Figure 4.5 highlights that there is considerable variation in regional rates of continuing entrepreneurship, although geographically this variation is more tightly constrained with elements of a core-periphery than when the entry rate is standardised by either the total or working population[10]. The average VAT registration rate in Scotland ranges from 4.04 (Orkney Islands) to 12.38 (Glasgow City) with a Scottish average of 9.04 registrations per 100 of existing business stock. Eighteen regions have above average rates of continuing entrepreneurship. The highest rates of entrepreneurial activity are: Glasgow City (12.38), West Lothian (11.94) and North Lanarkshire (11.67). These regions are located in the urbanised central belt between Edinburgh and Glasgow. Regions with the lowest rates of continuing entrepreneurship are: the Orkney Islands (4.04), the Shetland Islands (5.12) and Dumfries and Galloway (5.67) which are located in rural and island regions.

Two major differences are discernible when rates of continuing entrepreneurship are standardised by the stock of existing businesses compared with rates standardised by the total and working population. First, is the introduction of a core-periphery pattern with the highest rates of continuing entrepreneurial activity located in the central belt, particularly between Edinburgh and Glasgow. Second, are the low levels of continuing entrepreneurial activity reported in rural regions. Indeed Figure 4.5 highlights that with the exception of Stirling no rural regions have above average rates of continuing entrepreneurial activity. This is perhaps the most surprising finding given, it is the opposite of what was identified when the rate of continuing

[10] Again, as with the dependent variables in sections 4.2.3 and 4.2.4 a Shapiro-Wilk test for normality at the 0.05 level produced a p-value of 0.15, which does not reject the null hypothesis that the dependent variable standardised by the existing business stock came from a normally distributed population.

entrepreneurship is standardised by either one of the population approaches. Furthermore, the business stock approach appears to indicate a North-South divide with particularly low rates of continuing entrepreneurship in northern parts of Scotland, with the exception of Aberdeen City, and higher rates in the centre and south of Scotland with the exception of Dumfries and Galloway. It is also discernible that while Dundee City (10.72) has one of the lowest rates of continuing entrepreneurship under both population approaches, it is above average and among the highest rates when standardised by the stock of existing businesses. In addition to Glasgow, both Edinburgh (11.65) and Aberdeen (9.96) cities also have above UK average rates of continuing entrepreneurship when standardised by the stock of existing businesses.

Figure 4.5 Spatial Variation in Rates of Continuing Entrepreneurial Activity per 100 of Existing Business Stock 1998-2007.



4.2.6 Summary of Spatial Patterns in Continuing Entrepreneurial Activity

The aim in this section of the thesis was to identify patterns of continuing entrepreneurial activity (the dependent variable) and thereby justify the rationale for the econometric modelling in the following sections, which attempts to explain spatial patterns of continuing entrepreneurship in Scotland. The data revealed that significant spatial variation in rates of continuing entrepreneurship exist across the UK and Scotland.

Most importantly in the context of this study the data revealed that there is considerable variation in regional rates of continuing entrepreneurship within Scotland at the local authority level that is not detectable at the more aggregated GOR level. This justifies the need and requirement for the spatial study of determinants of continuing entrepreneurship in Scotland. Indeed, analysis of Scotland's 32 local authority council regions, which are the principal unit of analysis in this study, (as discussed in Section 3.8.1), highlighted that highly urbanised regions such as Edinburgh, Glasgow and Aberdeen cities are more entrepreneurial in absolute terms, than less urbanised regions, yet the highest rates of continuing entrepreneurship are found in rural regions. The data also revealed that a variety and complexity of spatial patterns exist within Scotland. The variety is reflected by differences in rates of continuing entrepreneurial activity between regions, while the complexity is highlighted by the different spatial patterns that emerge, dependent upon which way the rate of continuing entrepreneurship is standardised. Within Scotland both total and working population approaches indicate a strong urban-rural divide, with the highest rates of continuing entrepreneurship predominantly found in rural regions, while the business stock approach provides a different interpretation with higher rates of continuing entrepreneurship in urban regions and the emergence of a core-periphery, which is not present when continuing entrepreneurship is standardised by either of the population approaches. However, while the business stock approach reported higher rates of continuing entrepreneurship in many of the former industrial regions, this may be the result of a technical issue arising when

standardising rates of entrepreneurial activity. Specifically, as highlighted in section 3.5.2, it only takes a small increase in the number of new VAT registered businesses relative to the stock of existing VAT registered businesses for regions to appear to have higher rates of continuing entrepreneurship when standardised by the stock of existing businesses. Nevertheless, our mapping analysis demonstrates as suggested by the literature in section 3.5.2 that patterns of continuing entrepreneurship are strongly influenced by the choice of denominator.

Therefore, while we have been able to identify regional patterns of continuing entrepreneurship in Scotland, this exercise is only useful in the sense that it describes the spatial distribution of continuing entrepreneurship. It cannot explain why those patterns exist. That said, this section has importantly highlighted and justified the need for greater understanding and explanation about the spatial determinants of continuing entrepreneurial activity in Scotland. Following an overview of the descriptive statistics and correlation among variables in the following section the results of the hypotheses testing are reported in an attempt to explain the causes of the regional patterns of continuing entrepreneurial activity that emerged in this section of the thesis.

4.3 Model Estimation: Introduction

In the previous chapter a multiple regression model was developed in order to account for regional variation in rates of continuing entrepreneurial activity. In the following sections of this chapter interpretations are offered about the empirical results of various specifications of that model. These specifications are reflected by the three different ways in which the dependent variable is standardised: (1) by the total population (2) the working population and (3) the stock of existing businesses. Again the rationale for standardising the dependent variable in these ways is well documented in Section 3.5.2 of the methodology chapter, but not least because they are prone to producing differing results dependent upon the method of standardisation used. The main objective in comparing the results of the alternative models based on the way the dependent variable is standardised is to ascertain if the estimate, sign and significance differs across models. Generally, we can have a greater degree of confidence in a given predictor if it is replicated across models.

Furthermore, our model was tested using three distinct panel data estimation techniques – pooled OLS, fixed effect and random effect procedures. This was necessary because, as previously discussed (Section 3.7) when using panel data techniques the key is to reach a conclusion about what is the most effective estimation technique with which to model the data; that is to say should one use a pooled, fixed effect or random effect model to estimate coefficient parameters (Baltagi, 2005; Cameron and Trivedi, 2010).

A summary of all OLS, fixed effect and random effect panel estimations are provided in Appendix E for comparison purposes. However, as will be reported in the forthcoming section, diagnostic tests revealed an individual effect model rather than a pooled model is most appropriate. In particular our results reveal the random effects model to be the most appropriate technique for estimating determinants of continuing entrepreneurial activity.

4.3.1 Descriptive Statistics and Correlation Among Variables

Tables 4.4 and 4.5 show the descriptive statistics and correlation matrix for each variable. While the correlation matrix does not inform us about the causality of variables, it does act as a useful approximation to the hypothesis testing in the following sections by indicating the direction and strength of any relationship among variables.

Table 4.4 Descriptive Statistics for Dependent and Independent Variables.

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
Entry Rate TP	320	23.30	6.03	10.18	50.18
Entry Rate WP	320	35.90	9.21	15.83	77.17
Entry Rate Ecological	320	9.04	2.35	3.07	16.15
Wage Growth	320	4.13	5.80	-13.80	20.70
Population growth	320	0.004	0.59	-2.40	1.50
Unemployment rate	320	1.74	0.32	1.09	2.58
Human Capital	320	30.09	7.16	11.90	58.10
Access to Finance	320	9.88	6.74	-8.30	30.80
Specialisation Economies Manufacturing	320	1.06	0.51	0.00	4.89
Specialisation Economies Business Services	320	0.89	0.29	0.01	1.69
Urbanisation Economies	320	461.74	732.56	8.00	3366.00
Size of public sector workforce	320	28.75	5.01	14.10	47.30
Existing small business population	320	90.43	3.75	82.10	96.70

The correlation matrix (Table 4.5) highlights the relationship between certain variables conflicts with the direction of the predicted hypotheses; seemingly influenced in some cases by the way the dependent variable is standardised. The relationship between H1 is contrary to the predicted effect based on one of the indicators (wage growth), although the effect is not significant. However, (population growth) - the other demand-side variable- supports the direction of the predicted hypothesis in all models and is significant in both the total and working population models. H2 (unemployment) is statistically significant in all models, however, the direction of the relationship and predicted hypothesis is only supported in the case of the total and working population approaches. H3 (Human Capital) is positive and statistically significant in all models as predicted. H4 (access to finance) is positively correlated in all models as predicted, although the relationship is only significant in both total and working population models. The correlation matrix also indicates the relationship between continuing entrepreneurial activity and agglomeration economies is mixed. Although the relationship is weak H5 (specialisation economies in manufacturing) highlights a positive relationship in both the total and working population models although the effect is not significant. In the case of standardisation via the business stock approach the relationship is negative and significant. On the other hand the relationship between specialisation economies in business services is positive in all models, although it is only significant in the business stock and total population approaches. Urbanisation economies has a negative insignificant relationship in both total and working population models, which contradicts the positive and statistically significant relationship between continuing entrepreneurial activity and urbanisation economies indicated by the business stock approach. The relationship between H6 (size of public sector workforce) is negative as predicted, although the relationship is not significant. The direction of the relationship in H7 (existing small business population) is positive and statistically significant as predicted by both population approaches, however, the relationship is strongly negative and significant when standardised by the existing business stock. Therefore, the correlation matrix appears to indicate that the relationship between continuing entrepreneurship and the predictor variables depend and differ on the way the VAT registration rate is standardised with particular differences between both population and business stock approaches. The results of the hypothesis tests outlined in Chapter 2 based on pooled, fixed and random effect models are provided below.

Table 4.5 Correlation Matrix of Dependent and Independent Variables[1].

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Entry Rate (TP)[2]	1.000												
2. Entry Rate (WP)[3]	**0.993**	1.000											
3. Entry Rate (Ecological)	**-0.127**	**-0.198**	1.000										
4. Wage Growth	-0.059	-0.056	-0.015	1.000									
5. Population growth	**0.271**	**0.266**	0.086	-0.033	1.000								
6. Unemployment rate	**-0.496**	**-0.522**	**0.404**	0.014	**-0.384**	1.000							
7. Human Capital	**0.281**	**0.256**	**0.259**	0.026	**0.115**	**-0.310**	1.000						
8. Access to Finance	**0.113**	**0.114**	0.079	-0.023	0.044	**-0.147**	**0.206**	1.000					
9. Specialisation Economies Manufacturing	0.001	0.019	**-0.139**	-0.010	**-0.158**	0.014	**-0.196**	0.055	1.000				
10. Specialisation Economies Business Services	**0.132**	0.069	**0.512**	-0.032	**0.160**	-0.077	**0.496**	0.007	**-0.302**	1.000			
11. Urbanisation Economies	-0.001	-0.067	**0.558**	-0.015	**-0.200**	**0.391**	**0.259**	0.027	-0.067	**0.358**	1.000		
12. Size of public sector workforce	-0.030	-0.016	-0.102	0.007	**-0.187**	-0.016	**0.155**	0.062	**0.185**	**-0.256**	**0.110**	1.000	
13. Existing small business population	**0.419**	**0.484**	**-0.727**	0.027	**0.152**	**-0.511**	-0.028	-0.036	0.063	**-0.324**	**-0.516**	0.063	1.000

(1) Bold print represents statistical significance at 0.05 level (2) TP= total population (3) WP= working population

4.3.2 Model Estimation: Results and Interpretation

Initially our theoretical model developed in Section 2.6 was tested by standardising rates of continuing entrepreneurial activity (the dependent variable) by the total population which standardises the number of firms relative to the population. This was subsequently followed by versions of the same model standardised by both the stock of existing businesses and working population. The total population approach makes the assumption that entrepreneurs grow their business in the region where they are living (Cross, 1981; O'Farrell, 1986) implying that continuing entrepreneurial activity is largely dependent on local market conditions in that region.

Results of all modelling are provided in Table 4.6. Results of the OLS pooled model are represented by the column Model 1. The dependent variable is the rate of continuing entrepreneurial activity per 10000 of total population annually for the period 1998-2007. The value of the F-test demonstrates that the overall model is statistically significant. The R^2 value shows the pooled model can explain 42% of the variance in continuing entrepreneurial activity between regions.

OLS pooled regression results confirm that population growth, the unemployment rate, specialisation economies in manufacturing, urbanisation economies, size of the public sector workforce and the number of existing small businesses in a region are significant factors explaining regional variation in continuing entrepreneurial activity. As predicted the unemployment and public sector workforce variables have a negative impact on levels of continuing entrepreneurship.

Table 4.6. Regression Results. Dependent Variable: Continuing Entrepreneurial Activity

Model[1]	**Model 1 TP**	**Model 2 TP**	**Model 3 TP**	**Model 4 WP**	**Model 5 BS**
Estimation Technique	OLS	FE[2]	RE[2]	RE[2]	RE[2]
Independent Variable					
Demand and Supply factors					
Wage Growth	-0.056 (0.045)	-0.023 (0.027)	-0.023 (0.026)	-0.038 (0.040)	-0.004 (0.009)
Population Growth	**1.230** **(0.496)****	**1.186** **(0.633)***	**1.180** **(0.573)****	**1.567** **(0.862)***	**0.554** **(0.157)*****
Unemployment Rate (log)	**-6.116** **(1.153)*****	-0.565 (1.437)	-1.761 (1.144)	**-2.952** **(1.771)***	**1.115** **(0.373)****
Human Capital	0.062 (0.049)	**0.117** **(0.042)****	**0.107** **(0.040)****	**0.167** **(0.062)****	**0.034** **(0.013)****
Access to Finance	0.046 (0.040)	**0.085** **(0.041)****	**0.079** **(0.039)****	**0.123** **(0.059)****	0.018 (0.011)
Agglomeration factors					
Specialisation Economies (Manufacturing)	**0.910** **(0.545)***	0.191 (0.394)	0.268 (0.368)	0.408 (0.559)	0.033 (0.122)
Specialisation Economies (Business Services)	1.416 (1.276)	-0.994 (1.610)	-0.111 (1.776)	-0.559 (2.694)	0.761 (0.472)
Urbanisation Economies	**0.002** **(0.004)*****	0.008 (0.010)	**0.002** **(0.009)****	**0.003** **(0.001)****	**0.006** **(0.002)****
Policy and cultural factors					
Size of Public Sector Workforce	**-0.109** **(0.059)***	0.015 (0.037)	-0.003 (0.035)	-0.003 (0.001)	-0.016 (0.014)
Small Business Population	**0.711** **(0.093)*****	0.671 (0.479)	**0.804** **(0.212)*****	**1.309** **(0.321)*****	**-0.305** **(0.054)*****
Constant	-33.67 (10.20)***	-45.02 (44.42)	-52.24 (19.51)**	-85.64 (29.60)***	32.77 (5.397)***
F-value	22.60***	3.70***	56.50***	61.33***	149.64***
R^2	0.42	0.08	0.37	0.40	0.68
N	320	320	320	320	320

Significance at the 0.01, 0.05 and 0.10 level indicated by ***, ** and *.

(1) TP =dependent variable standardised by total population, WP = dependent variable standardised by working population, BS = dependent variable standardised by existing business stock.

(2) Robust standard error used to correct for heteroscedasticity.

While wage growth has a negative effect this effect is not significant. Similarly, no significant effect is identified for variables representing human capital, access to finance and specialisation economies in business services. However, a series of diagnostic tests reported below revealed ultimately, that the OLS pooled model is not an efficient or effective way to model regional patterns of continuing entrepreneurial activity.

Although the correlation matrix (Table 4.5) did not indicate any strong relationship between variables, a formal test for multicollinearity was conducted using the Variance Inflation Method (VIF). Based on the VIF result (Table 4.7) and Myers (1990) synopsis that a VIF less than 10 is not a problem no multicollinearity is detected between variables.

Table 4.7 Results of Variance Inflation Factor Analysis.

Variable	VIF	1/VIF
Unemployment rate	2.03	0.49
Specialisation Economies Business Services	2.02	0.49
Human Capital	1.85	0.54
Existing small business population	1.83	0.54
Urbanisation Economies	1.77	0.56
Size of public sector workforce	1.31	0.76
Population growth	1.27	0.79
Specialisation Economies Manufacturing	1.15	0.86
Access to Finance	1.09	0.91
Wage Growth	1.01	0.99

Nevertheless, further diagnostic tests were undertaken to identify any problems with the data. A normal probability plot (Figure 4.6) indicates the standardised residuals are normally distributed. However, a plot of the standardised residuals against the fitted residuals (Figure 4.7) indicates the presence of heteroscedasticity in the data. The presence of heteroscedasticity is confirmed by the Cook/ Weisberg test for constant variance, which rejects the null hypothesis that all error variance is equal at the 0.01 level. The presence of heteroscedasticity indicates that OLS regression is no

longer optimal, as standard errors will be biased, which in turn may lead to bias test statistics and confidence intervals. Furthermore, a Breusch-Pagan Lagrange multiplier (equation 3.9) was used to test whether intercept terms vary across cross-sectional units. The test produced a $\mathcal{X}^2$ statistic of 476.76 which strongly rejects the hypothesis that the intercept term is invariant across cross-sectional units. Therefore, the Breusch-Pagan test rejects the pooled OLS model in favour of an individual effect model (fixed or random model), as the pooled OLS model would lead to inconsistent and biased results.

Figure 4.6 Normal Probability Plot of Standardised Residuals.

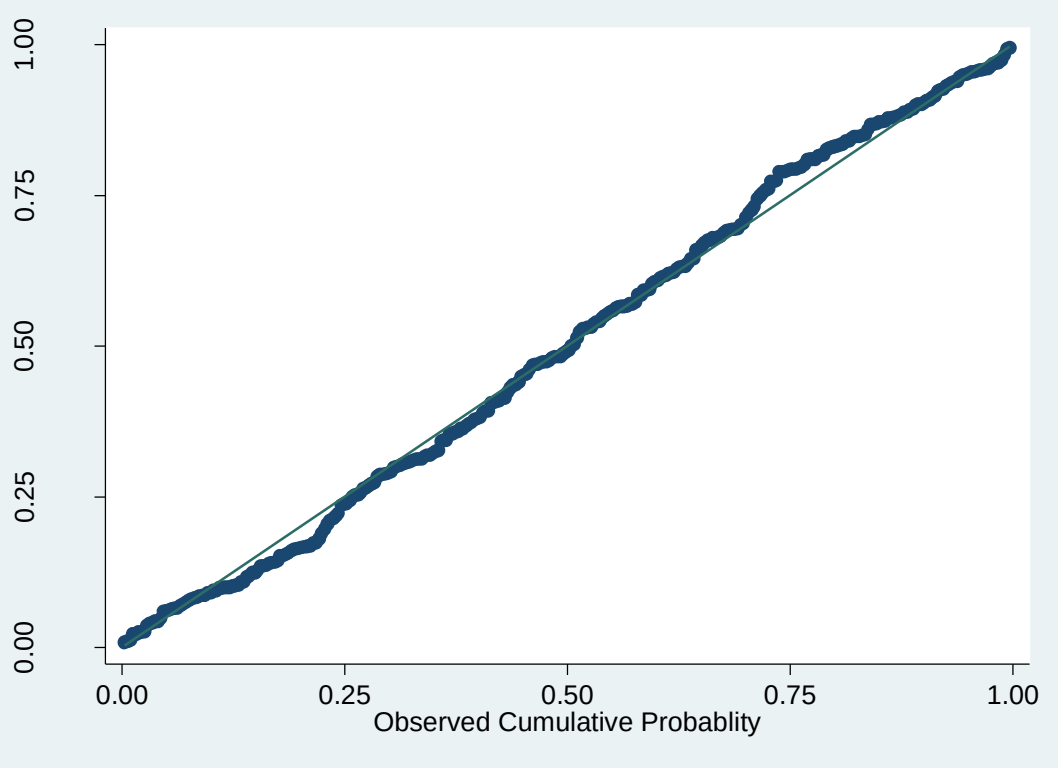
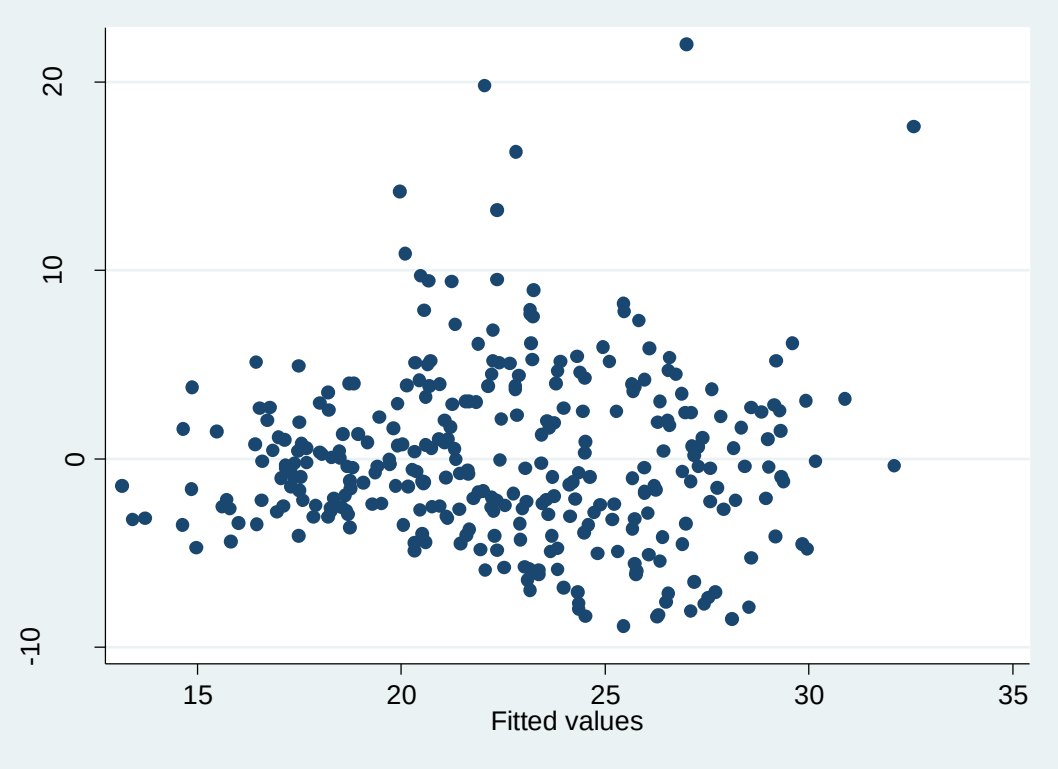


Figure 4.7 Homoscedastic Scatterplot of Standardised Residuals Against Predicted Values.



4.3.3 Fixed and Random Effect Estimation

Following elimination of the aforementioned pooled OLS estimation both a fixed and random effect model was estimated. The heteroscedasticity present in the OLS pooled model (Model 1) was corrected for by the implementation of Huber White robust standard errors, which ensures accurate p-values, but does not change the coefficient. The fixed effect model (Model 2) makes the assumption that the individual effect is captured by an individual intercept for each region, whereas the random effect model (Model 3) makes the assumption that the individual effect is not part of the intercept term, as it is in the fixed effect model, but forms part of the error structure. The results of both models are reported in Table 4.6. The value from the F-tests demonstrates that each model is statistically significant.

In terms of statistical significance results from Model 3 (the random effect model) report that 5 factors positively and significantly explain region variation in continuing entrepreneurial activity when standardised by the total population: population growth (0.05), human capital (0.05), access to finance (0.05), urbanisation economies (0.05) and the number of existing small businesses (0.01), whereas, Model 2 (the fixed effect model) only reports 3 factors: population growth (0.10), human capital (0.05) and access to finance (0.05).

Comparing the estimates yielded by models 2 and 3 it is possible to view some differences between the fixed and random effect estimations. The most apparent difference relates to the R^2 values; the random effect model has considerably greater explanatory power than the fixed effect model. The R^2 value is very low in the fixed effect model and can only explain 8% of the variation in regional entrepreneurial levels, opposed to 37% in the random effect model.

Further comparison of parameters estimates yielded by the fixed and random effect techniques, reveal that all the predictors associated with statistically significant effects in the fixed effect model are also significant in the random effect model. Nevertheless, while urbanisation economies and the small business population variables reach statistical significance at the 0.05 and 0.01 level respectively in the random effects model these variables do not reach statistical significance in the fixed effect model. A strong explanation for this outcome doubtless reflects the fundamental technical difference between the two estimation techniques. For example, although the variable urbanisation economies, which is proxied by population density (a variable that is static i.e. does not change from year to year like a variable such as the unemployment rate or house prices) has a slightly larger coefficient in the fixed effect model, it is only significant in the random effect model; this is most likely explained by the failure of the fixed effect model, to capture time invariant factors or factors that change very little (i.e. fixed effects) as was described in section 3.7 of the methodology chapter in terms of potential weaknesses of using a fixed effect estimator to model continuing entrepreneurial activity.

For example, given that each individual region has unique characteristics that may or may not influence the predictor variables, the fixed effect model controls for this by removing any time invariant factors ($\nu_{it} - \mu_i$) in order to assess the predictors' net

effect. This suggests if the unobserved effect does not change over time, it must follow, that any change in the dependent variable must be due to influences other than the fixed effects (Stock and Watson, 2003).

Thus given that the fixed effect estimator allows for correlation between α_i and the explanatory variables across all time periods Cov (X_{it}, U_i) $\neq 0$, this must be offset by the inability of the fixed effect model to include time constant/invariant regressors. As a result the fixed effect estimator (equation 3.5) may be imprecise where time varying regressors vary little over time and this may also be symptomatic of the relatively lower explanatory power offered by the fixed effect model when compared with the random effect model.

Moreover, in addition to our own empirical results and explanation a Hausman specification test (equation 3.10) was conducted. This tests the null hypothesis that the μ_i are uncorrelated with the independent variables and is, therefore, a test that the random effect model is the preferred model opposed to the alternative fixed effect model. The Hausman Test produced a χ^2 result of 9.08 which fails to reject the null hypothesis and confirms the random effect model is the most appropriate model to estimate spatial variation in regional rates of continuing entrepreneurial activity in Scotland.

Therefore, on the basis that the random effect model is the preferred choice of estimation technique; the remainder of the models presented in this chapter and in the subsequent discussion and interpretation of results in Chapter 6 are on the basis of random effect modelling being the most effective and efficient way to explain regional variation in rates of continuing entrepreneurial activity.

As a result, following the total population random effects output in Model 3 our theoretical model was also further developed by standardising the dependent variable by both the working population (Model 4) and by the existing business stock (Model 5) in order to test its robustness. The results are again reported in Table 4.6.

The working population approach (Model 4), is based on the theory of entrepreneurial choice (Evans and Jovanovic, 1989) and standardises the number of firms relative to the working population, making the assumption that entrepreneurs grow their business in the same labour market in which they have gained previous

work experience and allows the entrepreneur to live in another region (Audretsch and Fritsch, 1994).

The R^2 value shows that the model can explain 40% of regional variation in rates of continuing entrepreneurial activity and the F-test shows the model is statistically significant.

However, perhaps most reassuringly is over and above the explanatory power of Model 4, which co-incidentally is very similar to the 37% of variance explained in Model 3, is the apparent robustness of our original theoretical framework. This is reflected by the outcomes reported showing similar statistical significance and parameter estimates among variables. Comparing the estimates yielded between Models 3 and 4 we can see that all the predictors associated with statistical significance in Model 3 are also significant in Model 4, with the exception of the unemployment variable, which has a negative significant effect (0.10). The negative sign is not significant when standardised by the total population in Model 3. The other notable differences between Models 3 and 4 is that the coefficient size is always slightly larger in Model 4 and secondly, that the population growth variable is only significant at the 0.10 level in Model 4 compared with the 0.05 level in Model 3.

Overall, Model 4 shows that 6 factors are statistically significant: population growth (0.10), the unemployment rate (0.10), human capital (0.05), access to finance (0.05), urbanisation economies (0.05) and the number of existing small businesses (0.01) in a region significantly explain regional variation in continuing entrepreneurial activity.

Finally, the dependent variable was standardised in Model 5 by the existing business stock, which is based on the assumption that existing firms spin out businesses, thereby acting as an incubators and providing key support to these firms. The dependent variable is the rate of continuing entrepreneurial activity per 100 of existing business stock annually for the period 1998-2007.The regression results are reported in Model 5 of Table 4.6.

Model 5 reports that population growth (0.01), the unemployment rate (0.05), human capital (0.05) and urbanisation economies (0.05) positively and significantly explain

regional variation in continuing entrepreneurial activity. Although the number of existing small businesses (0.01) has a significant effect the coefficient indicates that this effect is negative.

On the basis of Model 5 when standardisation of the dependent variable is substituted with the existing business stock; two major differences emerge from the reported results than were reported in models 3 or 4 when the dependent variable was standardised by the total and working populations. The most striking difference is that the coefficients of the unemployment variable are positive, suggesting that regions with high levels of unemployment are associated with higher, and not lower rates of continuing entrepreneurial activity.

Creating further ambiguity still, taken together, the business stock and population approaches suggest that, while a high unemployment rate results in a high rate of continuing entrepreneurial activity relative to the number of establishments already in existence, the propensity of workers to grow a business in a high unemployment region tends to be relatively low. There are two possible interpretations for this negative relationship between the propensity of workers to grow a business and the unemployment rate. The first is that the propensity to grow or expand a business is lower for unemployed than for employed workers. The alternative explanation is that the propensity to grow a business, regardless of employment status, is negatively influenced by higher regional rates of unemployment, which is in line with our own hypothesis developed in Section 2.6

The second major difference is that the sign of the coefficient for the small business population variable in models 3 and 4 is positive for both population approaches, but negative when standardised by the stock of existing businesses in Model 5, which goes against our own predicted hypothesis and suggests that role models have a negative influence on rates of continuing entrepreneurial activity as discussed in section 2.6.

One final observation is that the R^2 value (68%) in Model 5 is somewhat higher than those of Models' 3 and 4, which may be a sign of endogenity likely to result from the conceptual weaknesses of standardising the rate of continuing entrepreneurial activity with the stock of existing businesses (Model 5), as discussed in section 3.5.2, which highlighted the propensity for an endogenous relationship to exist when the

denominator is not exogenous to the numerator. Furthermore, on the basis of the critique regarding standardisation of the dependent variable in section 3.5.2 and given that this study is concerned with the role of the regional environment in influencing individuals to undertake an entrepreneurial act, it would be most appropriate to measure continuing entrepreneurial activity standardised by the labour market approach, as conceptually businesses are most likely to be created and grown by the actions of an individual/individuals. In other words people grow and develop businesses, not business entities.

In the following section we further test the robustness of our models by incorporating time (year) effects.

4.3.4 Model Elaboration: assessing the role of time effects.

The process of model elaboration involved testing the original relationships and output reported in the previous section in Models 3, 4 and 5 by further examining via partials created by the introduction of new variables. As a result, it is possible to specify more precisely the empirical relationships and the conditions under which those initial relationships hold. For example, by conducting such a process, certain original relationships may be explained away as being spurious, previously supressed relationships may emerge, and still further others may have their signs reversed. In short, elaboration techniques push the usefulness of any statistical analysis to the limits of the available data (Poister, 1978) and in doing so introduce a measure of robustness to findings that would otherwise not be evident.

As with the original modelling in the previous section the main objective was to assess whether the introduction of time controls altered the parameter sign and significance levels across models. The reason being that we can ascertain a greater degree of confidence in a given predictor whose effect estimate is replicated across models.

The use of the elaboration process reported in Table 4.8 will determine whether certain associations reported in Table 4.6 are robust to further influences in the form of the introduction of year (time) dummy variables. In particular three additional

models, which take account of the three different ways in which the dependent variable was standardised were estimated to assess the influence of time effects on the explanatory variables of the original random effect models (Models 3, 4 and 5) reported in Table 4.6. The results are reported in Table 4.8. We only report the coefficients of the predictor variables in Table 4.8, as it is not possible to include both predictor and time effect coefficients for 10 years due to the lack of space. The coefficients for the time effects are reported fully in Appendix F.

Overall, the output reported in Table 4.8 once time controls (which should account for period influences) are included, is in general, extremely positive given that they largely reflect the earlier modelling reported before the introduction of time controls. Indeed, turning to our primary concern, which is the influence of time effects on the robustness of our original modelling in terms of whether the introduction of time controls altered the parameter sign and significance levels across models we can see there is little in the way of change that calls into question the results that are reported in our original modelling in Table 4.6. Indeed, the inclusion of time effects would appear, if anything, to enhance the validity of our model in most cases, reflected by the replication of all significant variables identified in the original models (Models 3, 4 and 5 of Table 4.6), as significant when time controls are implemented with the exception of one variable as reported by Model 8 in Table 4.8[11].

[11] It should be noted that Models 6, 7 and 8 in Table 4.8 are extensions of Models 3, 4 and 5 from Table 4.6 for ease of comparison. Models 1 and 2 from Table 4.6 were not modelled with time effects given they had been rejected already.

Table 4.8. Regression Results: Model elaboration through inclusion of time effects. Dependent Variable: Continuing Entrepreneurial Activity.

Model[1]	**Model 6 TP**	**Model 7 WP**	**Model 8 BS**
Estimation Technique	RE[2]	RE[2]	RE[2]
Independent Variable			
Demand and Supply factors			
Wage Growth	-0.016	-0.027	-0.001
	(0.026)	(0.040)	(0.087)
Population Growth	**0.755**	**0.953**	**0.368**
	(0.401)**	**(0.518)***	**(0.130)****
Unemployment Rate (log)	-2.246	**-3.618**	0.476
	(1.553)	**(2.380)***	(0.456)
Human Capital	**0.114**	**0.175**	**0.040**
	(0.0459)**	**(0.070)****	**(0.014)****
Access to Finance	**0.089**	**0.134**	0.022
	(0.032)**	**(0.050)****	(0.019)
Agglomeration factors			
Specialisation Economies (Manufacturing)	0.284	0.433	0.050
	(0.329)	(0.507)	(0.109)
Specialisation Economies (Business Services)	-0.165	-0.119	0.604
	(1.210)	(1.858)	(0.373)
Urbanisation Economies	**0.001**	**0.002**	**0.006**
	(0.001)*	**(0.001)***	**(0.002)****
Policy and cultural factors			
Size of Public Sector Workforce	-0.018	-0.027	-0.021
	(0.042)	(0.064)	(0.013)
Small Business Population	**0.656**	**1.105**	**-0.351**
	(0.207)***	**(0.312)*****	**(0.048)*****
Constant	-36.62	-63.92	38.88
	(19.99)*	(30.18)***	(4.829)***
F-value	148.65***	145.54***	287.52***
R^2	0.42	0.44	0.72
N	320	320	320

Significance at the 0.01, 0.05 and 0.10 level indicated by ***, ** and *.

(1) TP =dependent variable standardised by total population, WP = dependent variable standardised by working population, BS = dependent variable standardised by existing business stock.

(2) Robust standard error used to correct for heteroscedasticity.

For example, we can see in Table 4.8 that while all significant relationships and the direction among variables in each of the population models (Model 6 and 7) holds when time effects are added; the unemployment variable when standardised by the stock of existing businesses and combined with time effects (Model 8 of Table 4.8) loses it level of significance when compared with the same model in Table 4.6. Model 5 (in Table 4.6) had originally indicated that unlike our predicted hypothesis and both empirical estimations when the dependent variable was standardised by either of the population approaches that higher unemployment had a positive effect on rates of continuing entrepreneurial activity. Therefore, the addition of time effects has if anything enhanced our own theoretical position outlined in section 2.6, that higher unemployment is indeed, as supported by two of our three original models and subsequently replicated by models 6 and 7 in Table 4.8 actually likely to have a negative effect on rates of continuing entrepreneurial activity.

Two additional observations are also worthy of note when time effects are included. Firstly, although the unemployment variable as discussed above is the only variable to lose its statistical significance when time effects are included a small number of variables do see a change in their level of statistical significance. For example, in Models 6 and 7 although the influence of urbanisation economies remains significant the level of significance falls from the 0.05 level to 0.10. Similarly, in Model 8 the population growth variable falls from a significance level of 0.01 to 0.05. Secondly, when compared to the original modelling in Table 4.6, we find that the overall explanatory power of the models which include time controls increases between 4-5% in each of the respective models reported in Table 4.8.

Finally, although, it was not the aim of this study to directly investigate how time *per se* influences the determinants of continuing entrepreneurial activity one of the most revealing aspects that emerge from the inclusion of time effects is that with the exception of the year 2007, in all models reported (See Appendix F) rates of continuing entrepreneurial activity proceeded at rates below that of 1998 and that this effect is significant in all years with the exception of 1999 and 2003. Therefore, while we cannot ascertain with any certainty what those period influences are; primarily because we do not have sufficient data available to expand our database further, this is certainly an area that is worthy of further investigation in the future.

4.5 Summary

This chapter reported the findings from the first phase of the sequential mixed methods investigation into locational determinants of continuing entrepreneurial activity across local authorities in Scotland. As a prelude to the reporting of the hypotheses testing in the latter part of this chapter an initial overview of the spatial distribution of continuing entrepreneurial activity among Scottish local authorities revealed that there is considerable variation in rates of continuing entrepreneurship across Scottish regions. Indeed, it is apparent from the spatial data presented in Section 4.2 that the way in which the dependent variable is standardised can influence patterns of entrepreneurial activity across regions and ultimately as was revealed by the empirical results significantly affect whether the direction of a coefficient is positive or negative in the case of certain variables.

In an attempt to explain the causes of those spatial patterns outlined in Section 4.2; panel data analysis using pooled, fixed and random effect models highlighted that regional variation in continuing entrepreneurial activity is a complex process, which can be explained by a range of socio-economic region-specific factors. However, the extent to which each set of estimated models can explain regional differences in continuing entrepreneurship differs quite significantly dependent upon the way the rate of continuing entrepreneurship is standardised and the econometric technique used.

Furthermore, in addition to the presence of heteroscedasticity in the OLS pooled model, and as previously discussed in the methodology chapter (section 3.7.4) selecting the correct econometric model is not always straightforward when using panel data. For example, given that each of Scotland's 32 regions are not homogenous and rates of continuing entrepreneurial activity differ significantly between regions, officially we tested whether intercepts vary across cross sectional units by running a Breusch-Pagan Lagrange Multiplier test for each set of models dependent upon how the rate of continuing entrepreneurial activity is standardised. The test statistics strongly rejected the hypothesis that the intercept is invariant across cross sectional units, which rejects the pooled model in favour of an

individual effect model. However, when running an individual effect model the key distinction is to decide between a fixed or random effect model. The choice of whether to estimate coefficients using a fixed or random effect model was made using the Hausman specification test (equation 3.10), which tests if the μ_i are uncorrelated with the independent variables. The Hausman test did not reject the null hypothesis at any point indicating it was most appropriate to use the random effect model.

The subsequent econometric testing based on random effect modelling specifically identified six factors, which significantly explain spatial variation in Scottish entrepreneurial activity including: local demand (population growth variable), culture (existing small business population variable), unemployment, human capital, agglomeration and access to finance; and it is those six factors which subsequently become the themes for the sequential qualitative phase reported in the following chapter. The purpose of the qualitative phase, as discussed in Chapter 3 was to follow-up the initial quantitative analysis reported in this chapter and identify whether opinion formers who work in the field at local authority level were aware of the significant explanatory variables and the emphasis they place on those findings as determinants of continuing entrepreneurial activity. Ultimately, as discussed in Chapter 3 it is hoped that the combination of both quantitative and qualitative methods will create a more detailed and robust understanding of spatial aspects related to continuing entrepreneurship in Scotland. Moreover, the supplementary qualitative information in addition to the quantitative findings reported in this chapter are able to better inform the discussion and interpretation of results in Chapter 6 and ultimately strengthen the research findings and policy recommendations in Chapter 7.

In the next Chapter we present the results of the qualitative phase of the study.

5. Qualitative Results

5.1 Introduction

This chapter presents the results of the second phase of the sequential mixed method research outlined in Figure 3.1. As discussed earlier in Chapter 3, the main objective of the qualitative analysis was to validate, inform and strengthen the initial quantitative analysis established in the first phase of the study (Chapter 4). This objective was achieved through the collection and analysis of data from semi-structured interviews held with a sample of local authority opinion formers/professionals involved in influencing and implementing enterprise services at local authority level in Scotland.

The sample population, for the qualitative phase, as discussed in Chapter 3 was all 32 existing Scottish local authorities. At least one interview was conducted with a local authority representative from each region. Seven local authorities provided two respondents, as originally requested by the author, thus taking the sample size to 39 from an original sample frame of 64. The sample can be regarded as representative in the sense that it includes at least one interview with an individual from each local authority who is actively involved in influencing and implementing enterprise services at local authority level in Scotland.

In particular the purpose of the interviews was to follow-up the initial quantitative analysis and identify whether respondents were aware of the significant explanatory variables and the emphasis they placed on those findings as determinants of continuing entrepreneurial activity. Therefore, as highlighted in Chapter 3 the qualitative element was able to act as both a complement and supplement to the initial quantitative analysis and was intended to provide a better understanding of what opinion formers at the local level believe the determinants of continuing entrepreneurial activity are in Scotland. Furthermore, it was also useful to canvas opinion formers and analysts in order to inform and strengthen the policy recommendations made in Chapter 7.

Ultimately, by combining both quantitative and qualitative methods we are able to create a more comprehensive understanding of the spatial determinants related to continuing entrepreneurship in Scotland, thus adding validity to the existing reliable and generalizable statistical results identified in Chapter 4. Indeed, as Reid and Jacobsen (1993) highlight in their study of *The Small Entrepreneurial Firm* the benefit of complimenting quantitative analysis with primary fieldwork is that the empirical element of any study is well grounded in reality in a way that it would not be if only secondary quantitative sources had been used. As a result, our sequential mixed method design, as discussed in section 3.3.2 helps to mitigate against insights and understandings that may have been missed if only quantitative methods had been used (Johnson and Onwuegbuzie, 2004).

In line with our sequential mixed method design the interview schedule was themed on the variables that were identified as statistically significant in the econometric modelling reported in Chapter 4. The initial quantitative phase identified 6 significant factors showing statistical significance: local demand, culture, human capital, unemployment, access to finance and agglomeration. However, before interviewees' were asked to comment on specific variables identified as significant in the quantitative phase they were asked what they believed the key determinants of continuing entrepreneurship are. This allowed respondents to discuss any factors that were not identified in the statistical analysis, but that may be important for future entrepreneurship policy in the context of the findings reported in this study.

The subsequent reporting of the qualitative results in this chapter is intended to establish whether the data provided by respondents validate the quantitative analysis and secondly whether any similarities and/or differences exist in the attitudes, beliefs and perceptions of respondents in relation to those factors that were identified as significant by the statistical analysis.

The qualitative results are reported in the following sections.

5.2 Determinants of Entrepreneurship

As a means of introduction and following an explanation by the author about the aims and objectives of the study, as discussed in Chapter 3 respondents were asked **'what they believed the key determinants of continuing entrepreneurial activity are in Scotland'**. This acted as an ice-breaker to try and ensure both the interviewer and interviewee were comfortable with each other during the interview process and allay any reservations that the interviewee may have had about providing information to the interviewer. As might be expected the responses provided were variable in length and the number of explanatory factors mentioned. Some respondents sought to provide an explanation for their answers, while others simply listed factors that they believed to be key determinants. A summary of those variables and the number of times they were mentioned are provided in Table 5.1.

Although, it is clear from Table 5.1 that a considerable number of variables were mentioned; this was to be expected with such an open introductory question. However, the underlying explanations about these specific determining factors and why they are important in terms of explaining rates of continuing entrepreneurial activity in Scotland according to the respondents could be summarized and synthesised relatively easily to reflect a few main points.

Table 5.1 Respondents responses about what they believed the key determinants of continuing entrepreneurial activity are in Scotland and the number of times mentioned.

Variable	Times mentioned	Variable	Times mentioned
Lack of finance	7	Knowledge of the business	4
Market opportunities	6	Culture	3
Local economic climate	6	Personal Wealth	2
Education	6	Determination	2
Access to money	5	Skill level	2
Local attitudes toward entrepreneurship	5	Necessity	1
Role models	5	Limited employment opportunities	1
Strong demand	4		

Firstly, as argued by the author and reflected by the quantitative results in Chapter 4 continuing entrepreneurial activity is determined by a wide range of region-specific factors. Nevertheless, particular emphasis was placed by respondents on the impact of role models (discussed further in section 5.4) and that where a lack of role models exist or where people are not exposed to other entrepreneurs, a culture develops, that is less conducive to entrepreneurial activity. In particular respondents highlighted that Scotland has been over dependent on large employers, which has not been conducive to the creation of an entrepreneurial culture because of a 'large company' culture and this has led to a lack of role models which were identified as a significant determinant of continuing entrepreneurial activity in Chapter 4.

Furthermore, respondents reflected that the historical dependence of the Scottish economy on heavy industry, large employers and inward investment rather than indigenous entrepreneurship for job creation until the early 1990s, highlights that traditionally there has been a culture in Scotland, where people have not been

exposed to the small firm environment and, therefore, relatively speaking have not been as exposed to role models that often play an important part in guiding potential and existing entrepreneurs in terms of the experience they are able to offer. This is important because as the literature suggests, entrepreneurship is a regional event that changes little overtime (Andersson and Koster; 2011; Fritsch and Mueller, 2007) and may help explain why Scotland, as highlighted in Section 4.2 has both a low rate of continuing entrepreneurial activity relative to most other UK Government Office Regions and highly skewed rates of continuing entrepreneurship across Scottish regions.

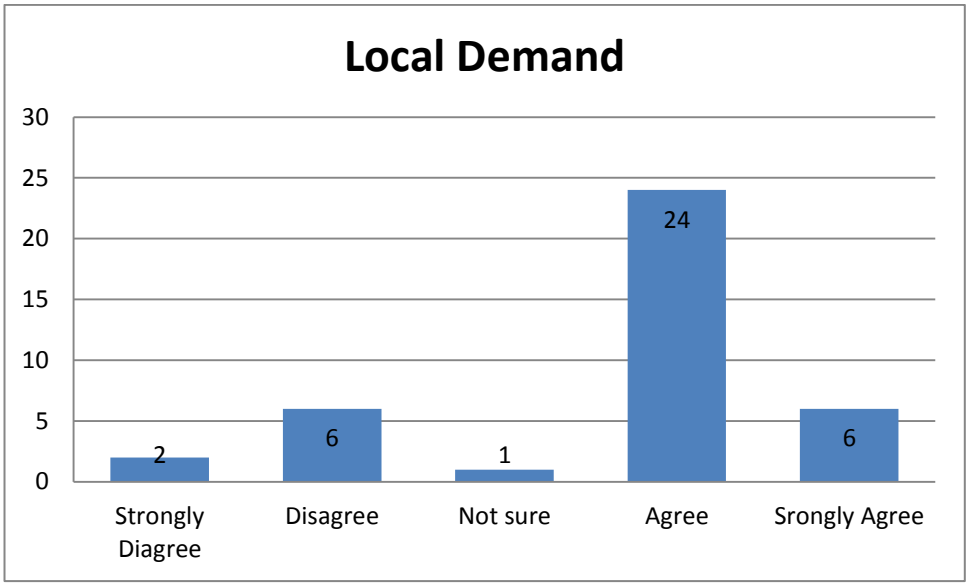
Despite the number of variables highlighted in Table 5.1, with the exception of 'determination' the variables can be broadly clustered to correspond with the significant factors identified in the quantitative analysis in Chapter 4, which are subsequently discussed in the following sections of this chapter. For example, factors cited such as strong demand, market opportunities and the local economic climate correspond with local demand conditions discussed in Section 5.3. Role models and local attitudes towards entrepreneurship correspond with Section 5.4. Education and skill level corresponds with Human Capital discussed in Section 5.5. Limited employment opportunities and necessity correspond with the unemployment variable discussed in Section 5.6, while lack of finance, access to money and personal wealth are discussed in Section 5.7

The remainder of this chapter focuses on the data collected during the interviews in response to the significant variables reported in the earlier econometric analysis. This identifies any differences between the econometric results and responses provided by respondents, before the discussion and interpretation of both quantitative and qualitative results in Chapter 6.

5.3 Local Demand

Statistical analysis in Chapter 4 reported that *local demand* was a highly significant factor explaining regional variation in rates of continuing entrepreneurial activity in both population models and the second most important variable in the business stock model. This implies local demand conditions are not only crucial for new firms who tend to serve local markets initially (Figueriredo *et al.*, 2002; Tamásy, 2006; Michelacci and Silva, 2007; Dahl and Sorensen, 2009), but that local demand conditions continue to be an important determinant of growing small businesses in Scotland. During the qualitative phase respondents' from each local authority were asked '**how important local demand is in explaining regional variation in continuing entrepreneurial activity'**? Table 5.2 highlights that 30 local authority respondents (77%) either agreed or strongly agreed that local demand conditions were an important determinant of continuing entrepreneurial activity in Scotland.

Table 5.2 Respondents responses about how important local demand conditions are as a determinant of continuing entrepreneurial activity.



In general, therefore, it is possible to observe from the data collected during the interviews that the majority of local authority respondents believe that local demand

is an important determinant of continuing entrepreneurial activity. One respondent who had worked across a number of local authorities in their career expressed an opinion which summarised well the general consensus *"...yes... all my experience says it is. Local market conditions are crucial, as this is where most businesses build their reputation for providing a quality good or service... [and] it is this initial reputation established locally that then allows the opportunity for a business to expand"*. [Senior Economic Development Officer].

Another respondent also reflected the importance of local market conditions for the trajectory of a growing business by stating *"local demand will help entrepreneurs, see a market that they can potentially serve. It is also a subset of the wider or longer term entrepreneurial ambitions, which is to target regional, national and international demand".*[Economic Development Officer].

There was, however, some variation in the qualitative responses regarding the extent to which respondents perceived the importance of local demand conditions with one local authority respondent suggesting that while local demand is important, it will be more important for certain types of businesses;

"it depends on the type of business, if it's a local [business] like a hairdresser or a taxi firm, these factors will play an important part in the development of the company... but if you've got a high-tech start-up company where all their customers are abroad, local demand conditions are much less important". [Lead Economic Development Officer].

Another respondent commented *"all the work I've done suggests demand is important, but not as important as supply-side factors"* [Development Officer], which again supports the statistical findings, recognising while local demand is a significant factor, it is only one of a number of factors that explain regional variation in continuing entrepreneurial activity in Scotland.

For the small number of respondents who did not believe local demand conditions were a significant determinant of continuing entrepreneurial activity, they reflected that this was the result of businesses being *'lifestyle'* businesses, where people simply ran businesses because that was what they had decided to do as a means of

employment and that they often did this without much consideration of local market conditions.

Given the data collected and responses provided by participants, it is possible to verify the quantitative findings reported in Chapter 4 by confirming that local authority respondents do perceive local demand conditions to be an important determinant of continuing entrepreneurial activity. However, while respondents confirmed local demand conditions are important, they were also able to provide a breadth to the data that was not possible to obtain from the statistical results reported in Chapter 4 alone by highlighting that some respondents perceive local demand conditions to be less important for exporting businesses, while others highlighted that although demand was important, supply-side issues were also important.

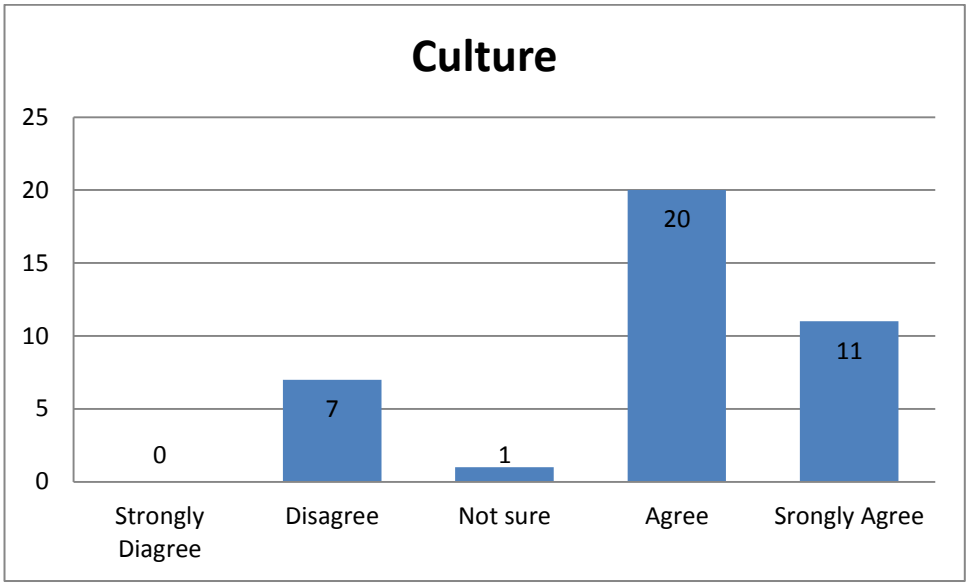
5.4 Culture and Role Models

Statistical analysis in Chapter 4 highlighted that the number of existing small businesses in a region, which acts as a proxy for entrepreneurial culture was the second most important variable explaining regional variation in continuing entrepreneurial activity in Scotland. However, the effect was only positive in the population and working population modelling. The positive coefficient is potentially important for two reasons: (1) a large small business population acts as proxy for how well entrepreneurial activity is accepted and legitimised by society, implying a positive attitude and an enterprising culture encourages others to establish and grow a business and (2) regions with a large number of small businesses are able to act as role models providing advice and mentoring for potential entrepreneurs and existing entrepreneurs looking to grow their business.

Respondents were asked two questions relating to the broad concept of entrepreneurial culture. Firstly, respondents were asked '**to what extent do you believe Scotland has low rates of continuing entrepreneurship relative to the UK?** From Table 5.3 it is evident that local authority respondents are aware Scotland has an entrepreneurial deficit, as reflected by the spatial data reported in Section 4.2. The data highlights that 31 local authority representatives (79%) agreed or strongly

agreed that Scotland has an entrepreneurial deficit relative to the UK. Moreover, a number of common themes emerged from the interviews, which sought to explain Scotland's relative lack of continuing entrepreneurial activity, namely that respondents believe the structure of the economy and lack of role models are key explanatory factors.

Table 5.3 Respondents responses about the extent to which Scotland has low rates of continuing entrepreneurial activity relative to the UK.



The below quote summarises well the general responses expressed by respondents when explaining why they believed Scotland has low rates of entrepreneurial activity:

"I think there is [a low rate], and it's for the reasons that I mentioned a while back about determinants and I think the local cultural and historical situation in the economy. You can't ignore that, it plays a huge…and it has a huge legacy affect. Behind entrepreneurship is the peer issue, and if you don't have any peers…your friends and mums and dads aren't entrepreneurs you don't have that aspiration, whereas if you grow up in California and a lot of your mates' dad have their own

companies, you don't see that…you see that as achievable and in Scotland we don't have that peer effect and it's a kind of vicious cycle because it's hard to break out of that." [Head of Economic Development].

A number of respondents also suggested the structure of industry and Scotland's reliance on a large public sector was likely to lead to lower entrepreneurial activity with one respondent commenting:

"We have a very large public sector which to some extent will crowd out potential creative private sector activity…and that probably does stifle entrepreneurship". [Lead Officer for Business Gateway Services]

It was evident from responses provided that role models are perceived to be an important determinant. Responses such as *"If you've got low levels of entrepreneurship then you're not going to be encouraging your children to set themself up in business; you're going to be directing them towards what you have done in your life and that's a job"*[Economic Development Officer] were commonplace. Furthermore, respondents were also keen to stress given Scotland's large public sector and historical dependence on large employers there has been limited scope for role models which are highlighted in both the statistical analysis and responses provided, as key determinants.

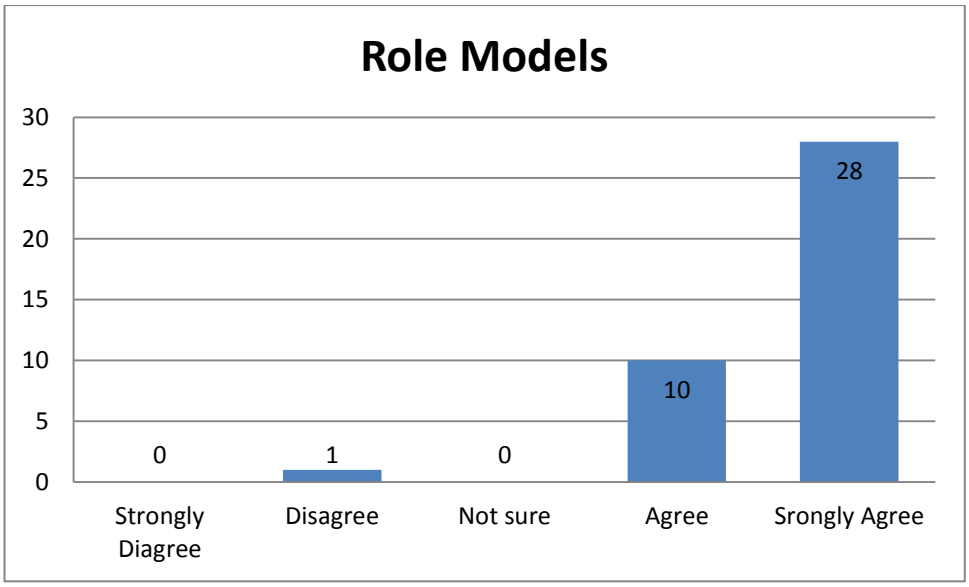
It is also worthy of note, that 6 of the 7 respondents who did not recognise that Scotland had an entrepreneurial deficit acknowledged themselves that their answer was simply a personal reflection and not based on any official data sources. Clearly, these responses are at odds with the majority of other respondents and with the data reported in this study (Section 4.2), which clearly highlights Scotland's entrepreneurial deficit with the rest of the UK regarding rates of continuing entrepreneurial activity.

Therefore, the qualitative results reported in this chapter do support the quantitative findings. The participants' responses clearly recognised that Scotland has an entrepreneurial deficit. Respondents' account for the entrepreneurial deficit by either implicitly or explicitly referring to Scotland's historical over-dependence on large businesses and the public sector for employment, which has subsequently led to a lack of small businesses that are able to act as role models; the importance of which

are highlighted by both the statistical analysis and responses given by respondents as key determinants.

Indeed when respondents were asked **'how important are role models for growing small firms'** it was unsurprising that almost all respondents believed that role models were important and have a positive impact on continuing entrepreneurial activity, with Table 5.4 highlighting that 38 respondents (98%) either agreed or strongly agreed that role models are important.

Table 5.4 Respondents responses about how important role models are as a determinant of continuing entrepreneurial activity.



Furthermore, as our theoretical model in Chapter 2 argues role models can allow growing businesses to build contacts and develop relationships which help facilitate the exchange of information relating to various aspects of their business via increased access to a variety of relevant and reliable information, thereby helping to improve the speed and quality of decision making processes within a business, and thus increase their prospects for growth. In addition to the general recognition regarding the importance of role models a number of notable responses emerged regarding the need for targeting or matching of role models and businesses. For example one respondent commented;

"if you can't identify with somebody who runs a business and see that as a positive thing, then actually the chances of it ever happening to you are that much less, I think that sense of somebody who actually inspires people is absolutely fundamental, and I think it's important to get a wide range of different types of background who do it". [Economic Development Officer]

Another respondent commented *"role models are extremely important. I do wish we could do more on the role model front. I think it's very, very important for all different categories of entrepreneurship".* [Senior Development Officer]. Therefore, respondents' clearly perceived role models as a pivotal component in the entrepreneurial process given the function they perform in stimulating and mentoring new and expansionary entrepreneurial activity. However, there was an understanding among a number of respondents that role models were most successful in the main when they were not, as one respondent put it *'supermen'*, but rather *people that demonstrate that it can be done, and that you could do it"*. [Principal Economic Development Officer].

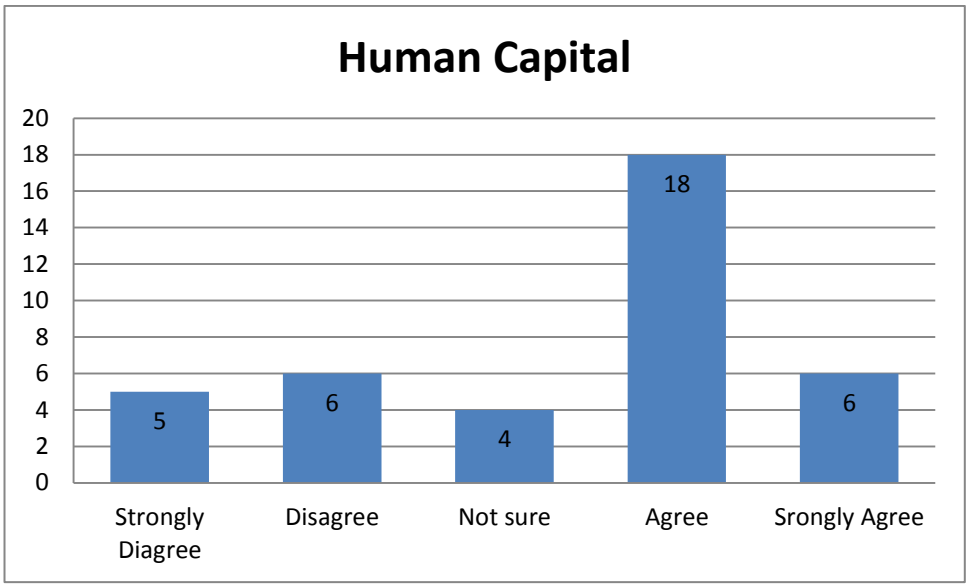
Therefore, the data and participants' responses clearly recognise that Scotland has an entrepreneurial deficit, which supports the quantitative results reported in Chapter 4. Furthermore, respondents also confirmed culture is an important determinant of continuing entrepreneurial activity and suggested that a positive culture towards entrepreneurship does not exist in Scotland, which in their opinion is likely to be a reflection of past industrial structure and overdependence on large employers, thus reducing the number of role models, which both the econometric analysis in Chapter 4 and primary data clearly indicate is an important determinant.

5.5 Human Capital

Statistical analysis in Chapter 4 emphasised human capital proxied by level of education and skill attainment had a positive and significant effect on rates of continuing entrepreneurship in all models. Policy makers were asked **'how important do you believe education is in terms of continuing entrepreneurial activity'**. Table 5.5 shows that 24 local authority representatives (61%) either agreed

or strongly agreed that human capital is an important determinant of continuing entrepreneurial activity. 11 respondents (29%) disagreed or strongly disagreed that level of human capital was important with 4 respondents (10%) expressing that they did not know whether human capital was an important determinant of continuing entrepreneurial activity.

Table 5.5 Respondents responses about how important they believe human capital is as a determinant of continuing entrepreneurial activity.



Therefore, in general a majority of respondents support our earlier econometric analysis in Chapter 4 by confirming human capital is an important determinant. However, the qualitative interview responses also highlighted that there is an element of variation about how much emphasis some of the respondents placed on human capital with some respondents suggesting that levels of human capital are more likely to be important dependent upon the industrial sector in which a firm operates. For example one respondent commented:

"It depends on the sector. If it's a high-tech sector then education is absolutely fundamental. If it is window cleaners or delivery or gardening companies…there are lots of very good small businesses in those sorts of sectors, but if it's relatively low skilled work then I don't think education plays much of a role. When things become

more complex, when you're VAT registered, when you need to buy-in specialist advice and that sort of thing, then having a better grasp of business fundamentals is probably a lot more important". [Head of Economic Development and Planning]

The other theme to emerge around the importance of human capital related to security. A number of respondents expressed the idea that human capital is an important determinant emphasising not just the correlation between human capital and growth potential, as identified by the statistical analysis, but that human capital provides a security net in the case of business failure, whereby better educated individuals should find it easier to find a job should the need arise. For example, one respondent [Principal Economic Development Officer] reflected a number of similar responses on this matter by commenting "*If they don't succeed they've got the knowledge, they've got the ability to be able to go off and do something else, if they fail on their first attempt, whereas I think people who don't have a qualification have got a lot more to lose.".* This quote reflected the opinion among some respondents that human capital helps reduce fear and provides transferrable skills should businesses encounter problems.

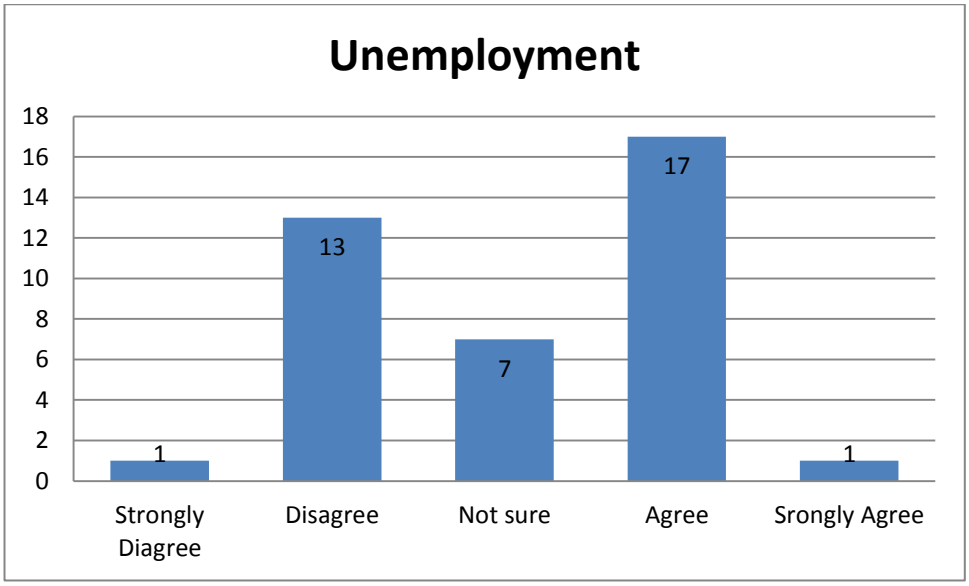
Although, a majority of respondents believed education was an important determinant 29% of respondents disagreed that education was an important factor. Some local authority respondents simply felt that human capital was *'overstated'* in relation to entrepreneurial activity and one respondent said that *"they knew countless entrepreneurs who have no qualifications, yet have grown successful businesses".* [Economic Development Officer]. Another respondent passionately expressed the view that while education is clearly important to the average person, when it comes to entrepreneurship, it is *"not important at all. It's about having a good idea…a good entrepreneur will always find educated people if he needs them".* [Development Officer]. Nevertheless, despite these latter viewpoints respondents do corroborate the earlier econometric analysis reported in Chapter 4 that higher levels of human capital are likely to be correlated with higher rates of continuing entrepreneurial activity.

5.6 Unemployment

The econometric analysis reported in Chapter 4 highlighted as predicted by the theoretical model in Chapter 2, that unemployment is likely to lead to lower rates of continuing entrepreneurial activity when the entry rate is standardised by both the population and working population approaches. Alternatively, when the dependent variable was standardised by the existing business stock (Model 5), unemployment had a positive effect on rates of continuing entrepreneurship; a result that has also been commonly reported in the literature related to general start-up entrepreneurship, yet as extensively discussed in section 3.5.2 this is likely to be a reflection of a methodological weakness of standardising the dependent variable by the stock of existing businesses. Indeed, we were able to show via model elaboration and specifically through the inclusion of time effects in Model 8 (Section 4.3.4), that although the coefficient still has a positive sign when the dependent variable is standardised by the existing business stock (with time effects) no statistically significant relationship exists thereby confirming our original hypothesis.

In order to verify the econometric analysis respondents were asked **'to what extent they believe unemployment has a negative impact on levels of continuing entrepreneurial activity'**. Table 5.6 shows that 18 local authority representatives (47%) either agree or strongly agree that unemployment has a negative impact on rates of continuing entrepreneurial activity. 14 respondents (35%) disagreed or strongly disagreed that unemployment had a negative impact with 7 respondents (18%) expressing that they did not know what impact unemployment had on levels of continuing entrepreneurial activity.

Table 5.6 Respondents responses about to what extent they believe unemployment has a negative impact on rates of continuing entrepreneurial activity.



Overall a greater number of respondents agree/strongly agree in comparison with those who disagree/strongly disagree, which supports the statistical analysis in Chapter 4 by confirming unemployment is likely to have a negative impact on rates of continuing entrepreneurial activity in Scotland.

For example, common responses made by respondents were in line with our hypothesis that regional unemployment *'reduced market demand'* and that such conditions *'were not conducive to business expansion'* or unlikely to encourage business expansion as a result of less disposable income in a region and deteriorating economic conditions. Responses provided by respondents also support the complex and often contradictory nature of the unemployment hypothesis, recognising the unemployment effect is difficult to predict and depends on many different factors. For example, one respondent commented that it depends on the type of regional unemployment; *"If you've got long term unemployment [in a region] it's much more difficult to get people to ignite the spark of enthusiasm within them to go and take*

risks and do something new and additional with their business". [Development Officer].

Another respondent commented; *"I know some people do go and set-up a business when they become unemployed and I have seen it happen…, however, this is not the norm, this is the exception I would say. In terms of continuing entrepreneurship, as you describe it… I can't see how higher unemployment has a positive effect on growing businesses…higher unemployment usually means negative economic conditions, especially at a regional level."* [Senior Economic Development Officer].

Almost one-fifth of respondents expressed the opinion that they were unsure about what effect unemployment has, stating most often and quite sensibly, that it will depend on the type of business. One respondent suggested that in his region the main industry was global and that those businesses tend to serve export markets, whereby *'high regional unemployment in this region would make very little difference…it wouldn't inhibit existing business expansion for the majority of our businesses'*. [Head of Economic Development]

Therefore, the responses provided reinforce the complexity of the earlier statistical analysis and the influence that unemployment has on entrepreneurial activity. For example, some respondents stressed the unemployment effect would also depend on supply-side factors in the labour market and the skill base of those who have been made redundant. To take one example, a respondent suggested the unemployment effect may depend on skill level and education, giving the example of unemployed Motorola workers who were able to find other forms of employment relatively quickly following redundancy because they were considered to be skilled workers by existing local businesses. Moreover, given that demand conditions were highlighted as one of the most important determinants of continuing entrepreneurial activity in the earlier statistical analysis in Chapter 4 and the influence of demand conditions were acknowledged by respondents in section 5.2 to be important, the unemployment effect may also need to be considered in the context of demand deficiency, whereby structural unemployment leads to reduced demand which may also simultaneously limit expansionary entrepreneurial activity.

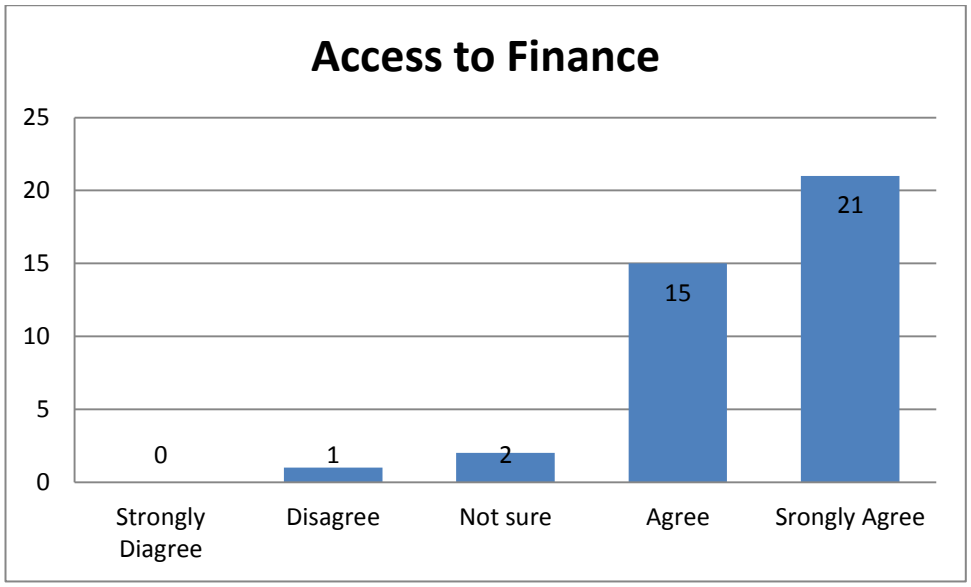
Therefore, although the effects of unemployment on entrepreneurial activity are complex the data from the interviews is able to strengthen the validity of the

quantitative findings by corroborating our predicted hypothesis, but also raising awareness that the effect of unemployment on entrepreneurship can be complicated and influenced by a number of different factors alluded to by the respondents.

5.7 Access to Finance

Statistical analysis in Chapter 4 reported access to finance as a significant determinant of continuing entrepreneurial activity in both population and working population models. Respondents were asked **'how important do you believe access to finance is for continuing entrepreneurial activity?** Table 5.7 shows that 36 local authority representatives (92%) either agree or strongly agree that access to finance is an important determinant of continuing entrepreneurial activity with only 3 respondents from 39 being either unsure or disagreeing that access to finance is an important determinant of continuing entrepreneurial activity in Scotland.

Table 5.7 Respondents responses about how important they believe access to finance is as a determinant of continuing entrepreneurial activity.



Therefore, an overwhelming majority of respondents confirmed the earlier econometric analysis in Chapter 4 by indicating that access to finance is a significant determinant of growing small businesses in Scotland.

The qualitative data collection also revealed that while almost all respondents (92%) believed access to finance is important for continuing entrepreneurship with words such as *critical* and *vitally important* being cited on numerous occasions respondents also highlighted that access to finance is likely to be more important for certain types of business and the business sector in which it operates. For example, one respondent's comment summarises well the almost ubiquitous '*it depends on the business'* response provided by most respondents by commenting "*I think if you're looking at technology-based businesses, businesses that are of a high growth trajectory and potential, then it is exceedingly important and that's where things like risk capital come in."*. [Economic Development Officer]. Respondents also commented that they felt access to finance was a major issue hindering the development of growing firms in Scotland; in the sense that they believed simply that there is not enough finance available for growing businesses in Scotland. The reasons cited for this fell broadly into two categories. Firstly, that compared with locations like London there is a lack of venture capitalists and business angels. Yet the main reason cited and summarised well by the following quote was that at present "*banks appear reluctant to lend to small businesses and when they do the commercial loan rates are perceived to be too high*" [Principal Economic Development Officer].

For the very small number of individuals (2 respondents) who were unsure about whether access to finance was a major issue, both suggested that issues related to asymmetric information were the major problem rather than lack of finance, as suggested by the majority of other respondents. Those who were unsure believed, that access to finance from their experience was hindered by business owners not knowing where to locate information about different financing options available and secondly *'that people are asking for the wrong type of money in the wrong way'* [Economic Development Officer] and are refused on those grounds rather than an actual lack of finance being available. Cleary, however, this is not the general consensus held by the vast majority of respondents.

Therefore, from the supporting detail provided by local authority respondents, it is possible to corroborate and validate the statistical findings reported in Chapter 4 by confirming that in general local authority representatives do perceive access to finance to be an important determinant of continuing entrepreneurial activity in Scotland, although the qualitative responses clearly and perhaps not unexpectedly

ratified that access to finance is likely to be more important dependent upon which sector or industry a business is operating in. There was also a general consensus, that lack of finance is currently a prohibitive factor for existing businesses in terms of growth and expansion.

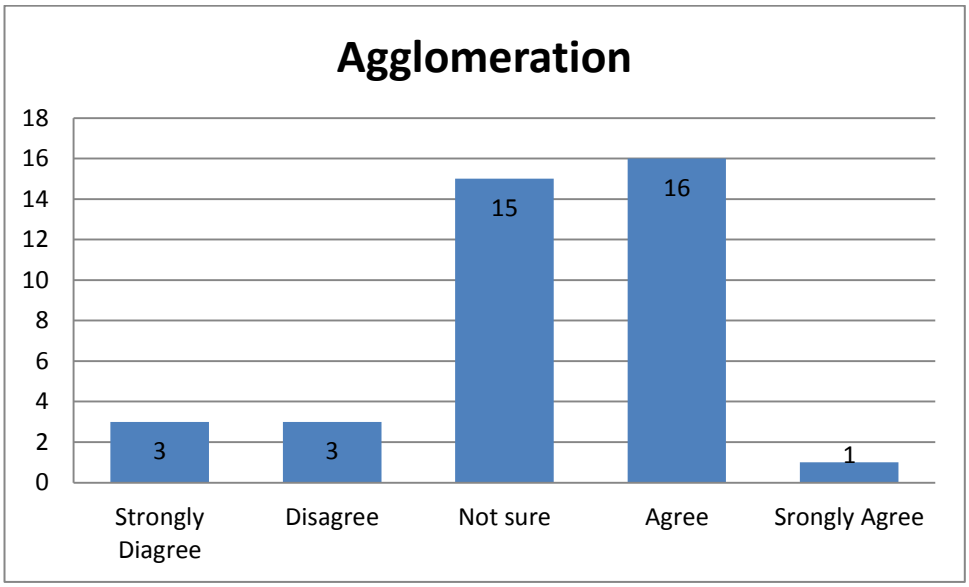
5.8 Agglomeration

Statistical analysis in Chapter 4 reported that agglomeration economies were a significant determinant of continuing entrepreneurial activity in all models. The study specifically identified the positive effect of urbanisation economies, which suggests firms locate where economic activity is most diverse, rather than to take advantage of the benefits associated with specialisation economies. Currently, the UK and Scottish Governments are reintroducing enterprise zones, as an economic development tool in an attempt to boost economic activity and attract businesses into certain regions.

In order to validate the statistical analysis respondents were asked **'do you believe the current government policy of implementing enterprise zones are a good way of generating economic agglomeration given the benefits associated with agglomeration and entrepreneurial activity?'**. Table 5.8 shows that 17 local authority representatives (45%) either agreed or strongly agreed that enterprise zones are a good way of generating agglomeration benefits.

6 respondents (16%) disagreed or strongly disagreed that the new enterprise zone policy was a good way of stimulating the benefits of agglomeration. The second largest group of respondents, 15 (39%), expressed the opinion that they did not know whether enterprise zones would be an effective policy. 1 respondent decided not to answer the question on the grounds that it was a politically sensitive issue. The data collected demonstrate that there are mixed opinions regarding the current policy on enterprise zones and its associated benefits with continuing entrepreneurial activity.

Table 5.8 Respondents responses about whether they believe the current government policy of implementing enterprise zones is a good way of generating agglomeration benefits given the benefits associated with agglomeration and entrepreneurial activity.



Respondents (39%) who answered that they were unsure tended in the main to clarify their viewpoint by informing the interviewer that they were either unqualified to provide an answer, did not have enough experience to make a judgment or had no prior experience of working within or in conjunction with enterprise zones. This is an entirely consistent answer given that enterprise zones have only recently been reinstated as a major policy tool in the UK for the first time since the 1980's (Centre for Cities, 2011).

Furthermore, even for the 17 (45%) respondents who either agreed or strongly agreed that enterprise zones would be an effective mechanism; their evidence by their own acknowledgment, to support their position was limited because they had no recent experience with which to support their claims. For example, they could only make hypothetical claims such as *'we would expect them to stimulate local services'* or that *'it would be hoped that they would encourage additional spin-out activity'*. Others commented that while they thought they were a good idea, it was most likely to be large businesses that receive the benefits, and as one respondent put it *'many small*

growing firms simply don't have enough capital outlay to qualify for the incentives being made available'. [Economic Development Officer].

On the other hand for the 39% of respondents who were opposed to the introduction of the new enterprise zones they were much more precise and explicit in their criticism and often drew on previous empirical evidence from the 1980's to support their viewpoint. Their criticism was mainly related to two themes: deadweight and displacement. For example, respondents commonly suggested that the enterprise zone initiative would simply generate deadweight by bringing forward future economic development that was already going to take place anyway. One high ranking respondent who had experience of working with enterprise zones in the 1980's was extremely critical and commented:

"They are not a good idea. The evidence from the '80s and '90s showed that they just lead to displacement. They make it look, as if they are creating jobs, yet the net effect on the overall economy is low given that the new jobs within the enterprise zone are likely to have been redistributed from elsewhere." [Head of Economic Development].

Therefore, while previous literature (section 2.4) and the econometric analysis reported in Chapter 4 highlight that agglomeration benefits have a positive effect on entrepreneurial activity, the qualitative data presented in this chapter does not explicitly support the current UK and Scottish Government policy of attempting to generate agglomeration benefits through the reintroduction of enterprise zones. Clearly based on the data collected and the responses provided in this study there is not enough timely evidence available (even from those who support enterprise zones) to judge whether the current government policy on the re-introduction of enterprise zones will be an effective mechanism with which to generate agglomeration benefits. This is something that can only be judged at a period in the future.

5.9 Summary

This chapter presented the results of the second phase of the mixed methods study. The results of 39 follow-up semi-structured interviews were reported in an attempt to verify and build upon the significant explanatory variables identified by the econometric analysis in Chapter 4. The sample population for the fieldwork were all 32 Scottish local authorities. At least one interview was conducted with a local authority representative from each local authority in Scotland. Seven local authorities provided two respondents, as originally requested by the author, thus taking the sample size to 39 from an original sample frame of 64. Although, a full discussion of both quantitative and qualitative results is provided in the following chapter a brief synthesis of the results reported in this chapter is provided below.

Local authority respondents confirmed that local demand conditions were an important determinant of continuing entrepreneurial activity in Scotland. However, there was a degree of variation in terms of how important local demand conditions were perceived to be, with some respondents suggesting local demand is less important for export orientated companies.

Similar to the quantitative findings, respondents also confirmed culture was an important determinant of continuing entrepreneurial activity, acknowledging Scotland lacked a culture of continuing entrepreneurial activity and entrepreneurship more generally, which was likely to be a reflection of past industrial structure and overdependence on large employers, thus reducing the number of role models, which respondents almost unanimously agreed was an important determinant.

Respondents confirmed the significant relationship between levels of human capital and rates of continuing entrepreneurial activity. However, there were some differences about whether human capital is as important to general start-up activity, as it is to growth businesses and businesses in high technology sectors.

Local authority respondents validated the hypothesis that higher unemployment will have a negative impact on continuing entrepreneurial activity as a result of factors such as lower disposable income and the likelihood of falling market demand

associated with negative labour market conditions. Nevertheless, respondents also recognised that the effect of unemployment is complicated and often difficult to predict as highlighted by the quantitative analysis in Chapter 4.

Respondents verified the statistical analysis by confirming access to finance is a determinant of continuing entrepreneurial activity in Scotland. The qualitative responses revealed that while almost all respondents believed access to finance is important for continuing entrepreneurial activity respondents also highlighted that access to finance is likely to be more important for certain types of business and the business sector in which a firm operates.

Finally while the econometric analysis in Chapter 4 identified agglomeration economies as a significant predictor of continuing entrepreneurial activity, there was a lack of consensus among respondents regarding support for the implementation of enterprise zones to generate agglomeration benefits, even among those who supported there implementation, citing likely deadweight and displacement as potential problems.

In the following chapter of this thesis, the key findings from the quantitative and qualitative phases of the study are drawn together and discussed in light of their context and contribution to the wider literature, as a precursor to the policy recommendations and conclusions made in Chapter 7.

6. Discussion and Interpretation of Results

6.1 Introduction

The preceding two chapters of this thesis present the findings from a sequential mixed methods study conducted in a quantitative then qualitative sequence investigating locational determinants of continuing entrepreneurial activity at local authority level in Scotland.

In this chapter of the thesis the quantitative and qualitative results are discussed in the context of the earlier theoretical and empirical literature, as a precursor to the conclusion and policy recommendations in the following chapter. The discussion and interpretation of results is broadly divided between two groups. The first takes account of the different results reported in Chapter 4 dependent upon how the entry rate was standardised. The quantitative results highlighted that the way the entry rate is standardised is a key factor explaining regional levels of continuing entrepreneurship, given that the coefficient values and direction of certain variables differ significantly subject to how the dependent variable is standardised. The second interprets the results of each random effect model in the context of the theoretical and empirical literature outlined in Chapter 2. Integrating the results with the theoretical and empirical literature allows conclusions to be drawn and assesses the extent to which the different econometric models are able to explain regional variation in continuing entrepreneurial activity in Scotland. In addition the discussion and interpretation of the quantitative results are strengthened by the complimentary sequential qualitative phase of the study reported in Chapter 5. Indeed, combining both quantitative and qualitative results allowed the researcher to test the validity of the theoretical framework in Chapter 2 and follow-up the significant statistical findings in order to verify the quantitative results and ultimately provide a more robust and deeper understanding about determinants of continuing entrepreneurship in Scotland.

6.2 Demand-Side Factors

As highlighted by our theoretical framework in Chapter 2 demand conditions are likely to be important determinants of where any firm chooses to locate. We argued, that in line with the business cycle, as regions with growing demand have more market opportunities it can be expected, that increasing demand for goods and services will be associated with higher rates of continuing entrepreneurial activity, as existing businesses take advantage of positive market conditions and opportunities for expansion. We hypothesised that:

H1: Demand has a positive effect on the rate of continuing entrepreneurial activity.

Two indicators of local demand conditions were utilized to test the hypothesis. Firstly, as discussed in Chapter 3 we predicted that, income levels are likely to affect demand for local businesses. As *wages* increase demand may also rise creating a positive impact on the rate of continuing entrepreneurial activity (Reynolds *et al.*, 1994). Secondly, it may be expected that an increase in *population growth* will have a positive effect on rates of continuing entrepreneurial activity (Keeble and Walker, 1994; Reynolds *et al.*, 1995; Armington and Acs, 2002; Tamásy and Le Heron, 2008).

6.2.1 Wage Growth

Wage Growth. The results from all three regression models are reported in Table 4.6 of Chapter 4. The results do not support the predicted effect, that as wages rise individual's will spend or consume a proportion of that additional income in their local region, in turn leading to an increase in the number of growing small businesses servicing that additional consumption power in any of the three random effect models (Model 3, 4 and 5). Although, the effect is not significant the finding is consistent with both Ashcroft *et al.*, (1991) and Bosma *et al.*, (2008) who find a negative, but insignificant effect on wage growth. By comparison Armington and Acs (2002) find that income growth in the United States has a positive effect on

entrepreneurship across the whole economy. In the case of our study a negative coefficient may have arisen for a number of reasons. First, as wages rise individuals may not maximise their utility based on the availability of local goods and services. Therefore, any increase in incomes may lead to individuals consuming goods and services from out-with their local region, as their propensity to consume increases. Second, although increased incomes may lead to increased spending, any additional demand maybe insufficient to increase a firm's turnover beyond that required to be officially recorded on the VAT register. Thirdly, the correlation matrix (Table 4.5) highlights that population growth and wage growth are negatively correlated, indicating while an increasing population may lead to increasing demand for goods and services, population growth also increases the supply of labour driving wage rates downwards, resulting in individuals having less disposable income to spend locally.

6.2.2 Population Growth

Population Growth. The results from all three regression models are reported in Table 4.6 of Chapter 4. The results support the predicted effect that population growth leads to greater demand for goods and services and that some of this additional demand will be met by existing businesses. Therefore, as predicted population growth has a positive statistically significant effect, which is consistent with earlier empirical studies addressing start-up entrepreneurship (Keeble and Walker, 1994; Reynolds *et al.*, 1994; Guesnier, 1994; Tamasy and Le Heron, 2008; Audretsch and Fritsch, 1994; Lee *et al.*, 2004; Okamuro and Kobayashi, 2006). Therefore, our findings extend the existing literature by indicating local demand conditions in Scotland are highly influential in explaining regional variation in rates of continuing entrepreneurial activity too. Furthermore, our findings also support the theoretical work of the New Economic Geography (see section 2.3.3) which suggests market size matters, whereby firms are drawn to locate where markets are largest, as a means of reducing transportation costs and achieving economies of scale. Furthermore, the qualitative data reported in section 5.3 validates and supports the quantitative analysis reported in Chapter 4 by highlighting that approximately 80%

of local authority respondents perceive local demand conditions to be an important determinant of continuing entrepreneurial activity in Scotland. Nevertheless, some respondents (Section 5.3) did suggest quite sensibly that the level of importance attached to local demand conditions would depend on the type of business in question. They also suggested that local demand conditions might be less important over time for some growth orientated businesses, as companies become more reliant upon inter-regional and international export markets.

Therefore, as hypothesised differences in local demand conditions do influence regional rates of continuing entrepreneurial activity. Furthermore, simple correlations highlighted in Table 4.5 show population growth and rates of continuing entrepreneurial activity are positively correlated (r= 0.27, r= 0.26 and r= 0.08) in all three models. Indeed, we are also able to observe (Appendix H) that when rates of continuing entrepreneurship are standardised by both the total and working population methods the top ten regions with the highest rates of continuing entrepreneurial activity, have also had the largest increases in population growth in Scotland in eight of those regions. Moreover, West Dunbartonshire, Inverclyde and North Ayrshire, which have the lowest rates of continuing entrepreneurship in Scotland, have all had declining populations over the 1998-2007 period helping explain why low rates of continuing entrepreneurship may exist within those regions. Ultimately, if the demand for the goods and services a business provides does not exist, then eventually that business will be unsustainable.

Therefore, we reject the null hypothesis and conclude local demand conditions via population growth are a significant variable explaining regional variation in rates of continuing entrepreneurial activity in Scotland.

6.3 Supply-Side Factors

6.3.1 Unemployment

Empirical literature outlined in Section 2.5, highlighted that the rate of unemployment reflects the supply of entrepreneurs in a region. However, as

described in Chapter 2 studies assessing the impact of unemployment on levels of entrepreneurship have often produced contradictory results. For example, at one level when an individual is made redundant and unable to find a replacement job or appropriate employment they may be forced or 'pushed' into establishing their own business, as a means of creating employment. On the other hand there is an argument to suggest individuals are more likely to conduct entrepreneurial activity under conditions of economic expansion, when incomes are growing and opportunities are strong for market specialisation.

As a result, unlike start-up entrepreneurship, where there is considerable confusion around push-pull theories our model outlined in Chapter 2 argued there should be far less confusion around the impact of unemployment on rates of continuing entrepreneurial activity, as high unemployment is more likely to inhibit market demand for products, as low employment levels generate less disposable income and, therefore, a lower level of demand for goods and services within a region. Therefore, we hypothesised that:

H2: Unemployment has a negative effect on the rate of continuing entrepreneurial activity.

Unemployment. The results of all three regression models are reported in Table 4.6 of Chapter 4. In line with previous empirical studies assessing the impact of unemployment on new firm creation, we report contradictory findings dependent upon whether the dependent variable is standardised using one of the population approach's (Models 3 and 4) or the alternative business stock approach (Model 5) (Reynolds *et al.*, 1994; Davidsson *et al.*, 1994; Audretsch and Fritsch, 1994; Love, 1995; Okamuro and Kobayashi, 2006; Bosma *et al.*, 2008; Audretsch *et al.*, 2010). As hypothesised, both the total and working population modelling highlighted, that the unemployment rate has a negative effect on rates of continuing entrepreneurial activity. However, the effect is only significant in the working population model (Model 4). Furthermore, Model 5 which standardises the rate of continuing entrepreneurship by the stock of existing businesses reports a positive coefficient that is significant at the .001 level. However, as discussed in Chapter 4 once time effects (Table 4.8) are added into the elaborated estimation (Model 8) the unemployment variable loses its significant effect.

Nevertheless, although the initial contradictory findings reported in Table 4.6 subject to the way the dependent variable is standardised is somewhat confusing, it is not completely unexpected given the prior discussion in relation to standardisation in Section 3.5.2 or that our contradictory finding is consistent with some other studies (Audretsch and Fritsch, 1994; Love 1995). Indeed, as a result of the prior discussion in the methodology chapter we reiterate that the researcher must utilise the method they believe is the most likely source of entrepreneurial activity. Conceptually, as highlighted in section 3.5.2 standardisation via the existing business stock suggests a firm is born of an existing firm and while this is not an unusual assumption given that existing businesses do spin out 'new' firms; in most cases a business is developed and expanded by an individual or group of individuals'. Therefore, from a conceptual basis the rate of continuing entrepreneurial activity standardised by the total or working population is a more straightforward position to maintain based on the theory of entrepreneurial choice put forward by Evans and Jovanovic (1989).

The results reported in the working population model (Model 4) are consistent with those of Reynolds *et al.,* (1994), Davidsson *et al.,* (1994); Audretsch and Fritsch, (1994); Kangasharju, 2000; Okamuro and Kobayashi (2006), Bosma *et al.,* (2008) and Audretsch *et al.,* (2010) suggesting there is no evidence that unemployment has a positive effect on rates of continuing entrepreneurship in Scotland. More precisely as predicted by our theoretical framework in Chapter 2 the negative effect indicates regions with higher levels of unemployment are likely to feel a dampening effect on purchasing power as a result of lower levels of disposable income, which will adversely affect consumption patterns than is the case in more economically prosperous and employment active regions, which provide better economic conditions for growing or expanding a business.

Moreover, the qualitative data presented in section 5.6 collected via semi-structured interviews with local authority respondents verified our hypothesis and predicted effect, that higher unemployment is likely to have a negative impact on continuing entrepreneurial activity. Nevertheless, as highlighted in section 5.6 respondent's also recognised that the effect of unemployment on continuing entrepreneurial activity is complicated and often difficult to predict, as the unemployment effect is likely to be dependent upon region-specific factors including (1) the length of time people have been unemployed, as this potentially effects both their consumption power and their

stock of human capital (2) how skilled the regional workforce is (i.e. is there a sufficient skill base to enable firms to grow and expand) and (3) the structure of industry.

Thus in a region that has traditionally been associated with large employers such as those in the West of Scotland and who have higher than average rates of unemployment, it is less likely that an environment conducive to small growing firms will exist. Indeed, as Appendix I highlights those regions with the highest unemployment rates are predominantly located in the west and south west of Scotland and it is those regions with the highest unemployment rates excluding Glasgow City and South Ayrshire that have some of the lowest rates of continuing entrepreneurial activity in Scotland. Therefore, as predicted our model implies that higher unemployment does not create an environment that is conductive to business growth and expansion, whereas continuing entrepreneurship is considerably higher in those regions with low unemployment rates, which in turn is an indicator of a vibrant economy and market opportunities.

Therefore, it is possible to reject the null hypothesis finding that higher rates of unemployment negatively affect rates of continuing entrepreneurial activity in Scotland.

6.3.2 Human Capital

The supply of entrepreneurs has been strongly linked to the level of human capital that exists within a region. Therefore, as described in our model in Chapter 2 if we develop Schultz (1975) theoretical argument that human capital is viewed largely as the capacity of the entrepreneur to adapt in order to deal with disequilibrium, human capital is about return to ability, which in turn is reflected by an entrepreneurs stock of human capital most commonly acquired through education. As discussed in Chapter 3 the indicator of human capital used in this study is the percentage of the population with a *National Vocation Qualification 4 or above (NVQ4+)*. This proxy indicator of human capital was employed to account for both skill based vocational qualifications and for traditional academic qualifications including undergraduate

and postgraduate qualifications which are more closely associated with knowledge acquisition.

Therefore, in our model developed in Chapter 2 we argued it is more likely that in regions with more highly educated populations, that greater human capital is embodied by general and specific skills, not only for implementing new ideas and starting new businesses, but also growing existing businesses. Moreover, regions with a rich stock of human capital can generate environments rich in local spillovers, which is also another support mechanism by which existing businesses can grow and be sustained. Therefore, it was hypothesised that:

H3: Human capital has a positive effect on the rate of continuing entrepreneurial activity.

The results from all three regression models are reported in Table 4.6 of Chapter 4. The results support the hypothesis that the higher a regions stock of human capital proxied by education/skill attainment, the greater is the likelihood of a region having higher rates of continuing entrepreneurial activity. The coefficient is positive and statistically significant in all three models at the .05 level. The findings are consistent with other studies which have indicated educational attainment positively influences rates of entrepreneurship (Armington and Acs, 2002; Acs and Armington, 2004; Lee *et al.,* 2004; Okamuro and Kobayashi, 2006; Gleave and Mitra, 2010).

The correlation matrix (Table 4.5) shows a positive relationship (0.28, 0.25 and 0.25) between levels of human capital and continuing entrepreneurial activity in all three random effect models with Appendix J revealing that it is those regions with lower rates of education and skill attainment that have lower rates of continuing entrepreneurial activity in Scotland. Therefore, the counter argument that higher levels of education lead to higher real wage rates, which in turn leads to lower rates of entrepreneurial activity does not appear to exist in the Scottish context. Moreover, although formal education itself may not provide the skills required to start a new business, it does provide individuals with the ability to analyse and assess the feasibility of a business opportunity and better enables the individual to take advantage of knowledge spillover.

Indeed human capital theory suggests entrepreneurial ability is enhanced by greater levels of knowledge, which results in productivity gains and efficiency of economic activities (Schultz, 1959; Becker, 1964). Moreover, in regions where demand conditions and business climate are similar, the stock of human capital will influence the quality of labour, which can potentially explain regional differences in rates of continuing entrepreneurial activity. Acs and Armington (2002) stress a higher quality of human capital increases the propensity for knowledge spillover leading to additional rounds of new innovative activity and business expansion. Therefore, the quality of human capital may influence continuing entrepreneurship at two levels. First, given the arguments set out above a more educated and skilled person may be more likely to establish and grow a business. Second, in line with the theory of industrial districts (Marshall, 1890), Growth Pole Theory and the New Economic Geography (Krugman 1991a) discussed in Chapter 2 entrepreneurs may be more attracted towards regions where they can access well-qualified labour allowing businesses to benefit and be sustained by continuing knowledge spillover.

Moreover, the qualitative results reported in section 5.5 also support the quantitative results reported in Chapter 4 by confirming that the majority (61%) of local authority respondents perceive human capital to be a significant determinant of continuing entrepreneurship; although it was quite clear from respondents that understandably the actual level and extent of importance would be dependent upon the type of business and sector in which a firm operates. For example, some respondents expressed opinions along the lines that education/skill attainment is likely to be of greater importance in certain high-technology businesses. Although in a minority, another group of respondents (29%) didn't believe human capital was a significant factor, stating from their own experience that they believed skill/educational attainment was overstated and not a prohibitive factor in growing a small business.

Nevertheless, despite the differences between some respondents on the basis of both quantitative and qualitative data we are able to reject the null hypothesis and confirm as predicted that higher levels of human capital proxied by education and skill attainment are a key determinant of regional variation in continuing entrepreneurial activity in Scotland.

6.3.3 Access to Finance

As discussed in Chapter 2 debt capital is often the preferred choice and most likely source of external financing among small growing firms, even though there are certain barriers and apparent penalties associated with debt financing, such as collateral guarantees and higher interest rates imposed by banks. As a result, we argued in our model via an extension of resource base theory that regions endowed with relatively high levels of per capita financial assets are more likely to be areas where access to debt capital is comparatively easy. Moreover, given the positive links between wealth and the availability of capital based on the collateral an entrepreneur can offer, there is strong reason to believe access to capital will influence the supply of continuing entrepreneurial activity, whereby the wealthier a region is the easier it should be to obtain finance for business expansion. Therefore, we hypothesised that:

H4: Rates of continuing entrepreneurial activity are higher in regions with greater levels of personal wealth.

Given that access to finance is commonly calculated via some measure of personal/household wealth, whereby the entrepreneur can raise finance against the value of their property we adopted the dynamic indicator of *capital gains in house prices.*

The results of all three regression models are reported in Table 4.6 of Chapter 4. The results support the hypothesis that rates of continuing entrepreneurial activity are higher in regions with greater levels of personal wealth. The coefficient is positive in all three models and statistically significant in both total and working population models at the .05 level. The results are consistent with previous studies indicating regions with greater access to finance will have higher rates of entrepreneurial activity (Reynolds *et al.,* 1994; Ashcroft *et al.,* 1991; Garofoli, 1994; Guesnier, 1994; Okamuro and Kobayashi, 2006; Sutaria and Hicks, 2004; Nykvist, 2008). Our findings are also supported by Black *et al.,* (1996) who identified that a 10% increase in the value of housing equity leads to a corresponding increase of 5-6% in VAT registrations. Increasing house prices may also indicate increasing prosperity, which may in turn create further market opportunities for business growth, as firms expand

to service increasing local demand, which was identified by both quantitative and qualitative results as a significant determinant of continuing entrepreneurship in Scotland.

Furthermore, Appendix K demonstrates house price growth ranged from 8.5%-11.3% with an average of 9.8% in Scotland over the 1998-2007 period. While, the highest growth in capital gains was Glasgow City (11.3%) many rural regions with higher than average entrepreneurial rates, such as Aberdeenshire, the Orkney Islands and Argyle and Bute have also experienced some of the highest increases in capital gains. Our findings, therefore, indicate that in regions with low levels of personal wealth, individuals may find it more difficult to raise finance and thus decrease the likelihood that they will be able to acquire capital to expand a business.

The qualitative results presented in section 5.3 strongly corroborate the quantitative results with almost all respondents (92%) interviewed highlighting access to finance as a key determinant of continuing entrepreneurial activity. In particular, some respondents also suggested that access to finance in Scotland may be an issue given Scotland's historically low rates of homeownership relative to some other parts of the UK making banks less willing to provide funding. This would appear to be a particularly relevant point because there is some evidence to suggest that debt finance for business expansion is most likely to be obtained from banks (Binks *et al.*, 1988). Yet banks are often reluctant to provide unsecured lending, in case of default and the uncertainty associated with lending to small businesses where success and profit are never guaranteed or certainly not realised until an unspecified later date. As a result potential entrepreneurs and existing entrepreneurs wishing to start or expand their business may be constrained by the lack of liquidity in less well-off regions (Evans and Jovanovic, 1989; Blanchflower and Oswald, 1998). Therefore, given the positive links identified between wealth and the availability of debt capital, there is strong reason to believe access to finance will influence the supply of continuing entrepreneurship.

Therefore, on the strength of both the qualitative and quantitative results we can reject the null hypothesis and conclude that access to finance is a significant variable explaining regional variation in rates of continuing entrepreneurial activity in Scotland.

6.4 Agglomeration Economies

The large body of theoretical and empirical studies (emanating from the Regional Economics School) reviewed in Section 2.3 clearly highlighted that both the location of industry and new firm formation is likely to be influenced by a range of external agglomeration factors. Our theoretical model developed in Chapter 2 similarly advocated that the benefits arising from agglomeration or centrifugal forces as Krugman (1991a) puts it will have a positive effect on continuing entrepreneurial activity, as growing firms will attempt to take advantage of pecuniary and non-pecuniary externalities. Therefore, it was hypothesised that:

H5: Economic agglomeration has a positive effect on rates of continuing entrepreneurial activity.

Although we predicted that agglomeration benefits would have a positive effect we could not say whether continuing entrepreneurial activity is driven by specialisation economies or urbanisation economies. Therefore, we tested for the first time for the presence of both *specialisation* and *urbanisation* economies.

6.4.1 Specialisation Economies

Specialisation economies are the external benefits arising from the intra-industry proximity proposed by Marshall (1890). In this study we tested for the presence of specialisation economies by calculating two location quotient indexes to measure the concentration of firms in the manufacturing and business service sectors. According to Marshall, specialisation economies result from the geographical proximity of firms in the same industry clustering together in order to benefit from access to a specialised pool of labour, specialised suppliers and knowledge transmission among similar firms.

The results for all three regression models are reported in Table 4.6 of Chapter 4. In both the total and working population modelling the specialisation coefficient is

positive in the manufacturing sector, but negative in the business service sector. When the dependent variable is standardised by the existing business stock the specialisation coefficient is positive in both manufacturing and business services. However, the coefficient is not statistically significant in any of the three models for specialisation economies in either the manufacturing or business service sectors. Therefore, our findings do not in the case of Scotland support the theoretical literature (Marshall, 1890; Krugman, 1991a; Porter, 1998a) on industrial districts or clusters which suggest firms locate in close proximity to take advantage of externalities that arise from specialisation economies.

While no evidence is found to support the specialisation hypothesis in either manufacturing or business services, it may be possible to offer an explanation based on the theory of the New Economic Geography. Krugman (1991a) argued, that one of the reasons firms locate in close proximity is the result of globalisation, suggesting globalisation has led to declining transport costs and trade barriers, allowing firms to locate close to large markets enabling them to take advantage of economies of scale. Therefore, as a result of globalisation and reducing trade barriers, Krugman is at least implicitly reflecting on agglomeration in an 'international' cross border context, which simply may not be applicable to Scotland. Moreover, given the emphasis on examining the environment for entrepreneurship at the local level within Scotland this renders the concept of trade barriers irrelevant. Furthermore, in relation to Scotland's physical geography, it is a relatively small country with a total population of 5.19[12] million with relatively high levels of communication, transportation infrastructure and relatively short commuting times especially between its cities. As a result firms may not feel it is necessary to locate in close proximity, as the natural geography of Scotland means firms are located in relative proximity to a large labour pool, suppliers, technical advisors and support services. Furthermore, although there are benefits of competition for both consumers and producers in terms of lower prices, productivity gains and the continued improvement in a firms innovative capacity; the negative yet insignificant effect for specialisation in business services may also reflect a high degree of competition, whereby the positive externalities highlighted by the theoretical literature of same sector specialisation are actually outweighed by the degree of competition. Moreover, as Bade and Nerlinger (2000)

[12] Data from NOMIS.

identified, specialisation economies can hamper rather than foster entrepreneurship. Therefore, we find no evidence that specialisation economies have a significant effect on rates of continuing entrepreneurship in Scotland. However, as reported in the following sub-section we do find evidence of agglomeration influences measured by urbanisation economies.

6.4.2 Urbanisation Economies

Urbanisation economies arise, unlike specialisation economies as a result of the emphasis placed on a critical mass of inter-industry spillover rather than intra-industry spillover, supporting the idea that diversity and variety of industry is likely to be greatest in more densely populated regions and cities where firms can benefit from improved and advanced infrastructure, large labour markets and the support provided by access to a wide range of consulting and financial support firms.

The results from all three regression models are reported in Table 4.6 of Chapter 4. The coefficient is positive and statistically significant in all models at the .05 level and the results are consistent with previous studies (Reynolds *et al.,* 1994; Guesnier, 1994; Audretsch and Fritsch, 1994; Davidsson *et al.,* 1994; Bosma *et al.,* 2008; Audretsch *et al.,* 2010). Therefore, our findings support Jacobs's (1969) urbanisation hypothesis, that unlike specialisation economies economic activity is enhanced in locations where there is a wide range of knowledge and opportunities external to the industry in which a firm operates. Where there are a greater variety of entrepreneurs and potential entrepreneurs with different backgrounds, experiences and capabilities, this will lead to a wide range of different valuations relating to the commercial usefulness of knowledge available (Florida, 2002). Thus it is the variety of agents, therefore, that triggers differences in knowledge evaluation and forms the basis for entrepreneurial activity.

Therefore, we reject the null hypothesis and conclude that agglomeration benefits are a key determinant explaining regional variation in rates of continuing entrepreneurial activity in Scotland.

However, while the quantitative findings demonstrate that agglomeration positively and significantly influences levels of continuing entrepreneurship the qualitative results provided by local authority respondents in section 5.8 are less explicit and do not definitively support the current spatial strategy regarding the reintroduction of enterprise zones, as an effective mechanism for generating agglomeration benefits to boost entrepreneurial activity. If anything the qualitative results appear to lack consensus with 55% of respondents disagreeing or being unsure about the reintroduction of enterprise zones. With both the UK and Scottish Governments recently announcing the reintroduction of enterprise zones, it is expected that the new enterprise zones will offer discounted business rates, a simplified planning system, superfast broadband and enhanced capital allowances in an attempt to create a critical mass of economic activity and associated agglomeration benefits.

However, local authority respondents believed on the basis of evidence from the 1980s that enterprise zones are more likely to cause displacement among existing firms rather than incentivise businesses to grow or expand. Furthermore, other respondents also commented that enterprise zones will do little for entrepreneurship, claiming they are more suited to attracting inward investment for large companies. Therefore, enterprise zones were generally perceived negatively, particularly regarding their ability to boost entrepreneurship among small firms. Moreover, the scepticism with which the respondents' viewed enterprise zones is also reflected by a recent report published by the Centre for Cities (2011) which suggest enterprise zones offered mixed benefits when they were originally introduced in the 1980s and suggested the firms that benefited were not new and small firms, but those that chose to relocate from other areas. As a result it would appear there may be some danger that the creation of enterprise zones in lagging regions may simply lead to the relocation of firms from existing agglomerations into less economically prosperous regions, where workers are exposed to lower productivity, which may ultimately prohibit and harm the national economy.

6.5 Institutional and Cultural Factors

As discussed in Chapter 2 Mason (1991) highlighted that culture is relevant to entrepreneurship from two perspectives. Firstly, it gives an indication of attitudes towards entrepreneurship among the local population and secondly the extent to which local institutions are supportive in terms of political leadership. In our model of continuing entrepreneurial activity outlined in section 2.6 like Etzioni (1987) our theoretical model of continuing entrepreneurial activity advocated that the demand and supply for entrepreneurship in a region will be a function of how well it is accepted and legitimised by society and the more supportive a society is towards entrepreneurial activity the more frequent the process of entrepreneurship is likely to be. As outlined in Chapter 2 we tested two hypotheses, which argued that the local environment for entrepreneurship will be influenced by societal attitudes and institutional frameworks towards entrepreneurship.

6.5.1 Size of the Public Sector Work Force

Firstly, we argued that the institutional environment is important as political and economic institutions underlie and determine the incentive structure of an economy (North, 1991) which in turn can either encourage or hinder an entrepreneurial culture. We hypothesised that:

H6: A large public sector will be negatively associated with the rate of continuing entrepreneurial activity.

The effect of the institutional environment on continuing entrepreneurial activity was captured by using the proxy measure of the *proportion of the work force employed in the public sector* in each region, as one of the key aspects of product market institutions is the level of competition. However, competition refers not only to competition between firms in the private sector, but also between private firms and

the public sector. More precisely, our own model argued, given that 28%[13] of Scotland's workforce is employed in the public sector and, therefore, not in private sector profit seeking businesses, this makes it less likely that public sector workers will be exposed to the skills required to run and grow a small business and that it may be expected that a large public sector is also likely to crowd out private sector firms as a result of competition.

The results from all three regression models are reported in Table 4.6 of Chapter 4. Unlike studies from other countries (Bjornskov and Foss, 2008; Okamuro and Kobayashi, 2006; Nystrom, 2008) our results do not support the hypothesis that a large public sector workforce has a negative impact on rates of continuing entrepreneurial activity in Scotland. While the coefficient is negative as predicted, the effect is not significant in any of the three models estimated. Therefore, we cannot reject the null hypothesis.

Indeed, given the extremely weak relationship between the dependent variable and size of the public sector workforce an observation could be made that the public sector may actually generate some entrepreneurial opportunities, given that many of the duties and services undertaken by the public sector both nationally and locally are often contracted out to specialised firms for supposed efficiency reasons. Therefore, at one level a large public sector may provide new opportunities or sustain existing businesses, yet at another having a large percentage of the existing population employed in the public sector over the long-term may actually prohibit the formation of an entrepreneurial culture and the important influence that role models (as discussed in the following section) perform in terms of encouraging others to undertake entrepreneurial activities.

6.5.2 Existing Small Business Population

Secondly, we argued that social and cultural norms are likely to influence the number of people who have already undertaken entrepreneurial activity in a region, thus reflecting that entrepreneurial activity is a function of how well it is accepted and

[13] Figures taken from the Annual Population Survey and Annual Labour Force Survey based on local Authority figures for those aged 16-64.

legitimised by society (Malecki, 2009; Aoyama, 2009). In particular, we put forward the idea that the presence of a large existing small business population will imply a positive attitude and culture towards entrepreneurship, whereby existing firms are able to act as seedbeds and incubators for entrepreneurs looking to grow their business. Therefore, our theoretical model in Chapter 2 argued a large small business population allows growing businesses to build contacts and develop relationships which help facilitate the exchange of information relating to various aspects of their business and thus increase their prospects for growth. Therefore, we hypothesised that:

H7: A large proportion of small firms have a positive effect on rates of continuing entrepreneurial activity.

The results for all three regression models are reported in Table 4.6 of Chapter 4. Results from both the total and working population models support the hypothesis that the existing small business population is a significant factor explaining regional variation in rates of continuing entrepreneurial activity in Scotland. The coefficient is positive and highly statistically significant in both models at the 0.01 level. These findings are consistent with other studies (Keeble and Walker, 1994; Reynolds *et al.*, 1994; Garofoli, 1994; Guesnier, 1994; Davidsson *et al.*, 1994; Tamasy and Le Heron, 2008; Audretsch and Fritsch, 1994; Kangasarju, 2000; Armington and Acs, 2002; Lee *et al.*, 2004; Okamuro and Kobayashi, 2006; Audretsch *et al.*, 2010), indicating that the size structure of regional firms and the number of existing small businesses matters.

Furthermore, the quantitative results reported in Chapter 4 are strengthened considerably by the weight of the qualitative results reported in section 5.4 which confirms the importance of an entrepreneurial culture and the impact that role models can have on rates of continuing entrepreneurship with 98% of local authority respondents citing role models as a key determinant of continuing entrepreneurship. The qualitative data also indicated the historical structure of industry in Scotland has led to an overreliance on large businesses and the public sector for employment, which has been counterproductive to the establishment of an entrepreneurial culture, as a result of fewer small businesses, which in turn has limited the number of role

models, which are able to act as seedbeds. Therefore, the existing stock of small businesses in a region is likely to be important for a number of reasons.

Firstly, a large existing body of small firms in a region provide entrepreneurs with access to role models, which in turn give them the opportunity to directly observe, consume and question other business owners and thereby acquire the skills and knowledge required to help grow their own business. Such an environment allows business owners to build contacts and develop networks, which are not only important when starting a business, but also to help ensure the subsequent survival and success of a business.

Second, networks- formal as well as informal- among entrepreneurs facilitate the exchange of information relating to different aspects of their business. New ideas, production and distribution methods and techniques, problems and solutions and related concerns are discussed through network communications; with increased access to a variety of relevant and reliable information obtained through well-developed network communications, which can help improve the speed and prospects for a business's survival and success. Furthermore, regions with a large proportion of existing small businesses are also able to act as incubators, whereby the degree of interaction between firms and the function an owner of a small business is likely to perform may better place them in a position to foresee market opportunities (Johnson and Parker, 1996).

Third, in regions with a large number of small businesses there is a far greater likelihood that an existing entrepreneur will have worked at some point in a small business and have had greater opportunities to build relationships and networks with customers and suppliers on a regular basis allowing them to be at the cutting edge of consumer demand (Mason, 1991), than if they had previously worked in a large firm where individuals are often limited to the activities of the department in which they work, where tasks are often specialised and a rigid hierarchy exists preventing individuals from gaining the exposure to the wide range of skills required to start and sustain a growing business.

Moreover, small firms for reasons outlined above can have a positive impact on growing small businesses, while large firms may have a negative impact. For example, large branch plants may be limited in terms of their networks,

communicating instead more regularly with headquarters and other large branch plants. Large firms are also more likely to dominate a large amount of resources, which may in turn crowd out opportunities for small firms. Therefore, being an employee in a small firm and managing a small firm has greater similarities than working in a large firm and managing a small firm.

Both quantitative and qualitative results show that while the decision to establish and/or grow a business is often that of an individual or a small group of individual's, this decision is likely to be shaped by the societal and cultural institutions that underpin a society (Casson, 1995; Davidsson, 1995). Indeed, a regional culture of entrepreneurship is likely to be important because the behaviour and attitudes of the individual entrepreneur are often closely related to their social interactions with family members and knowledge acquired through external networks including that of other entrepreneurs (Casson 1995; Nijkamp, 2003). Similarly Aoyama (2009) stresses a particular attitude or culture may be reinforced by previous success, business opportunities and a dominant industrial structure, such as the historical association with heavy industry in the west coast of Scotland, which will shape individual motivation, perception to risk and socially acceptable attitudes. Furthermore, Aoyama (2009) stresses it is these attitudes and historical precedents that account for regional distinctiveness. Therefore, while entrepreneurs are agents of change, their behaviours and propensity for entrepreneurship are strongly influenced by regional norms and cultures and are as much agents of change as proponents of regional legacy. Therefore, on the basis of our findings regional culture matters and also reinforces previous empirical findings that entrepreneurial activity is a path dependent process (Mueller and van Stel, 2008; Andersson and Koster, 2011), whereby regions with high (low) rates of entrepreneurship are likely to continue on the same trajectory.

Therefore, in line with both the qualitative and quantitative data it is possible to reject the null hypothesis and confirm that a regions rate of continuing entrepreneurship is positively associated with the number of existing small businesses.

6.6 Summary

In this chapter of the thesis the quantitative and qualitative results were discussed in the context of the theoretical and empirical literature outlined in Chapter 2, as a precursor to the policy recommendations and conclusions in the following chapter. The discussion and comparison of the research findings confirms as hypothesised in Chapter 2 that regional variation in continuing entrepreneurship in Scotland is determined by a range of socio-economic region-specific factors and that continuing entrepreneurship is a regional event. Furthermore, in addition to helping explain the variation in continuing entrepreneurship identified in section 4.2, an attempt was also made to produce a set of results that were reliable and generalizable by using a set of standardised variables which allow the results in this study to be directly compared with other empirical research studies into determinants of entrepreneurship.

On the basis of the results reported in this chapter Scottish enterprise policy should attempt to address the entrepreneurial deficit that exists between regions and the creation of a positive culture towards entrepreneurship in Scotland. This should involve the continued development of institutions and levers that are capable of providing an environment which encourages and actively supports an entrepreneurial culture because an environment that is not conducive to entrepreneurial activity is more likely to feel the consequences of urban decline and social deprivation, as a result of lower economic growth, fewer jobs created and lower levels of investment. As a consequence it is clear that entrepreneurship has a much wider impact on the social fabric that underpins a society and, therefore, polices to promote and encourage dynamic innovative driven regions are crucial for future prosperity and sustainable development.

The final and following chapter concludes by providing an overview of the research findings identified in this study. On the basis of those findings a number of policy recommendations are proposed in an attempt to stimulate higher rates of continuing entrepreneurial activity in Scotland.

7. Conclusion and Policy Recommendations

7.1 Introduction

This chapter explores the policy implications derived from the findings presented in the last chapter. Therefore, the policy suggestions are based on the results obtained from both the quantitative and qualitative results.

The principal aim and contribution of this research study was to investigate and identify locational determinants of continuing entrepreneurial activity across local authority regions in Scotland given the importance placed on entrepreneurship and especially small growing firms as a driver of economic growth. The study argued that regional characteristics specifically influence the capacity for entrepreneurial activity and crucially, therefore, while entrepreneurship continues to make a contribution towards economic growth, job creation and innovation, there is a continued need to understand theoretically, empirically and from a policy perspective the causes and environments that enhance entrepreneurial activity given that levels of economic growth and future prosperity in both regions and countries appear to be increasingly related to levels of entrepreneurship.

The role of the local environment was investigated by testing a number of hypotheses reflecting the local socio-economic characteristics of a region and the extent to which socio-economic region-specific factors are able to explain variation in rates of continuing entrepreneurial activity in Scotland. In doing so the research study was for the first time, able to provide a more advanced understanding about the causes of munificent and sparse environments for continuing entrepreneurship and contribute to the limited body of existing knowledge addressing spatial studies of entrepreneurship within Scotland.

It is hoped the research findings will also provide guidance for government, local authorities and other associate organisations involved in the design and

implementation of enterprise policy and services, with specific reference to continuing entrepreneurship in Scotland, as part of an attempt to foster an environment that is conducive and more attuned to growing small businesses at the local level in Scotland.

The following section briefly summarises the results obtained from the quantitative and qualitative results reported and discussed in Chapter 6 before exploring the policy implications of those findings in Section 7.4.

7.2 Principal Findings

Sequential quantitative and then qualitative analysis revealed the location of continuing entrepreneurial activity in Scotland can be explained by a range of socio-economic region-specific variables. In particular the research findings showed that differences in rates of continuing entrepreneurship can most significantly be explained by population growth an indicator of local demand conditions and secondly by the number of existing small businesses, an indicator of attitudes and culture towards entrepreneurship. Human capital proxied by level of education and skill attainment was also found to significantly explain rates of continuing entrepreneurship across Scottish regions. As predicted access to finance had a positive significant effect and, therefore, those who have limited access to finance are likely to have a lower propensity to access capital with which to grow their business. Findings related to agglomeration were mixed with no statistically significant effects for specialisation economies, however, population density a proxy for urbanisation economies had a positive significant effect in all models. The unemployment rate was found to negatively impact rates of continuing entrepreneurship and is likely to indicate a lack of demand for business growth in regions where there is higher and prolonged levels of unemployment. The findings were also able to demonstrate the way in which the dependent variable is standardised can influence whether the direction of a coefficient is positive or negative for certain variables.

On the basis of the research findings section 7.4 attempts to address potential policy options that could be used to foster and enhance the environment for continuing entrepreneurial activity in Scotland. The policy recommendations are informed by both the quantitative and qualitative results. However, given the empirical nature of this study and the subsequent policy recommendations forthcoming in this chapter, it is briefly worth contextualising the forthcoming recommendations within the context of current enterprise service delivery in Scotland, as the forthcoming recommendations in section 7.4 are largely aimed as a guide to those organisations currently delivering enterprise services in Scotland at the local level in the context of continuing entrepreneurship.

7.3 Enterprise Services and Method of Delivery in Scotland

In Scotland current economic policy focusses on the promotion of effective support mechanisms to stimulate efficiency and growth, while developing an environment conducive to business by providing a range of support and advice services (Scottish Government (2012). In particular it is the role of Business Gateway (BG), Scottish Enterprise and Highlands and Islands Enterprise (HIE) to deliver frontline business advisory services to new and growing businesses, yet as will be highlighted the role of Business Gateway although related is different to that of Scottish Enterprise and Highlands and Islands Enterprise.

At present local authorities have lead responsibility to deliver Business Gateway services, which is the national advisory service and likely first point of contact for potential entrepreneurs and small growing businesses when seeking business advice about start-up and business development.

Although, Business Gateway became prominent in 2007 when the delivery of local services for businesses transferred from Local Enterprise Companies to local authorities, as part of the 2007 enterprise network reforms, the role the Business Gateway organisation performs today has its roots in the Enterprise Trust movement established in Scotland in 1982. Enterprise Trusts were (and in some cases continue to be) a private sector initiative created by Scot BIC (Scottish Business in the

Community), which sought to foster linkages between the public and private sector on the grounds, that it should not only be the public sector that is responsible for economic development and regeneration (Reid and Jacobsen, 1988). The Enterprise Trusts like Business Gateway today provided a free business advice service for potential and new businesses, as part of a wider attempt to develop an enterprise culture in Scotland and was achieved through small, local organisations manned by individuals with technical and business experience (very much similar to what the Business Gateway offers today). As Reid and Jacobsen (1988) put it, Enterprise Trusts were 'essentially information brokers', but perhaps most importantly Reid and Jacobsen (1988) highlight the services Enterprise Trusts provided were able to take account of local 'time and place' information, as a result of their "familiarity with the unique character of each local business environment" (Reid and Jacobsen, 1988, p74). A concept according to the empirical results presented in this study, that would appear to continue to be an important element of entrepreneurial activity given the importance of local socio-economic region-specific factors identified.

Indeed, although local advisory services now fall ubiquitously under the Business Gateway 'brand' rather than local Enterprise Trusts; in practice the Business Gateway service is procured as a series of regional contracts by lead local authorities, with many Enterprise Trusts having been successful in bidding for Business Gateway contracts and are incumbent providers in their particular areas. Therefore, in summary, most Business Gateway contracts continue to be delivered by Enterprise Trusts and offer the same local advisory services described by Reid and Jacobsen (1988), but under the Business Gateway brand.

Working as an online information service, telephone enquiry, and referral service, Business Gateway provides a range of support accessible to all businesses including general information, start-up and marketing seminars, market research, and personal and business planning, which are advertised on the Business Gateway website. Business Gateway does not directly provide finance, although it is able to offer advice on types of finance and where it may be obtained. Therefore, the function of Business Gateway is predominantly to offer 'soft' support at the local level.

More advanced support is available to businesses with high growth potential via Scottish Enterprise and Highlands and Islands Enterprise (HIE). However, although

the roles Business Gateway and Scottish Enterprise perform are different, they are related as one element of the service Business Gateway fulfils is the identification of businesses with high growth potential and their subsequent referral to the high growth units for enhanced support. Business Gateway advisors specifically target companies that demonstrate the potential to increase turnover between £400,000-£800,000 over 3 years and provide them with one-to-one support, working with companies to develop growth plans and recommending companies for account management with either Scottish Enterprise or Highlands and Islands Enterprise.

However, the forthcoming policy recommendations in section 7.4 are likely to be most applicable to the Business Gateway organisation given that they are charged with delivering local enterprise support to new and small growing businesses at local authority level in Scotland.

7.4 Policy Recommendations

Both the quantitative and qualitative findings highlighted, that continuing entrepreneurship is a regional event and that regional characteristics specifically influence regional rates of continuing entrepreneurship in Scotland. This section of the thesis is designed, therefore, to provide guidance for local authorities and other organisations involved in the design and implementation of enterprise policy and services, with specific reference to growing small firms in Scotland.

That said, given the socio-economic region-specific nature of the variables influencing regional rates of continuing entrepreneurship, it is extremely unlikely that a homogenous one-size fits all policy on the basis of the research findings identified in this study would be appropriate, as individual regions have very different circumstances socially, economically and historically. Indeed, we continue to recommend that enterprise services continue to be delivered at the local level in the same way as currently provided by the Business Gateway in order to take account of regional heterogeneity.

Nevertheless, at a broad policy level it is possible to draw some important points from the research findings, which can be used to inform future enterprise policy and,

hopefully, help foster a more entrepreneurial environment within Scotland. Therefore, our recommendations are meant as a general guide regarding possible options based on our research findings for those organisations delivering enterprise services in Scotland at the local level in the context of continuing entrepreneurship.

7.4.1 Demand

Both quantitative and qualitative results indicated that local demand conditions are an important determinant of continuing entrepreneurial activity. However, because of the complexity associated with stimulating additional demand, the role of Government and local authorities will be constrained. Nevertheless, on the basis of the results a number of recommendations and potential options are suggested which could potentially help boost demand and create further economic opportunities for small businesses in Scotland.

First, the Scottish Government could attempt to boost demand by legislating to ensure public procurement better supports new and existing businesses within regions by ensuring local authorities source a proportion of their services from local businesses. This would provide new and young growing businesses with guaranteed demand for the goods and services they produce and importantly allow these businesses a period of time to fully establish themselves and thus a targeted approach to public procurement by local authorities, hopefully, becomes a stepping stone to other larger domestic and export markets.

Second, the Scottish Government and local authorities should continue to invest in capital infrastructure and the bringing forward of capital investment expenditure to further develop regional infrastructure, which is vital in order to attract both businesses and people into regions. In particular investment should focus on projects such as transport, housing and telecoms, which will boost demand delivering economic growth in the short-term and supply-side factors in the longer term, both of which should have positive effects and create further opportunities for business growth in the Scottish economy.

Third, because of Scotland's limited market size more could be done at a policy level to encourage small growing firms to target growing markets, with particular emphasis on Asian and Middle Eastern markets which continue to have relatively high rates of economic growth. However, this must, therefore, be accompanied by a strategic evaluation of what companies produce in Scotland with what growing international markets require to sustain their economic development. This means Scottish businesses must create more goods and services of high value for overseas markets, which requires greater government intervention to better network indigenous entrepreneurs with growing and emerging markets stimulating demand for Scottish products and services. However, it should be acknowledged that this may be difficult given that our study shows the majority of small growing firms continue to rely on local markets. Policy, therefore, should focus on helping firms increase their propensity for export and growth by encouraging firms to tap into the supply chain of existing exporting businesses as proposed by the Fraser of Allander Institute (2011) when they are not able to enter export markets directly.

Finally, the Business Gateway and both Scottish and Highlands and Islands Enterprise should continue supporting existing businesses through sales training, marketing initiatives, trade fairs, directories and export activities.

7.4.2 Culture

The discussion and interpretation of results in section 6.5.2 clearly indicated that more is required to be accomplished in order to develop a culture of entrepreneurship in Scotland. Yet, changing culture is not something that can be achieved easily or quickly, as entrepreneurship tends to be path dependent (Mueller and van Stel, 2008; Andersson and Koster, 2011), which makes it difficult to reverse trends in regions with low rates of entrepreneurship and implement a culture that correctly values the contribution of the entrepreneur. However, there are a number of actions that policy makers could potentially take to further enhance a culture of entrepreneurship in Scotland.

Actions should include further development and the promotion of stronger links between business communities, local schools, colleges and universities. Not only did our results emphasise a positive correlation between human capital proxied by education/skill attainment and continuing entrepreneurship, but the Davies Review commissioned by the Department for Education and Skills (DfES) also identified that schools play a key role influencing attitudes towards careers and subsequently recommended that enterprise education should be part of the curriculum (DfES, 2002). Indeed, while enterprise education is delivered in Scottish secondary schools through the *'Determined to Succeed'* programme, which promotes the basic skill sets required to start a business, policy makers must consider that the majority of individuals will not start a business and, therefore, it is vitally important that in addition to providing the basic skills required for entrepreneurship, they must be complimented by educating people in general, and young people in particular about the role the entrepreneur plays in economic growth, job creation, innovation and, therefore, the wider importance of entrepreneurship to society in an attempt to develop a positive culture towards entrepreneurship not just among those who might wish to choose entrepreneurship as a career, but among the wider population who will not start or run a business.

This could be achieved by additional public relations campaigning, which promotes entrepreneurial careers and role models, with particular emphasis placed on television and social networking sites, as these are the communication mediums that a significant number of young people (our future entrepreneurs) use to interact with their peers. Furthermore, when people are continually exposed to successful role models across a range of businesses, small and large, a positive culture towards entrepreneurship is more likely to develop and may also help reduce the fear of failure, which is often cited as a preventative mechanism for entrepreneurial activity.

Indeed, the importance of role models highlighted by the quantitative and qualitative results in this study indicate there is a continued need for a well-developed network of business mentors, whereby regular opportunities exist for potential and existing entrepreneurs to meet and discuss their concerns. Therefore, given the importance of role models identified in this study, both government and local authorities should ensure that the facilities for network exchange exist and are enhanced with any events well publicised in the media. The more networking events are publicised and

promoted the greater importance that will be attached to entrepreneurship in a given region. This would appear, as discussed in Chapter 2 to be particularly important for growing businesses to enable contacts to be forged and relationships developed. This will help facilitate the exchange of information relating to various aspects of their business with increased access to a variety of relevant and reliable information, thereby helping to improve the speed and quality of decision making processes within a business and thus increasing their prospects for growth.

Moreover, in addition to well documented national role models who lead successful national and international businesses, it is also important that role models come from a cross-section of society, including from all different types of businesses and not just business men and women who run the largest businesses, as this may be intimidating, counterproductive and on a scale that new and small existing business owners believe they cannot realistically achieve. For example, entrepreneurs should be able to locate other entrepreneurs in the same industries and at similar or more advanced stages of business development, so that these entrepreneurs can learn from one another and provide each other with moral support, information and resources. Therefore, local authorities via the Business Gateway should continue to encourage the development of networks by sponsoring local events which bring small business people together, as such events have been shown to have a large impact at a relatively low cost (Malecki, 1994). However, potential entrepreneurs and role models should be closely matched relative to industry and experience.

Therefore, while culture can often be overlooked as a ‘soft’ concept on the grounds that it is not easy to define or measure the importance of having regions with a positive culture towards entrepreneurship and one which is able to understand both the role and needs of the entrepreneur in combination with regional, political, educational and cultural institutions that actively promote entrepreneurship will only help create an entrepreneurial environment and boost entrepreneurship.

7.4.3 Education

The research findings highlighted a strong link between continuing entrepreneurship and a regions level of human capital proxied by education and skill attainment. Therefore, one way to increase awareness of entrepreneurship as a career option centres around the education system.

Although enterprise education already forms part of the curriculum for some age groups enterprise education should be integrated within all levels of education (e.g. primary, secondary and post-secondary levels) as part of an aim to develop an entrepreneurial culture with particular emphasis on promoting entrepreneurship as a career option. As a minimum, policy should ensure that entrepreneurship is integrated into the business curriculum, whereby the role of the entrepreneur and their impact on the economy is emphasised, alongside many of the skills that are already taught as part of the business curriculum including accounting, economics, marketing and the concepts of creativity and innovation which are key features of working and running any business. This will help provide both the basic business skills needed to run a business and promote the message that entrepreneurship is a viable career option.

This is achievable and in some cases already exists through the implementation of business plan competitions at all levels of education to expose students to the concepts of competition and innovation. Within schools small entrepreneurial projects should be implemented such as car-boot sales to expose students to the concepts of buying, selling and marketing of events in an attempt to start embedding an entrepreneurial mind-set among younger people. Of course, while most of the individuals' involved in any of the aforementioned activities will not start a business the introduction of an entrepreneurial mind-set and skills will also be important within organisations in both public and private sectors, as organisations continually look to innovate and achieve or retain competitive advantage and by doing so are contributing to future economic development and prosperity. Such action would also require that teachers are exposed to the importance of entrepreneurial activity too.

Another specific point to address is that while entrepreneurship degrees and modules are available throughout all of Scotland's universities, it is particularly important that enterprise education is available across all degree disciplines and not limited to business students, as some of the most creative individuals from the engineering, science and the creative industries may be excluded or unable to access enterprise education if it is not an option as part of their degree course.

Therefore, education is something that policy makers can and should specifically address, given the positive links identified between level of education and entrepreneurial activity. Furthermore, given that higher levels of education are correlated with higher incomes, this may also stimulate aggregate demand and businesses may be attracted to locate in close geographical proximity to well qualified labour. Therefore, the promotion of education generally is one of the key initiatives that should be targeted at less well developed regions, given the positive links between higher levels of education and rates of entrepreneurship.

7.4.4 Unemployment

At a broad policy level our findings inform policy makers that continuing entrepreneurial activity in Scotland is opportunity driven and the effect of a given business cycle is greater than any push effect, which re-enforces the idea that strong and stable economic conditions are likely to lead to higher levels of entrepreneurial activity rather than weak and weakening economic conditions.

Therefore, the focus should be on getting more people into employment resulting in higher incomes and increasing aggregate demand, thus generating stronger and more stable economic conditions, which encourages investment and creates economic opportunities for existing businesses, rather than any policies specifically targeting the unemployed for business start-ups. Furthermore, given the negative correlation between the unemployment rate and level of education, enterprise policy should also focus on promoting and improving educational attainment among the unemployed, given the positive correlation between education and higher levels of entrepreneurial activity identified in this study and the wider empirical literature more generally.

Moreover, it was particularly noticeable, as discussed in section 6.3.1 that regions with lower education and skill attainment also have some of the highest levels of unemployment and in turn lowest levels of continuing entrepreneurial activity.

However, the unemployed like any other potential entrepreneur should continue to be able to make use of the support provided by the Business Gateway in terms of developing soft skills, which include training in business skills, lectures and tutorials on taxation, regulation, business practices, and opportunity identification, thus allowing unemployed individuals the opportunity to understand and acquire the required skills and competencies to run a business or that would at least reduce the likelihood of failure.

7.4.5 Finance

As predicted both quantitative and qualitative results highlighted that access to finance is a significant determinant explaining regional variation in rates of continuing entrepreneurship in Scotland. Therefore, enterprise policy should attempt to ensure a well-developed and advanced capital market exists, and is able to provide a wide range of potential financing options for raising capital, given that the results suggest in regions where there is a lack of finance there may also be lower rates of continuing entrepreneurial activity, as individuals struggle to obtain capital to grow their business. A wide range of financing options is crucial, as the type of finance required by individuals is often likely to depend on the type of business and industry in which a business chooses to operate. Therefore, finance should be available from traditional lending institutions including banks, but also from venture capitalists and business angels. Furthermore, in order to avoid the issue of asymmetric information highlighted by the qualitative data in section 5.7, financing options must be promoted more extensively, which will in turn be part of the promotion of an entrepreneurial culture as discussed in section 7.4.2.

A well-developed capital market which is able to provide a range of different financing options will also reduce the opportunity cost of business expansion. However, any policy addressing the provision of finance must strike a balance between the provision of adequate and properly costed lending to businesses and

wasted public money that is likely to lead to failure. For example, with the provision of public finance, through current schemes such as the West of Scotland Development Fund and the East of Scotland Development Fund, which offers gap funding up to £50,000 for new and growing small businesses there is always a danger of moral hazard. Moreover, the net effect of any public support must be considered, as potential problems associated with the provision of subsidies include displacement, allegations of unfairness and the fact that many entrepreneurs will enter into industries with lower barriers to entry and low economic impact. Therefore, while there is clearly a role for the provision of public finance in some cases, governments must be vigilant of creating a culture of *'grantrepreneurship'*, whereby individuals' are incentivised to establish and grow businesses by grants rather than consumer demand (Baumol, 1990).

At present 'hard' financial support in Scotland is primarily focussed on so called account managed high growth trajectory companies with turnover in excess of £1 million over 3 years on the basis that these companies are perceived to have the greatest economic impact. The reality, however, is these funding sources made available by both Scottish Enterprise and Highlands and Islands Enterprise are not available to the vast majority of small growing businesses, such as those under investigation in this study and it is even more unlikely that the recipients of that finance will be located in the least entrepreneurial regions. Indeed, Devins (2009) highlighted that in deprived areas, it is often a struggle to obtain finance. These regions often have less cash reserves, lack of collateral, low house prices, and a prevalence of social housing, making it less likely that they will be able to obtain conventional finance. That said, in 2012 the UK Government launched the *Guaranteed Lending Scheme*, which covers lending banks for 75% of the value of the loan made to SME's, however, borrowers are required to pay a premium interest rate to avoid moral hazard and, therefore, the lending rate is above the market rate and this is something policy makers and banks should jointly seek to address.

Finally, more should be done to promote different sources of finance in terms of the grants and loans available via the Business Gateway website. This could be achieved by better communication and marketing promotions and form part of the wider promotion of an entrepreneurial culture discussed in section 7.4.2. Secondly, through enterprise education and workshops for entrepreneurs, where individuals will be able

to see the different sources and types of finance available, while becoming aware of the correct type of finance they should be attempting to acquire and attract for their business. Therefore, it is crucial that individuals are informed about different financing options and how to approach the relevant organisations and institutions.

7.4.6 Agglomeration

The quantitative results reported that the benefits of agglomeration have a positive effect on rates of continuing entrepreneurship in Scotland. In particular, small growing firms choose to locate where they can absorb knowledge spillover at an inter-industry level, as opposed to intra-industry allowing these businesses to benefit from an extensive division of labour, the wide range of specialised services available across all industries, and the benefits accruing from public infrastructure that are often most developed in urban areas.

Therefore, policy makers should attempt to enhance city regions or imitate them in other less entrepreneurial regions, as small growing firms based on our results are attracted into regions where a wide range of economic activity and support systems already exist, reinforcing the importance of cumulative causation discussed in section 2.3.2. Furthermore, if as Glaeser *et al.*, (1992) suggests close proximity enhances the rate at which knowledge is exchanged, then knowledge spillover will be particularly important in densely populated regions and may help explain why city regions often grow faster than other regions. Indeed, Glaeser's view point is supported by the notion that three of Scotland's four city regions (Edinburgh, Glasgow and Aberdeen) have above average rates of continuing entrepreneurship.

The key question to be addressed at a policy level is whether an attempt should be made to manufacture special economic zones. The nature of urbanisation economies suggest they are naturally self-reinforcing, whereby firms will be attracted into existing areas of high economic activity because of the natural advantages they provide including a large market size and the aforementioned externalities. Therefore, in current areas of high economic activity and industrial diversity, policy makers should continue to stimulate and enhance the environment for business. The

more difficult task being how to stimulate regions that lag behind and have lower rates of continuing entrepreneurial activity.

One of the ways in which this might be achieved is through the use of spatial clustering or the creation of enterprise zones (currently being proposed), whereby new and existing firms are incentivised to locate in specific regions that offer benefits, which might include reduced rates of corporation tax, advanced business infrastructure, reduced rent and access to advisors that are not available in other regions. The advantage of being located in a large incubator is the opportunity to tap into and develop networks, such as those proposed by Porter (see section 2.3.4). Furthermore, the administrative management of the enterprise zone/incubator should also be well integrated within both public and private sector networks and be capable of bringing people together. However, unless these firms are export orientated they will require sufficient local demand conditions to survive in the medium to long-term, following the removal of any support mechanisms. However, it is not clear whether this demand will exist by simply installing existing firms in that region. Therefore, policy makers would need to ensure they are not simply incentivising firms into regions, that would not do so, if they were not subsidised. Furthermore, the use of spatial clustering may further expose regions to inter-regional income disparities (Sternberg, 2009). However, without incentives entrepreneurs will only tend to invest their time and money in a business, if they believe there are good economic prospects for their company (Wagner and Sternberg, 2004). Furthermore, it is not efficient if the same firms achieve less growth and development in the subsidised region, than if they had remained in a non-subsidised region, implying policies may indirectly hamper national growth at the expense of regional growth suggesting a net loss overall.

A more radical option might include a scheme similar to that of the *charter city* concept proposed by Paul Romer (2012) or a special administrative zone, such as those in Hong Kong and Macau. The charter city concept would involve setting aside a piece of land or in this case possibly a region large enough to form a city, which is governed by a separate set of rules applicable to that region only. The land/regions would have a guarantor responsible for its rules and institutions which may be an outside authority such as the case of the British in Hong Kong until 1997. The population would be comprised of those who wish to be there and the rules would

only apply to those who live there. While this is clearly a radical option and unlikely to be implemented in the same format as Romer proposes, some abbreviated version may be appropriate. Therefore, while radical, it is clear that current policy over some 20 years has thus far failed to create dynamic entrepreneurial driven regions in Scotland.

7.4.7 Generalizability of Policy Recommendations

Given that the results reported in this study clearly demonstrate that entrepreneurship is a regional event the aforementioned policy recommendations are only generalizable to Scotland. Therefore, we cannot say the policies recommended in this chapter are applicable in other countries or even other small northern European countries because the recommendations are made on the basis of determining factors of continuing entrepreneurship within Scotland. This is an inevitable limitation reflecting the complexity of the entrepreneurial process, which is determined by individual region-specific characteristics. Furthermore, given the unique characteristics of individual regions, it is likely that some of the policy recommendations made on the basis of the research findings will be more applicable in certain regions of Scotland than others. Therefore, as already discussed individual regions should continue to have their own unique set of tailored policies which reflect the needs, capabilities and institutional framework of that region, as attempting to implant policy approaches from other regions is no guarantee for success (Sternberg, 2009). Indeed, if all policy recommendations were generalizable it would be unlikely that major differences in rates of entrepreneurial activity would exist between countries and certainly between regions within countries. Therefore, continued spatial research into determinants of entrepreneurship is and always will be required in each country.

7.5 Limitations and Recommendations for Future Research

First, while the VAT register lists over 2 million businesses and accounts for approximately 99% of UK economic activity (ONS, 2011) a number of issues arise when using VAT registration data as a measure of continuing entrepreneurship. It is estimated that there are approximately 4.3 million businesses in the UK, which certainly means VAT registration data is likely to underestimate the total number of small growing businesses showing growth tendencies. Indeed, a large number of growing firms will simply not pass the VAT threshold. Furthermore, VAT registration may not necessarily be the result of a growing business, but the consequence of a business reorganisation, change in ownership or business acquisition. Moreover, the VAT register is quantity driven and, therefore, fails to distinguish between type of business and motivation of the entrepreneur. That said, although there are limitations regarding how representative VAT data are as a measure of continuing entrepreneurship, the data is collected regularly, is spatially disaggregated and is officially recognised as a measure of entrepreneurial activity by the Scottish Government and local authorities.

Second, the lack of an up-to-date time series given that VAT registration data is only available and, therefore, modelled in this study until 2007 must be acknowledged. This limitation is a consequence of VAT data being subject to a methodological change from 2008 onwards in line with the Structural Business Statistics Regulation introduced by Eurostat, which means from 2008 the historical VAT register no longer exists, as it must now include firms that are not only VAT registered, but that are also employers even if those firms are below the VAT threshold. Therefore, while the new Business Demography database is more representative of the wider business population, it is less consistent in that while it includes firms that are employers those firms need not pass the VAT threshold to be included on the register. As a result the Business Demography database must be treated with some caution when merging pre and post 2008 VAT data, as they are not directly comparable. Equally, in order to benefit from the advantages of panel data it was not possible to model the data before 1998 due to a lack of data on certain explanatory

variables. Therefore, while the lack of a current time series is a limitation the research study was able to mitigate and validate the quantitative results by conducting 39 follow-up interviews with local authority respondents. The qualitative results did not reveal any significant new information that had not been identified by the time series modelled in this study.

Third, in one of the few studies to address regional determinants of entrepreneurial activity in Scotland, a broad range of explanatory variables were identified to explain regional patterns of continuing entrepreneurship. While the study specifically modelled a range of explanatory variables which have been applied in other spatial studies of entrepreneurship to ensure results are generalizable and to make a contribution to the existing body of knowledge, future studies could attempt to extend the current number of explanatory variables used in this study in an attempt to provide a more advanced understanding about specific determinants which arise from the research findings. This would further enhance the understanding of entrepreneurship in Scotland and lead to more in-depth analysis about the influence of certain variables given that many of the explanatory variables used in this study are proxies. For example, while access to finance was identified as a significant determinant, further research could attempt to identify and assess whether certain types of finance are more relevant than others. Finally, with the introduction of the Single Outcome Agreement in 2007 it will be possible in the future to include additional variables such as broadband connectivity and regional infrastructure variables including kilometres of A class roads to assess the impact of such variables, which were unfortunately not available for the time frame under investigation in this study. Although, we cannot say with any certainty what the effect of those variables would be there is reason to believe that variables such as broadband connectivity and regional infrastructure variables including kilometres of A class roads will boost demand delivering economic growth in the short-term and supply-side factors in the longer term, both of which should have positive effects and create further opportunities for businesses growth in the Scottish economy.

Fourth, although it has been possible to provide a set of research findings based on variables that can be generalised, it is not possible to generalise the policy recommendations beyond the regions of Scotland and certainly not at an international level given national and regional heterogeneity. Nevertheless, the existing body of

knowledge would be enhanced further if studies were undertaken into determinants of small growing businesses in comparable small countries due to the lack of current literature in this area.

Fifth, the results in this study only provide a detailed analysis of regional determinants of continuing entrepreneurship in Scotland, however, in order to provide a more detailed account of entrepreneurship in general it would be useful for future research to compare regional patterns of continuing entrepreneurship with overall start-up activity and high growth firms, especially given the emphasis that is starting to be placed on those firms at a policy level. However, this may not be straightforward in terms of the latter given the limited public availability of such data sets. However, it would be interesting from a policy perspective to compare determinants of different types of entrepreneurial activity in order to generate a fuller picture of the study of entrepreneurship in Scotland more generally.

Sixth, although follow-up interviews were conducted with individuals from each local authority, given that this research is in a field of public policy no interviews were conducted with individual entrepreneurs. This is primarily the result of time restrictions and the financial costs that are involved when attempting to produce a set of results that are representative of the entrepreneurial population given that determinants of continuing entrepreneurship were modelled for 32 Scottish regions. Therefore, future research could attempt to better understand individual determinants, motivations, success and perceived problem factors among individual entrepreneurs across Scottish regions. This would importantly advance theories of entrepreneurship and address the lack of spatial implications within the Entrepreneurship School identified in Chapter 2.

7.6 Concluding Comment

The principal aim and contribution of this research study has been to empirically test and explain regional variation in rates of continuing entrepreneurial activity in Scotland. In particular the role of the regional environment was investigated by testing a number of hypotheses reflecting the socio-economic characteristics of a region. The study identified that continuing entrepreneurship is a regional event reflected by findings which demonstrate regional characteristics including demand, culture, unemployment, human capital, agglomeration and access to finance significantly explain regional rates of continuing entrepreneurial activity. Therefore, given that entrepreneurship is influenced by regional characteristics there is a continued need for enterprise policy and services to reflect the specific characteristics of individual regions given regions are not economically, socially or historically homogenous. As a result the Enterprise Trusts and associated Business Gateway organisation should continue to provide a critical mass of enterprise services that address issues specific to a given region in order to reflect the regional heterogeneity of Scotland's 32 regions.

References

Abreu, M., Grivevich, V. et al. (2008). Absorptive Capacity and Regional Patterns of Innovation, Centre for Business Research, University of Cambridge., University of Cambridge.

Acs, Z. and Varga, A. (2002) Geography, Endogenous Growth and Innovation. *International Regional Science Review*, 25 (1): 132–148.

Acs, Z., Audretsch, D. et al. (2003) The Missing Link: The Knowledge Filter and Endogenous Growth. DRUID Summer Conference 2003 on Creating, Sharing and Transferring Knowledge. The role of Geography, Institutions and Organisations., Copenhagen June 12-14, 2003.

Acs, Z. J. and Armington, C. (2004) The Impact of Geographic Differences in Human Capital on Service Firm Formation Rates. *Journal of Urban Economics*, 56 (2): 244-278.

Acs, Z.J. and Storey, D. (2004) Introduction: Entrepreneurship and Economic Development. *Regional Studies*, 38 (8): 871-877.

Acs, Z.J., Braunerhjelm, P. et al. (2009) The Knowledge Spillover Theory of Entrepreneurship. *Small Business Economics*, 32 (1): 15-30.

Acs Z.J., Mueller, P. (2008) Employment Effects of Business Dynamics: Mice, Gazelles and Elephants. *Small Business Economics*, 30 (1): 85–100.

Adams, J., Khan, H., Raeside, R., and White, D. (2007) *Research Methods for Graduate Business and Social Science Students*, New Delhi: Response Books.

Ahmed, A and McQuaid, R. (2005) Entrepreneurship, Management, and Sustainable Development. *World Review of Entrepreneurship, Management, and Sustainable Development*, 1(1): 6–30.

Aldrich, H (1999) *Organisations Evolving*, London: Sage

Andersson, M. and Koster, S. (2011) Sources of Persistence in Regional Start-Up Rates - Evidence from Sweden. *Journal of Economic Geography*, 11 (1): 179-201.

Aoyama, Y. (2009) Entrepreneurship and Regional Culture: Hamamatsu and Kyoto, Japan. *Regional Studies*, 43 (3): 495-512.

Arauzo-Carod, J. M. and Viladecans-Marsal, E. (2009) Industrial Location at the Intra-Metropolitan Level: The Role of Agglomeration Economies. *Regional Studies*, 43 (4): 545-558.

Armington, C and Acs, Z. (2002) The Determinants of Regional Variation in New Firm Formation. *Regional Studies*, 36 (1): 33-45.

Arrow, K. (1962) The Economic Implications of Learning by Doing. *The Review of Economic Statistics*, 29 (3): 155-173.

Ashcroft, B., Love, J. H. et al. (1991) New Firm Formation in the British Counties with Special Reference to Scotland. *Regional Studies*, 25 (5): 395-409.

Ashcroft, B., Plotnikova, M. et al. (2007) New Firm Formation in British Counties. Centre for Public Policy for Regions. Working Paper No.6: 1-21.

Asheim, B. (1996) Industrial Districts as 'Learning Regions': a Condition for Prosperity. *European Planning Studies*, 4 (4): 379-400.

Audretsch, D. (1993) New Firm Formation Activity in US Manufacturing in Small Business Dynamics: International, National and Regional Perspectives, in Charlie Karlsson. S. B. D. I. (eds), National and Regional Perspectives. London and New York, Routledge Press**:** 40-53.

Audretsch, D. and Fritsch, M. (1994) The Geography of Firm Births in Germany. *Regional Studies*, 28 (4): 359-365.

Audretsch, D and Fritsch, M (1995) The Measurement of Entry Rates. *Empirica*, 22 (2): 159-161.

Audretsch, D. (2002) Entrepreneurship: A Survey of the Literature

Audretsch, D. (2003) Innovation and Spatial Externalities. *International Regional Science Review*, 26 (2): 167-174.

Audretsch, D. and Keilback, M. (2004a) Entrepreneurship Capital and Economic Performance. *Regional Studies*, 38 (8): 949-960.

Audretsch, D. and Keilback, M. (2004b) Entrepreneurship and Regional Growth: An Evolutionary Interpretation. *Journal of Evolutionary Economics*, 14 (5): 605-616.

Audretsch, D. and Keilbach, M. (2004c) Does Entrepreneurship Matter*? Entrepreneurship Theory and Practice*, 28 (5): 419-430.

Audretsch, D. and Keilbach, M. (2005) Entrepreneurship Capital and Regional Growth. *Annals of Regional Science*, 39 (3): 457-469.

Audretsch, D. and Keilbach, M. (2007a) The Localisation of Entrepreneurship Capital: Evidence from Germany. *Papers in Regional Science*, 86 (3): 351-365.

Audretsch, D. and Keilback, M. (2007b) The Theory of Knowledge Spillover Entrepreneurship. *Journal of Management Studies*, 44 (7): 1242-1254.

Audretsch, D. Dohse, D. and Niebuhr, A. (2010) Cultural Diversity and Entrepreneurship: A Regional Analysis for Germany, *Annals of Regional Science*, 45 (1): 55-85.

Aydalot, P. (1986) Milieux Innovateurs en Europe. GREMI, Paris.

Bade, F.J. and Nerlinger, E.A. (2000) The Spatial Distribution of New Technology-based Firms: Empirical Results for West-Germany. *Papers in Regional Science*, 79 (2): 155-176.

Ball, J. (2007) New Firm Formation: Is VAT Registration Data an Accurate Indicator? *Local Economy*, 22 (3): 279–292.

Baltagi, B. (2005) *Econometric Analysis of Panel Data*. Chichester: John Wiley and Sons Ltd.

Braunerhjelm, P (2007) Academic entrepreneurship: Social norms, university culture and policies. *Science and Public Policy*, 34 (9): 619-631.

Bartik, T.J. (1989) Small Business Start-Ups in the United States: Estimates of the Effects of Characteristics of States. *Southern Economic Journal*, 55 (4): 1004-1018.

Baumol W. J. (1990) Entrepreneurship: Productive, Unproductive and Destructive. *Journal of Political Economy*, 98 (5): 892-921.

Baumol W. J. (1993) Formal Entrepreneurship Theory in Economics: Existence and Bounds. *Journal of Business Venturing*, 8 (3): 197-210.

BBC News (2011) New 'Enterprise Zones' Announced Around England. Available at: http://www.bbc.co.uk/news/uk-england-14552193. (accessed 4 February 2012).

Beaudry, C. and Schiffauerova, A. (2009) Who's right, Marshall or Jacobs? The localisation versus urbanisation debate. *Research Policy*, 38 (2): 318-377.

Becattini, G. (1990) The Marshallian Industrial District as a Socio-economic notion, in F. Pyke, G. Becattini and Sengenberger W. (eds) *Industrial Districts and*

Inter-firm Co-operation in Italy, Geneva: International Institute for Labour Studies.

Becker, G.S. (1964) *Human Capital*. Chicago: The University of Chicago Press.

Beesley, M.E. and Hamilton, R.T. (1984) Small Firms' Seedbed Role and the Concept of Turbulence. *Journal of Industrial Economics,* 33 (2)**:** 217–231.

Behrens, K. and Thisse, J.F. (2007) Regional Economics: A New Economic Geography Perspective. *Regional Science and Urban Economics*, 37 (4): 457-465.

Bennett, R. (2008) SME Policy in Britain Since the 1990s: What Have We Learnt? *Environment and Planning C: Government and Policy* 26 (2): p375-397.

Benzing, C., Chu, H. et al. (2009) Entrepreneurs in Turkey: A Factor Analysis of Motivations, Success Factors and Problems. *Journal of Small Business Management*, 47 (1): 58-91.

Beugelsdijk, S. and Noorderhaven, N. (2004) Entrepreneurial Attitude and Economic Growth, A Cross Section of 54 Regions. *Annals of Regional Science*, 38 (2): 199-218.

Binks, M. Ennew, C. and Reed, G. (1988) Small Business and Banks: a two nation perspective, prepared for the Forum of Private Business, UK and the National Federation of Independent Businesses, USA.

Birch, D. L. (1981) Who Creates Jobs. *Public Interest*, 65: 3-14.

Bjørnskov, C and Foss, N.J. (2008) Economic Freedom and Entrepreneurial Activity: Some Cross Country Evidence. *Public Choice*, 134 (3): 307–328

Black, J., de Meza, D., and Jeffreys, D. (1996) House Prices, The Supply of Collateral and the Enterprise Economy, *The Economic Journal*, 106 (434): 60-75.

Blanchflower, D.G. and Oswald, A.J. (1998) What Makes an Entrepreneur? Journal of Labour Economics, 16 (1): 26-60.

Blaug, M. (1985) *Economic Theory in Retrospect*. Cambridge: Cambridge University Press.

Bolton J. E. (1971) Small Firms: Report of the Committee of Inquiry on Small Firms: HMSO, London.

Boshuizen, J., Geurts, P et al. (2009) Regional Social Networks as Conduits for Knowledge Spillovers: Explaining Performance of High-Tech Firms. *Tijdschrift Voor Economische En Sociale Geografie*, 100 (2): 183-197.

Bosma, N. and Schutjens, V. (2007) Patterns of Promising Entrepreneurial Activity in European Regions. *Tijdschrift voor Economische en Sociale Geographie*, 98 (5): 675-686.

Bosma, N, Van Stel, A. et al. (2008) The Geography of New Firm Formation: Evidence from Independent Start-ups and New Subsidiaries in the Netherlands. *International Entrepreneurship and Management Journal*, 4 (2): 129-146.

Bosma, N. and Schutjens, V. (2009) Mapping Entrepreneurial Activity and Entrepreneurial Attitudes in European Regions. *International Journal of Entrepreneurship and Small Business*, 7 (2): 191-213.

Bosma, N. and Schutjens, V. (2011) Understanding Regional Variation in Entrepreneurial Activity and Entrepreneurial Attitude in Europe. *Annals of Regional Science*, 47 (3): 711-742.

Boswell, J. (1973) *The Rise and Fall of Small Firms*. London: Allen and Irwin.

Botham, R and Graves, A. (2011) Regional Variations in New Firm Job Creation: The Contribution of High Growth Start-Ups. *Local Economy*, 26 (2): 95-107.

Boudeville, J. (1966) *Problems of Regional Economic Planning*. Edinburgh: Edinburgh University Press.

Brooksbank, D., Thompson, P., and Williams, R. (2008) Entrepreneurial Attitudes, Intentions and Activities- A Comparison of Urban and Rural Areas in Wales. *International Journal of Entrepreneurship and Small Business*, 6 (3), 421-436.

Brouwer, P., de Kok, J., and Fris, J. (2005) Can Firm Age Account for Productivity Differences? EIM SCALES-paper, N200421, Zoetermeer, Netherlands. Available at: http://www.ondernemerschap.nl/pdf-ez/N200421.pdf. (accessed 2 January.

Brown, R. (2000) Cluster Dynamics in Theory and Practice with Application to Scotland. Regional and Industrial Policy Research Paper, Number 38. Glasgow, University of Strathclyde**:** 1-30.

Brown, R. and Danson, M. (2008) Fresh Talent or Cheap Labour? Accession State Migrant Labour in the Scottish Economy. Scottish Affairs, 64 Summer: 37-52.

Brown, R, and Mason, C. (forthcoming) The Evolution of Enterprise Policy in Scotland. In: Blackburn R, Schaper M (eds). Government, SMEs and Entrepreneurship Development: Policy, Practice and Challenges. Farnham: Gower.

Bruce, D., Deskins, J. et al. (2009) (Small) Business Activity and State Economic Growth: Does Size Matter? *Regional Studies*, 43 (2): 229-245.

Bruyat, C. and Julien, P.A. (2000) Defining the Field of Research in Entrepreneurship. Journal of Business Venturing, 16 (2): 165-180.

Bryman, A. (2006) Integrating quantitative and qualitative research: how is it done? *Qualitative Research*, 6 (1): 97-113.

Bryman, A. (2007) Barriers to Integrating Quantitative and Qualitative Research. *Journal of Mixed Methods Research*, 1 (1): 8-22.

Bryman, A. and Bell, E. (2007) *Business Research Methods*, New York: Oxford University Press.

Bull, A., Pitt, M. et al. (1991) Small Firms and Industrial Districts, Structural Explanations of Small Firm Viability in Three Countries. *Entrepreneurship and Regional Development*, 3 (1): 83-99.

Business Birth Rate Inquiry (2000) The Scottish Business Birth Rate Inquiry 2000. A Strategy for Scotland Discussion Paper: Scottish Enterprise, Glasgow.

Business Birth Rate Strategy (1993) Improving the Business Birth Rate: A Strategy for Scotland: Scottish Enterprise, Glasgow.

Bygrave, W.D. and Hofer, C.W. (1991) Theorizing About Entrepreneurship. Entrepreneurship Theory and Practice, 16 (2): 13-22

Cameron, C. and Trivedi, P. (2010) *Microeconometrics Using Stata*. Texas: Stata Press.

Camagni, R. (1991) *Innovation Networks: Spatial Perspectives*. London/New York: Belhaven Press.

Campbell, A. (1998) VAT Registrations and Deregistrations in Scotland and the UK. Scottish Economic Bulletin 56. Available at: http://www.archive.official-documents.co.uk/document/scotoff/seb/vatreg.htm.(accessed 15 December 2011).

Candau, F. (2008) 'Entrepreneurs' Location Choice and Public Policies: A Survey of the New Economic Geography." *Journal of Economic Surveys*, 22 (5): 909-952.

Capello, R. (2009) Indivisibilities, Synergy and Proximity: The Need for an Integrated Approach to Agglomeration Economies. *Tijdschrift Voor Economische En Sociale Geografie*, 100 (2): 145-159.

Carree, M. (2002) Industrial Restructuring and Economic Growth. *Small Business Economics*, 18 (4): 243–255.

Carree, M., Piergiovanni, R., Santarelli, E., Verheul, I. (2002) Policies Fostering New Firm Formation and Self Employment in Italy: An Empirical Exercise, in J. Leitao and R Baptista (eds.*) Public Polices for Promoting Entrepreneurship: A European Perspective*, Springer, New York

Carree, M.A. and Thurik, A.R. (2008) The Lag Structure of the Impact of Business Ownership on Economic Performance in OECD Countries. *Small Business Economics*, 30 (1): 101-110.

Cassis, Y. and Minoglou, I. (2005). *Entrepreneurship in Theory and History*. London, Palgrave MacMillan.

Casson, M. (1982) *The Entrepreneur: An Economic Theory*. Cheltenham: Edward Elgar.

Casson, M. (1995) *Organisation of International Business*. Aldershot: Edward Elgar.

Casson, M. (2003) *The Entrepreneur: An Economic Theory*. Cheltenham: Edward Elgar

Casson, M. (2005) Entrepreneurship and the Theory of the Firm. *Journal of Economic Behaviour and Organisation*, 58 (2): 327-248.

Casson, M. and Wadeson, N. (2007) The Discovery of Opportunities: Extending the Economic Theory of the Entrepreneur. *Small Business Economics*, 28 (4): 285-300

Chapple, K., Markusen, A. et al. (2004) Rejoinder: High-Tech Rankings, Specialisation, and Relationship to Growth. *Economic Development Quarterly*, 18 (1): 44-49.

Centre for Cities (2011) What Would Maggie Do? A Report by the Centre for Cities on the Effectiveness of Enterprise Zones and future policy options. Available at:http://www.centreforcities.org/assets/files/2011%20Research/11-02-25%20Enterprise%20Zones.pdf. (accessed 18 November 2011).

CFIB (2001) Banking on Entrepreneurship: Results of CFIB Banking Survey.

Cheng, S. and Li, H. (2011) Spatially Varying Relationships of New Firm Formation in the United States. *Regional Studies*, 45 (6): 773–789.

Clarkson, M., and Fink, M et al. (2007) Industrial Clusters as a Factor for Innovative Drive in Regions of Transformation and Structural Change: A Comparative Analysis of East Germany and Poland. *Journal for East European Management Studies*, 12 (4): 340-364.

Clinch, J. P. and O'Neill, E. (2009) Applying Spatial Economics to National Spatial Planning. *Regional Studies*, 43 (2): 157-178.

Cooper, A. C., & Gimeno-Gascon, F. J. (1992). Entrepreneurs, process of founding and new venture performance. In D. Sexton & J. Kasarda (Eds.), The state of the art in entrepreneurship. Boston, MA: PWS Kent Publishing Co.

Cooper, A. C., Gimeno-Gascon, F. J., and Woo, C. Y. (1994) Initial human and financial capital as predictors of new venture performance. *Journal of Business Venturing*, 9 (5): 371–395.

Corbin, J. and Strauss, A. (1990). Grounded theory research: procedures, canons, and evaluative Criteria. *Qualitative Sociology*, 13 (1): 3-21.

Cortright, J. (2006) Making Sense of Clusters: Regional Competitiveness and Economic Development, The Brookings Institute**:** 1-66.

Creswell, J. W. (2003a) *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 2nd Ed, Thousand Oaks, CA: Sage Publications.

Creswell, J.W., Plano Clark, V.L., Gutmann, M.L. & Hanson, W.E. (2003b). Advanced mixed methods research designs. In Tashakkori, A. & Teddlie, C. (Eds). *Handbook of mixed methods in social and behavioural research*. Thousand Oaks, California: Sage.

Creswell, J.W. and Plano Clark, V.L. (2007) *Designing and conducting mixed methods research.* London: Sage Publications Inc.

Cross, M. (1981) *New Firm Formation and Regional Development*. Farnborough: Gower.

Dahl, M and Sorensen, O. (2009) The embedded entrepreneur. *European Management Review*, 6 (3): 172-181.

Daskalopoulou, I. and Liargovas, P. (2008) Entrepreneurship and the Spatial Context: Evidence on the Location of Firm Births in Greece. *Review of Urban & Regional Development Studies*, 20 (3): 179-193.

Davidsson, P. (1995) Culture, Structure and Regional Levels of Entrepreneurship, *Entrepreneurship and Regional Development*, 7 (1): 41-62.

Davidsson, P. and Wiklund, J. (1997) Values, Beliefs and Regional Variations in New Firm Formation Rates. *Journal of Economic Psychology*, 18 (2-3): 179-199.

Davidsson, P., Lindmark, L., and Olofsson, C. (1994) New Firm Formation and Regional Development in Sweden, *Regional Studies*, 28 (4): 395-410.

Dawkins, C. J. (2003) Regional Development Theory: Conceptual Foundations, Classic Works, and Recent Developments. *Journal of Planning Literature*, 18 (2): 131-172.

Department for Business Innovation and Skills (2010) Vince Cable Launches New Entrepreneurs' Forum Available at: http://nds.coi.gov.uk/content/detail.aspx?NewsAreaId=2&ReleaseID=416532&SubjectId=2. (Accessed July 2011).

Department for Business Innovation and Skills (2011) Helping Small Firms Start, Grow and Prosper. Available at: http://www.bis.gov.uk/assets/biscore/enterprise/docs/b/11-515-bigger-better-business-helping-small-firms. (Accessed January 2012).

Derbyshire, J. and Haywood, G. (2010) Labour, the Enterprise Gap and the Red Queen. *Local Economy*, 25 (5-6):494-509.

Desrochers, P. and Sautet, F. (2008) Entrepreneurial Policy: The Case of Regional Specialisation vs. Spontaneous Industrial Diversity. *Entrepreneurship Theory and Practice*, 32 (5): 813-832.

Devins, D. (2009) Enterprise in Deprived Areas: What Role for Start-ups*? International Journal of Entrepreneurship and Small Business*, 8 (4): 486-498.

De Vos, A.S. (2005) Combined quantitative and qualitative approach. In De Vos, A.S., Strydom, H., Fouché, C.B. & Delport, C.S.L. (Eds). *Research at grass roots for the social sciences and human service professions* (3rd ed). Pretoria: Van Schaik.

DfES (2002) *Davies Review: A Review of Enterprise and the Economy in Education*, Department for Education and Skills: HMSO, London.

DTI (2007) *Household Survey of Entrepreneurship 2005*. London: HMSO.

Drucker, P.F. (1985) *Innovation and Entrepreneurship: Practice and Principles*. New York: Harper Business.

Dubini, P. (1989) The Influence of Motivations and Environment on Business Start-ups: Some Hints for Public Policies. *Journal of Business Venturing*. 4 (1): 11-26.

Ebner, A. (2005) Entrepreneurship and Economic Development: From Classical Political Economy to Economic Sociology. *Journal of Economic Studies*, 32 (3): 256-274.

Equinox Mangement Consultants Ltd. (2000) Informal Equity Capital for SMEs: A Review of Literature.

Etzioni, A. (1987) Entrepreneurship, Adaptation and Legitimation: A Macro Behavioural Perspective. *Journal of Economic Behaviour and Organisation*, 8 (2): 175-189

European Commission (2003) Entrepreneurship in Europe. Green Paper, Brussels. Available at:http://www.juntadeandalucia.es/averroes/~emprender/documentos/libro_verde_es piritu_empresarial_europa_ingles.pdf.

Evans, D. and Jovanovic, B. (1989) An Estimated Model of Entrepreneurial Choice Under Liquidity Constraints, *The Journal of Political Economy*, 97 (4): 808-827.

Evans, D. and Leighton, L. (1990) Small Business Formation by Unemployed and Employed Workers. *Small Business Economics*, 2 (4): 319-330.

Feldman, M.P. (2001) The Entrepreneurial Event Revisited: Firm Formation in a Regional Context. *Industrial and Corporate Change*, 10 (4): 861-891.

Figueirdo, O., Guimaraes, P. and Woodward, D. (2002) Home-Field Advantage: Location Decisions of Portuguese Entrepreneurs. *Journal of Urban Economics*, 52 (2): 341-361.

Flick, U. 2006. *An introduction to qualitative research* (3rd ed). London: Sage.

Fortune, A.E. and Reid, W.J. 1999. *Research in social work* (3rd ed). New York: Columbia University Press.

Florida, R. (2002) The Economic Geography of Talent. *Annals of the Association of American Geographers*, 92 (4): 743-755.

Fotopoulos, G., Spence, N. (1999) Spatial Variation in New Manufacturing Plant Openings: Some Empirical Evidence from Greece, *Regional Studies*, 33 (3): 219-229.

Frankfort-Nachmias, C. and Nachmias, D. (1992) *Research Methods in the Social Sciences*, New Delhi: Response Books.

Fraser of Allander Institute (2001) Promoting Business Start-ups: A New Strategic Formula. University of Strathclyde Business School.

Fraser of Allander Institute (2011) Fraser of Allander Institute Economic Commentary. University of Strathclyde Business School. 33, (1),Available at: http://www.strath.ac.uk/media/departments/economics/fairse/backissues/Fraser_of_Allander_Economic_Commentary,_Vol_33,_No_1.pdf.(accessed 2 January 2012).

Fraser of Allander Institute (2011) Fraser of Allander Institute Economic Commentary. University of Strathclyde Business School. 35, (1) Available at: http://www.strath.ac.uk/media/departments/economics/fairse/Latest-Fraser-of-Allander-Economic-Commentary.pdf. (accessed 2 January 2012).

Freeman, J. (1999) Venture Capital as an Economy of Time. in Leenders, R., Gabby, S.M. (eds.) Corporate Social Capital and Liability. Boston, Kluwer Academic Publishing: 460-482.

Freytag, A. and Thurik, R. (2007) Entrepreneurship and its Determinants in a Cross-Country Setting. *Journal of Evolutionary Economics*, 17 (2): 117-131.

Fritsch, M (1992) Regional Differences in New Firm Formation: Evidence from West Germany. *Regional Studies*, 26 (3): 233-241.

Fritsch, M. and Mueller, P. (2007) The Persistence of Regional New Business Formation-Activity over time - Assessing the Potential of Policy Promotion Programs. *Journal of Evolutionary Economics*, 17 (3): 299-315.

Fritsch, M., and Falck, O. (2007) New Business Formation by Industry Over Space and Time: A Multi-Dimensional Analysis. Regional Studies, 41 (2): 157–172.

Fujita, M., Krugman, P. et al. (1999). *The Spatial Economy*, Cambridge, Mass. MIT Press.

Fujita, M. and Krugman, P. (2004) The New Economic Geography: Past, Present and the Future. *Papers in Regional Science*, 83 (1): 139-164.

Fujita, M. and Thisse, J.F. (2009) New Economic Geography: An Appraisal on the Occasion of Paul Krugman's 2008 Nobel Prize in Economic Sciences. *Regional Science and Urban Economics*, 39 (2): 109-119.

Gaile, G. (1980) The Spread-Backwash Concept. *Regional Studies*, 14 (1): 15-25.

Garofoli, G. (1994) New Firm Formation and Regional Development: The Italian Case. *Regional Studies*, 28 (4): 381-393.

Gartner, W.B. (1989) "Who is and Entrepreneur" I the Wrong Question. *American Journal of Small Business*, 12(4): 1-32.

Gatewood, E. and Hoy, F. (1989). Functionalist vs. Conflict Theories: Entrepreneurship Disrupts the Power Structure in a Small Community. Journal of the Community Development Society, 20 (1): 70-83.

Gaygisiz, E. and Kokasal, J. (2003) Regional Variation in New Firm Formation in Turkey: Cross-Section and Panel Data Evidence. Economic Research Centre Working Paper 03/08. Middle East Technical University. Ankara, Turkey. Available at: http://www.erc.metu.edu/menu/series03/0308.pdf.

Gerlach, K. and Wagner, J. (1994) Regional Differences in Small Firm Entry in Manufacturing Industries: 1979-1991. *Entrepreneurship and Regional Development*, 6 (1): 63-80.

Gill, J and Johnson, P. (2002) *Research Methods for Managers*, 3rd Edition, London: Sage Publications.

Glaeser, E.L. Kallal, H., Sheinkman, J. and Schleifer, A. (1992) Growth in Cities. *Journal of Political Economy*, 100 (6): 1126–1152.

Glaeser, E. L. and Kerr, W.R. (2009) Local Industrial Conditions and Entrepreneurship: How Much of the Spatial Distribution Can We Explain? *Journal of Economics & Management Strategy*, 18 (3): 623-663.

Glancey, K.S. and McQuaid, R.W. (2000) *Entrepreneurial Economics*, Hampshire: MacMillan Press Ltd.

Gleave W, Mitra J. (2010) The Spatial Determinants of Entrepreneurship in the Regions of England, 2000–2004. *International Journal of Entrepreneurship and Small Business*, 9 (2): 143–161.

Goodman, E. (1989) Introduction: The Political Economy of the Small Firm in Italy. In *Small firms and Industrial Districts in Italy*, ed. Goodman and J. Bamford, 1-3. London: Routledge.

Gordon, I. and McCann, P. (2000) Industrial Clusters: Complexes, Agglomeration and/or Social Networks? *Urban Studies*, 37 (3): 513-532.

Goulding, C. (2002) *Grounded Theory: A Practical Guide for Management, Business and Market Researchers*, London: Sage Publications.

Granovetter, M. (1985) Economic-Action and Social-Structure-the Problem of Embeddedness. *American Journal of Sociology*, 91 (3): 481-510.

Greene, J. C., Caracelli, V. J. and Graham, W. F. (1989). Towards a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis*, 11 (3): 255-274.

Greene, J.C. & Caracelli, V.J. (2003). Making paradigmatic sense of mixed methods practice. In A. Tashakkori & C. Teddlie, eds. *Handbook of mixed methods in social & behavioural research.* Thousand Oaks, CA: Sage, p.91-110.

Greene, F, Mole, K. and Storey, D.J. (2004) Does More Mean Worse? Three Decades of Enterprise Policy in the Tees Valley. *Urban Studies*, 41 (7):1207-1228.

Greene, W.H. (2007) *Econometric Analysis*. Pearson Education.

Grilo, I. and Thurik, R. (2005) Latent and Actual Entrepreneurship in Europe and the US: Some Recent Developments. *International Entrepreneurship and Management Journal*, 1 (1), 441-459.

Grummitt, J (1980) *Interviewing Skills*, London: Industrial Society.

Guba, E. G. and Lincoln, Y. S. (1994) Competing Paradigms in Qualitative Research. In N. K. Denzin & Y. S. Lincoln (Eds.), Handbook of Qualitative Research (pp. 105-117). London: Sage.

Guesnier, B. (1994) Regional Variations in New Firm Formation in France. *Regional Studies*, 28 (4): 347-358

Gupta, V. and Subramanian, R. (2008). Seven Perspectives on Regional Clusters and the Case of Grand Rapids Office Furniture City. *International Business Review*, 17(4): 371-384.

Harrison, B. (1991) Industrial Districts-Old Wine in New Bottles. *Regional Studies*, 26 (5): 469-483.

Harrison, R., Mason, C., Findlay, A. and Houston, D. (2003) The Attraction and Retention of High Skilled Labour in Scotland: A Preliminary Analysis. Scottish Enterprise, www.scottish-enterprise.com.publications/talentresearch.com.

Haug, P. (1995) Formation of Biotechnology Firms in the Greater Seattle Region: An Empirical Investigation of Entrepreneurial, Financial, and Educational Perspectives. Environment and Planning A, 27 (2): 249-267.

Hausman, J.A. (1978) Specification Test in Econometrics. *Econometrica*, 46 (6): 1251-1271.

Hebert, R., Link, A. (1989) In Search of the Meaning of Entrepreneurship. *Small Business Economics*, 1(1): 39–49.

Henderson, J. V. (1986) Efficiency of Resource Usage and City Size. *Journal of Urban Economics*, 19 (1): 47-70.

Highlands and Islands Enterprise (2011) Highlands and Islands Enterprise Business Plan 2011/14. Available at: http://www.hie.co.uk/about-hie/about-hie/what-we-do.html.

Hirschman, A. (1958) *The Strategy for Economic Development*. New Haven, Connecticut: Yale University Press.

HM Treasury (2005) *Enterprise and Economic Opportunity in Deprived Areas*. London: HM Treasury. Available at: *www.hm-treasury.gov.uk/d/bud05_enterprise_economicopportunity_565.pdf*.

Hoang, H. and Antoncic, B (2003) Network-Based Research in Entrepreneurship - A Critical Review. *Journal of Business Venturing*, 18 (2): 165-187.

Holcombe , R. (2003) The Origins of Entrepreneurial Opportunities. *The Review of Austrian Economics*, 16 (1): 25-43.

Huggins, R. and Williams, N. (2009) Enterprise and Public Policy: A Review of Labour Government Intervention in the United Kingdom. *Environment and Planning C: Government and Policy*, 29 (1): 19-41.

Isbasoiu, G. (2007) Industrial Clusters and Regional Development. The Case of Timisoara and Montebelluna. Prepared for the ERIK Network Conference, Brussels, May 10-11, 2007.

Ivankova, N.V., Creswell, J.W. and Stick, S.L. (2006) Using mixed-methods sequential explanatory design: from theory to practice. *Field Methods,* 18: 3-20.

Ivankova, N.V. and Stick, S.L. (2007). Students' persistence in a distributed doctoral program in educational leadership in higher education: a mixed methods study. *Research in Higher Education,* 48 (1): 93-135.

Iverson, J., Jorgenson, R. et al. (2008) Defining and Measuring Entrepreneurship. *Foundations and Trends in Entrepreneurship*, 4 (1): 4-9.

Jacobs, J. (1969) *The Economy of Cities*. Random House: New York.

Jick, T. D. (1979). Mixing qualitative and quantitative methods: triangulation in action. *Administrative Science Quarterly*, 24 (4): 602-611.

Jogulu, U. D. and Pansiri, J. (2011). Mixed methods: a research design for management doctoral dissertation. *Management Research Review*, 34 (6): 687-701.

Johnson, P, and Conway, C. (1997) How Good are the UK VAT Registration Data at Measuring Firm Births? *Small Business Economics*, 9 (5): 403–409.

Johnson, P, and Parker, S. (1995) Spatial Variations in the Determinants and Effects of Firm Births and Deaths. *Regional Studies*, 30 (7): 679–688.

Johnson, R. and Onwuegbuize, A.J. (2004) Mixed Method Research: A Research Paradigm Whose Time Has Come. *Educational Researcher*, 33 (7): 14-26.

Kaufmann, P.J. and Dant, R.I. (1998) Franchising and the Domain of Entrepreneurship. *Journal of Business Venturing*, 14 (5): 5-16.

Kangasharju, A. (2000) Regional Variations in Firm Formation: Panel and Cross Section Data Evidence from Finland. *Papers in Regional Science,* 79(4), 355-373.

Keeble, D. and Walker, S. (1994) New Firms, Small Firms and Dead Firms: Spatial Patterns and Determinants in the United Kingdom. *Regional Studies*, 28 (4): 411-427.

Keen, M and Smith, S. (2007) VAT Fraud and Evasion: What Do We Know and What Can Be Done? IMF Working Article. Washington, DC: IMF

Kihlstrom, R .E. and Laffont, J.J. (1979) A General Equilibrium Entrepreneurial Theory of Firm Formation Based in Risk Aversion. *Journal of Political Economy*, 87 (4): 719-748.

Kirchhoff, B.A. (1994) Entrepreneurship and Dynamic Capitalism, Westport: Praeger Publishers

Kirzner, I. (1973) *Competition and Entrepreneurship,* Chicago: The University of Chicago Press.

Kirzner, I. (1979) *Perception, Opportunity, and Profit*, Chicago: The University of Chicago Press.

Kirzner, I. (1997) Entrepreneurial Discovery and the Competitive Market Process: An Austrian Approach. *Journal of Economic Literature*, 35 (1): 60-85.

Kitson, M., Martin, R. et al. (2004) Regional Competitiveness: An Elusive yet Key Concept? *Regional Studies*, 38 (9): 991-999.

Klenke, K (2008) *Qualitative Research in the Study of Leadership,* Bingley: Emerald Group Publishing.

Knight F. (1921) *Risk Uncertainty and Profit,* New York: Houghton Mifflin.

Knoben, J. (2009) Localised Inter-Organisational Linkages, Agglomeration Effects, and the Innovative Performance of Firms. *Annals of Regional Science,* 43 (3): 757-779.

Koo, J. and Cho, K. (2011) New Firm Formation and Industry Clusters: A Case of the Drugs Industry in the US. *Growth and Change,* 42 (2): 179-199.

Koestler, A. (1959) *The Sleepwalkers*. *A History of Man's Changing Vision of the Universe*. Middlesex: Penguin.

Krugman, P. (1980) Scale Economies, Product Differentiation, and the Pattern of Trade. *American Economic Review*, 70 (5): 950-959.

Krugman, P. (1991a) *Geography and Trade*. Cambridge: MIT Press.

Krugman, P. (1991b) Increasing Returns and Economic Geography. *Journal of Political Economy,* 99 (3): 483-99.

Krugman, P. (1991c) History and Industry Location - The Case of the Manufacturing Belt. *The American Economic Review,* 81 (2): 80-83.

Krugman, P. (1998) What's New About the New Economic Geography? *Oxford Review of Economic Policy,* 14 (2): 7-17.

Kuhn, T. S. (1970). *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press.

Kuratko, M., Oksoy, D. et al. (1997) Growth Plans of Small Business in Turkey: Individual and Environmental Influences. *Journal of Small Business Management*, 35 (1): 24-33.

Lee, R. and Jones, O. (2008) Networks, Communication and Learning During Business Start-up - The Creation of Cognitive Social Capital. *International Small Business Journal*, 26 (5): 559-594.

Lee, S., Florida, R. et al. (2004) Creativity and Entrepreneurship: A Regional Analysis of New Firm Formation. *Regional Studies*, 38 (8): 879-891.

Lerner, J. and Merges, R. (1998) The Control of Technology Alliances: An Empirical Analysis of the Biotechnology Industry. *Journal of Industrial Economics*, 46 (2): 125–56.

Levie, J. (2009) Enterprise in Scotland: Insights from Global Entrepreneurship Monitor. Report for Scottish Enterprise: Research and Policy. Available at: http://www.scottishenterprise.com/~/media/SE/Resources/Documents/DEF/Enterprise-in-scotland-insights-from-global-monitor.ashx. (accessed 2 January 2012).

Littlechild S.C. and Owen G. (1980) An Austrian Model of the Entrepreneurial Market Process. *Journal of Economic Theory*, 23 (3): 361-379.

Lloyd, P. and Mason, C. (1984) Spatial Variations in New Firm Formation in the United Kingdom: Comparative Evidence from Merseyside, Greater Manchester and South Hampshire. *Regional Studies*, 18 (3): 207-220.

Loasby, B. (1982) The Entrepreneur in Economic Theory. Scottish Journal of Political Economy, 29 (3): 235-245.

Loasby, B. (1990). "Firms, Markets, and the Principle of Continuity." In J.K. Whitaker (ed.), *Centenary Essays on Alfred Marshall*. Cambridge: Cambridge University Press, pp. 108–126.

Love, J.H. (1995) The Measurement of Entry Rates: Reconsideration and Resolution. *Empirica*, 22(2): 151-157.

Love, J.H. and Ashcroft, B. (1999) Market Versus Corporate Structure in Plant-Level Innovation Performance. *Small Business Economics*, 13 (2): 97-109.

Lucas, R (1988) On the Mechanics of Economic Development. *Journal of Monetary Economics*. 22 ():3-42

Lumpkin G.T. and Dess, G.G. (1996) Clarifying the Entrepreneurial Orientation Construct and Linking it to Performance. *The Academy of Management Review*, 32 (1): 135-72.

Malecki, E. (1994) Entrepreneurship in Regional and Local Development. *International Regional Science Review*, 16 (1): 119-153.

Malecki, E. (2009) Geographical Environments for Entrepreneurship. *International Journal of Entrepreneurship and Small Business*, 7 (2): 175-190.

Markusen, A. (1996) Sticky Places in Slippery Space: A Typology of Industrial Districts. *Economic Geography*, 72 (3): 293-313.

Marshall, A. (1890) *Principles of Economics.* London: Macmillan and Co.

Marshall, A. (1919) *Industry and Trade* Volume 1. New York: Cosimo.

Marshall, A. (1920). *Principles of Economics*. 8th ed. London : Macmillan.

Martin, R. (1999) The New Geographical Turn in Economics: Some Critical Reflections. Cambridge, *Journal of Economics*, 23 (1): 65-91.

Martin, R. and Sunley, P. (1996) Paul Krugman's Geographical Economics and its Implications for Regional Development Theory: A Critical Assessment. *Economic Geography*, 72 (3): 259-292.

Martin, R. and Sunley, P. (2003) Deconstructing Clusters: Chaotic Concept or Policy Panacea? *Journal of Economic Geography*, 3 (1): 5-35.

Mason, C. (1991) Spatial Variations in enterprise: The geography of new firm formation. In R. Burrows (ed), Deciphering the enterprise culture: Entrepreneurship, petty capitalism and the restructuring of Britain. New York: Routledge.

Mason, C. (1992) New firm formation and growth. In: Townroe P, Martin R (eds). Regional Development in the 1990s: The British Isles in Transition. London: Jessica Kingsley Publications and the Regional Studies Association. 150–160.

McCann, P. (2002) *Industrial Location Economics*. Cheltenham: Edward Elgar

McDonald, F. and Belussi, F. (2002) Industrial Districts: A State of the Art Review. Project West-East In Industrial Districts Re-Location Processes: Identifying Policies in the Perspective of the European Union Enlargement.

McDonald, F., Huang, Q.H. et al. (2007) Is There Evidence to Support Porter-Type Cluster Policies? *Regional Studies*, 41 (1): 39-49.

McKee, D. (2008) Services, Growth Poles and Advanced Economies. *Service Business*, 2 (2): 99-107.

Merriam, S. B. (1991) How Research Produces Knowledge. In J. M. Peters & P. Jarvis (Eds.), *Adult Education Quarterly*. Lanham, MD: Jossey-Bass.

Michelacci, C. and Silva O. (2007) Why So Many Local Entrepreneurs? *Review of Economics and Statistics*, 89 (4): 615-633.

Morgan, D.L. (1998) Practical strategies for combining qualitative and quantitative methods: applications to health research. *Qualitative Health Research*, 8 (3): 362-376.

Morky, B.W. (1988). *Entrepreneurship and Public Policy*. New York: Quorum Books.

Morrison, A. (2000) Entrepreneurship: What Triggers it? *International Journal of Entrepreneurial Behaviour and Research*, 6 (2); 59-71.

Morrison, A. (2008) Gatekeepers of Knowledge within Industrial Districts: Who They Are, How They Interact. *Regional Studies*, 42 (6): 817-835.

Morse, J.M. (1991) Approaches to qualitative-quantitative methodological triangulation. *Nursing Research*, 40 (2), p.120-123.

Morse, J.M. (2003). Principles of mixed methods and multimethod research design. In A. Tashakkori, & C. Teddlie, eds. Handbook of mixed methods in social & behavioral research. Thousand Oaks, CA: Sage.

Motoyama, Y. (2008) What Was New About the Cluster Theory? What Could It Answer and What Could It Not Answer? *Economic Development Quarterly*, 20 (10): 1-11.

Moulaert, F. and Sekia, F. (2003) Territorial Innovation Models: A Critical Survey. *Regional Studies*, 37 (3): 289-302.

Mueller, P. (2006) Entrepreneurship in the Region: Breeding Ground for Nascent Entrepreneurs? *Small Business Economics, 27* (1), 41-58.

Mueller, P., van Stel, A. et al. (2008) The Effects of New Firm Formation on Regional Development Over Time: The Case of Great Britain. *Small Business Economics*, 30 (1): 59-71.

Myers, R. (1990) *Classical and Modern Regression with Applications*. Boston, MA: Duxbury Press

Myers, D. (1983) Emergence of the American Manufacturing Belt: An Interpretation. *Journal of Historical Geography*, 9 (2): 145-174.

Myrdal, G. (1957) *Economic Theory and Underdeveloped Regions*. London: Duckworth.

Naude, WA, Gries, T, Wood, E and Meintjes, A. (2008) Regional Determinants of Entrepreneurial Start-ups in a Developing Country. *Entrepreneurship and Regional Development*, 20 (2): 111-124.

National Commission for Entrepreneurship (2001) Building Entrepreneurial Networks. Kansas City: Ewing Marion Kauffman Foundation.

National Economic Forum (2009) Productivity- Business and the Business Environment. Scottish Government. Available at: http://www.scotland.gov.uk/Resource/Doc/206963/0091455.pdf.

National Economic Forum (2011) Business Growth- Effective Public Sector Support for Business Growth. Scottish Government. Available at: http://www.scotland.gov.uk/Resource/Doc/919/0117806.pdf.

Newman, P. (1960) The Erosion of Marshall's Theory of Value. *The Quarterly Journal of Economics*, 74 (4): 587-599

Nijkamp, P. (2003) Entrepreneurship in a Modern Network Economy. *Regional Studies*, 37 (4)**:** 395-405.

North, D.C. (1991) Institutions. *Journal of Economic Perspectives*, 5 (1): 97-112.

Nykvist, J. (2008) Entrepreneurship and Liquidity Constraints: Evidence from Sweden. *Scandinavian Journal of Economics*, 110 (1): 23-43.

Nystrom, K. (2008) Regional Institutional Environment and Swedish Regional New Firm Formation. CESIS Electronic Working Paper Series No 142.

O'Cathain, A., Murphy, E. and Nicholl, J. (2007). Why, and how, mixed methods research is undertaken in health services research in England: a mixed methods study. *BMC Health Services Research*, 7: 85.

OECD (2008a) Fostering Entrepreneurship. Paris: OECD.

OECD (2008b) Defining Entrepreneurial Activity: Definitions Supporting Frameworks for Data Collection. Paris: OECD.

OECD (2009) Turin Round Table on the Impact of the Global Crisis on SME & Entrepreneurship Financing and Policy Responses. Issues paper. Turin, Italy, 26–27 March. Available at: http://www.oecd.org/dataoecd/37/4/42514259.pdf (accessed 3 January 2012).

Office for National Statistics (2011) Overview of the Inter-Departmental Business Register (IDBR). Available at: http://www.ons.gov.uk/ons/about-ons/who-we-are/services/unpublished-data/business-data/idbr/index.html.

O'Farrell, P. (1986) Entrepreneurship and Regional Development: Some Conceptual Issues. *Regional Studies*, 20 (6): 565-574.

Okamuro, H and Kobayashi, N. (2006) The Impact of Regional Factors on the Start-Up Ratio in Japan. *Journal of Small Business Management* 44 (2): 310–313.

O'Malley, E. and Van Egeraat, C. (2000) Industry Clusters and Irish Indigenous Manufacturing: Limits of the Porter View. *Economic and Social Review*, 31 (1): 55-79.

Parker, S. (2005) Explaining Regional Variations in Entrepreneurship as Multiple Equilibria. *Journal of Regional Science*, 45 (4): 829-850.

Parker, S. C. (2008) The Economics of Formal Business Networks. *Journal of Business Venturing*, 23 (6): 627-640.

Parr, J. (1999) Growth-Pole Strategies in Regional Economic Planning: A Retrospective View. Part 1. Origins and Advocacy. *Urban Studies*, 36 (7): 1195-1215.

Peneder, M. (2009) The Meaning of Entrepreneurship: A Modular Concept. WIFO Working Paper 335/2009. Vienna: Austrian Institute of Economics Research. Available at: http://www.wifo.ac.at/wwa/jsp/index.jsp?fid=23923&id=35399&typeid=8&display_mode=2 (accessed 3 January 2012).

Penrose, E. T. (1959) The Theory of the Growth of the Firm. New York: John Wiley.

Perroux, F. (1950) Economic Space: Theory and Applications. *Quarterly Journal of Economics*, 64 (1): 89-104.

Phelps, N. (1991) External Economies, Agglomeration and Flexible Accumulation *Transactions of the Institute of British Geographers*, 17(1): 35-46.

Piore, M. and Sabel, C. (1984) *The Second Industrial Divide: Possibilities for Prosperity*. New York: Basic Books.

Plummer, P. and Taylor, M. (2001) Theories of Local Economic Growth (part 1): Concepts, Models, and Measurement. *Environment and Planning*, 33 (1): 219-236.

Poister, T. H. (1978) *Public Program Analysis: Applied Research Methods*. Baltimore: University Park Press

Pope, C., Ziebland, S. and Mays, N. (2000). Qualitative research in health care: analysing qualitative data. *British Medical Journal*, 320 (7227): 114-116.

Porter, M.E. (1990) *The Comparative Advantage of Nations*. New York: Free Press.

Porter, M. E. (1998a) On *Competition*. Boston: Harvard Business School of Publishing.

Porter, M. E. (1998b) Clusters and the New Economics of Competition. *Harvard Business Review*, 77-90.

Porter, M. E. (1998c). The Adam Smith Address. *Business Economics*, 33 (1): 7-13.

Porter, M. E. (2000) Location, Competition, and Economic Development: Local Clusters in a Global Economy. *Economic Development Quarterly*, 14 (1): 15-34.

Pred, A. (1966) *The Spatial Dynamics of U.S. Urban-Industrial Growth, 1800-1914: Interpretive and Theoretical Essays*. Cambridge, Mass: MIT Press.

Ratti, R. (1989) PME, Synergies Locales et Cycles Spatiaux d' Innovation, Working Paper 135, GREMI-Barcelona.

Reid, G.C (1987) *Theories of Industrial Organisation*, Oxford: Basil Blackwell

Reid, G.C and L.R. Jacobsen (1988) *The Small Entrepreneurial Firm*, Aberdeen: Aberdeen University Press.

Reid, G.C (1989) *Classical Economic Growth*, Oxford: Basil Blackwell

Reid, G.C (1992) *The Survival of Small Business Enterprise.* Inaugural lecture of Professor Gavin C. Reid, Department of Economics, University of St Andrews, and Director of the Centre for Research into Industry, Enterprise, Finance and the Firm (CRIEFF). Delivered 1st December1992, in Lower College Hall, Quadrangle, St Salvator's College, North Street.

Reid, G.C. (1993) *Small Business Enterprise*. Routledge: London.

Reid, G.C. (2007) *The Foundations of Small Business Enterprise: An Entrepreneurial Analysis of Small Firm Inception and Growth. Routledge*: London.

Reynolds, P. (1994) Autonomous Firm Dynamics and Economic Growth in the United States, 1986-1990. *Regional Studies*, 28 (4): 429-442.

Reynolds, P. D., Miller, B. et al. (1995) Explaining Regional Variation in Business Births and Deaths. *Small Business Economics*, 7 (5): 389-407.

Reynolds, P., Storey, D. et al. (1994) Cross-National Comparisons of the Variation in New Firm Formation Rates: An Editorial Overview. *Regional Studies*, 28 (4): 343-346.

Richardson, H. (1976) Growth Pole Spillovers: the Dynamics of Backwash and Spread. *Regional Studies*, 10 (1): 1-9.

Richardson, H. (1978) *Regional and Urban Economics*. London: Penguin Books.

Ripsas, S. (1998) Towards an Interdisciplinary Theory of Entrepreneurship. *Small Business Economics*, 10 (2): 103-115.

Ritchie, J. and Spencer, L. (1994) Qualitative data analysis for applied policy research. In A. Bryman, & R.G. Burgess, eds. *Analysing qualitative data.* London: Routledge.

Ritchie, J., Spencer, L. and O'Connor, W. (2003) Carrying out qualitative analysis. In J. Ritchie, & J. Lewis, eds. *Qualitative research practice: a guide for social science students and researchers.* London: Sage, p.219-262.

Ritsila, J. and Tervo, H. (2002) Effects of Unemployment on New Firm Formation: Micro-Level Panel Data Evidence from Finland. *Small Business Economics*, 19 (1): 31-40.

Robbins, D.K., Pantuosco, L.J., Parker, D.F., et al. (2000) An Empirical Assessment of the Contribution of Small Business Employment to US State Economic Performance. *Small Business Economics* 15 (4): 293-302.

Robichaud, Y., McGraw, E. et al. (2001) Toward the Development of a Measuring Instrument for Entrepreneurial Motivation. *Journal of Development Entrepreneurship*, 6 (2): 189-201.

Robson, M.T. (1998) Self-employment in the UK regions. *Applied Economics*, 30 (3): 313-322.

Rocha, H. (2004) Entrepreneurship and Development: The Role of Clusters. *Small Business Economics*, 23 (5): 363-400.

Romer, P. (1986) Increasing Returns and Long-Run Growth. *The Journal of Political Economy*, 94 (5): 1002-1037.

Romero-Martínez, A. M. and Montoro-Sánchez, A. (2008) How Clusters can Encourage Entrepreneurship and Venture Creation. Reasons and Advantages. *The International Entrepreneurship and Management Journal*, 4 (3): 315-329.

Rosenthal, S. S. and Strange, W.C. (2004) Evidence, Nature and Sources of Agglomeration Economies, in Henderson J.V. and Thisse J.F. (Eds) *Handnook of Urban and Regional Economics*: North Holland, Amsterdam.

Ross, A.G., Crossan, K. and Juleff, L. (2012) How Accurate are VAT Registrations as a Measure of Entrepreneurship? A Spatial Analysis of Scotland and its Regions. *Local Economy*, 27 (3): 279-296.

Rubin, H. and Rubin, I. (2005) *Qualitative Interviewing*, London: Sage

Santarelli, E., Carree, M. et al. (2009) Unemployment and Firm Entry and Exit: An Update on a Controversial Relationship. *Regional Studies*, 43 (8): 1061-1073.

Sato, Y., Tabuchi, T. et al. (2012) Market Size and Entrepreneurship. *Journal of Economic Geography*, (Forthcoming).

Saunders, M., Lewis, P. and Thornhill, A. (2009) *Research Methods for Business Students*, Essex: Pearson Education Limited.

Schultz, T. (1959) Investment in Man: An Economist's View, *The Social Science Review*, 33 (2): 69-75.

Schultz, T. (1975) The Value of the Ability to Deal with Disequilibria. Journal of Economic Literature, 13 (3): 827-846.

Schumpeter J. (1934) *The Theory of Economic Development*, Cambridge, Mass: Harvard University Press.

Schutjens, V. and Wever, E. (2000). Determinants of New Firm Success. *Papers in Regional Science, 79* (2): 135-159.

Scottish Chamber of Commerce (2010) Written Evidence Reported to the Economy, Energy and Tourism Committee of the Scottish Parliament as a Contribution to the Committees Report Entitled "A Fundamental Review of the Purpose of an Enterprise Agency and the Success of the Recent Reforms". Scottish Chamber of Commerce. Available at: http://www.scottishchambers.org.uk/userfiles/file/Consultations%202010/EnterpriseReviewFinal%2010%209%2010.pdf.

Scottish Corporate Sector Statistics (2010) *Scottish Corporate Sector Statistics for the Scottish Government*. Available at: http://www.scotland.gov.uk/Resource/Doc/982/0106216.pdf.

Scottish Enterprise (2002) Generating Entrepreneurial Dynamism, A New Approach for the Scottish Enterprise Network, The Strategy Explained, Background to the New Approach: Scottish Enterprise, Glasgow.

Scottish Enterprise (2008) *Enterprise and Economic Growth.* Available at: http://www.scottish-enterprise.com/word-icon-2.gif.

Scottish Enterprise (2011) Scottish Enterprise Business Plan 2011/14. Available at: http://www.scottishenterprise.com/~/media/SE/Resources/Documents/ABC/Business-plan-2011-14-revised-2-june.ashx.

Scottish Executive (2001) A Smart Successful Scotland. Edinburgh: Scottish Government. Available at: http://www.scotland.gov.uk/Resource/Doc/158455/0042945.pdf.

Scottish Government Economic Strategy (2007) Scottish Government Economic Strategy. Available at: http://www.scotland.gov.uk/Resource/Doc/202993/0054092.pdf.

Scottish Government (2008) New Approach to Relocation Policy. Available at: http://www.scotland.gov.uk/News/Releases/2008/01/28103558.

Scottish Government (2009) Urban Rural Classifications. Available at: http://www.scotland.gov.uk/Publications/2009/08/07115535/14.

Scottish Government Economic Strategy (2011) Scottish Government Economic Strategy. Available at: http://www.scotland.gov.uk/Resource/Doc/357756/0120893.pdf.

Shalman, W. A. and Stevenson, H. H. (1992) *The Entrepreneurial Venture Readings*. Boston: Harvard Business School Publications.

Shane, S. and Venkataraman, S. (2000) The Promise of Entrepreneurship as a Field of Research. *Academy of Management Review*, 25 (1): 217–226.

Shane, S. (2003) A *General Theory of Entrepreneurship-The Individual-Opportunity Nexus*. Cheltenham: Edwrad Elgar.

Shane, S. (2009) Why Encouraging More People to Become Entrepreneurs is Bad Public Policy. *Small Business Economics*, 31 (2): 141-149.

Shapero, A. (1984), The entrepreneurial event, Kent, C.A. (ed.) in The Environment for Entrepreneurship, Lexington, Mass: Lexington Books, D.C. Heath and Company: 21-40

Slack, J. (2005) The New Entrepreneur Scholarships: Self-Employment as a Means to Tackle Social Deprivation. *Education and Training*, 47 (6): 447-455.

Sorensen, O., Audia, P. G. (2000) The Social Structure of Entrepreneurial Activity; Geographic Concentration of Footwear Production in the United States 1940–1989. *American Journal of Sociology*, 106 (2): 424-461.

Spilling, O.R. (1996) Regional variation of new firm formation: the Norwegian case, *Entrepreneurship & Regional Development*, 8 (3): 217-244.

Stam, E. (2009): Entrepreneurship, Evolution and Geography. in: Boschma, R. and Martin, R. (eds) The Handbook of Evolutionary Economic Geography. Cheltenham: Edward Elgar.

Sternberg, R. (2009) Regional Dimensions of Entrepreneurship. *Foundations and Trends in Entrepreneurship*, 5 (4): 211-340.

Stock, J. and Watson, M. (2003) *Introduction to Econometrics*. Addison-Wesley.

Storey, D. (1982) *Entrepreneurship and the New Firm*. Croom Helm: London.

Storey, D. (1984) Editorial. *Regional Studies*, 18 (3): 187-188.

Storey D., and Johnson, S. (1987) Regional Variations in Entrepreneurship in the UK. *Scottish Journal of Political Economy*, 34 (2): 161–173.

Storey, D. (1991) The Birth of New Firms-Does Unemployment Matter? A Review of the Evidence. *Small Business Economics*, 3 (3): 167-178.

Storey, D. (2002) *Understanding the Small Business Sector*. London: Thomson Learning.

Strauss, A. and Corbin, J. (1998). *Basic of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*, 2nd Edition, Thousand Oaks, CA: Sage Publications.

Stuart, T. and Sorenson, O, (2003) The Geography of Opportunity: Spatial Heterogeneity in Founding Rates and the Performance of Biotechnology Firms. *Research Policy*, 32 (2): 229-253.

Sutaria, V. (2001) *The Dynamics of New Firm Formation*, Hampshire: Ashgate Publishing Ltd.

Sutaria, V. and Hicks, D. A. (2004) New Firm Formation: Dynamics and Determinants. *Annals of Regional Science*, 38 (2): 241-262.

Swales, J. (1979) Entrepreneurship and Regional Development: Implications for Regional Policy, in MacLennan, D and Parr, J *Regional Policy: Past Experience and New Directions.*

Swinney, J. (2011) Economy, Energy and Tourism Committee Report, Official Report, 2nd Report entitled "A Fundamental Review of the Purpose of an Enterprise Agency and the Success of the Recent Reforms". The Scottish Parliament. Available at: http://www.scottish.parliament.uk/s3/committees/eet/reports-11/eer11-02-01.htm.

Tamasy, C. (2006). Determinants of Regional Entrepreneurship Dynamics in Contemporary Germany: A Conceptual and Empirical Analysis. *Regional Studies*, 40 (4): 365-384.

Tamasy, C. and Le Heron. R. (2008) The Geography of Firm Formation in New Zealand. *Tijdschrift Voor Economische En Sociale Geografie*, 99 (1): 37-52.

Tashakkori, A. and Teddlie, C. (1998). *Mixed Methodology: Combining Qualitative and Quantitative Approaches*, Thousand Oaks, CA: Sage Publications.

Tashakkori, A. and Creswell, J. W. (2007). Exploring the nature of research questions in mixed methods research. *Journal of Mixed Methods Research*, 1 (3): 207-211.

Teddlie, C. and Tashakkori, A. (2009) *Foundations of Mixed Methods Research.* London: Sage.

Tervo, H. (2008) Self-Employment Transitions and Alternation in Finnish Rural and Urban Labour Markets. *Papers in Regional Science*, 87 (1), 55-76.

Turney, K., Clampet-Lundquist, S., Edin, K., Kling, J.R. and Duncan, G.J. (2006) Neighbourhood effects on barriers to employment: results from a randomized housing mobility experiment in Baltimore. *Brookings-Wharton Papers on Urban Affairs* pp. 137–187.

US Department of Commerce (2007) Economic Development America. Available at: http://www.eda.gov/ImageCache/EDAPublic/documents/pdfdocs2007/edamericasummer2007_2epdf/v1/edamericasummer2007.pdf.

Valliere, D. and Peterson, R. (2009) Entrepreneurship and Economic Growth: Evidence from Emerging and Developed Countries. *Entrepreneurship and Regional Development*, 21 (5&6): 459-480.

Van der Panne, G and Van Beers, C. (2006) On the Marshall-Jacobs Controversy: It takes two to Tango. Industrial and Corporate Change, 15 (5): 877-891.

Van der Zwan, P., Verheul, I., Thurik, R. (2011) Entrepreneurial Progress: Climbing the Entrepreneurial Ladder in Europe and the United States. *Regional Studies*. (Forth coming)

Van Praag, C. M. (1999) Some Classic Views on Entrepreneurship. *De Economist*, 147 (3): 311-335.

Van Praag, C.M. and Versloot, P.H. (2007) What is the Value of Entrepreneurship? A Review of Recent Research, *Small Business Economics* 29 (4): 351-382.

Van Stel A, Suddle, K. (2008) The Impact of New Firm Formation on Regional Development in the Netherlands. *Small Business Economics*, 30 (1): 31–47.

Verheul I, Carree M, Santarelli, E. (2009) Regional Opportunities and Policy Initiatives for New Venture Creation. *International Small Business Journal*, 25 (5): 608-625.

Wagner, J. and Sternberg, R. (2004) Start-up Activities, Individual Characteristics, and the Regional Milieu: Lessons for Entrepreneurship Support Policies from German Micro Data. Annals of Regional Science, 38 (2): 219-240.

Wang, S. W. (2006) Determinants of New Firm Formation in Taiwan. *Small Business Economics*, 27 (4-5): 313-321.

Weber, A. (1929) *Theory of the Location of Industries.* London: University of Chicago Press.

Wennekers, S. and Thurik, R. (1999). Linking Entrepreneurship and Economic Growth. *Small Business Economics*, 13 (1): 27-55.

Whittington, R.C. (1984) Regional Bias in New Firm Formation in the UK, *Regional Studies*, 18 (4): 253-256.

Wilkinson, D. & Birmingham, P. 2003. *Using research instruments: a guide for researchers*. London: Routledge Falmer.

Williams, N. and Williams, C. (2011) Tackling Barriers to Entrepreneurship in a Deprived Urban Neighbourhood. *Local Economy*, 26 (1): 30-42.

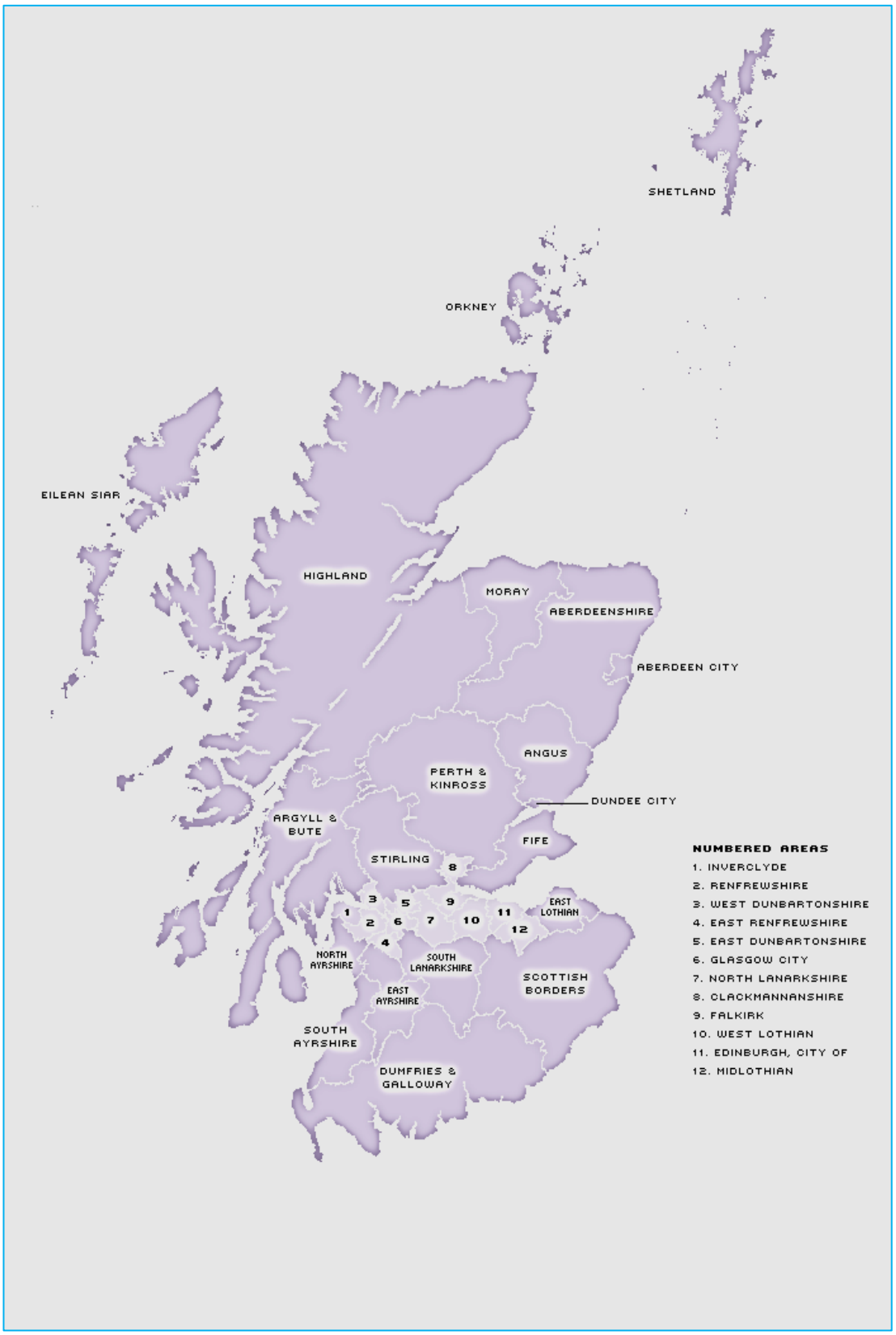
Wilson, L. (2011) Economy, Energy and Tourism Committee Report, Official Report, 2nd Report entitled "A Fundamental Review of the Purpose of an Enterprise Agency and the Success of the Recent Reforms". The Scottish Parliament. Available at: http://www.scottish.parliament.uk/s3/committees/eet/reports-11/eer11-02-01.htm.

Wooldridge, J.M. (2006) *Introductory Econometrics: A Modern Approach*. Ohio: Thomson-South-Western.

Yang, C.H., Huang, C.H. (2005) R&D, Size and Firm Growth in Taiwan's Electronics Industry. *Small Business Economics*, 25 (5): 477–487.

Appendices

Appendix A. Map of Scotland's 32 local authorities.



Appendix B. Copy of the email attachment sent to local authorities

Andrew G. Ross
Lecturer in Economics
Edinburgh Napier University

Regional Determinants of Continuing Entrepreneurial Activity in Scotland.

This aim of this study is to investigate the role of entrepreneurship within Scotland in an attempt to identify the key determinants that underpin its development and hence the contribution of entrepreneurship to the Scottish economy.

The role of the regional environment was investigated by testing a number of hypotheses reflecting the local socio-economic characteristics of a region and the extent to which these factors are able to explain variation in rates of continuing entrepreneurial activity.

On the basis of the quantitative results a series of supporting qualitative interviews are now being undertaken across Scotland's 32 local authorities in order to add validity to the statistical findings and gain a more advanced understanding about the influence of those variables in the context of Scottish entrepreneurship.

I plan to interview a number of local authority representatives (hopefully, two from each local authority where possible) and these interviews would take place at a time convenient to you and would last one hour maximum.

All interviews and responses will be treated confidentially and the research results made available on request once the study is complete.

Contact:

Andrew Ross
Edinburgh Napier University
Phone: 0131 455 4627
Email: a.ross2@napier.ac.uk

Appendix C. Semi-structured Interview Guide

General question before addressing the specific determinants identified by the quantitative analysis.

1. What do you believe the key determinants of continuing entrepreneurship are?

2. In your opinion how important are local demand conditions in explaining regional variation in continuing entrepreneurial activity?

Strongly Disagree ☐ Disagree ☐ Not Sure ☐ gree ☐ ongly Agree ☐

Please explain your answer

3. To what extent do you believe Scotland has low rates of continuing entrepreneurship relative to the UK and other similar smaller sized countries?

Strongly Disagree ☐ Disagree ☐ Not Sure ☐ gree ☐ ongly Agree ☐

Please explain your answer

4. How important are role models for growing small firms?

Strongly Disagree ☐ Disagree ☐ Not Sure ☐ gree ☐ ongly Agree ☐

Please explain your answer

5. How important do you believe education is in terms of continuing entrepreneurial activity?

Strongly Disagree ☐ Disagree ☐ Not Sure ☐ gree ☐ ongly Agree ☐

Please explain your answer

6. To what extent do you believe unemployment has a negative impact on levels of continuing entrepreneurial activity?

Strongly Disagree ☐ Disagree ☐ Not Sure ☐ gree ☐ ongly Agree ☐

Please explain your answer

7. How important do you believe access to finance is for continuing entrepreneurial activity?

Strongly Disagree ☐ Disagree ☐ Not Sure ☐ gree ☐ ongly Agree ☐

Please explain your answer

8. Do you believe the current government policy of implementing enterprise zones are a good way of generating economic agglomeration given the benefits associated with agglomeration and entrepreneurial activity?

Strongly Disagree ☐ Disagree ☐ Not Sure ☐ gree ☐ ongly Agree ☐

Please explain your answer

Appendix D. Rates of Continuing Entrepreneurial Activity for Scottish Regions, 1998-2007.

	Total Population	Working Age Population	Business Stock
Aberdeen City	29.12	42.52	9.96
Aberdeenshire	31.71	48.81	7.09
Angus	20.02	31.77	7.34
Argyll & Bute	24.76	39.31	6.52
Clackmannanshire	18.16	27.89	10.71
Dumfries & Galloway	22.04	35.47	5.67
Dundee City	17.57	27.08	10.72
East Ayrshire	17.72	27.51	8.32
East Dunbartonshire	19.19	29.93	9.86
East Lothian	21.21	34.04	8.75
East Renfrewshire	20.40	32.42	9.93
Edinburgh, City of	30.84	44.76	11.65
Eilean Siar	23.16	37.51	6.03
Falkirk	18.61	28.49	10.85
Fife	18.09	28.01	9.31
Glasgow City	26.91	40.21	12.38
Highland	28.95	45.24	6.96
Inverclyde	15.10	23.45	10.97
Midlothian	19.00	29.46	9.71
Moray	18.78	29.41	6.30
North Ayrshire	16.56	25.88	9.06
North Lanarkshire	17.13	26.01	11.67
Orkney Islands	30.56	48.10	4.04
Perth & Kinross	28.10	44.77	7.46
Renfrewshire	20.06	30.61	10.50
Scottish Borders	27.32	43.75	6.70
Shetland Islands	29.59	45.92	5.12
South Ayrshire	22.35	35.50	8.62
South Lanarkshire	21.45	32.87	10.22
Stirling	31.62	48.54	9.32
West Dunbartonshire	12.58	19.37	10.04
West Lothian	22.30	33.41	11.94

Appendix E. Summary of Results and Alternative Estimation Techniques.

	OLS			Fixed Effect[1]			Random Effect[1]		
Independent Variable	TP	WP	ECO	TP	WP	ECO	TP	WP	ECO
Demand and Supply factors									
Wage Growth	-0.056	-0.088	0.003	-0.023	-0.038	-0.008	-0.023	-0.038	-0.004
	(0.045)	(0.067)	(0.012)	(0.027)	(0.042)	(0.008)	(0.026)	(0.040)	(0.009)
Population Growth	1.230	1.681	0.944	1.186	1.582	0.342	1.180	1.567	0.554
	(0.496)**	(0.743)**	(0.137)***	(0.633)*	(0.954)*	(0.195)*	(0.573)**	(0.862)*	(0.157)***
Unemployment Rate (log)	-6.116	-9.284	1.964	-0.565	-1.109	0.160	-1.761	-2.952	1.115
	(1.153)***	(1.729)***	(0.319)***	(1.437)	(2.223)	(0.516)	(1.144)	(1.771)*	(0.373)**
Human Capital	0.062	0.104	0.050	0.117	0.184	0.023	0.107	0.167	0.034
	(0.049)	(0.074)	(0.013)***	(0.042)**	(0.657)**	(0.014)	(0.040)**	(0.062)**	(0.013)**
Access to Finance	0.046	0.074	0.018	0.085	0.132	0.026	0.079	0.123	0.018
	(0.040)	(0.060)	(0.011)*	(0.041)**	(0.062)**	(0.013)*	(0.039)**	(0.059)**	(0.011)
Agglomeration factors									
Specialisation Economies (Manufacturing)	0.910	1.231	0.137	0.191	0.292	0.061	0.268	0.408	0.033
	(0.545)*	(0.817)	(0.150)	(0.394)	(0.597)	(0.145)	(0.368)	(0.559)	(0.122)
Specialisation Economies (Business Services)	1.416	0.862	1.766	-0.994	-1.591	-0.653	-0.111	-0.559	0.761
	(1.276)	(1.914)	(0.353)***	(1.610)	(2.488)	(0.478)	(1.776)	(2.694)	(0.472)
Urbanisation Economies	0.002	0.003	0.004	0.008	0.014	0.005	0.002	0.003	0.006
	(0.004)***	(0.007)***	(0.001)**	(0.010)	(0.016)	(0.005)	(0.009)**	(0.001)**	(0.002)**
Policy and cultural factors									
Size of Public Sector Workforce	-0.109	-0.161	-0.006	0.015	0.022	-0.005	-0.003	-0.003	-0.016
	(0.059)*	(0.089)*	(0.016)	(0.037)	(0.057)	(0.016)	(0.035)	(0.001)	(0.014)
Small Business Population	0.711	1.173	-0.299	0.671	1.021	0.345	0.804	1.309	-0.305
	(0.093)***	(0.140)***	(0.025)***	(0.479)	(0.729)	(0.160)**	(0.212)***	(0.321)***	(0.054)***
Constant	-33.67	-57.75	29.082	-45.02	-68.50	-25.67	-52.24	-85.64	32.77
	(10.20)***	(15.30)***	(2.824)***	(44.42)	(67.79)	(14.36)*	(19.51)**	(29.60)***	(5.397)***
F-value	22.60***	24.66***	74.94***	3.70***	3.90***	2.12**	56.50***	61.33***	149.64***
R^2	0.42	0.44	0.70	0.08	0.04	0.14	0.37	0.40	0.68
N	320	320	320	320	320	320	320	320	320

Significance at the 0.01, 0.05 and 0.10 level indicated by ***, ** and *. (1) Robust standard error used to correct for heteroscedasticity.

TP =dependent variable standardised by total population, WP = dependent variable standardised by working population, ECO = dependent variable standardised by existing business stock.

Appendix F. Model elaboration through inclusion of time effects.

Model[1]	**Model 6 TP**	**Model 7 WP**	**Model 8 BS**
Estimation Technique	RE[2]	RE[2]	RE[2]
Independent Variable			
Demand and Supply factors			
Wage Growth	-0.016 (0.026)	-0.027 (0.040)	-0.001 (0.087)
Population Growth	**0.755 (0.401)****	**0.953 (0.518)***	**0.368 (0.130)****
Unemployment Rate (log)	-2.246 (1.553)	**-3.618 (2.380)***	0.476 (0.456)
Human Capital	**0.114 (0.0459)****	**0.175 (0.070)****	**0.040 (0.014)****
Access to Finance	**0.089 (0.032)****	**0.134 (0.050)****	0.022 (0.019)
Agglomeration factors			
Specialisation Economies (Manufacturing)	0.284 (0.329)	0.433 (0.507)	0.050 (0.109)
Specialisation Economies (Business Services)	-0.165 (1.210)	-0.119 (1.858)	0.604 (0.373)
Urbanisation Economies	**0.001 (0.001)***	**0.002 (0.001)***	**0.006 (0.002)****
Policy and cultural factors			
Size of Public Sector Workforce	-0.018 (0.042)	-0.027 (0.064)	-0.021 (0.013)
Small Business Population	**0.656 (0.207)*****	**1.105 (0.312)*****	**-0.351 (0.048)*****
Year 1999	-0.804 (0.665)	-1.210 (1.026)	-0.440 (0.222)
Year 2000	-1.613 (0.682)**	-2.491 (1.052)**	-0.765 (0.227)***
Year 2001	-2.565 (0.745)***	-3.735 (1.147)***	-1.249 (0.243)***
Year 2002	-2.385 (0.780)**	-3.416 (1.201)**	-1.287 (0.255)***
Year 2003	-1.271 (0.899)	-1.714 (1.386)	-0.735 (0.295)**
Year 2004	-2.095 (1.047)**	-2.984 (1.611)*	-0.949 (0.337)**
Year 2005	-2.399 (1.029)**	-3.457 (1.582)**	-1.229 (0.325)***
Year 2006	-2.272 (1.035)**	-3.385 (1.591)**	-1.376 (0.327)***
Year 2007	1.573 (1.052)	2.443 (1.617)	0.295 (0.333)
Constant	-36.62 (19.99)*	-63.92 (30.18)***	38.88 (4.829)***
F-value	148.65***	145.54***	287.52***
R^2	0.42	0.44	0.72
N	320	320	320

Significance at the 0.01, 0.05 and 0.10 level indicated by ***, ** and *.

(1) TP =dependent variable standardised by total population, WP = dependent variable standardised by working population, BS = dependent variable standardised by existing business stock.
(2) Robust standard error used to correct for heteroscedasticity.

Appendix G. Interviewee Job Titles

	Job Title within Local Authority
1.	Economic Development Officer
2.	Economic Development Officer
3.	Business Advisor
4.	Principal Economic Development Officer
5.	Senior Economic Development Officer
6.	Head of Economic Development
7.	Head of Economic Development & Planning
8.	Principal Economic Development Officer
9.	Economic Development Officer
10.	Development Officer
11.	Head of Economic Development
12.	Economic Development Officer
13.	Economic Development Officer
14.	Economic Development Officer
15.	Economic Development Officer
16.	Principal Development Officer
17.	Senior Economic Development Officer
18.	Lead Economic Development Officer
19.	Lead Officer for Business Gateway Services
20.	Senior Development Officer
21.	Principal Economic Development Officer
22.	Development Officer
23.	Head of Economic Development
24.	Economic Development Officer
25.	Senior Development Officer
26.	Principal Economic Development Officer
27.	Senior Economic Development Officer
28.	Development Officer
29.	Principal Economic Development Officer
30.	Economic Development Officer
31.	Senior Economic Development Officer
32. 33. 34. 35. 36. 37. 38. 39.	Economic Development Officer Senior Economic Development Officer Principal Economic Development Officer Development Officer Senior Economic Development Officer Economic Development Officer Head of Economic Development Economic Development Officer

Appendix H. Population Growth for Scottish Regions, 1998-2007

West Lothian	1.00
East Lothian	0.64
Stirling	0.54
Perth & Kinross	0.52
Falkirk	0.46
Aberdeenshire	0.41
Edinburgh, City of	0.41
Scottish Borders	0.41
Highland	0.33
Fife	0.32
East Renfrewshire	0.21
South Lanarkshire	0.10
Clackmannanshire	0.08
North Lanarkshire	0.05
Midlothian	0.03
Orkney Islands	0.01
Dumfries & Galloway	-0.03
Argyll & Bute	-0.03
Moray	-0.08
Angus	-0.10
North Ayrshire	-0.15
South Ayrshire	-0.17
East Ayrshire	-0.24
Glasgow City	-0.30
East Dunbartonshire	-0.35
Renfrewshire	-0.39
West Dunbartonshire	-0.42
Shetland Islands	-0.43
Aberdeen City	-0.55
Inverclyde	-0.66
Dundee City	-0.68
Eilean Siar	-0.81

Appendix I. Unemployment rate for Scottish Regions, 1998-2007

Glasgow City	9.94
North Ayrshire	8.87
East Ayrshire	8.84
Dundee City	8.76
West Dunbartonshire	8.56
North Lanarkshire	7.77
Inverclyde	7.76
Clackmannanshire	7.30
South Ayrshire	6.98
Fife	6.97
Eilean Siar	6.92
Falkirk	6.47
Renfrewshire	6.34
South Lanarkshire	6.14
Stirling	5.72
Dumfries & Galloway	5.61
Argyll & Bute	5.47
Angus	5.45
Edinburgh, City of	5.41
Highland	5.29
West Lothian	5.27
Aberdeen City	4.76
Moray	4.74
Midlothian	4.54
East Lothian	4.46
Perth & Kinross	4.39
East Dunbartonshire	4.37
East Renfrewshire	4.22
Scottish Borders	4.17
Shetland Islands	3.86
Orkney Islands	3.66
Aberdeenshire	3.56

Appendix J. Percentage of Population with NVQ4+ in Scottish Regions, 1998-2007

East Dunbartonshire	44.87
Edinburgh, City of	44.64
East Renfrewshire	43.92
Stirling	36.98
Aberdeen City	36.36
Perth & Kinross	35.08
Glasgow City	33.63
Argyll & Bute	31.64
Renfrewshire	30.46
South Ayrshire	30.26
South Lanarkshire	30.26
Aberdeenshire	29.54
Eilean Siar	29.10
Dundee City	29.03
North Ayrshire	28.81
Fife	28.55
Clackmannanshire	28.43
East Lothian	28.38
Angus	28.23
Inverclyde	27.81
Highland	27.79
Midlothian	26.74
Dumfries & Galloway	26.59
West Lothian	26.56
Scottish Borders	25.99
Moray	25.65
North Lanarkshire	25.60
West Dunbartonshire	25.39
Shetland Islands	24.73
Falkirk	24.71
Orkney Islands	24.68
East Ayrshire	22.41

Appendix K. House Price Growth in Scottish Regions, 1998-2007

Glasgow City	11.34
East Ayrshire	11.23
Aberdeenshire	10.98
East Lothian	10.96
Renfrewshire	10.66
Aberdeen City	10.53
Midlothian	10.36
Fife	10.36
Angus	10.33
Inverclyde	10.30
West Dunbartonshire	10.28
South Ayrshire	10.15
Argyll & Bute	10.14
Orkney Islands	10.04
Dumfries & Galloway	10.00
Dundee City	9.80
Clackmannanshire	9.77
East Dunbartonshire	9.75
North Lanarkshire	9.69
Scottish Borders	9.68
Edinburgh, City of	9.68
Eilean Siar	9.61
Moray	9.60
South Lanarkshire	9.59
Highland	9.28
Stirling	9.22
Falkirk	9.07
North Ayrshire	8.98
East Renfrewshire	8.83
Perth & Kinross	8.81
West Lothian	8.53
Shetland Islands	8.50

Appendix L. Specialisation Economies in the Manufacturing Sector for Scottish Regions, 1998-2007

Eilean Siar	1.86
Shetland Islands	1.72
Orkney Islands	1.35
West Dunbartonshire	1.24
South Lanarkshire	1.21
Falkirk	1.20
West Lothian	1.19
Renfrewshire	1.15
Midlothian	1.13
North Lanarkshire	1.10
East Ayrshire	1.08
Highland	1.06
Moray	1.06
Fife	1.06
Scottish Borders	1.06
Dundee City	1.04
Glasgow City	1.03
Aberdeen City	1.02
East Lothian	1.01
Angus	0.99
North Ayrshire	0.98
Aberdeenshire	0.97
Dumfries & Galloway	0.97
Inverclyde	0.97
East Dunbartonshire	0.89
Argyll & Bute	0.87
Perth & Kinross	0.83
South Ayrshire	0.80
East Renfrewshire	0.78
Clackmannanshire	0.76
Stirling	0.75
Edinburgh, City of	0.73

Appendix M. Specialisation Economies in the Business Services Sector for Scottish Regions, 1998-2007

Aberdeen City	1.55
Edinburgh, City of	1.46
East Renfrewshire	1.21
East Dunbartonshire	1.19
Stirling	1.17
Aberdeenshire	1.14
West Lothian	1.04
East Lothian	1.01
Inverclyde	1.00
Glasgow City	1.00
Clackmannanshire	0.97
Perth & Kinross	0.97
Midlothian	0.97
Renfrewshire	0.94
Fife	0.93
Dundee City	0.93
South Ayrshire	0.89
Angus	0.88
South Lanarkshire	0.87
Falkirk	0.83
Scottish Borders	0.82
North Ayrshire	0.75
North Lanarkshire	0.75
Highland	0.73
Moray	0.72
East Ayrshire	0.68
West Dunbartonshire	0.67
Argyll & Bute	0.64
Dumfries & Galloway	0.51
Orkney Islands	0.45
Shetland Islands	0.42
Eilean Siar	0.36

Appendix N. Population Density for Scottish Regions, 1998-2007

Glasgow City	3310
Dundee City	2432
Edinburgh, City of	1709
Aberdeen City	1135
North Lanarkshire	686
Renfrewshire	661
East Dunbartonshire	616
West Dunbartonshire	586
Inverclyde	523
East Renfrewshire	513
Falkirk	491
West Lothian	372
Clackmannanshire	304
Fife	265
Midlothian	226
South Lanarkshire	172
North Ayrshire	154
East Lothian	133
East Ayrshire	95
South Ayrshire	92
Angus	50
Stirling	39
Moray	39
Aberdeenshire	36
Perth & Kinross	26
Dumfries & Galloway	23
Scottish Borders	23
Orkney Islands	20
Shetland Islands	15
Argyll & Bute	13
Eilean Siar	9
Highland	8

Appendix O. Wage Growth for Scottish Regions, 1998-2007

Eilean Siar	6.32
East Renfrewshire	5.49
Clackmannanshire	5.40
Midlothian	5.30
Highland	4.99
East Lothian	4.92
Moray	4.71
Aberdeenshire	4.65
North Lanarkshire	4.62
East Dunbartonshire	4.57
Angus	4.55
Argyll & Bute	4.50
Dundee City	4.39
Dumfries & Galloway	4.39
South Lanarkshire	4.35
East Ayrshire	4.32
West Dunbartonshire	4.28
Renfrewshire	4.23
Edinburgh, City of	4.12
Perth & Kinross	4.07
Fife	3.84
North Ayrshire	3.77
Scottish Borders	3.71
Stirling	3.68
Shetland Islands	3.46
Glasgow City	3.45
Aberdeen City	3.29
West Lothian	3.00
Inverclyde	2.99
Falkirk	2.98
South Ayrshire	2.81
Orkney Islands	1.10

Appendix P. Percentage of the Workforce Employed in the Public Sector for Scottish Regions, 1998-2007

Eilean Siar	38.06
Shetland Islands	34.68
East Dunbartonshire	34.53
Orkney Islands	33.00
Dundee City	32.33
West Dunbartonshire	32.03
Argyll & Bute	31.92
East Renfrewshire	31.52
Glasgow City	30.78
Edinburgh, City of	30.15
Inverclyde	29.93
Highland	29.75
Midlothian	29.70
Moray	28.72
Angus	28.38
South Lanarkshire	28.19
Stirling	28.08
Fife	27.99
North Lanarkshire	27.49
South Ayrshire	27.49
East Ayrshire	27.18
East Lothian	27.15
Renfrewshire	27.10
Clackmannanshire	26.80
North Ayrshire	26.59
West Lothian	25.97
Dumfries & Galloway	25.93
Scottish Borders	24.90
Perth & Kinross	24.60
Falkirk	24.38
Aberdeen City	23.93
Aberdeenshire	20.80

Appendix Q. Percentage of Existing Businesses Classified as Small for Scottish Regions, 1998-2007

Orkney Islands	96.50
Aberdeenshire	96.46
Argyll & Bute	94.87
Scottish Borders	94.76
Eilean Siar	94.67
Dumfries & Galloway	94.35
Shetland Islands	94.33
Highland	93.86
Angus	93.29
East Lothian	93.01
East Renfrewshire	92.54
Perth & Kinross	92.32
Fife	92.14
Moray	91.93
East Dunbartonshire	91.39
South Lanarkshire	90.85
North Ayrshire	90.30
East Ayrshire	90.25
Edinburgh, City of	89.95
Midlothian	89.70
South Ayrshire	89.09
Stirling	88.75
Glasgow City	88.48
Clackmannanshire	87.88
North Lanarkshire	87.50
West Lothian	85.88
Aberdeen City	85.69
Renfrewshire	85.38
Falkirk	85.37
Inverclyde	85.18
West Dunbartonshire	84.55
Dundee City	82.50