# *Small firms and local economic recovery: the case of Britain's depleted communities*

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# Small Firms and Local Economic Recovery: The Case of Britain's Depleted Communities

by

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## Abstract

This research aims to contribute to a better understanding of the small firm sector's role in bringing about employment growth at the community level. The study begins by focusing on the new prominence of the small firm and the reasons for this. Part of this new prominence relates to the apparent ability of the small firm sector to generate a disproportionately large number of jobs when compared to the large firm sector. This ability has in turn led to speculation that small firms could play an important role in regional development. However, the literature reporting on small firms and the literature reporting on changes in the economy send mixed signals with respect to the potential of the small firm sector as an instrument of regional development. As a result, it is relevant to ask whether small firms can lead recovery in communities recently depleted by above average employment losses.

In seeking an answer to this question the research focuses on Great Britain. There are several reasons for this choice. First, since the 1980s, many researchers in Great Britain have studied the small firm sector; as a result, there is a substantial knowledge base including a sound understanding of the environmental factors that influence rates of new firm formation. Second, Great Britain has simultaneously experienced both growth and decline as its regional economies exhibit substantial variation; consequently, issues of regional development are important there. Third, during the 1980s the new prominence of the small firm received a considerable boost from promotion of the enterprise culture by successive Thatcher governments. Fourth, Great Britain's small firm sector exhibited exceptional growth over the 1980s when the population of VAT registered firms increased substantially. Therefore the British experience should be an important indicator of the potential of the small firm sector to lead recovery.

Using the NOMIS data base and other sources, each community in Great Britain was classified as occupying an environment that was either most conducive, least conducive or indeterminate with respect to its influence on the rate of new firm formation. It was then shown that the majority of depleted communities in Great Britain occupied environments that were among the least conducive to new firm formation. Consequently, for the majority of Britain's depleted communities, small firm led recovery would require a

robust small firm sector that was capable of overcoming the limitations imposed by unfavorable environmental conditions.

The research also showed that in recovering communities there was virtually no association between rates of firm formation and rates of net FTE employment change. This result strongly suggests that many recovering communities relied on other sources of employment change for their recoveries. An analysis of employment changes in recovering and non-recovering depleted communities revealed the very important role played by the manufacturing sector. In recovering communities the manufacturing sector acted as a "stabilizer" which made it possible for the contributions of new small firms to be observed.

Together these findings suggest that in communities experiencing substantial losses in manufacturing employment, government policies which are intended to stimulate recovery by emphasizing entrepreneurship would be more effective if at least some resources were directed toward stabilizing employment in the manufacturing sector. In other words, even though new small firms created many new jobs, differences between depleted communities that recovered and depleted communities that did not recover are not well explained by variations in the number of jobs created by new small firms. Rather, the differences appear to be better accounted for by the abatement of manufacturing job losses in some communities (those that recovered) and the continuation of manufacturing job losses in others (those that did not recover).

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# THE NEW PROMINENCE OF THE SMALL FIRM

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## Introduction

**Since the work of Birch (1979), there has emerged what might be termed an era of new prominence for small firms. According to this, small firms in the US played a dominant role in generating new employment in the mid 1970s. Similar studies in the United Kingdom, Europe, and New Zealand have confirmed that in many countries small firms have become net creators of jobs at a time when large firms have been net losers (Storey and Johnson, 1987).**

**In both the US and the UK research has shown that 'technology based firms' have demonstrated a significant capacity for job generation and it has been the younger (and, at least initially, smaller) firms within this category that appear to have generated jobs at the highest rates (Rothwell, and Zegveld, 1982). Research also shows that small firms have been able to exert a positive influence on levels of innovation within their host industries and these small firms are themselves important vehicles for product innovation (Acs and Audretsch, 1990). Strategies based on technology and innovation bear an important relationship to job creation. Innovation and technology increase the possibilities of establishing *new markets* and they stimulate *import replacements*; in turn, these outcomes reduce employment displacement effects, thereby maximising the level of *net* employment gained from jobs created by the small firm sector (Johnson, P., 1986). *So the new prominence of smaller firms portrays the sector as a key source of job growth in many countries.***

**Other studies contributing to the new prominence have measured the changing proportions in the number of large firms to small firms in many modern economies. For example, Loveman and Segenberger (1990) have**

demonstrated a noticeable shift in recent years toward greater numbers of small enterprises in many developed countries. Observations such as these suggest that the small firm sector is thriving in contemporary economic conditions. Research shows that small firms represent a very large proportion of the population of all firms; for example, at least 95% of all businesses in *all* countries of the European Community can be regarded as being small (Storey, D., 1994). In fact, small and medium sized enterprises (SMEs) appear to have increased in *both* their numbers and their shares of employment in *most* advanced economies (Stanworth and Gray, 1991).

Findings such as these have led to a re-evaluation of the contribution small firms might make to an economy. *So, the new prominence has also come to mean recognition of the increased share of economic growth that comes directly from this sector.* New prominence in this sense brings about a 'change' in attitude towards the small firm sector (Gibb, 1987). The change in attitude is by no means confined to the academic community; evidence of it can be found in other quarters as well:

> "The biggest change coming over the world of business is that firms are getting smaller. The trend of a century is being reversed. Until the mid-1970s the size of firms everywhere grew: The numbers of self-employed fell...Now it is the big firms that are shrinking and the small ones are on the rise. The trend is unmistakable - and business and policy makers ignore it at their peril."(Economist, January 21, 1989)

Governments and their international agencies have also contributed to, and been affected by, the new prominence of the small firm. In Britain between 1965 and 1980 the number of parliamentary expressions of interest in small business rose from 1 to 120 (Levicki, 1984). As early as 1971 the Bolton Commission reported the findings of its inquiry into small firms in the UK.

In the US, Congress passed its Economic Policy Act of 1980 commissioning the US Small Business Administration to create the Small Business Data Base. The Commission of European Communities initiated studies to compare job creation in small and medium sized enterprises in various European countries (1985). *These actions and others indicated a shift in thinking. In the past, governments and their advisers had emphasised the importance of large firms* (Galbraith, 1967). Now, more of their attention is being directed toward the small firm sector; *so in this sense as well, the prominence of the small firm is new.*

*Government responses to the SME sector during the 1980s both reflected and contributed to the new prominence of the small firm. Nowhere has this been more evident than in the UK.* The UK case offers a particularly clear example of a national government expressing its commitment to the small firm sector. The Thatcher governments' numerous schemes to promote and support an 'enterprise culture' operated throughout the 1980s. Small business was a centre-piece of the enterprise culture rhetoric. During the decade successive governments in the UK introduced more than one hundred measures to promote the small business sector (Karlsson, Johannisson and Storey, 1993). The attention devoted to this family of issues has undoubtedly influenced public opinion. For example, recent research indicates that the British public is now receptive to the idea of a stronger small firm sector (Stanworth and Gray, 1991). Britain is one of the clearest examples of a country where the new prominence of the small firm *included* active government support for the SME sector.

Considering the difficult economic problems governments have been facing it is easy to understand why they were more receptive to small firms during the 1980s. Particularly in the US and the UK, where governments were forced to deal with heavy job losses in ever weakening old line industries (Hirst and Zeitlin, 1989), news of a new economic engine could not have been more timely. So at least part of the increased emphasis placed on the small firm sector by these governments is a reflection of coincident decline elsewhere in the economy.

## The Influence of De-industrialisation On The New Prominence Of The Small Firm

Many of the world's most advanced countries have been undergoing a process of industrial decline which, by most accounts, began in the early 1970s (Reich, 1983; Laxer, 1987; Martin and Rowthorn, 1988). In most of these cases job losses within the *large* firm sector have been particularly heavy. One common and immediate effect of this kind of decline, as implied earlier (p. 5), has been the creation of mass unemployment and a demand for jobs. But the adjustments larger firms are making have had *other* effects, also.

At the very least, the rise in prominence of the small firm sector has been *amplified* by a coincident decline of large scale industry. These coincident changes are not confined to a single country. Using data from the UK, France and Germany, Keeble and Wever (1986) reports a consistent continuum in the rate of employment change and size of manufacturing firms. Since the rise in prominence of the small firm sector is based, at least in part, on its increasing share of total employment, the coincident decline of employment in larger firms has made the rise of the small firm sector appear all the more dramatic. At the same time, the coincident decline raises the possibility that actual growth in the small firm sector may be more apparent than real. *In fact, in an environment where large firms are shedding jobs, the share of total employment to be found in small firms would increase even if the small firm sector was dormant.* Indeed, it has been argued that this is exactly what happened to employment in UK manufacturing between 1980 and 1983 (Storey and Johnson, 1990). Furthermore, the growing share of manufacturing employment accounted for by the small establishment sector may also be caused, in part, by the reduced ability of these establishments to grow out of the small establishment sector (Johnson, 1989A).

As a further example of this *amplification* effect, consider large firm adjustments, like externalisation. In recent years large firms have increasingly sub-contracted (externalised) business functions previously performed in-house (Gibb, 1987 ). In theory, actions like these could explain why many new small firms have been formed. However, empirical work, by Mason (1989B) in manufacturing, and by Milne (1989) in electronics, offers little support for the externalisation thesis. Nonetheless the importance of this phenomenon cannot be dismissed, for as Keeble (1990A) points out, evidence of externalisation may lie elsewhere - in the service sector for instance (see Jones-Evans and Kirby, 1995).

Another type of adjustment emanating from large firms is 'fragmentation' (Shutt and Wittington, 1987). Like externalisation large firm fragmentation may also account for the emergence of some new small firms. Either or both adjustments (externalisation and fragmentation) would amplify the share of employment accounted for by the small firm sector. Furthermore, in either case the process would lead to actual growth in the number of jobs provided by small firms. However, taking either adjustment into account would necessarily *lower* any estimate of the *net impact* that new small firms have had on total employment change. That is, under either the externalisation or the fragmentation thesis jobs are being *redistributed* not *created.*

When many large firms cease operations or substantially reduce their labour forces there are *other indirect effects* that ultimately would lead to the new prominence of the small firm. For instance, in a depressed region one of the basic incentives often used to attract new development is the availability of labour. However, when large firms from *many* different regions are down sizing in a struggle to survive, an abundant supply of labour is *no longer* a feature that is unique to the depressed regions. Furthermore, under such circumstances, the number of expansions involving new branch plants will almost certainly diminish. From the perspective of the depressed regions this means that the number of opportunities to attract inward investment also diminishes. It can be argued that *the declines experienced by the large firm sector have affected conventional approaches to regional development so that strategies like inward investment receive less emphasis.*

As external solutions to internal problems have disappeared, increasingly regional policies in Europe have emphasised the *indigenous* potential of regions and have sought ways to stimulate their entrepreneurial potential (Keeble, 1986). Similar responses are evident in North America (Savoie, 1986). *Here again the case provided by the UK is one of the most interesting because of the scale of de-industrialisation experienced in that country throughout the 1970s and 1980s (Martin and Rowthorn, 1988).*

## De-Industrialisation In The UK

There is a body of literature (Martin and Rowthorn, 1988; Allen and Massey, 1990; Blackaby, 1979; Artis, 1992; Lever, 1987) which attempts to trace both the decline of industry in the UK and shifts in the country's relative standing among developed nations over the twenty-five year period between the mid 1960s and 1990. A key concept within this literature is 'de-industrialisation'. Many definitions for the term de-industrialisation have been forged through varying usage; realistically, it has become a family of terms; among the more prominent meanings are:

1.De-industrialisation is a process which begins with an *absolute decrease* in the number of individuals who earn their living by working in the 'production industries' of mining, manufacturing, construction, or public utilities (Martin, and Rowthorn, 1988).

2.De-industrialisation is a decline in the *proportion* of all employees who earn their living by working in the industrial sector (Martin, and Rowthorn, 1988).

3.De-industrialisation means a progressive failure to achieve a sufficient surplus of manufactured exports over imports to keep the economy in external balance (Keeble, 1987).

Regardless of which definition is used, the UK qualifies as a nation undergoing de-industrialisation. Between 1966 and 1983 its manufacturing sector shed 3.14 million jobs or 37% of its 1966 total. In 1966 the manufacturing sector's share of the country's total employment was 36.9%, in 1985 it was 25.8%. The progressive failure of UK manufactured exports to grow as fast as manufactured imports led, in 1983, to the UK's *first* balance of payments deficit in manufactured goods since the industrial revolution (Keeble, 1987).

An even broader definition of de-industrialisation is provided by Rhodes (1988) who suggests that de-industrialisation occurs when a nation fails to secure a rate of growth of output and net exports (of all kinds) which is sufficient to achieve full employment (Rhodes, 1988). By including references to full employment Rhodes' definition introduces the concept of "jobless growth", that is, increases in output accompanied by static or even decreasing employment. Under this definition also, the UK economy is found to be experiencing de-industrialisation.

One of the most salient features of UK de-industrialisation has been the scale of employment change that occurred in the manufacturing sector. Job losses in this sector during the 1970s and 1980s can only be described as *massive*. Moreover, when considered spatially, the distribution of these losses has been uneven. One way this imbalance manifests itself is in terms

Table 1.1

Changes in Manufacturing Employment 1980-91

| | Absolute Change | Percentage |
|---|---|---|
| North | -1,192,000 | -30% |
| South | -776,000 | -25% |

Source Artis, 1992

of a "North-South divide". Table 1.1 shows that in the UK the North has had to absorb a much larger share (almost 60%) of these losses in manufacturing employment.

Although the process of de-industrialisation (particularly employment losses in the manufacturing sector) has been underway since the late 1960s there is evidence to demonstrate its acceleration during the Thatcher years (Rhodes, 1988). Table 1.2 shows that for the first part of the 1980s decline was heaviest in the North.

Table 1.2

Percentage Change in Manufacturing Employment 1979-84

| Region | % Change |
|---|---|
| South East | -17.5% |
| East Anglia | -14.5% |
| South West | -16.7% |
| West Midlands | -28.5% |
| East Midlands | -19.7% |
| Yorkshire Humberside | -28.0% |
| North West | -29.0% |
| North | -29.8% |
| Wales | -33.0% |
| Scotland | -27.7% |

Source: Martin and Rowthorn, 1988

**While the 1980s saw *continued* industrial decline in the UK, nationally this was a period of growth. In aggregate, service sector employment growth did much to off-set employment losses in manufacturing. But, at the regional and community levels the situation was more turbulent.**

**Unfortunately, for those areas of the UK suffering most from employment *losses* in manufacturing, employment *growth* in services occurred elsewhere and did not off-set the losses. A comparison of Table 1.1 with Table 1.3 illustrates this at the broadest spatial scale.**

Table 1.3

Changes in Non -Manufacturing Employment 1980-91

| | Absolute Change | Percentage Change |
|---|---|---|
| North | 877,000 | 10.1% |
| South | 1,488,000 | 15.7% |

**Source: Artis, 1992**

**The combined effects of *heavier losses* in manufacturing employment and comparatively *weaker growth* in service sector employment have helped establish the case for a north - south divide in the UK. These occurrences may be linked to the UK's small firm sector in several ways.**

**There are at least three theoretical connections between de-industrialisation and the new prominence of small firms in the UK. The first is a strategic link. Much of the preceding account is negative and relies**

heavily on data to 'trace' rather than 'explain' the decline in the UK's position as a 'workshop of the world'. When explanations of the decline *are* provided, the accounts frequently make reference to the growing openness of the UK economy and the increasing competition which British manufacturers have had to face. Among the underlying causes of these changes were improvements in communication technologies (such as satellite and computer technologies) and improvements in transportation (such as containerisation and long haul jumbo aircraft). These changes made possible both offshore competition and globally distributed manufacturing. A second and closely related trend that also continues to contribute to the increased openness of the UK economy is the growing number of firms throughout the world that are becoming multi-national. Growth in the number and size of multinationals has been a two edged sword for the UK economy. On the one hand, UK firms faced stiffer competition as offshore firms entered their markets. On the other, as more UK firms assumed a multinational character, they exported jobs! For example, between 1979 and 1986 the forty largest UK firms made redundant 415,000 domestically based workers; at the same time they created 125,000 jobs abroad (Hamilton, 1991). Furthermore, global competition was not limited to the manufacturing sector; the same forces have also been felt in the service sector. For instance, during the 1980s London witnessed a marked increase in the number of foreign-owned producer service firms operating there (Cooke, 1989).

The lesson for UK firms (both large *and* small) was that they *must* be competitive. This in turn suggests that for those firms facing competition, 'strategy' would be a key factor in determining their success. As Cooke (1989) points out, it is not only firms but whole communities that have felt the brunt of global competition. These ideas are developed further in Chapter 2.

A second theoretical link between de-industrialisation in the UK and the new prominence of small firms is provided by the idea of "recession pushed entrepreneurs" (Storey, 1991). Here the argument is that for those individuals who have lost their jobs, or for others who have become frustrated by the lack of opportunity provided by their employment, the prospect of starting their own businesses becomes increasingly attractive. Thus, as the economy loses jobs, the supply of *potential entrepreneurs* rises and with this increase, presumably, there is a corresponding increase in the number of new small firms (Storey, 1988). However, empirical work in the UK suggests the need for a more complex model. Hamilton (1989) found that as unemployment rose rapidly, evidence of the pushed entrepreneur diminished. Other empirical research in the UK shows that many new firms in the sub-category of business services have been started for more *positive reasons;* that is, firms in these sub-categories have been started in order to seize opportunities of better financial rewards or to achieve more personal autonomy (Keeble, Bryson and Wood, 1991). Nonetheless, programmes like the Enterprise Allowance Scheme have operated within the UK throughout the 1980s and their success lends some support to the idea of recession pushed entrepreneurs.

A third link between the new prominence of the small firm and de-industrialisation is made through regional development. It has been argued here that de-industrialisation and the closely-related phenomenon of large firm decline have increased the need for successful regional development. These changes have also led to a new emphasis on indigenous growth in regional development policies and less reliance on inward investment. The UK represents a case where the linkages between de-industrialisation, regional development, and the new prominence of the small firm are very strong. In particular the timing, scale, and location of job losses associated with de-industrialisation have worked together to create both a very real need for action, and a perception about the relative importance of the small firm sector (Keeble and Wever, 1986). In these circumstances regional development policies have come to emphasise the importance of indigenous development. Therefore, one effect of de-industrialisation and the decline of older, larger firms has been to raise the profile of the small firm sector in regional development. However, before developing this theme for the UK context there are some examples of small firm led regional development in other countries that should be considered.

## Small Firms And Regional Development

The new prominence of small firms has not escaped the notice of those concerned with issues of regional development. Speculation about the importance of small firms as tools for regional development has become a feature of the small firm literature. In particular, attention has been focused on the issue of whether small firms *can* lead regional development?

There *is* some clear evidence that supports the idea that they can. For instance, well documented cases such as Northern Italy (Brusco, 1986) or Mondragon in Spain (MacLeod, 1986) confirm that small firms have contributed importantly to the development of these regions. But while these reports strengthen the case for small firm led regional development they by no means seal it.

It can be argued that northern Spain and northern Italy are special cases. In these regions complex sets of factors may have combined to produce unusual environments and perhaps it is because of these conditions that small firms have flourished. Arguments of this sort do not deny the *existence* of 'small firm led regional development', but they do raise doubts about its *efficacy*. That is, such arguments tend to emphasise the milieu as a factor of key importance and they imply that it may be very difficult or even impossible to repeat these successes in other environments. But perhaps there is other evidence which *can establish* the efficacy of small firm led regional development.

In addition to particular cases there is a more general argument that springs from the new prominence of the small firm itself. This argument builds on the fact that many national economies have more new small firms than they had twenty years ago and that in recent years only the small firm sector has been a net creator of jobs. Based upon their recent performance it might be concluded that small firms are particularly well suited to thrive under contemporary economic conditions. That is, perhaps the small firm is the right economic vehicle for the prevailing economic conditions. In this argument considerable emphasis is placed on the nature of the small firm itself as opposed to the milieu in which the small firm must operate. As the evidence for this kind of argument is drawn from several countries it suggests that small firms are effective over a range of conditions which in turn implies that they are likely to be effective tools for regional development. However, that conclusion requires a considerable leap of faith, for while it may be true that small firms are flourishing, it could be that small firms are only flourishing in the more prosperous areas of each country whilst the need for regional development often exists in less prosperous areas. So while the proposition that small firms are effective tools of regional development cannot be dismissed it requires further support if it is to be convincing.

## Small Firms And Regional Development In The UK

For several reasons the UK represents a particularly interesting case for the study of small firms and regional development in the 1980s. Throughout the country the impacts of job losses (strongly associated with de-industrialisation) and the impacts of job creation (strongly associated with service sector growth) have been experienced in different regions. As a consequence, for some areas of the country, the issue of regional development is one of how to bring work to the workers.

The UK has also been a rich source of SME research. The new prominence can be linked to growth of a specialised body of literature which has the small firm as its object of study. This literature both accounts for, and is itself a manifestation of, the new prominence of the small firm. Research in this field has attempted to measure the contributions or impacts made by small firms on the economies in which they operate. A good deal of the work tends to be descriptive, relying on counts of firms, jobs, start-ups, failures, innovations and so on. Many articles in this literature illustrate a particular theme - spatial variations in small firm performance; and a particular methodology - one which might be described as " the spatial geographical studies approach". Possibly some of these articles were motivated in part by government policies; policies ostensibly meant to stimulate small firm growth and promote an enterprise culture (Barkham, 1987). A clear sense of the importance of small firms in the UK is gained from this literature.

In aggregate the small firm sector in the UK was certainly active throughout the 1980s. For instance, between 1980 and 1990 UK businesses registering for VAT increased by 420,000 (Daly, 1991A). It is estimated that between 1980 and 1988 285,000 new businesses were added to the population and by 1988 provided 1,270,000 jobs (Keeble 1990B) while the number of self-employed increased by almost 70% (or 1.5 million) between 1979 and 1990 (Stanworth and Gray, 1991). Although these figures are impressive the small firm sectors of some other countries have out performed the UK's small firm sector, at least with respect to their share of GDP. But, while the phenomenon of growth in the sector has been common to many countries, nowhere has the change been more dramatic than in the UK (Stanworth and Gray, 1991). Perhaps this is because at the outset of the era of small firm growth the UK small firm sector was disproportionately small when compared with other industrial economies. Indeed in 1971, the Bolton Committee described the UK as more dependent on large firms than any of its international competitors (Bolton, 1971). So in the UK there was a smaller base from which to build and this has amplified the rate of change.

The importance of the UK small firm sector to net job creation in the 1980s is illustrated by the fact that between 1987 and 1989, 68.8% of the net increase in employment came from firms with fewer than 100 employees and 46.4% came from firms with fewer than 10 employees (Daly, M., Campbell, M., et. al., 1992). Other research has concluded that between 1985 and 1987 *virtually all* net employment growth in the UK came from small businesses with fewer than 20 employees (Gallagher, Daly and Thomason, 1990). As these figures demonstrate, over the decade the small firm sector has been an important source of net employment growth in the UK.

Possibly inspired by spatial variations in the need for jobs, considerable research work into small firms has focused on the spatial distribution of new firm formations. Studies of this sort are referred to here as spatial geographical studies[1] because of the methodology employed. Since most new firms are small and it is small firms that have provided a substantial share of job growth throughout the 1980s, any indications of spatial variation in new firm formation are assumed to imply related variations in the prospects for small firm job creation and ultimately net employment growth. A similar assumption, in terms of their long run impact, has been made by Mason (1991) in his studies of the spatial variations of new firm formation rates.

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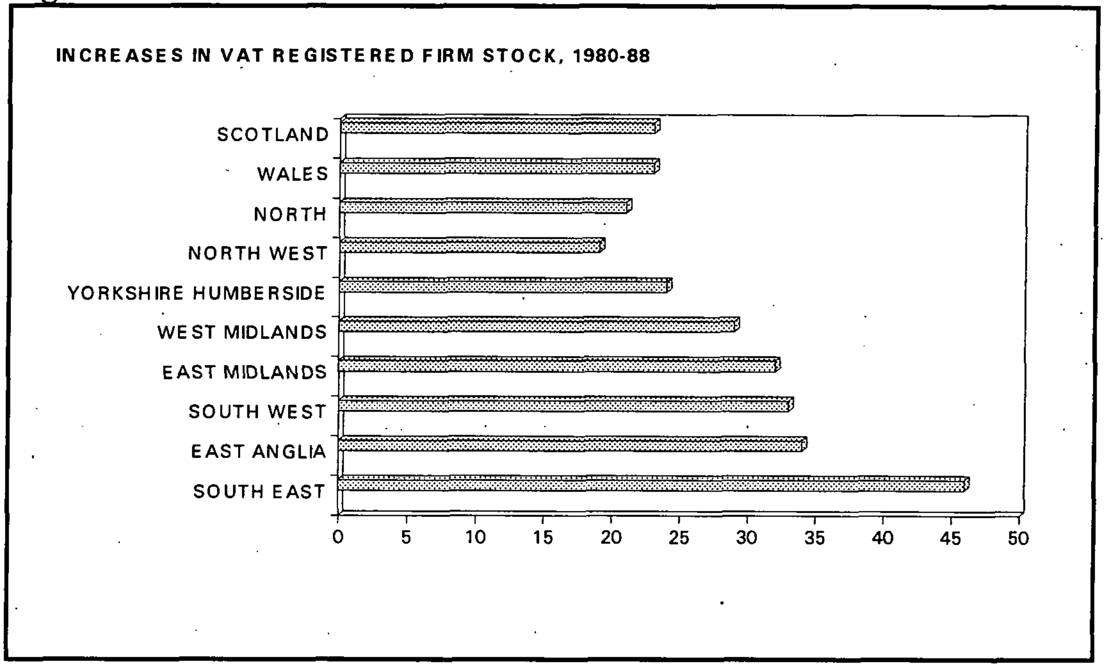
[1]Studies by Storey, Westhead, Birley, O'Farrel, Mason and others have drawn samples of firms from two or more geographic regions and compared their small firm sectors on one or more measures of performance. The November 1984 issue of Regional Studies provides several examples of spatial geographical studies.

Spatial geographical studies at the regional level demonstrate considerable differences in small firm formation rates. Figure 1.1 shows rates of change in VAT registered firm stock between 1980 and 1988 by region. It reveals

Figure 1.1

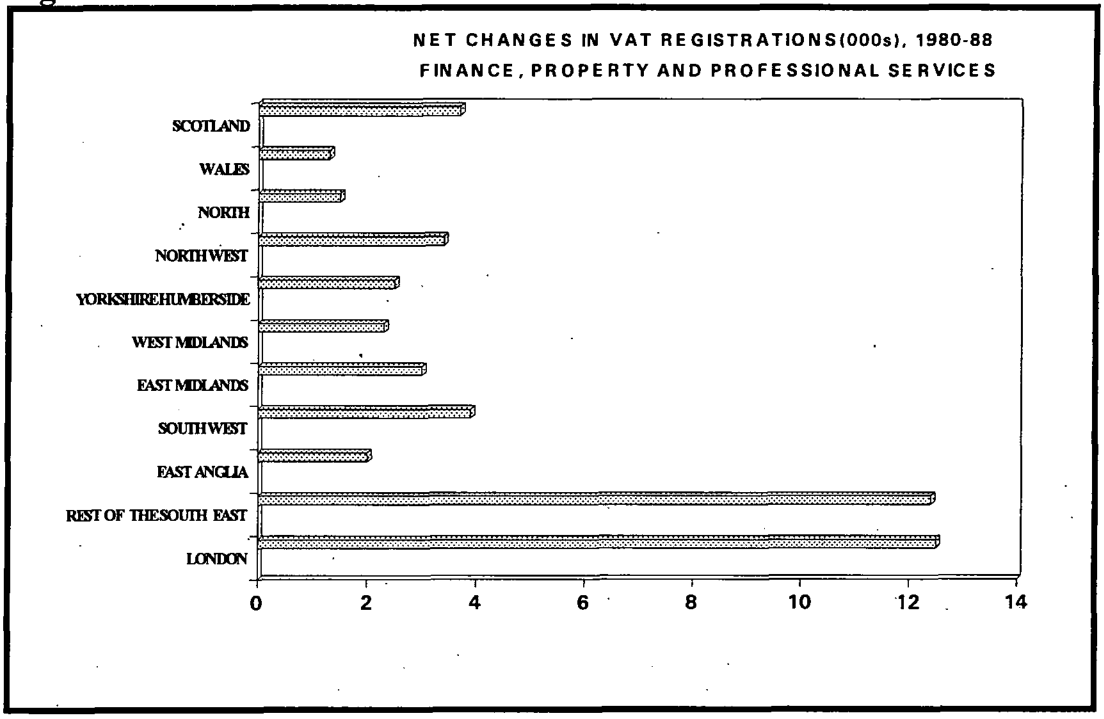



Source: Artis, 1992

that the South East led the country over the period and in aggregate the 'South' out performed the 'North' in terms of net firm population growth per region .

It is known that parts of the service sector have exhibited particularly strong growth throughout the decade. When comparisons are confined to the parts of this sector which have been growing rapidly, *similar* spatial variations to those displayed in Figure 1.1 are evident. Figure 1.2 compares the regions in terms of net changes in the number of firms registered for one of the fastest growing sectors - the service areas of finance, property and professional services. The Northern region and Wales are seen to be particularly weak while the South East shows comparatively massive growth. It would appear, then, that while small firms were increasing, in number and in the numbers they employed, they were not responding as vigorously in those regions hardest hit by the declines in manufacturing employment. In fact, research by Mason (1989A) suggests that there are

Figure 1.2




Source: Keeble, 1990A

even spatial variations in the numbers of *successful* firms and, like the variations in rates of formation, they favour the more prosperous regions. Results such as these have led to criticisms in the literature (Barkham, 1987; Storey, 1982) of UK government policies designed to promote small firms and entrepreneurship. The case made has been that the prevailing *aspatial* policies designed to promote small firm development, *will increase regional disparities rather than reduce them.*

Comparative studies of small firms have speculated 'on the reasons' for such observed differences in formation rates and performance over space. Factors (characteristics of the regions) seen to exert some influence on small firm performance and formation rates were identified and the regions ranked on several of the characteristics to develop an index of entrepreneurship (Storey, 1982). The index ranked each region of the UK with East Anglia as the highest and the lowest being the Northern region followed by Wales. Studies by Westhead (1990) and Sweeney (1987) have taken similar approaches. More recently, research into factors believed to account for some of the differences in small firm formation rates has been reviewed by Mason (1991). He divides the factors into three broad categories of influence as follows:

1. Structural Differences - a key factor identified in this work is the proportion of total employment in small and medium sized enterprises. As this proportion increases so does the rate of new firm formation. {It is worth noting that Wittington (1984) found this factor to be of relatively minor importance};

2. Socio-Cultural Differences - the stock of individuals with technical, professional or managerial skills has a positive influence on the formation of new firms. That is, areas with higher concentrations of people possessing these skills tend to have higher rates of new firm formation;

3. Economic - two key factors in this category are access to capital and presence of market opportunities. Several studies have used surrogates for these attributes when direct measurement was impossible. Both factors are positive influences; that is, rates of new firm formation tend to be high when the level of either factor is above average.

As Mason (1991) points out, the determinants of new enterprise are complex and poorly understood but variations in the above listed factors may account for some of the variation in small firm formations.

**Reynolds (1993) has observed that many of those regional characteristics identified as influencing small firm performance are difficult to change through public policy. In other words, it is unclear whether the regional characteristics that might be considered shortcomings *could* be altered. Research like this raises doubts about whether small firms can overcome certain *limiting characteristics* of their local economic environments. So is it reasonable to assume that UK small firms can lead regional development? On this issue the small firm literature sends mixed signals.**

## Aims and Objectives

**During the early 1980s many communities in the United Kingdom had to cope with a heavy round of job losses. For these 'depleted' communities the question of whether small firms can lead regional development may be refined to the following: Can small firms lead economic 'recovery' by restoring in the country's depleted communities, jobs lost in the recent past? Recovery is a special case - a subset of the regional development issue. The question this research attempts to answer, therefore, is: *How important were small firms as instruments of recovery in the 1980s?* On the issue of recovery, even less is known about the importance of small firms.**

**Much of the research into the new prominence of small firms is descriptive. As a consequence, explanations as to *why* small firms are increasingly important are *not provided* and in some cases they are *not even implied.* In this chapter it has been demonstrated that the coincident phenomenon of de-industrialisation, particularly in the UK, has contributed to the new prominence of the small firm in several ways:**

**1. The spatial unevenness of job losses and the contraction of many large firms have helped shift the emphasis in regional policies toward indigenous growth, including a greater reliance on growth from the small firm sector.**

**2. The massive scale at which jobs have been lost in large firms has had the effect of increasing the *share* of total employment found in small firms.**

**3. It is very likely that de-industrialisation has led to large increases in the supply of recession-pushed entrepreneurs which in turn should increase the numbers of businesses formed.**

**4. De-industrialisation has placed the national government under pressure to respond to the decline. The promotion of an 'Enterprise Culture' was in part a response to the declines in industry and has contributed to the new prominence of the small firm.**

**But these explanations of the new prominence create an image of the small firm sector that is *negative*. To quote Rainnie (1991) - small firms are presented as the 'peasants of industry'. The impression created by such explanations is that small firms are not autonomous. Rather, they are entities to be 'acted upon'. Viewed in this light the prospect of small firms becoming *effective agents* of regional development is quite unlikely. But if this view is correct, then perhaps the prospect of *any form* of regional development occurring is also unlikely; since the large firm sector has registered a very weak performance overall. Some of these concerns are expressed in this passage by Bennett Harrison:**

**Among the leading international trading countries, only in the United Kingdom is there uniform and unambiguous evidence that small is becoming increasingly bountiful, for both individual plants and whole companies. Knowing what we do about the long, sad history of British de-industrialisation, and how a collapse of big companies and the closure of large factories can make small business look relatively more important than it really is, these numbers do not**

> necessarily offer a propitious sign for that beleagured island. (Harrison, B., 1994, p. 51)

There are *other factors,* however, that also help explain the new prominence of the small firm. The attention showered on the sector has come at a time when a growing body of literature reports that fundamental changes are occurring in the economies of most developed nations (Thurow, 1992; Reich, 1992; Bellon and Niosi, 1988; Bennet and Estall, 1991). Discussion of these changes provides additional background against which the coincident new prominence of the small firm should be viewed. In Chapter 2, linkages between this "literature of change" and the performance of small firms are spelled out. In the process of linking these trends together a more complete theoretical framework will emerge; one which provides other possible explanations for the rise in importance of the small firm as a vehicle for job creation and economic growth. At that point discussion of the small firm sector as an instrument of recovery will be resumed.

# CHAPTER TWO

# THE FORCES OF CHANGE

# CONTENTS

## Introduction

Chapter one traced the rise in prominence of the small firm sector and explored some possible explanations for this phenomenon. In particular, the impacts registered on the small firm sector by processes such as de-industrialisation, large firm sector decline and restructuring were considered. Under these accounts, small firms were portrayed as passive recipients - 'the peasants of industry'. To regions in need of economic renewal, such explanations offer little ground for optimism, especially when current views on regional development emphasise indigenous growth (Keeble and Wever, 1986; Damesick and Wood, 1987). Such explanations also raise serious doubts about claims and/or expectations of efforts aimed at stimulating small firm led regional development. For instance, in commenting upon efforts by the UK government to stimulate the small firm sector into job creation, Stanworth and Stanworth, 1989, claimed:

> "government policy is merely turning the unemployed into self employed window cleaners in the name of 'enterprise culture' (Stanworth and Stanworth, 1989, p. 22).

There are however, alternative explanations for the new prominence of small firms; explanations which have the potential to create a very different image of the small firm sector and the broad economic trend(s) of which it is a part.

This chapter examines three broad trends: 1. advances in technology and innovation; 2. increasing evidence of flexible specialisation 3. growth in services. Each of these trends has received considerable attention in the literature of economic change and, as will be demonstrated, each may be linked to changes in the small firm sector. These trends are presented here as the 'forces of change' and it is argued that they form part of the background against which the new prominence of the small firm *must* be viewed if that phenomenon is to be understood.

## The Forces Of Change

The economies of many developing and developed nations have undergone profound changes over the past two-three decades (Hamilton, 1991). Fundamental changes of this sort are frequently characterised as marking a transition or passage from one kind of economic era to another (Allen, 1990; Piore and Sabel, 1984). In such transitions, old remedies to economic problems tend to lose much of their effectiveness (Reich, 1984).

Major economies like the US and the UK have experienced changes on this scale (Porter, 1990; Reich, 1983; Bellon and Niosi, 1988; Laxer, 1987; Allen and Massey, 1990). When nations find themselves in such circumstances a review of established theories is called for (Chisholm 1990; Kuttner, 1985) and this sparks interest in alternative (often new) theoretical accounts. In a period of fundamental change the ability to surmise and foresee depends upon successfully identifying the forces of change which are the underlying causes of the transition or passage. The 1980s have seen the emergence (or re-emergence) of several broad theoretical accounts: the Theory of Regulation (Aglietta, 1982; Piore and Sabel, 1984), The Long Wave Theory of Technological Change (Marshall, M. 1987; Freeman, 1984; Tylecote, 1992) and the theory of a Post-Industrial Society (Bell, 1977; Allen and Massey, 1990). These are distinct theories in that each identifies a different set of underlying causes or forces of change.

## Technology And Innovation

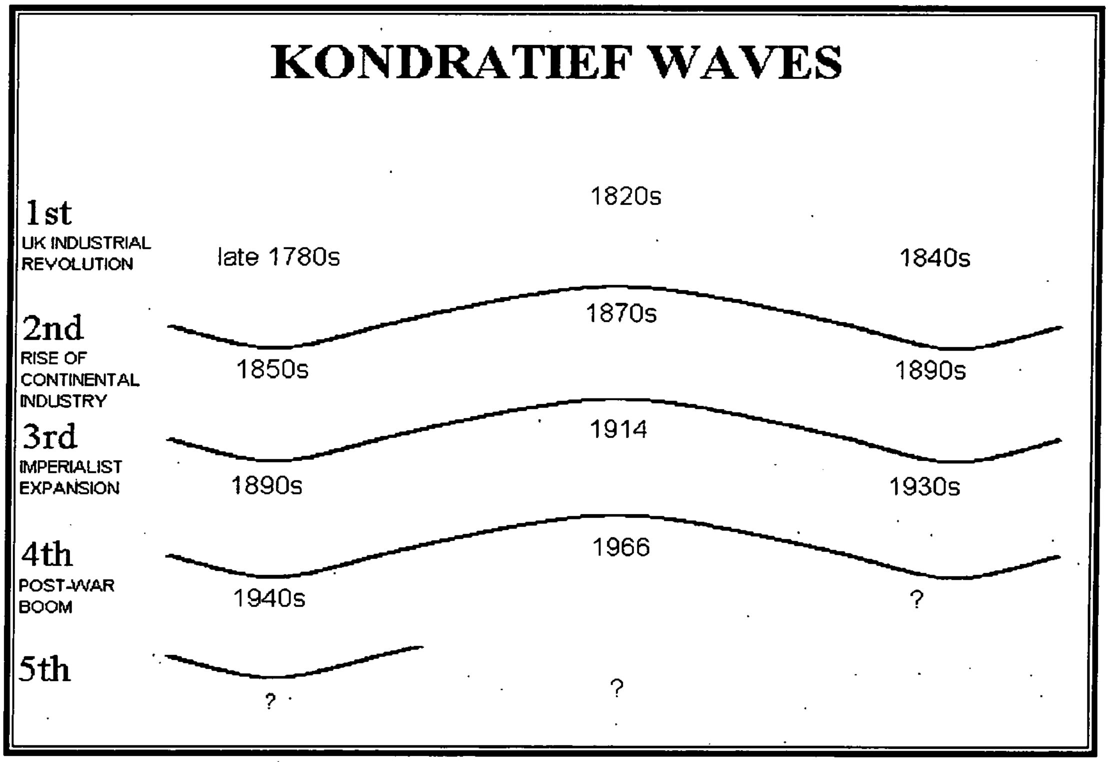
Advances in technology and innovation are frequently cited as key sources of many of the observed changes in the economies of advanced and developing nations. Such a view is the cornerstone of the Long Wave Theory of Technological Change, where innovation and new technology can be central ideas. While hardly the sole source of such ideas, the long wave theory is generally associated with a Soviet Economist, Kondratief (Massey and Allen, 1990; Freeman, 1984). Under this theory economic growth occurs in long waves or cycles, each lasting about fifty years. In more refined versions of the theory the waves advance through stages: introduction, growth, maturity and decline. Kondratief had identified the waves by tracing changes in commodity prices over time. One of his most detailed presentations used commodity price data from the UK but he had little to say about the causes of the wave phenomenon.

Linkages between long waves and innovation were to come later. Two versions of the Long Wave Theory, one by Schumpeter (1939) and another by Mensch (1980), place considerable emphasis on the role of innovations as the engine of growth (Freeman, 1984). According to Schumpeter there is an essential process of *creative destruction* where old industries must make way for newer ones that are founded on the basis of a cluster of recent innovations. For Mensch, on the other hand, decline sets in when a *technological stalemate,* a period characterised by numerous pseudo-innovations, is reached (Marshall, M., 1987).

Under either view, each new wave is launched by a cluster of new innovations; where an innovation is an invention or adaptation which is also economically feasible. Since the late 1700s, long wave theorists claim, there have been four waves as indicated in Figure 2.1 (Allen and Massey, 1990).

According to proponents of the Long Wave theory the UK economy has entered, or is about to enter, a 'fifth' wave which will carry it into the next century. Among other things, developments in the fields of electronics and biotechnology (Hall, 1988) are cited as having the potential of launching the next wave of industries.

Figure 2.1




Source: Allen and Massey, 1990, p. 83.

Left at this level of generality the Long Wave Theory provides little more than an interesting commentary on past and current, economic and social history. To do more, the account must identify those mechanisms that will lead to development of the next wave. Knowledge of these mechanisms could provide policy makers with a basis for action.

On the other hand, knowledge of the mechanisms might convince those concerned with regional policy that some outcomes are inevitable and that interventions which attempt to influence change are very likely to fail. So a key issue here is the scope available to policy makers for effective action, which raises two questions with respect to the Long Wave Theory; namely:

1. What mechanism gives rise to new innovations and hence the new wave?

2. To what extent can individuals or groups influence this mechanism?

## Innovation - The Role Of Small Firms

While Schumpeter and Mensch agree on the importance of innovation as a cause of the Long Waves, their accounts differ when it comes to identifying the origins of innovation: Schumpeter (1939) argues that this is a function undertaken by individuals (entrepreneurs) while Mensch (1980) holds that existing firms are the principal agents of innovation. Each view is examined.

## The Entrepreneur

Schumpeter argued that new development is largely entrepreneurially driven. Here the dual nature of innovation is clearly laid out; that is, innovations involve both technical feasibility and commercial viability. As part of this innovation process entrepreneurs form new firms and it is reasonable to assume that most of these would be small firms, at least in the initial stages of their development. *Thus, coupling the Schumpeter and Kondratief theories provides a theoretical account which links innovation with new small firms.* According to Schumpeter, individual entrepreneurs see opportunities associated with new technological development and they are motivated to take risks.

> "For Schumpeter, economic development has a self generating effect - innovation breeding innovation- until the spread of new innovative combinations becomes generalised throughout the economy. He saw the cyclical course of capitalist development as a 'process of creative destruction' where the destructive disruption of capitalist development was a necessary, functional prerequisite for creative renewal of development in a fresh long cycle of expansion (Marshall, M., 1987).

If the Schumpeter/Kondratief theory is valid, it might be expected that the number of new firms employing strategies of innovation and technical change would increase during those periods which mark the initial stages of each new Kondratief wave. Recently Kirchoff (1994) has expanded upon this theme to propose a theory of dynamic capitaliam.

## The Active Firm

An alternative approach used to explain the bunching of innovations is to view innovation as something to be introduced by established firms. The principal motivation for established firms to engage in innovation strategies will be to find new ways of generating profits. Under this view (Mensch, 1980) active firms are motivated to try new approaches if they have determined that more traditional methods of earning a profit no longer work. The trough of each long wave marks the transition period where more traditional industrial practices are in decline reaching a 'technological stalemate'. At this point in the decline, governments can do very little to alter the situation except by investing in innovation projects (Freeman, 1984). According to Mensch the only way to overcome the stalemate is through new innovations that create new demand. Therefore, at these transition points active firms will be motivated to innovate.

Any linkage between this viewpoint and new small firms appears tenuous. Nonetheless, implicit in the account is the position that innovation is an effective strategy for those firms seeking to establish themselves during periods of transition between one long wave and the next. Some researchers argue that when it comes to implementing strategies of innovation small firms have distinct advantages over larger firms (Acs and Audretsch, 1990). Rothwell (1989B) lists several advantages possessed by small firms that make them particularly effective vehicles for introducing innovations. These include:

1. Ability to react quickly to keep abreast of fast changing market requirements.

2. Lack of bureaucracy. Managers react quickly to take advantage of new opportunities and accept risk.

3. Efficient and informal communication networks allow fast responses to internal problems and provide the ability to reorganise rapidly.

There is also evidence to show that large firms will reorganise and even encourage some of their key employees to start new firms and, if some of these new firms begin to flourish, the parent will often buy them back (Giaoutzi, et. al., 1990). So again, the theory can be linked both to the small firm and the new small firm which in turn leads to the inference that new small firms could contribute (perhaps significantly) to development, especially in the area of job creation (Lever, 1987). Empirical work shows that the small firm sector has produced considerably more innovations per employee than the large firm sector and that new technology is currently diffused more quickly in small firms (Acs and Audretsch, 1990).

## The Fifth Kondratieff Wave: Britain's Prospects

Some presentations of the Long Wave Theory emphasize the deterministic nature of its explanations; this is especially evident in the presentations of Hall (1988) who sees a strong link between wave activity and geography. Thus on spatial variations in the availability of amenities, a regional feature that he believes influences the spatial distribution of innovations, Hall writes:

> "This has profound implications. For it means that the new industry is likely to be found in regions and in areas quite different from the old. Indeed, the image of the old industrial city - committed to dying industries produced by traditional methods with an ageing work force resistant to change, with a depressing physical environment that is unattractive to mobile workers, and perhaps lacking the necessary research expertise in the new technologies - is just about as repellent to the new industries as could be imagined. The new industry then, will seek positively to avoid such places."(Hall. P., 1988, p. 62)

From this account it is clear what Hall expects from the fifth wave; that is, *the account is deterministic in the truest sense because knowledge of the forces of change produce descriptions of how the future will unfold but leave little scope for actions designed to alter that future.* In Hall's view innovation and technological change are inextricably tied to a particular geography, and here Hall sees little room to manoeuvre.

Thus, new developments which will characterise the fifth Kondratief will be largely confined, as Hall sees it, to certain geographic areas. These are not likely to be the areas with the greatest need for new development. Hall's account draws upon the ideas of cumulative causation; that is, those geographic areas that serve as sites for early development will enjoy expansion in the 'growth' stage of the wave while other areas that had lagged behind in the early stages will feel the benefits far later if at all, and they will feel them with less intensity. As Hall puts it:

> What Britain needs now is someone to say ... that tomorrow's industries are not going to be born in yesterday's regions, and that the aim of the government should be to start planning for a massive move of people from the old areas to the new. Britain's future, if it has one, is in that broad belt that runs from Oxford and Winchester through the Thames Valley and Million Keynes to Cambridge.(Hall, P., 1981, p.237)

Earlier (p. 32 and p. 33), two mechanisms which lead to innovation were presented: 1. innovation brought about by entrepreneurs; 2. innovation brought about by established firms. How can Hall's views be tied to these mechanisms? First, by focusing on the issue of uneven geography, the question can be posed whether or not certain areas have, or are more likely to attract, a relative over-abundance of entrepreneurs. Indeed work of this type, undertaken by Storey (1982), suggests there is a wide variation in the supply of entrepreneurs among regions of the UK. Other research has established a link between occupation and the tendency to start a small business (Gould and Keeble, 1988). Generally the research suggests that those with managerial experience are more inclined to launch new enterprises. Massey's (1984) theory of a spatial division of labour in the UK contends that regions that are dependent on branch plants for employment have limited managerial resources. Thus one source of talented entrepreneurs is denied to some regions. Research shows that new (that is, formed since 1975) firms in the UK's computer electronics industry, an industry experiencing rapid technological innovation, were heavily concentrated in the South East and East Anglia; together these two regions accounted for 69% of such firms in 1984 (Keeble and Wever, 1986). In the UK, therefore, there is evidence that suggests that new small innovative firms are likely to exhibit an uneven geography. Moreover, the geography is unlikely to favour the depressed regions.

The geography of innovation as brought about by *existing* firms, like the geography of innovation brought about by entrepreneurial action, can be presented in a highly deterministic framework. Sweeney (1987) for instance, has attempted to evaluate different regions in terms of both their entrepreneurial and innovative potentials. He has found considerable differences in the attributes of regions which in turn may explain similar variations in their economic performances. Again spatial unevenness is a matter for later sections (see Chapter Four) but deterministic accounts generally build on spatial differences. *Therefore even though the theory of Long Waves can be linked to small firms the issue of spatial distribution implies that as a tool for regional development in the UK, small firm innovation may not be very significant.*

But not everyone who subscribes to the importance of innovation takes this mechanistic view. For instance, Rothwell and Zegveld (1982) agree with Hall on the importance of innovation as a basis for future development but argue that levels of innovation *can* be influenced by government policy and this, in turn, could affect the geography of the fifth Kondratief in the UK.

Similarly, Marshall (1987) argues that the Long Wave Theory itself has little to say about the process by which innovations `bunch' or the geography of that process. Marshall believes that at this level, the theory is "only descriptive" and that it leaves open the possibility of development from a variety of locations. He sees a complex process at work with technological change as only one of several forces underlying the long waves. Among the others are:

- crisis tendencies and short term fluctuations of capitalist development, particularly the tendency towards periodic phases of industrial over-accumulation;

- the capitalist labour process, representing the conjunction of the technical forces of production and the social relationships which circumscribe them;

- the uneven development of different industrial sectors and their labour processes;

- the uneven spatial development of all these factors;

- the social and political processes through which all these factors are brought into effect in different ways at different times and in different places (Marshall, 1987).

Like Rothwell, Marshall sees the possibility of influencing these processes and therefore the course of future development through policy initiatives. However, beyond the issue of whether it is possible to influence such events lies another barrier that is related to the sheer complexity of effectively implementing policy initiatives. For example, in the case of the UK semi-conductor industry, research shows that it has been very difficult to prevent regional development funds from going to production instead of to innovation where they had been targeted (Cooke, et al, 1984).

In this section the Long Wave Theory of Technological Change has been examined. Some versions of this theory offer explanations of past and future economic development in which innovation and technology are presented as the underlying forces of change. In turn, these forces have been linked to the performance of small firms and strategies of innovation showing that, in theory at least, small firms should be able to make important contributions to new development. In practice as well, small firms have demonstrated their ability to be innovative (Acs and Audretsch, 1990), especially in those situations where capital, research and development costs, and entry costs are low (Rothwell, 1989A).

It has also been shown that Long Wave theory can be presented either with a decidedly deterministic emphasis *or* as a process which is subject to influence through policy and individual effort. For some theorists the course of future development *may* be influenced; and much of this influence will be exerted by small firms employing strategies which emphasize innovation. Evidence from the UK shows that increasingly small firms are accounting for larger shares of the total number of innovations (Rothwell, 1989B). Theoretically, therefore, it is possible for small firms that adopt such strategies to be an important part of new economic development. In several European countries there is empirical evidence which supports this view: for example, new technology-based firms (NTBFs) appear to be playing an increasingly important role in development since the 1980s (Rothwell, 1989B); other research that examines the computer electronics industry in the UK shows:

> "...considerable evidence of the importance of technological change, scientific research and innovation in generating a surge of new small companies" (Keeble Wever, 1986, p.100).

In the north of England recent research indicates that firms adopting computer technology to establish networks are substantially outperforming other firms slow to adopt these changes (Goddard and Thwaites, 1991), while other research supports the contention that strategy[1] is vitally important to small innovative high technology firms (Dodgson and Rothwell, 1991).

[1]Evidence of innovation strategies include: 1. a history of promoting new products; 2. a history of adopting new production processes; 3. a history of R&D expenditures; 4. a history of ongoing capital equipment expenditures.

## The Theory Of Regulation

While recent years have been marked by uncertainty and the widespread failure of 'proven' panaceas to economic ills, between 1930 and 1970 the developed countries of the world enjoyed a period of more or less sustained and unparalleled economic growth (Maddison, 1989). According to the Theory of Regulation this was a time when a particular *regime of accumulation,* a *mode of regulation* and a *technological paradigm* were in effect (Tylecote, 1992).

'Fordism' is the name used to designate this system which has mass production as its *technological paradigm.* Fordism depends upon stable mass markets, stable exchange rates, and stable supplies of labour and materials.

A *regime of accumulation* is best understood as the macroeconomic principle which balances production and consumption (MacDonald, 1991). Under Fordism the regime is characterised by a growth in mass consumption. This assures that what is produced is also purchased. The *mode of regulation* is a broader concept that refers to society (both on national and international levels) and the complex networks of institutions used to support the regime of accumulation. Institutional support for collective bargaining, the massive role of the Keynesian state in maintaining demand, and the hegemony of large companies are all manifestations of the mode of regulation. These factors provided the stability Fordism required (MacDonald, 1991). Consumers forfeit their individual preferences in order to gain access to lower priced, uniform goods. American management theory, first developed by Taylor, emphasised the division of labour and rested heavily on the assumption that markets were large and expanding. Under this regime the key issue of production was to increase flow-through using the same or fewer resources. Just how pervasive Fordism is, or was, is a matter of some dispute.

For Aglietta (1979), who is largely responsible for the theory of Regulation, *nations* are the fundamental objects of study when attempting to understand the 'global economy'. Their laws, institutions and regulations figure importantly in the list of ingredients that make up a regime. He views the global economy as a system of relationships among the nations of the world with one nation in a hegemonic position. In the 1800s Britain would have assumed that role and it was later replaced by the United States in the early 1900s; now the hegemonic position of the United States is receding given the sustained economic challenges of countries like Germany and especially Japan. Other reasons for the decline of Fordism include: 1. increases in the differentiation of demand - that is, a move away from mass produced standardised goods towards more unique goods; 2. saturation of mass markets; 3. increases in the pace of market change; 4. technological developments like numerically controlled machinery and cad/cam which have allowed firms to increase their economies of scope (Allen and Massey, 1990).

So the Theory of Regulation is capable of accounting for much of the erosion in traditional industry (Fordism) by referring to the changing climate of international competition, technological advances in capital equipment used in production and the fragmentation of markets. Whether these forces of change lead to Neo-Fordism (thus emphasising continuity with the past) or Post-Fordism (thereby emphasising a break with the past) is a matter of debate which will be addressed later. But what is Neo-Fordism or Post-Fordism like and what is the connection with small firms?

## Flexible Specialisation And Small Firms

Piore and Sabel (1984) argue that the forces of change just discussed are leading to a 'second industrial divide' where, once again, it is possible for the future production of goods to be carried out on a *crafts basis* in contrast to the mass production paradigm of the Fordist era. At the divide, there arises a choice between different regimes and the outcome involves, of necessity, the political system. Because the political system *is* involved different outcomes will be possible in different countries. This is an important point because it marks a departure from a single logic that relies on scales of efficiency to explain the widely observed shift toward increases in the number of small firms (Loveman and Segenberger, 1991). For regulationists like Aglietta (1979) history is innovatory.

This new kind of regime, which Piore and Sabel term '*flexible specialisation*' is illustrated by the very successful small firm networks of clothing and footwear manufacturers operating in northern Italy. Similar success has been enjoyed by the Basques of Mondragon in Spain. There, utilising a federation of co-operatives which includes research facilities, financial institutions, factories, retail outlets and training facilities the Basques have proven their ingenuity and ability to compete in global markets. They have also placed heavy emphasis on producer services - especially in the functional areas of finance and marketing (MacLeod, 1986).

Denmark is a more recent example. This country has utilised a scheme of government support to finance 'network brokers' to work with small firms and develop new organisational structures that would permit them to work co-operatively, thus enabling the networks of firms to compete in markets which ordinarily would be out of reach for small firms acting

**independently. Marked positive changes in Denmark's trade balances and competitive ratings have been attributed to the success of these networks. Other frequently cited examples of a similar phenomenon are the American cases of Route 128 and Silicon Valley.**

**The image created by these cases, and others such as Baden Wurttenberg (Cooke, 1991) and Ile-de-France (Storper, 1993), is one where networks of small firms make inroads into fragmenting mass markets that were traditionally the exclusive domain of large producers. This creates the expectation that small firms utilising strategies of flexible specialisation will form an important part of many national economies in the future. Furthermore, the success of these networks will not necessarily involve growth in the conventional sense. These firms are likely to remain small; they are not 'temporarily small' in Storey and Johnson's (1987) sense. Also, these examples of flexible specialisation are geographically concentrated in regions sometimes referred to as industrial districts. In other words they are examples of 'geographical agglomeration' (Storper, 1993). Not surprisingly, those who study such phenomena examine the social relations and institutions operating at the regional level (Storper, 1993). Adylot's (1986) 'milieu theory' in which the region itself becomes the object of study, is representative of this line of thought; he has argued that responsibility for regional development has passed into the hands of the regions themselves via the creation of new small enterprises and this calls for a new theory of local dynamics (Adylot, 1983).**

***Although originally used to describe networks of small firms, increasingly, the term flexibility is presented in the literature as something to be 'internalised' by the firm; in fact, the literature now uses the term 'flexible firm' (Atkinson and Gregory, 1986) to describe enterprises that are able to***

*respond quickly to changes in the market.* Along with rapid changes in demand, rapid changes in technology also create the need for flexibility. Thus, Storper (1993) argues that more traditional strategies, such as vertical integration, are inhibited by the need for firms to avoid *lock - in* to a given technology which may be quickly rendered obsolete. Strategies of flexibility allow firms to travel pathways of technological change that cannot be fully defined in advance.

Existing large plants are also adopting fragmentation strategies such as decentralisation, devolvement and dis-integration in order to achieve this flexibility; therefore at least some of the employment growth attributed to small firms is *employment transfer* (Shutt and Wittington, 1987). So both large and small firms appear to be striving for flexibility.

Thus the term 'flexibility' has come to have several distinct meanings (O'Farrell, Moffatt and Hitchens, 1993) and strategies of flexibility can be observed when there is:

1. Evidence of sub-contracting between large firms and small firms; or between small firms and other small firms.

2. Evidence of non-permanent alliances between small firms in order to fulfil contracts.

3. Evidence of flexible labour: in terms of numerical flexibility, such as use of part-time labour; functional flexibility, through variations in duties expected of employees who are multi-skilled; financial flexibility, such as variations in pay brought on by two tiered pay systems or pay for performance.

4. Evidence of rigid standards with respect to quality of goods/services produced and delivery times.

5. Evidence of economies of scope in terms of the variety of goods produced and the limited quantities associated with each.

6. Evidence of capital equipment which enables small firms to alter their production quickly - for example numerically controlled production machinery.

7. Evidence of a variety of customers each ordering small batches of product or service or a few larger customers who order a number of different outputs from the supplier.

Keeble (1990B) makes the interesting observation that while many of these strategies are perhaps new to firms involved in production, such levels of flexibility have been the norm in services. Thus as manufacturing becomes increasingly flexible the economy as a whole moves closer to a 'service style' (not a 'service led') economy.

The body of research which has its roots in the theory of regulation holds numerous implications for small firms. Under the strongest interpretation, strategies of flexible specialisation will enable small firms to serve lucrative markets which have specialised needs. In these circumstances the firms will prosper while remaining small; aligning and realigning themselves with other members of a flexible network of small firms. At each alignment the firms involved form a constellation which produces a product specially suited to the identified market. Following this strategy small firms will remain competitive as small firms; that is, small firms are not required to expand in order to meet the needs of these markets.

In markets characterised by rapid changes in demand and in industries characterised by rapid changes in technology those firms that are able to remain flexible will hold a competitive advantage over firms that are not flexible. Small firms are inherently flexible and they should be well positioned to take advantage of this situation. The flexible specialisation account presented here is similar to what Storey and Johnson (1987) refer to as the Bologna Model.

## Flexible Specialisation In The UK

Some authors (Amin, 1990; Sayer, 1989) have questioned the degree to which flexible specialisation is a discernible phenomenon - how widespread is it, and does it justify those claims of a new era? Questions have also been raised as to whether the observed efforts at flexibility are the sole prerogative of firms in the new regime. Isn't it possible for Fordist's to resort to these strategies also? Amin, for instance, says that much of what passes for evidence of the emerging flexible specialisation is no more than existing firms responding to the pressures of competition. Thus strategies like just-in- time inventory are widely used and do not distinguish Post-Fordist from Fordist enterprises. Similarly, according to Amin (1990), the tendency to 'contract out' significant proportions of production is as much a strategy of Fordist enterprises as it is one for Post-Fordist enterprises.

On this point, Harrison (1989B) raises doubts about the durability of the flexible networks referred to by Piore and Sable (1984). He argues that in some cases small firms are reorganising themselves into larger operations resembling the Fordist complexes they were supposed to be replacing, while in other cases large conventional firms are now 'coming out of the corner' and competing directly with some of the flexible small firm networks. The suggestion here is that the flexibly organised firms have not been severely tested by direct competition and their ability to endure such an onslaught may still be seriously questioned.

In Britain there is little evidence of widespread adoption of flexible specialisation as a regime to replace Fordism. A study by Milne (1989) of

**the electronics industry, which is as likely a sector in which to find such evidence as would exist, indicates a myriad of strategies but little that clearly resembles the systems reported by (Piore and Sable, 1984). Other work by Milne (1991) does emphasize the importance of flexibility as a strategy; he has found that successful small firms strive to retain their flexibility by remaining small. One way they achieve this is through purchases of specialised equipment. Milne (1991) also reports evidence of large firms setting up small on-site operations under the large firm umbrella. In comparing the regions of Como (Italy), Lyon (France) and Leicester (UK) researchers from Bath University argue that Leicester does not conform to their model of an industrial district. Small firms in Leicester tend to exploit market niches and rarely co-operate with other small firms preferring, instead, to achieve self-sufficiency (Bull, Pitt, and Szarka, 1991).**

**On the other hand, Cooke (1989) argues that evidence of flexibility can be found but when compared with some other countries in Europe, Britain lags behind. In Wales a clear attempt at duplicating some of the strong networking techniques so successfully implemented in other parts of Europe is taking place. Cooke (1991) describes a regional partnership formed between Wales and Baden Wurttgenberg. Although evidence of industrial districts and/or sectoral networks is limited, several UK researchers have emphasised the importance and effectiveness of the *strategies* that lead to greater flexibility (Chisholm, 1990; Keeble, 1993A; Cooke, 1989). Recent research in the UK into the sub-classification, business services, provides evidence of networking and co-operation agreements among small firms; they appear to utilize such strategies in responding to highly specialized needs of client companies (Keeble, Bryson, and Wood, 1991). There is also evidence that younger rural based UK firms including some in**

**manufacturing are identifying and exploiting lucrative niche markets using strategies of flexible specialisation (Keeble 1993B).**

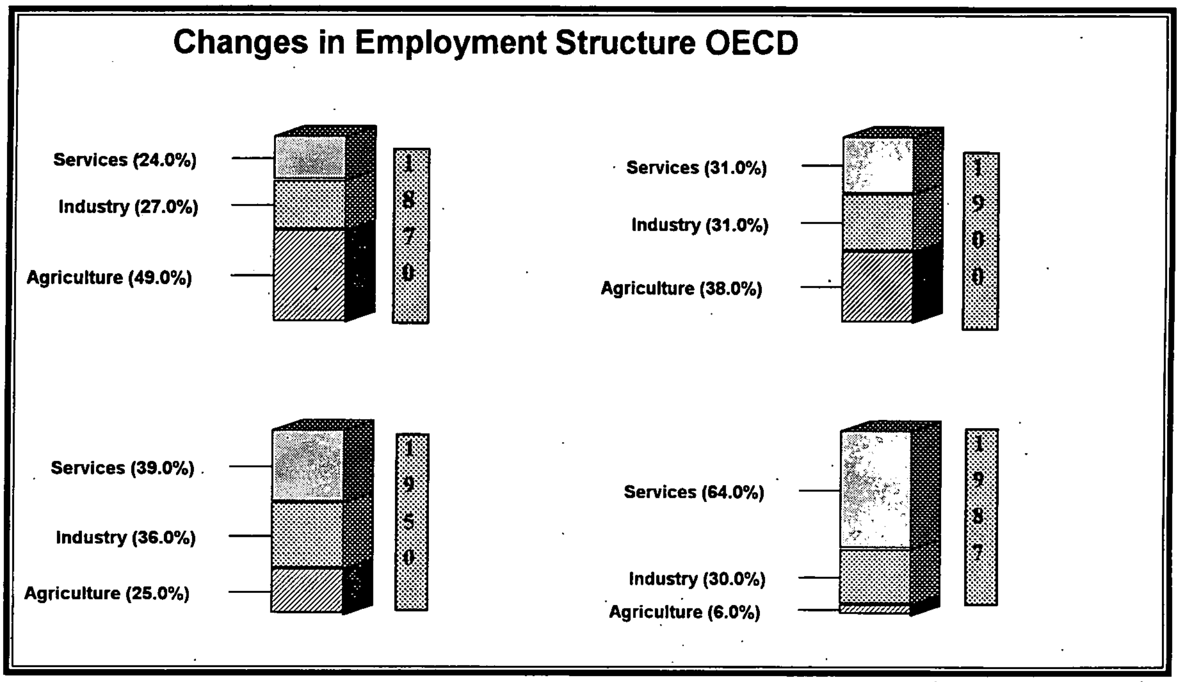
**Much of the debate between authors like Piore, Storper and Amin ( in Pyke, Becattini and Segenberger, 1990) is a Post-Fordism versus Neo-Fordism one that hinges on whether there is adequate evidence to support the contention of a 'passage' from one regime to another. If writers like Amin (1990) and Harrison (1989A) are correct, then the strategies of flexibility will be widespread and not confined to small firms in local areas or industrial districts. However, even under this interpretation, the strategies are presented as an effective means of competing and small firms adopting these strategies are likely to benefit when compared with companies that do not. In fact, strategies of flexibility may become even more important to the survival of small firms as demand creates non-price competition in the form of goods with minimum defects and high-quality design (Cooke, 1989).**

***There is less disagreement, however, as to what counts as a strategy of flexibility and whether such strategies are effective when properly implemented.*** **To this extent, at least, research in the UK indicates that flexibility/flexible specialisation is a strategic approach which should bode well for the survival of a small firm in current economic conditions. That is, the chances of a small firm surviving and prospering should be enhanced if these strategies are adopted.**

## The Rise Of The Service Economy

In most industrialised economies there has been a marked shift in the sectoral distribution of employment since the mid 1960s with steady increases in the proportion of jobs found in the service sector and steady decreases in the share of jobs found in the manufacturing and industrial sectors (Allen, 1990). Figure 2.2 traces changes over a much longer period

Figure 2.2




Source: Maddison, 1989

thereby also illustrating similar declines in the agricultural sector; data used here are averages based on OECD countries.

In Europe services have been the main source of new employment since the early 1970s (Marshall, 1988). Even *within* the manufacturing sector there is considerable tertiarization; for example, in the manufacturing sectors of most industrialised nations the proportion of internal service-related employment is between 25 and 30 percent (Bailly, Mailliat and Coffey, 1987). O'Farrell and Hitchens (1990) make related arguments referring to the *convergence* of manufacturing and services.

However, opinions vary as to the significance of these trends. For at least one commentator the distinction between services and manufacturing is of limited utility because current commercial practices blur these lines; today, it is argued, transactions involve webs of companies with some providing service functions while others provide manufacturing functions in order to serve demand (Reich, 1992). On the utility of maintaining the distinction between services and manufacturing Reich provides the following comment:

> "Such questions provide endless opportunities for debate, not unlike the arguments of thirteenth-century Scholastics over how many angels could comfortably fit on a pinhead. Such debates are socially useful in that they create excuses for business seminars, conferences, and magazine articles and thus ensure gainful employment for many. But such debates are less than edifying." (Reich, 1992, p. 94).

Interestingly enough, in discussing the utility of the distinction between services and production, a similar argument was made almost a century earlier:

> "there is no scientific foundation for this distinction... the sailor or the railway-man who carries coal above ground produces it, just as much as the miner who carries it underground."(Marshall, 1949, p. 79)

In sharp contrast to the view expressed by Reich a substantial body of literature describes the shift in employment towards services as a structural change of considerable significance. For those who take this view there are two broad positions:

1. The changes in service employment are independent of the changes in manufacturing and industry (post-industrialism).

2. The changes are causally linked and growth in services would not have occurred without the decline in manufacturing (late capitalism).

Each of these viewpoints will be described and their implications for the small firm sector will be discussed.

## Post-Industrialism

Recent literature contends that the rise in importance of the service sector is independent of changes (declines) in the manufacturing and industrial sectors ( Daniels, 1988). Included in this literature is the theme of a 'post-industrial society' (Bell, 1973) which gains much of its currency by referring to the increases in service sector employment. Additional evidence cited by post-industrial theorists includes shifts in occupational structure away from blue collar workers towards increases in the share of white collar workers, increases in part-time jobs and increases in the number of female employees (Damesick and Wood, 1987). *Information* is seen to drive much of this activity (Chisholm, 1990).

Coincident increases in service sector employment and decreases in industrial employment are viewed as little more than that - coincidence. The explanation for rapid service sector growth is to be found in increased demand for services. According to Engel's Law, demand for services increases once basic needs have been met because basic needs are replaced by higher order needs that are satisfied through the provision of services. An analysis of final demand by Gershuny (1978) has raised some doubts about this theory.

A second theoretical building block is provided by the Fisher Clark thesis (Crang 1990). Under this theory nations are seen to evolve from agrarian-based economies, to industrial-based economies and then onward to service-based economies (Figure 2.2). Thus the move to a service economy will occur first in those nations that are most advanced in terms of their manufacturing-industrial sectors. This description is quite mechanistic, portraying these changes as if countries were on a 'march' through successive stages of economic development (Allen and Massey, 1990). Doubts about the validity of such images as a progressive advance from one structural type to another may be raised. For instance, service employment is not just a recent phenomenon; services have been an important segment of national economies for many decades (Riddle, 1986). Secondly, there are cases where national economies seem to have skipped the industrial phase and moved directly from agrarian/to service based economies (Daniels, 1993). On the other hand, growth in demand for services seems undeniable.

## Late Capitalism

A second approach to explaining the rise in the importance of services is to link this rise (causally) to the decline in manufacturing. Here many of the observed changes in services are viewed as causal 'effects' of changes occurring in the manufacturing sector. Thus, the changes do not herald the emergence of some new type of economy which will replace the current industrial economy; instead, the observed changes in employment patterns reflect changes in industry as it adjusts in this time of late capitalism.

One explanation of this sort portrays the coincident rise in service employment, and decline in manufacturing employment, as a phenomenon of 'externalisation' where functions of a service nature, formerly carried out within manufacturing firms, are now contracted out to external service firms (Wood, 1988). Bellon and Niosi (1988) use this argument to explain increases in service sector employment in the US. Manufacturers externalise services to cut costs, increase flexibility and remain competitive. Additionally, the contributions or inputs made by services like marketing and accounting have an increased importance to the goods-producing sector as external competition adds pressure to keep costs down and productivity rising. Under externalisation many of the jobs in services are not new jobs they are *redistributions* of existing jobs.

An implication of the externalisation thesis is that many of the new jobs in services will be in the sub-category of "producer services". Producer services include such activities as research, design, technical training, finance, accounting and marketing; or, more generally, services that meet *intermediate* rather than *final* consumer demand. In fact the producer services sub-category *has* been particularly active in the 1980s and has attracted considerable attention (Bailly, Mailiat and Coffey, 1987; Marshall, 1988; Champion and Townsend, 1990; Perry, 1991; Daniels, 1988; Wood, 1988). This point will be discussed later in the chapter (pages 60-64); for now it should be emphasized that growth in the subcategory of producer services does not confirm the externalisation thesis (Bailly, Mailliat, and Coffey, 1987).

## Some Common Concerns

The coincident decline of manufacturing, whether causally linked to or independent of, service growth raises concerns about the long term consequences of the structural shift itself. Can a nation maintain its relative status with other nations if increasing proportions of its gross domestic product and exports are derived from services? Doubts about the value of service activities have a long history as evidenced by these passages written by Adam Smith in 1776:

"A man grows rich by employing a multitude of manufacturers; he grows poor, by maintaining a multitude of menial servants"(Smith, 1937 p.47).

Among the non-productive Smith included: "...churchmen, lawyers, physicians, men of letters of all kinds, players, buffoons, musicians, opera singers and opera dancers" (Smith, A., 1937, p. 47).

In addressing the question of the value of services to an economy some commentators have argued that the category of 'services' is a catch all which was originally set up to account for employment not falling into the manufacturing categories (Allen and Massey, 1988). Thus the range of activities falling under the category "services" may be so diverse that it becomes difficult to respond to concerns like the one just raised.

Partly in response to concern over the value of services, special sub-categories of services have been identified and studied. Producer services and in particular, business services, are examples of these sub-categories. Both sub-categories are portrayed as service activities that add value to products produced in other firms (clients); this is achieved by enhancing the client firms' performance in functional areas such as marketing, accounting, and finance. Thus producer service firms can be viewed as enabling their clients, many of whom are manufacturers, to compete more effectively in the market place. Against those who doubt the value of services it can be argued that at least by this indirect route, the service sector contributes to the economy.

A matter of considerable debate is whether manufacturing must remain robust while these structural changes occur; or, could services simply 'replace' manufacturing. Certainly when the manufacturing sector declines

**while the service sector grows, questions about their relationship are far from idle.**

**For some researchers in the UK, where job losses have been substantial, the simultaneous occurrence of these phenomena accounts for much of the importance ascribed to services:**

> **"... possibly the most critical aspect of service activities, namely that they have provided jobs at a time of declining manufacturing employment." (Marshall, J.N., 1988, p. 250)**

**Playing on this theme Green and Howells argue that at least part of the importance of the service sector arises because of its relative job generating** ***potential*****:**

> **"... the service sector both as the overwhelming source of new jobs over the 1970s and 1980s, and as the only sector which appears to offer large scale employment growth potential into the future."(Green, A., Howells, J., 1987, p.111)**

**UK employment projections for the year 2000 suggest that the only sector to show growth for the last decade of the twentieth century will be services (Artis, 1992).**

**Some researchers argue that services cannot flourish unless the manufacturing sector is also prospering; for them, a healthy manufacturing sector is essential if economic stability is to be achieved (Cohen and Zysman, 1987). International comparisons of manufacturing and service employment growth have led Marshall (1988) to conclude that:**

> "…. a dynamic economy including manufacturing, is a prerequisite to rapid service industry employment growth and that the poor performance of manufacturing is an impediment on UK service growth."(Marshall, J.N., 1988, p. 40)

However, there is evidence to suggest that services, and in particular producer services, are not wholly dependent on manufacturing; they serve a wide base of customers and draw much of their demand from other parts of the service sector (Damesick and Wood, 1987).

In contrast to the early 1970s the level of intermediate service inputs needed to attain a given level of primary or manufacturing industry output has increased (Gershuny and Miles, 1983). This increase should offset some of the negative effects of observed declines in the goods producing sector.

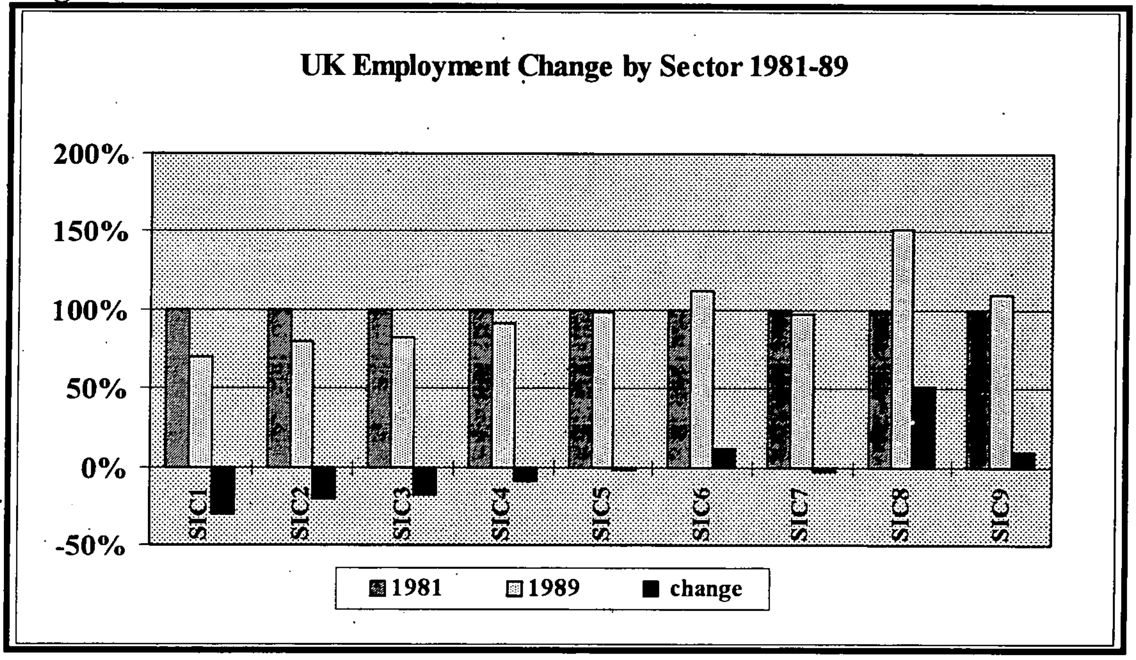
At the very least the goods producing sector has a supportive role to play as a continuing source of demand for services. However, in terms of job creation, the UK and other advanced economies are very likely to continue to depend on the service sector. This reflects both the positive outlook for future growth in services (Green and Howells, 1987) and a more negative dimension, namely the view that in the UK, recent declines in regional manufacturing employment have been so extreme they may be irreversible (Townsend, 1983).

There are then, competing explanations as to the reason(s) for, and nature of, the rise in importance of the service sector. Given the complexity of the service sector, including its heterogeneity, it is unlikely that any mono-causal explanation will account for all of the observed changes. It may well be that each explanation accurately accounts for some of the changes.

## Services and Small Firms In The UK

Like other advanced nations, the UK has experienced a marked shift in the sectoral distribution of employment since the mid 1960s with steady increases in the proportion of jobs found in the service sector and steady decreases in the shares found in the manufacturing and industrial sectors. Figure 2.3 demonstrates that in the UK these trends continued throughout the 1980s. In spite of the uneven distribution of services within the UK they are pervasive enough to be important to all regions. By the late 1980s

Figure 2.3




Source: NOMIS [2]

services accounted for well over half of the output and employment in every Economic Planning Region in the UK (Marshall, Wood, Daniels, et al., 1987). In the UK the industrial category services represents a diverse group of activities that, like the economy as a whole, has undergone changes over

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[2] SIC1=ENERGY, SIC2=EXTRACTION, SIC3=METAL GOODS, SIC4=MANUFACTURING, SIC5=CONSTRUCTIOIN, SIC6=DISTRIBUTION, SIC7=TRANSPORT, SIC8=BANKING, SIC9=OTHER SERVICES

time. That is, on a sub-sector level the nature of employment within the service sector itself is changing. Recently growth has occurred in the areas of finance, health care, business services and transport (Allen, 1990) and these changes will lead to a redistribution of employment within the service sector. Such changes within the broad category help confirm that the label "services" really includes several sub-categories which differ substantially in their behaviour. The utility of conventional categories is further undermined by the growing 'tertiarization' of manufacturing which makes the separation of services and manufacturing increasingly questionable (Wood, 1988).

Data related to the externalisation thesis provide some impressive figures for the UK case. By combining employment data on Administrative, Technical and Clerical staff in manufacturing firms (ATCs) and on producer services for the period between 1970 and 1981, Marshall (1988) estimated that employment in the producer services sector actually *decreased* by 74,000 jobs in contrast to the apparent increase of 500,000 jobs. In another study, Rajan (1987) estimates that as many as 300,000 jobs were 'externalised' from manufacturing to services in the first half of the 1980s. Many of the jobs in the service category are part-time jobs held by females so these new jobs are not offering alternative employment for many male workers made redundant by closures in manufacturing and industry. Furthermore, there is evidence that producer services are more sensitive than other services to general slow downs in the economy.

Simply stated the geography of services in the UK is uneven; many of the larger service operations are based in London. Also, the growth of services in those regions which have suffered most severely from job losses associated with de-industrialisation has been relatively limited (Tables 1.1

and 1.3). Marshall (1985) argues that the reasons for some of these patterns are complex and call for complex regional policies if services are to become an effective tool of regional development. Of course an uneven spatial distribution may not be true of all services and differences do appear when services are partitioned into categories. For instance, when services are separated into those which require regular face to face interaction with local customers (as is the case with services like distribution for instance) and those which may be delivered from a distance (as with something like package design), different geographies emerge. In so far as services are of the latter type they may make limited contributions to regional development and they may limit the potential contributions of other firms if the latter must 'import' these services.

Several reasons are given for the uneven spatial distribution of some services. Essentially these can be grouped into two categories: on the one hand there are explanations which refer to the presence or absence of demand, on the other there are accounts which refer to the presence or absence of supply items, which explain why particular regions develop and other regions do not. In some cases the explanations resort to agglomeration theory, that is, since some services had been established in particular areas these would tend to grow and spawn other related services in that area as well. Given the diversity of enterprises operating under the banner of services, it is likely that both descriptions have application.

A second kind of spatial unevenness also forms part of the character of services and that is an *uneven distribution of job types*:

> "In fact a worrying dualism is developing in the growth of producer service employment which could have important implications for locational studies. It is possible that we are

witnessing a spatial and social polarisation in labour markets with a concentration of highly skilled male employment in a limited number of areas and a more widely distributed growth in female and frequently part-time work of dubious character in many labour markets"(Marshall, 1988, pp. 254-55).

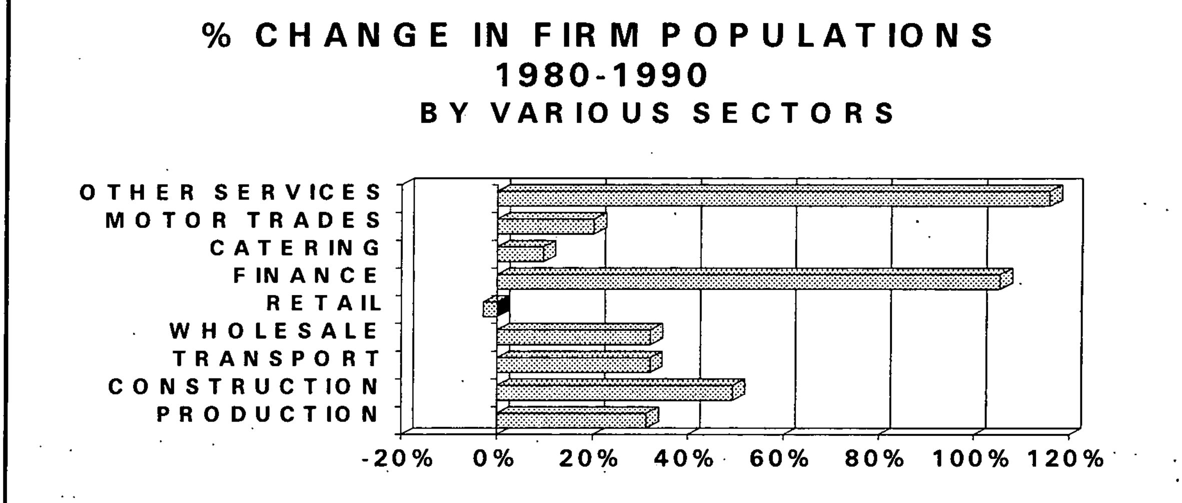
As with the other accounts examined in this chapter, at least some of those who study the progress of the service sector expect development to chart its own course. Unevenness in the service sector is especially significant given its importance to recent and future job creation.

What then are the connections between theories about services and the new prominence of the small firm? Whether the UK is moving toward a post-industrial society or undergoing the adjustments of late capitalism, at least one implication with respect to the small firm sector is the same; namely, there should be a flurry of activity in the service sector. For instance, as large firms externalise service functions this should lead to an increase in the number of new small service firms. Similarly, as global competition leads to increases in the demand for services, opportunities for new small firms will also grow.

Since the service sector appears to be the main, if not the only, source of new employment and the main source of contemporary employment as well, small service firms should be an important object for study. As Mason (1987A) recognised, in the UK, smaller firms are even more evident in the service sector than in the manufacturing sector. In fact in 1989 Great Britain had over 750,000 service establishments each with fewer than 11 employees; this represented 75% of all establishments (Townsend and Kirby, 1994).

Particularly with respect to 'new small firms' the service sector offers lower barriers to entry because of the lower capital costs associated with this sector (Cross, 1987; Townsend and Kirby, 1994). In contrast, the capital intensity of UK manufacturing nearly doubled between 1965 and 1983 (Keeble, 1987). Lower entry barriers may encourage a greater number of new firm starts. As figure 2.4 illustrates, the fastest growing

Figure 2.4




Source: Daly, 1990

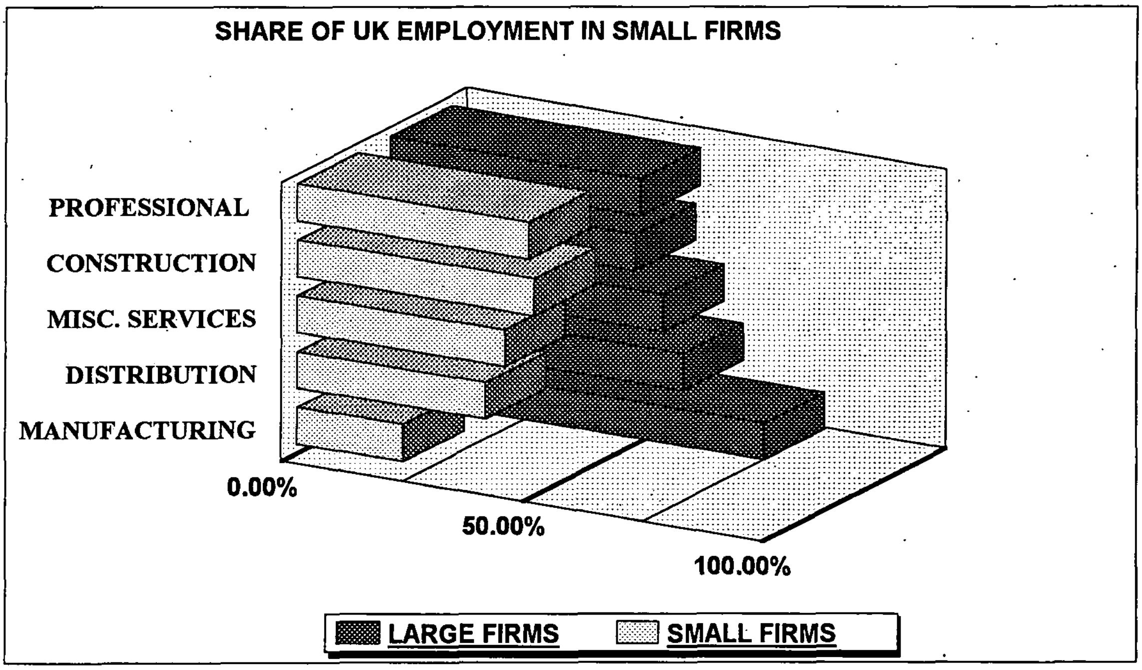
sectors in terms of firm population *are* the service sectors. Changes in the way firms compete have brought added importance to functions like market research, accounting and other business services that are provided effectively by smaller firms. This has led Wood to argue:

> ". . . The proliferation of specialist services favours the transfer of more labour intensive functions to the competitive small firm segment, where tendering imposes a criterion of cost effectiveness. This has long applied to the professional, managerial, commercial and technical activities which have expanded most rapidly in recent years. It is also becoming more common in other

service areas, including such `blue collar' activities as building maintenance, equipment service and repair, catering, cleaning, printing, packaging, security, delivery and transportation. More emphasis is also being placed on smaller companies for specialist research and development and innovative production of marketing, often through a process of key worker `spin-off' from the corporate sector."(Wood, 1986, p. 39)

Figure 2.5 provides estimates of the relative importance of small firms as employers across various sectors in the UK in 1976. It reveals that 48% of all employees in professional and scientific services worked in small firms; similarly, well over 40% of the employees in construction and in miscellaneous services worked in small firms (Mason, 1987A). Of those firms employing between one and twenty-four people, 90% are in the service and construction sectors (Curran and Burrows, 1988).

Figure 2.5




Source: Mason, 1987A

In general small firms in the service sector account for a larger proportion of total service sector employment (about 40%) than do small firms in the manufacturing sector (about 22%); however, small firms, with fewer than 100 employees, accounted for over 95% of all manufacturing businesses and therefore represent an important part of that sector as well (Mason, 1987A). Also, between 1970 and 1980 the number of very small manufacturing firms (with ten or fewer employees) grew by 58%, reversing a trend of several decades (Keeble, 1987). So, small firms are clearly important in both services and manufacturing in the UK.

Another link between small firms and services is made in terms of the sub-sector 'producer services'. Producer services make a *dual contribution*: first as employers themselves and second as firms whose 'product' contributes to the improved performance of other locally based firms, and by extension, the jobs they create or preserve as a consequence. It has been argued that lack of locally available producer services can contribute to the limited success enjoyed by other local firms (Riddle, 1986). In the UK the spatial distribution of these services is uneven (Marshall, 1988) leading Champion and Townsend to observe that:

> "Producer services in general are clearly helping to exacerbate the distinction between the core and the periphery within the British Economy. Thus there are clear limitations to the contribution of the biggest growth industry in tackling the UK's problems of uneven development." (Champion and Townsend, 1990, p. 105)

As direct sources of employment, producer services firms have shown substantial growth over the two decades between 1959 and 1981 creating an estimated 800,000 jobs (Marshall, 1988). Of course these estimates ignore the effects of externalisation. But within the category the picture is more turbulent: in contrast to the aggregate growth, job losses characterize the performance of certain segments of the producer service sub-category; for example both railways and inland transport lost jobs.

Empirical confirmation of the indirect contributions made by producer services is sketchy (Marshall, 1988). As an example, work by Champion and Townsend (1990) shows how important firms in the 'economic base' have been to regional employment growth. Since the economic base includes producer services it is possible that they have made significant indirect contributions.

Finally, producer services may contribute indirectly to the number of new small firms by providing a supply of entrepreneurs. Here again the uneven distribution of producer services could impact negatively on the formation of new firms in some regions:

> In particular, disparities in producer service endowments affect the size and diversity of the export base in different regions, and also have an impact upon regional occupational structures, and thus upon the range and quality, as well as, the volume of employment opportunities in different areas. This in turn may have implications for differences in regional `entrepreneurship potential' (Damesick and Wood, 1987, p.35).

## Conclusion

In an effort to expose some of the theoretical roots upon which much of the literature dealing with small firms is based, this chapter has reviewed several broad accounts of the underlying forces driving recent economic change. By developing an understanding of the forces of change operating in the economy as a whole, the potential role to be played by small firms can be clarified.

This review has claimed that small firms have recently attained a *new prominence* that may be traced both to some highly focused empirical work including reports of substantial small firm led job creation and to some much broader theoretical work which explores the forces of economic change. The new prominence has been accompanied by the expectation that small firms will make important contributions to future economic growth. As to the precise nature of these contributions opinions vary, but some frequently cited ones are presented here.

## The Expected Contributions of Small Firms:

Foremost among the ways in which the economic impact of small firms is expected to be felt is in terms of (1) job generation. Whether this expectation will be realised is a matter of some debate (Storey and Johnson, 1987; Birch, 1987). Other economic impacts expected from the small firm sector include: (2) an enrichment of occupational choice in local labour markets as small firms provide a full spectrum of employment functions within their operations; (3) diversification of the local economy as small firms seek out new opportunities in the local market and beyond; (4) increased competition leading to improved efficiency and lower prices as small firms challenge existing firms for established markets; (5) an expanded level of exports from the local economy as small firms seek customers beyond the local market (Mason, 1987A).

A distinction must be made between <u>the expected contributions</u> of small firms and <u>the set of attributes</u> generally possessed by small firms that would enable them to make these contributions. Accounts linking the rise in the prominence of the small firm sector both to the coincident decline of the large firm sector and the process of de-industrialisation, cast doubt on the ability of the small firm sector to deliver the expected contributions. Thus the question becomes: *What, if anything, has happened to small firms that would enable them to make these contributions?* The answer provided here focuses on strategies open to smaller firms, as they strive for survival and growth in the current economy. Strategies that are related to the 'forces of change' which have been influencing events on national and international scales.

*It is argued here that structural changes in the economy, brought on by the 'forces of change' described in Chapter 2, have increased the potential effectiveness of a range of strategies listed below. It can be said that these strategies are "right for the times" and they also happen to be particularly well suited for adoption by small firms.(See Dijk, M van, 1995)*

The strategies are:

1. the ability to be flexible in terms of labour, markets, alliances with other firms, product range, and inventory;

2. the capacity to innovate and use information as a central ingredient in producing a `commodity' (used in the broadest sense to include services) for the market;

3. the ability to identify and exploit emerging demand including niches in the market (very likely as a service oriented business) either to launch, continue or expand the operation.

*Small firms employing these strategies should be effective competitors in the contemporary marketplace.* Research by Gilinsky (1988) confirms the implementation of similar strategies by high growth companies in both the UK and the US. In certain contexts the convergence of all three forces of change is observable. For example, studies by researchers at the Cambridge Small Business Research Centre have confirmed that a "prime engine of change" for small firms in the business services sector is technological change and that these small firms frequently form networks and co-operative ventures to meet new specialized demands by client firms for services like marketing research and management consultancy (Keeble, Bryson, and Wood, 1991). Similarly, a review of economic performance in the 1980s suggests that:

> The activities that have shown the most growth tend to be the ones that use new technology, for example, services such as banking and telecommunications (Britton and Healey, 1990, p. 5).

From a theoretical perspective it should be possible for small firms to contribute to the economy in the ways outlined above by employing these strategies. This chapter has responded to the descriptive (and at times atheoretical) nature of much of the small firm literature of the 1980s (Gibb and Davies, 1990), by drawing from the literature on economic change an account that provides *possible explanations* for the new prominence of the small firm. The exceptional performance of small firms during the 1980s, both in the UK (Stanworth and Gray, 1991) and elsewhere, (Loveman and Segenberger 1991) was coincident with claims of fundamental changes in the economy (Piore and Sabel, 1984; Hall, 1981; Marshall, 1988). As a result of these 'forces of change' it has been argued that the paradigm of competition has been altered, thereby increasing the potential effectiveness of strategies that emphasise innovation, flexibility and the value of information (Chisholm, 1990). This was foreseen in the early 1980s[3] by some observers as this passage indicates:

> The industrial landscape in America is littered with the remains of once successful companies that could not adapt their strategic vision to altered conditions of competition. Only those able to see the new

[3]This passage was originally published in 1981.

> industrial competition for what it is and to devise appropriate strategies for participating in it will survive (Abernathy, Clark and Kantow, 1988, p. 17 )

*In the emerging economy those strategies that small firms can employ most effectively are themselves more effective.* This shift in the relative effectiveness of strategies creates opportunities for the small firm sector; opportunities that, if seized upon, should increase the impact this sector will have on the economy.

Many articles that deal directly with small firms *do* emphasise similar characteristics; however, in the small firm literature connections between strategies and wider changes in the economy are at best implicit.

A second issue addressed in this Chapter was prompted by the deterministic nature of much of the literature which describes the forces of change. Mechanistic explanations raise questions of direct relevance to contemporary regional development. For example, is it inevitable that innovation will occur in some areas and not in others? Similar questions may be asked about flexible specialisation, the growth in services, and some of the findings of the small firm research reviewed in Chapter 1.

As discussed earlier, current thinking suggests that indigenous growth now plays a major part in contemporary regional development and much of that, if it is to come from anywhere, is likely to come from the local small firm sector. If innovation, flexible specialisation and service growth are bound to flourish in some regions and not in others, then a nation's ability to respond to certain regional problems will be severely weakened.

On this issue Chapter Two has emphasised that the literature on the forces of economic change does have balance - it is not wholly deterministic. As each force of change was examined the possibilities for alternatives to mechanistic explanations were presented. For each case it was also demonstrated that there is a place for small firms, especially if they adopt the strategies listed above. *So, theoretically at least, it should be possible for small firms to operate successfully over a range of environments including those that are relatively non-conducive.* That is, the strategies just listed should enable small firms to be robust with respect to the conduciveness of the immediate environment. Furthermore it has been shown that small firms are leading regional development in places like Emilia-Romagna (Brusco, 1986) and Mondragon (MacLeod, 1986). Nonetheless, as far as regional development in the UK is concerned, findings of empirical work reported in the small firms literature (presented in Chapter 1) raise doubts about the efficacy of the small firm sector as a tool of regional development during the 1980s and 1990s (Storey, 1982; Keeble and Wever, 1986; Mason, 1987A). Clearly the signals from the literature are mixed.

It would appear that in the UK evidence showing that small firm performance is influenced by factors in the environment is mounting. Also there is evidence to show that in the UK, environments differ considerably from one region to another. What is not known is whether small firms have (or have not) contributed to the recovery of UK communities during this period of time. The issue then is the efficacy of small firm led recovery. Chapter 3 describes an approach designed to explore this issue.

# CHAPTER THREE

# METHODOLOGY, AIMS AND OBJECTIVES

# CONTENTS

## Introduction

As discussed contemporary regional development strategies place considerable emphasis on indigenous growth and are likely to rely on the small firm sector as an important source of new jobs (Keeble and Wever, 1986). This change in emphasis has been brought about, in part, by increasing competition for inward investment and in part, by the relative performance of the UK small firm sector.

As indicated earlier (page 1), in the US and much of Europe, small firms have been net creators of jobs while large firms have been net losers of jobs (Birch, 1979; Storey, 1992; Storey and Johnson, 1987). In the UK, the small firm sector has been a key source of new employment during the 1980s while between 1979 and 1989 the share of total employment in firms with more than 1000 employees dropped from 35.3% to 27.5% (Daly, 1990). During the 1980s there was also a steady increase in the number of firms; growth in firm population was especially strong between 1985 and 1989 when almost two thirds (64%) of the net increase took place (Daly, 1990). Developments such as this have helped establish expectations for the small firm sector as a tool for regional development in the UK.

While the new prominence of the small firm may be linked to de-industrialisation and the decline of large firms, alternative explanations are possible. Coincident with the new prominence of small firms are some broad economic changes which appear to have, as their root causes, changes in the nature of demand and changes in technology. Explanations which link the new prominence of small firms to these forces of change can be used to show how the latter have altered business practices and the effectiveness of particular competitive strategies. Because some of the most effective strategies appear to be well suited for adoption by small firms, their prospects as vehicles for competition have improved. As a consequence, the new prominence of the small firm cannot simply be dismissed as a temporary and relatively unimportant by-product of decline. In other words, under some theoretical accounts (like Flexible Specialisation and Long Wave Theory) the prominence of small firms is likely to be a continuing phenomenon.

## Regional Differences In The UK

During the 1980s and for some time before, employment in Britain's manufacturing sector declined. By far the heaviest losses occurred in the North of England. In contrast, the non-manufacturing sector, a net creator of jobs over the 1980s, showed a strong southern bias (Artis, 1992). Thus in the UK some regions were in need of recovery, where recovery is taken to mean job creation in response to recent job losses. Partly because of the regional variations in employment change, there was, and continues to be, considerable interest in the spatial distribution of small firm growth.

Within the UK, the performance of the small firm sector has varied from region to region. Johnson (1983) used shiftshare analysis to establish that significant regional differences in the formation rates[1] of new manufacturing firms were not well explained by regional variations in industrial structure. Registration rates[2] for manufacturing firms between 1980 and 1988 showed an urban-rural variation with the highest rates being recorded in the less urbanised counties (Keeble, 1993B). Using VAT data, which records registrations of both manufacturing and non-manufacturing firms, Whittington (1984) showed that there was a regional bias in firm formation rates[3] against the least prosperous regions. A regional comparison of Scottish

[1]Defined here as the number of new manufacturing firms formed in an industry per 1000 male employees in that industry.
[2]Defined as the number of registrations per 1000 employees in production industries in 1981.
[3]Defined as the number of new VAT registrations per 1000 working population.

manufacturing firms in terms of actual and expected numbers of births, and actual and expected numbers of deaths was undertaken by Beesley and Hamilton (1986); their results confirm Johnson's earlier finding that observed variations are not well accounted for by industrial structure. An analysis of new manufacturing firm formation in Wales indicated that variations in firm formation were evident at the sub-regional[4] level, also (Westhead, 1989).

In addition to studies of spatial variations in formation rates, small firms from different locations have been contrasted in terms of their operating performances. Using several indicators of success, Mason (1989A) has shown that firms in the south of England have a much greater tendency to succeed compared to firms in North, Scotland and Wales, while work by Birley and Westhead (1990) also demonstrates north-south contrasts in small firm performances.

Several pieces of research (Storey, 1982; Coombes and Raybould, 1989; Moyes and Westhead, 1990; Mason, 1989B) have sought to explain such observed variations in the regional performance of the small firm sector. Throughout the approach has been to infer that there are limits to the robustness of the small firm sector. That is, the sector is assumed to be sensitive to its environment; thus, performance in different regions varies as the environments in these regions vary. This is one of the underlying assumptions of the spatial literature on small firms. Features of the environment thought to influence small firm performance fall into three broad categories:

[4]An aggregation of travel to work areas was used.

**1. Structural characteristics, that is, variations in local sectoral composition and variations in plant-size;**
**2. Socio-cultural characteristics, that is, variations in the social and demographic character of the population;**
**3. Economic characteristics, that is, variations in demand, availability of capital, and other features that may provide competitive advantages (Keeble, Walker and Robson, 1993).**

**Thus it has been deduced that Britain's regions vary in terms of the conduciveness of their environments towards the performance of the small firm sector. At one extreme, environments may be considered hostile (Keeble, 1993) while at the other, environments are considered nurturing (Sweeney, 1987).**

**Since the conclusion that environments vary in their conduciveness is based in part on observed variations in small firm performances it might be expected that the regions with the poorest small firm sector performances would also be the regions with the least conducive environments. But it is also true that the regions with the poorest small firm sector performances are the regions with the greatest need for new jobs (Figures 1.1 and 1.2).**

**It would then follow that the relationship in the UK between a region's need (for new jobs), and the conduciveness of its environment towards the small firm sector, is such that those regions in greatest need are those with the least conducive environments.**

**This relationship is illustrated in Table 3.1 which contrasts and ranks percentage changes in employment between 1981 and 1984 (taken as a measure of need) with the ranking each region received in Storey's**

entrepreneurial index (taken as a measure of conduciveness). As Table 3.1 clearly illustrates, with the exception of the North West,[5] there is a strong general trend, at the regional level, for the least conducive environments to be the environments with the greatest need. Furthermore, aspatial government policies directed toward the small firm sector over the decade have had the effect of fueling existing regional differences not reducing them (Barkham, 1987; Storey, 1982).

**Table 3.1 A Comparison of Employment Change and Entrepreneurship in the UK Regions**

| REGION | % Employment Change 1981-84 | Ranking on % Change | Ranking on Storey's Entrepreneurial Index |
|---|---|---|---|
| South East | -0.30% | Third | First |
| South West | 0.60% | Second | Second |
| East Anglia | 6.00% | First | Third |
| North West | -6.50% | Tenth | Fourth |
| East Midlands | -0.60% | Fourth | Fifth |
| West Midlands | -2.50% | Fifth | Sixth |
| Scotland | -4.00% | Seventh | Seventh |
| Yorkshire Humberside | -3.70% | Sixth | Eighth |
| Wales | -5.30% | Ninth | Ninth |
| Northern | -5.30% | Ninth | Tenth |

Sources: Storey, 1982; NOMIS

In other words, unless there is a change in government policy, the gap between small firm performances in different regions will persist or perhaps even widen. In these circumstances it is relevant to ask what is the scope for policy initiatives?

[5]The North West has proved the exception in terms of firm formation as well ((Johnson, 1983).

**As analysis reveals, (see Chapter 4) many of the variables found to be determining factors of net firm growth are not easily changed by direct policy intervention (Keeble, Walker and Robson, 1993) and they include aspects of regional economic and social life that are of a long standing and deep seated character (Westhead, 1989). Reynolds (1993) has drawn similar conclusions based on studies of the US economy. It would appear, therefore, that in spite of the strong performance by the small firm sector in the aggregate, prospects for small firm led regional economic recovery in the UK are bleak (Champion and Townsend, 1990).**

**Thus the comparative literature leads to doubts about the efficacy, rather than about the possibility, of small firm led regional development in the UK. In particular, results of research into the performance of the small firm sector lead to questions about the efficacy of small firm led recovery; especially when discussion includes those regions and communities most in need of new jobs. Efficacy of small firm led recovery becomes an issue when the following conditions prevail:**

1. **The robustness of the small firm sector is assumed to be limited;**
2. **Variation in the conduciveness of environments is evident.**
3. **The need for job creation is widespread.**

## Conduciveness Of Environments In The UK

**Many studies have sought to identify environmental properties that influence the performance of the small firm sector. Information of this sort could have great value in matters such as the formulation of government policy. However, to date, work that attempts to gauge variations in the conduciveness of environments for small firms has yielded rather limited results.**

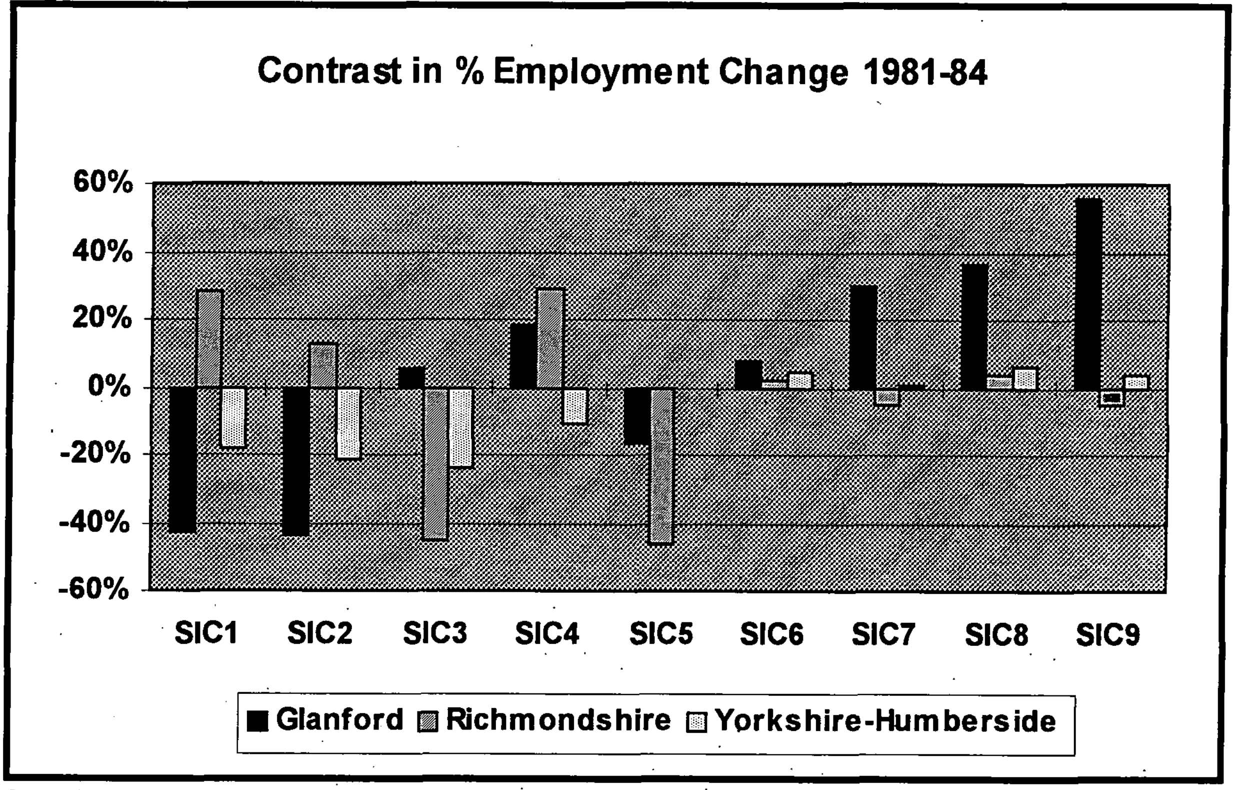
The most sophisticated scales developed are two rank order indices: Storey's (1988) entrepreneurial index and the Coombes and Raybould (1989) index of local enterprise activity potential (LEAP). Both indices are reported at the regional level of disaggregation, although the LEAP index is also applied at the county level.

These rank order scales provide comparative statements about the conduciveness of particular environments {e.g., environment A is more ( or less) conducive than environment B}. They provide no sense of the interval or gap that exists between environments of different rank; nor do they make possible a statement such as {environment A is twice as conducive as environment B}.

This is an important limitation because it means that inferences about the scale of the small firm response in a given environment of necessity will be vague. At best it might be possible to say that since environment A is more conducive than environment B it may be expected that the small firm response will be greater in environment A. In fact, tests by Whittington (1984) of Storey's (1982) entrepreneurial index even raise doubts about inferences at the rank order level.

Another weakness in much of this research is the tendency to use very coarse-grained regional data. Large spatial areas like regions can conceal considerable variation within their boundaries including what Westhead (1990) calls "Honey Pots". To illustrate this, Figure 3.2 displays change in employment for the period 1981 to 1984 for the Yorkshire and Humberside region as well as the employment change for the same period in two of its constituent Local Authority Districts: {Glanford and Richmondshire}. As Figure 3.2 illustrates, the aggregate measure conceals considerable variation within the region.

Figure 3.2




Source: NOMIS

Research by Cooke (1989) addresses this problem, as does work by Green and Howells (1987); both authors look at a much finer grain of space (local labour market areas) revealing considerable variation within regional boundaries. In other work, Fothergill and Gudgin (1979) found that there are greater spatial contrasts in economic development within regions than between them. Similarly, Coombes and Raybould (1989) observed much greater contrasts of firm activity when using county level data compared to regional level data.

The issue of coarse- versus fine- grained geographies may have relevance to the question of small firms and regional development, for while it appears to be the case that the small firm sector is not robust enough to overcome the environments of the most needy regions, there may be important exceptions within the broad boundaries of each region. The position taken here is that the issue deserves further investigation using a finer grained geography; one that monitors the community level. Such an approach is in line with recommendations made by Birley and Westhead (1990).

A third weakness in the research into the conduciveness of environments is the tendency to treat the small firm sector as a homogeneous set. It may be the case that certain environments are simultaneously conducive and non-conducive to small firms depending upon which industrial categories are examined. Recently, for example, evidence has been presented which shows that an environment characterized by the presence of many small firms is conducive to firm formation when consideration is limited to the manufacturing sector; however, for the formation of service firms, an environment with mainly large firms appears to be more conducive (Keeble, Walker and Robson, 1993). In the light of this it is worth noting that some of the early work on variations in small firm sector performance relied heavily on data from the manufacturing sector. Thus inferences about the small firm sector based on this information may be questioned. This illustrates that an issue like the conduciveness of an environment is likely to be complex and as Mason (1991) points out, knowledge on the topic is limited.

## Objective

Against this background the objective of this research is to examine the question of whether, at the community level, there are grounds for believing that small firm led recovery is efficacious, using Great Britain as a case region.

To answer this question the research focuses on the case of the Great Britain during the 1980s. As indicated in the first two chapters of this research, the country provides a setting where small firms exhibited strong growth throughout the decade. Also the political environment created by successive Conservative (Thatcher) governments favored the promotion of an "enterprise culture".

Great Britain also provides an environment where heavy job losses in the early part of the decade left many communities in need of job creation, and because these needs occurred in the 1980s, there were heavy demands for, and limited possibilities of, inward investment.[6]

As shown the small firm sector has been an important object of research in the UK. The literature on small firms has identified the sector as an engine of job creation but it has also established a body of evidence that raises doubts about the role small firms might play in less conducive environments. Thus research in the UK has sent mixed signals about its small firm sector and regional development.

The present research selects the community as its object of study because it is at the community level that the impact of job losses is most directly felt and it is at the community level that the <u>positive</u> impact of an active small firm

[6]At least one important exception to this general trend over that period is the level of investment entering Britain from Japan.

sector can provide a significant positive effect. For the purposes of this research communities are operationally defined as Local Authority Districts.

## Selecting The Communities

While it is contended here that the research on small firms gives mixed signals as to the likely efficacy of small firm led recovery, those research findings must not be ignored. For instance, information about variations in the conduciveness of different environments should be taken into account when adopting an approach for selecting communities.

If, as the literature suggests, performances of the small firm sector vary as environments vary, then communities selected on the basis of recent small firm sector performances would probably exhibit a bias with respect to the nature of their environments. That is, if communities were selected because their small firm sectors performed strongly then it is probable that these would be the communities with the most conducive environments. Such a subset would not yield a valid test of efficacy.

Similarly, if communities were selected for the nature of their environments then levels of small firm sector activity would be expected to vary as conduciveness varied. For instance, if communities were selected because they had non-conducive environments then, based on reported research, the performance of their small firm sectors would probably be relatively feeble. Therefore, as a basis for selection, this approach has the potential to introduce a bias that would make it difficult to answer questions about the efficacy of small firm led recovery.

Communities could be selected on the basis of their locations. But, given the questions being explored here, there is no compelling reason to select communities for their geography. If, for instance, a sample was selected so as to be equally composed of communities from the North and communities from the South, sharp contrasts in small firm activity might be evident but the question of efficacy would remain unanswered.

The approach adopted here is to identify communities that have recently experienced significant employment losses and are therefore communities in need of recovery. In this research these are referred to as depleted communities. Whether these depleted communities have environments that are conducive, non-conducive, or cover a range, is a matter of contingency. Similarly, whether these depleted communities have active small firm sectors, inactive small firm sectors, or represent a range of small firm activity levels is also a matter of contingency.

An important feature of this selection procedure is that it allows the issues of efficacy and robustness to be addressed separately. Robustness would only become an issue if a substantial proportion of the selected communities had environments that were non-conducive with respect to the formation of new firms. If all the environments were conducive, the issue of whether the small firm sector is robust would not arise. In other words, for the small firm sector to be efficacious in the face of non-conducive environments the small firm sector must be robust; but the sector could be efficacious without being robust if most of the environments were conducive.

Because the nature of environmental conduciveness in the set of depleted communities has not been determined apriori, it is meaningful and appropriate to ask whether there is a need for small firm led recovery to be robust in order for small firm led recovery to be efficacious.

By choosing communities without reference to their environmental properties and without reference to the performances of their small firm sectors, the biases that any interaction between these factors may have created are avoided.

So answers to the following questions are sought:

1. Must the small firm sector be robust in order to lead recovery in most of the depleted communities?
2. Is there evidence that small firm led recovery <u>is efficacious</u>?

The first question may be answered by examining the environments of the set of depleted communities. The selection process leaves open the question of whether Britain's depleted communities are varied or uniform with respect to the conduciveness of their environments; and, if uniform, whether they are all hostile or all conducive. In the context of this research, robustness means the demonstrated ability of small firms to overcome the limitations imposed by non-conducive environments to lead recovery. Therefore, evidence of robustness depends on evidence of non-conducive environments <u>and</u> on evidence of small firm led recovery. If the environments of all or most of the depleted communities are non-conducive, the need for small firms to be robust in order to lead recovery would be established.

The second question is really one about the nature of recovery. As such it requires delineation of a second set of communities. These are the recovering communities and they are drawn from, and are therefore a sub-set of, the depleted communities. A recovering community has been defined here as a depleted community that was able to restore some of its lost employment. If the results show recovering communities to be strongly linked to small firms and, at the same time, non-conducive with respect to environmental properties, then both the efficacy and the robustness of the small firm sector will have been established.

Can the small firm sector be depended upon to provide jobs to those communities in need of them regardless of the conduciveness of their environments? If it can, then the small firm sector will be efficacious. If it can not then the value of the small firm sector as a tool of regional development may be limited. But how can this be tested? The method adopted here is to identify the recovering communities, determine their environmental conduciveness and evaluate the contribution of the small firm sector to their recoveries.

The first stage is to identify a set of depleted communities. The procedure for doing this is described in the following section.

## Depleted Communities: An Operational Definition

In this research depleted communities are identified with geographic units known as 1981 Local Authority Districts. For convenience these local authority districts are referred to as 1981LADS. The identification was made for several reasons:

1. Foremost among the reasons was that 1981LADS are "frozen"; their physical boundaries do not change from year to year. Frozen or fixed boundaries are important to any study that tracks employment changes over time.

2. Local authority districts are also an appropriate choice because they represent a sphere of government influence which is an essential part of what is meant when a physical place is called a community (Perry, 1987).

3. Additionally, 1981LADS are jointly exhaustive and mutually exclusive thereby limiting errors of omission or errors arising from double counting.

4. In terms of scale each 1981LAD is large enough to offer an array of sectoral activity.[7] and small enough to reflect pockets of depletion even in regions thought to be thriving[8].

Having defined the concept of community used in this study as the 1981LAD, it is necessary to sort them into depleted communities and non-depleted communities. To develop such a procedure three attributes were explored. The first is a time interval over which the communities are to be monitored. The second is the quality of employment provided while the third is concerned with issues related to the meaning of terms like "significant loss" and "recovery" used in defining the depleted communities. When each of these points has been addressed an operational definition specifying a procedure for identifying depleted communities will be formulated.

In the introduction to this chapter depleted communities were defined as communities that had experienced a sudden and pronounced reduction in employment from which they were unable to recover quickly. In this,

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[7]In 1981 the average employment per local authority district was 46,400 (NOMIS).
[8]Using the definition developed here ten of Great Britain's eleven regions contain depleted communities.

considerable emphasis is placed on the notion of time. The loss was sudden and the loss was prolonged.

For the period under consideration (1981-1989) data on employment is drawn from the Department of Employment's Census of Employment which reports on employees. Information is available for four points during the decade: 1981, 1984, 1987, and 1989. The data is incapable therefore of providing a continuous description of what is taking place in each community. One potential source of information that could fill in these gaps is data that reports on changes in unemployment. Unemployment data is refreshed monthly. However, during the 1980s the unemployment definition changed as many as eighteen times (Economist, 1987); many of these changes led to significant differences in the estimates of the numbers involved. By one estimate the definitional changes led to a reduction of 420,000 in the numbers unemployed by the end of 1986 (Johnson, C., 1990). A second limitation arises when inferences are made about employment based on figures for unemployment. Changes in the number of unemployed can reflect changes in migration patterns; in such cases the changes would have nothing to do with employment within the Local Authority District. There may be further supplements possible, but an accurate picture of migration is difficult to develop because of the way in which this data is collected[9]

As a result of these limitations unemployment data was not used as a supplement for the employment data already available. Instead, employment data for the four time points is used and the limited benefits of a more continuous description are forfeited.

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[9]Information is gathered through the national Health system. Individuals moving to a new area may register with a new surgery. This information is compiled and used to determine flows into and out of a particular area.

Those 1981LADs that lost significant employment in the interval 1981-1984 and were unable to recover fully[10] by 1987 have been termed depleted communities. The set of depleted communities is delineated on the basis of employment change. Under the most straightforward interpretation, an individual is either employed or not employed. But this is a simplistic view because it is clear that for a community, loss of a full-time job and the establishment of a part-time job are not off-setting events. The significance of the problem is demonstrated by the scale of growth in part-time employment occurring in the 1980s; between 1981 and 1989 part-time employment in Great Britain increased by 685,000 jobs (Allen and Massey, 1990).

By measuring employment in terms of full time equivalents (FTE) the distinction between full-time and part-time employment may be addressed without escalating the complexities of the measurement. A depleted community is seen then as a community that experiences a significant reduction in employment where this measure is expressed in full-time equivalents[11]

In this research, to say that a drop in employment is significant is to say that FTE employment change has fallen below expectations. Thus for the interval 1981-1984 the national pattern was a decrease in employment so a depleted community would be a community that not only lost employment but lost employment at a rate that was in excess of the national rate. In addition to this feature a community would only be considered depleted if subsequent employment growth during the period 1984-1987 did not restore it to 1981-

[10]The expected value is based on the national trend in full time equivalent employment over the period 1981-1987 and means growth at the national rate.

[11]Part time employment is expressed in full time equivalents by use of a 2:1 ratio; that is, two part time jobs are considered the equivalent of one full time job. This is the approach adopted by Champion and Townsend, 1990.

1987 expected levels. Chapter 4 describes the set of depleted communities identified by these procedures.

## Recovering Communities

Like depletion itself, recovery is defined in terms of changes in FTE employment. In the context of this research the term recovering community is used to delineate those depleted communities that have managed to become significant net creators of jobs during the interval between 1984 and 1989. In particular, a depleted community is described as recovering if, during the interval between 1984 and 1989, growth in FTE employment exceeded the national rate of increase for the same period. Under these circumstances FTE employment in recovering communities would be greater than expected employment change for the period. Chapter 4 describes these recovering communities and contrasts them with the depleted communities.

## Conclusion

Depleted communities are operationally defined in this research to be those 1981LADS whose rates of decline in FTE employment were in excess of the national rate, for the period between 1981 and 1984. Thus depleted 1981LADS are communities that faced the mid to late 1980s in need of employment growth to recover their previous positions.

In terms of job generation, government policies at the time implied that officials were prepared to place considerable reliance on the contributions that were to come from the small firm sector. Because the interest here is in demonstrating the ability of the small firm sector, particularly new small firms, to respond to a community's need for recovery in the 'new' economy, it is important to identify a set of communities whose need for recovery was recent. The question is, could this group of depleted communities depend upon the small firm sector to provide some, or perhaps even all, of the jobs needed?

Declines in rates of employment which were lower than the national average would, on the basis of shiftshare analysis, suggest that either structural or 'indigenous' factors, or perhaps both, exerted a negative influence in these communities. Although this is a thin bit of evidence it does suggest that by definition depleted communities are likely to offer environments that are less supportive of job creation. Similarly, the approach employed to identify recovering communities uses a national standard for recovery, that is, the recovering communities are performing at a rate that is above the national average during the period between 1984 and 1989. From shiftshare analysis this implies that factors related to industrial structure and indigenous features of the communities are needed to account for at least some of the change. Since the literature suggests that structural accounts have limited explanatory power (Johnson, 1983; Westhead, 1989), the indigenous or residual factor is likely to be important.

The conduciveness of the environments provided by depleted communities may vary. They may be mostly conducive, mostly hostile or cover a range. This feature of depleted communities must be determined. If most depleted communities are found to be hostile environments, this would establish that recovery would have to be robust in order to be widespread. Then if small firms were shown to play a role in these recoveries the small firm contribution could also be considered robust. The approach does not prejudge the issues: rather than isolating on those cases where small firms have led recovery, all recovering communities are examined and the contribution of the small firm

**sector is evaluated. Chapters 4-6 report the findings with respect to the character and response of Britain's depleted communities.**

# CHAPTER FOUR

# BRITAIN'S DEPLETED COMMUNITIES

# CONTENTS

# Introduction

Chapter Four sets out to determine the extent to which Britain's small firm sector would have to be *robust* if it was to lead widespread employment recovery at the community level during the 1980s. To do this, Britain's depleted communities are identified and profiled. Depleted communities are those 1981LADs that have undergone significant FTE employment losses between 1981 and 1984 and are, therefore, communities needing recovery.

Some of the earliest work which investigated issues related to the conduciveness of different environments was carried out at the *regional* level. The results of this work are discussed and the implications with respect to conduciveness are drawn out. It is shown that most *regions* contain depleted communities. However, more recent studies of environmental factors believed to influence firm registration rates have been conducted at the *county* level. A review of this research identifies a series of factors which can be used to predict formation rates. Similar factors are compiled using the NOMIS data base and other sources and their ability to *explain* variations in firm registrations is demonstrated by means of a multiple regression. The factors are then used to operationalize the notion of conduciveness using a discriminant analysis procedure.

The concepts of efficacy and robustness introduced in Chapter 3 are developed further here. Efficacy, as it applies to recovery, implies that recovery is widespread; that is, recovery is efficacious when a considerable proportion of those communities identified as depleted are subsequently able to restore lost employment. Evidence of efficacy however, is not necessarily evidence of robustness. Robustness, refers to those cases where small firm led recovery occurs under conditions that would be described as non-conducive. Therefore, information about the conduciveness of the environments occupied by depleted communities must be available before any comment about robustness is possible. It is the purpose of this Chapter to develop a means of gauging the conduciveness of Britain's depleted communities.

## Britain's Depleted Communities

In Britain, between 1981 and 1984 the total number of employees in employment dropped by 2.1%. This net change was comprised of a 3% *increase* in part time employment, which occurred primarily in the service sector, and a concurrent *decrease* in full time employment of 3.5%, occurring primarily in manufacturing. The aggregate figures for various categories of 1981 - 1984 employment change in Britain are presented in Table 4.1.

Table 4.1

| | Total Employment | Part-Time Employment | Full-Time Employment | FTE Employment |
|---|---|---|---|---|
| 1981 | 21,298,651 | 4,492,731 | 16,805,920 | 19,052,285.5 |
| 1984 | 20,845,866 | 4,628,951 | 16,216;915 | 18,531,390.5 |
| Change | -452,785 | 136,220 | -589,005 | -520,895 |
| %Change | -2.10% | 3.00% | -3.50% | -2.70% |

Source: NOMIS

Of the various measures of employment change shown in Table 4.1 only the FTE employment statistic is able to reflect, in a single figure, the net impact of cases where losses in full time employment are partially offset by gains in part time employment. Because the British case *is* characterised by partially offsetting changes in full and part time employment for the period between 1981 and 1984, the FTE employment statistic is used in this research. Nationally, FTE employment dropped by 2.7% between 1981 and

**1984 with declines being recorded in eight of the country's eleven regions.**

**Table 4.2**

**FTE EMPLOYMENT CHANGE IN THE REGIONS OF GREAT BRITAIN 1981-84**

| REGION | 1981 FTE EMPLOYMENT | 1984 FTE EMPLOYMENT | CHANGE |
|---|---|---|---|
| South East (Rose)[1] | 3,231,981.50 | 3,288,779.00 | 56,797.5 |
| East Anglia | 606,634.00 | 638,548.50 | 31,914.5 |
| London | 3,238,997.50 | 3,148,057.00 | -90,940.5 |
| South West | 1,359,252.50 | 1,361,991.00 | 2,738.5 |
| West Midlands | 1,826,867.00 | 1,773,478.50 | -53,388.5 |
| East Midlands | 1,313,688.00 | 1,296,824.50 | -16,863.5 |
| Yorkshire & Humberside | 1,642,286.00 | 1,562,666.00 | -79,620.0 |
| North West | 2,193,488.50 | 2,031,682.00 | -161,806.5 |
| Northern | 1,004,461.00 | 938,844.00 | -65,617.0 |
| Wales | 843,899.00 | 790,013.50 | -53,885.5 |
| Scotland | 1,790,730.50 | 1,700,499.50 | -90,231.0 |
| Column Totals | 19,052,285.50 | 18,531,383.50 | -520,902.0 |

1 Rest of South East, i.e., South East excluding London

**Source NOMIS**

**Changes in FTE employment for the regions of Great Britain are presented in Table 4.2 where it can be seen that East Anglia, the South East and the South West proved exceptions to the general trend; in these regions FTE employment *grew.* There is, as well, a sharp differential between the performances of northern and southern regions of the country which is typical of the contrasts used to establish the notion of a North - South Divide. However, the contrast between North and South is less marked when FTE employment change is examined on a finer grain of geography. Table 4.3 illustrates that pockets of decline were evident even within the *growing* regions. At the community level, 273 of Britain's 459 LADs experienced losses in FTE employment *affecting all eleven regions of***

*Britain*. Thus the finer grained analysis confirms that FTE employment losses were a *relatively common experience* for local economies in Britain during the period between 1981 and 1984.

Table 4.3

FREQUENCY OF LADS EXPERIENCING 1981-84 EMPLOYMENT LOSSES OR GAINS BY REGION

| Region | FREQUENCY OF EMPLOYMENT LOSSES | FREQUENCY OF EMPLOYMENT GAINS | TOTALS |
|---|---|---|---|
| South East (Rose) | 41 | 57 | 98 |
| East Anglia | 4 | 16 | 20 |
| London | 26 | 7 | 33 |
| South West | 20 | 27 | 47 |
| West Midlands | 18 | 18 | 36 |
| East Midlands | 23 | 17 | 40 |
| Yorkshire & Humberside | 19 | 7 | 26 |
| North West | 31 | 6 | 37 |
| Northern | 23 | 6 | 29 |
| Wales | 28 | 9 | 37 |
| Scotland | 40 | 16 | 56 |
| Totals | 266 | 193 | 459 |

Source NOMIS

While the finer grained (1981LAD) approach establishes the importance of variations within regions, the data in Table 4.3 fails to provide any sense of the *degree* of FTE employment loss at the community level. Table 4.4 introduces this dimension of FTE employment change by reporting on the *regional* distribution of depleted communities. Depleted communities are those LADs recording the severest losses in FTE employment for the period between 1981 and 1984[1].

[1] FTE employment losses in excess of the national rate which was -2.7% for the period 1981-84.

It can be seen that when attention is focused on depleted communities evidence of the North-South Divide re-emerges. Table 4.4 also shows the disproportionate share (71%) of all depleted communities that are found in the North. In addition, Table 4.4 indicates that a LAD in a northern

Table 4.4

| | FREQUENCY OF NON-DEPLETED COMMUNITIES | FREQUENCY OF DEPLETED COMMUNITIES | TOTALS |
|---|---|---|---|
| South East (Rose) | 84 | 14 | 98 |
| East Anglia | 20 | 0 | 20 |
| London | 20 | 13 | 33 |
| South West | 42 | 5 | 47 |
| West Midlands | 28 | 8 | 36 |
| East Midlands | 32 | 8 | 40 |
| Yorkshire & Humberside | 14 | 12 | 26 |
| North West | 12 | 25 | 37 |
| Northern | 15 | 14 | 29 |
| Wales | 16 | 21 | 37 |
| Scotland | 27 | 29 | 56 |
| Totals | 310 | 149 | 459 |

Source:NOMIS

region is more likely to be depleted than one in the South, as the northern regions have larger shares of their constituent LADs depleted. The West Midlands, with only 11% of its LADs depleted, is an exception to this general trend.

In the local economies affected, these employment losses created a need for recovery; that is, a need to restore FTE employment lost in the period between 1981 and 1984. To assist in understanding the nature of these employment losses a shiftshare analysis was performed. In the shiftshare the set of depleted communities is contrasted with the set of all others (hereafter referred to as non-depleted communities).

Shiftshare analysis (Figure 4.1) indicates that although depleted communities accounted for only 44% of Britain's FTE employment in 1981 they shouldered almost 80% of the country's FTE employment *losses* between 1981 and 1984. Only part of this substantial drop is accounted for by reference to the national trend for the period; similarly, the industrial structure of depleted communities only accounts for some of the net loss of 668,347 FTE positions. By far the largest component of the shiftshare is the residual element which represents 58% of the total change. For depleted communities these residuals are negative in every industrial sector including the service sectors (SIC=7-9). Both depleted and non-depleted communities lost employment in sectors 1 to 4 but there are major differences in the rates of employment loss: for instance, with respect to category 2 (extraction and manufacturing) the rates of loss were six times as great in depleted communities; in all other categories of manufacturing, rates of loss in depleted communities exceeded rates of loss in non-depleted communities by at least a factor of two. In one sector (SIC=8) there was net employment growth in both types of community but the rate of growth for depleted communities was only one half the rate for non-depleted communities.

This analysis suggests that depleted communities underwent a complex process of FTE employment change between 1981 and 1984 where factors

FIGURE 4.1

SHIFTSHARE

| Industrial Sector | SIC NO. | 1981 | 1984 | Change | National Component | Structural Component | Residual Component |
|---|---|---|---|---|---|---|---|
| NON-DEPLETED | | | | | | | |
| ENERGY & WATER | 1 | 323,699 | 298,163 | -25,536 | -8,837 | -33,956 | 17,257 |
| EXTRACTION & MANUFACTURING | 2 | 422,113 | 407,688 | -14,426 | -11,524 | -40,481 | 37,579 |
| METAL GOODS & VEHICLE MFG. | 3 | 1,427,148 | 1,295,738 | -131,410 | -38,961 | -168,689 | 76,240 |
| OTHER MFG. INDUSTRIES | 4 | 1,186,109 | 1,139,518 | -46,591 | -32,381 | -60,254 | 46,044 |
| CONSTRUCTION | 5 | 585,020 | 559,509 | -25,511 | -15,971 | -19,130 | 9,590 |
| DISTRIBUTION, HOTELS | 6 | 1,972,949 | 2,063,839 | 90,890 | -53,862 | 94,504 | 50,247 |
| TRANSPORT AND COMMUNICATION | 7 | 756,450 | 744,465 | -11,985 | -20,651 | -20,273 | 28,939 |
| BANKING, FINANCE & INSURANCE | 8 | 1,016,577 | 1,195,479 | 178,902 | -27,753 | 174,750 | 31,905 |
| OTHER SERVICES | 9 | 2,763,612 | 2,918,378 | 154,767 | -75,447 | 139,562 | 90,651 |
| TOTALS | 1 - 9 | 10,453,675 | 10,622,775 | 169,101 | -285,385 | 66,033 | 388,453 |
| DEPLETED | | | | | | | |
| ENERGY & WATER | 1 | 362,113 | 297,016 | -65,097 | -9,886 | -37,986 | -17,226 |
| EXTRACTION & MANUFACTURING | 2 | 467,086 | 371,773 | -95,314 | -12,751 | -44,794 | -37,769 |
| METAL GOODS & VEHICLE MFG. | 3 | 1,360,703 | 1,086,267 | -274,436 | -37,147 | -160,835 | -76,454 |
| OTHER MFG. INDUSTRIES | 4 | 957,763 | 836,424 | -121,339 | -26,147 | -48,654 | -46,538 |
| CONSTRUCTION | 5 | 471,847 | 433,970 | -37,877 | -12,881 | -15,429 | -9,566 |
| DISTRIBUTION, HOTELS | 6 | 1,370,924 | 1,348,560 | -22,364 | -37,426 | 65,667 | -50,605 |
| TRANSPORT AND COMMUNICATION | 7 | 603,706 | 542,146 | -61,560 | -16,481 | -16,179 | -28,900 |
| BANKING, FINANCE & INSURANCE | 8 | 584,349 | 636,929 | 52,581 | -15,953 | 100,450 | -31,916 |
| OTHER SERVICES | 9 | 2,080,364 | 2,037,424 | -42,941 | -56,794 | 105,058 | -91,205 |
| TOTALS | 1 - 9 | 8,258,853 | 7,590,507 | -668,347 | -225,467 | -52,702 | -390,178 |

other than industrial structure and the influence of the nation's performance contributed to their poor showing.

For these depleted communities the prospect of recovery may well depend upon the kinds of environments the communities are able to provide for their small firm sectors. That is, the prospects for recovery are probably better if the environments are conducive to small firm sector activity. For this reason it is relevant to ask what kinds of environments do the small firm sectors in depleted communities face?

## The Environments of Depleted Communities

One of the earliest attempts to evaluate the relative conduciveness of various UK environments was Storey's (1982) entrepreneurial index. The index ranked regions of the UK based on a series of measures which attempted to gauge, often indirectly, factors like differences in the availability of capital; variations in the supply of educated entrepreneurs and those with managerial expertise; ranges in the size of incubator plants; and variations in barriers to entry in different environments (Storey, 1982).

The relevance of some components of the index to firm formation has been questioned (Whittington, 1984) but Storey claims the rankings, "...satisfactorily reflect the entrepreneurial potential of the regions." (Storey, 1988, p. 195) Storey's index ranks the regions from one to ten where a ranking of one indicates the region with the highest entrepreneurial potential and a ranking of ten indicates the region with the lowest entrepreneurial potential. It is reasonable to conclude therefore that those regions with rankings at or near one would be considered the most conducive to small firm formation and those with rankings beyond five, should be considered the least conducive.

Table 4.5 compares Britain's regions in terms of their ranking on Storey's index and the number of depleted communities each contains. With the exception of East Anglia, which has none, depleted communities are dispersed widely throughout the regions. This distribution establishes that widespread recovery (that is recovery in more than 50% of the communities identified as depleted) *would have to include some communities from the less conducive regions* since more than half of the depleted communities are found in the least

Table 4.5

**A REGIONAL COMPARISON OF ENTREPRENEURIAL INDICES AND FREQUENCY OF DEPLETED COMMUNITIES**

| RANKING | REGION | NO. DEPLETED |
|---|---|---|
| ONE | SOUTH EAST | 14 |
| TWO | SOUTH WEST | 21 |
| THREE | EAST ANGLIA | 0 |
| FOUR | NORTH WEST | 25 |
| FIVE | EAST MIDLANDS | 8 |
| SIX | WEST MIDLANDS | 5 |
| SEVEN | SCOTLAND | 29 |
| EIGHT | YORKSHIRE & HUMBERSIDE | 12 |
| NINE | WALES | 21 |
| TEN | NORTHERN | 14 |

Sources: Storey (1988) and NOMIS

conducive regions; in fact, more than half of the depleted communities are found in those regions ranked between the 7 and 10 on Storey's index . As discussed in Chapter Three the small firm sector must be robust in order to overcome the 'constraint' imposed by a non-conducive environment. Therefore, based on the information presented in Table 4.5 it could be concluded that in order to assist in the recovery of a majority of its depleted communities Britain's small firm sector would have to be robust.

But there are at least two reasons why this conclusion is unsatisfactory. The first concerns the relatively heterogeneous nature of Great Britain's regions.

Table 4.6

New Firm Registration Rates

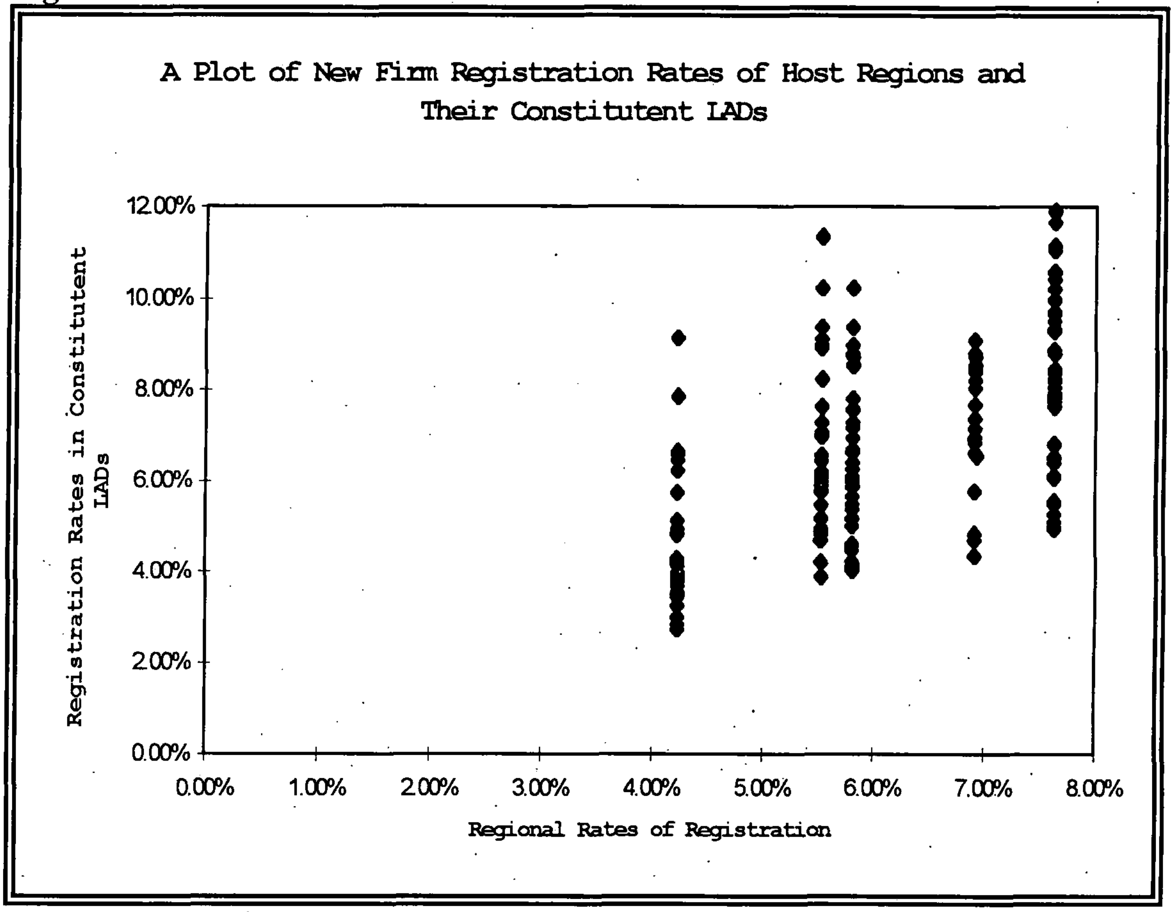
| Region | Regional Rate | Lowest Rate in Constituent LAD | Highest Rate In Constituent LAD |
|---|---|---|---|
| South East (Rose) | 7.70% | 3.10% | 12.20% |
| East Anglia | 6.91% | 4.40% | 9.10% |
| London | 6.93% | 3.90% | 11.30% |
| South West | 7.63% | 4.90% | 11.90% |
| West Midlands | 5.53% | 3.90% | 11.40% |
| East Midlands | 5.81% | 4.03% | 10.20% |
| Yorkshire & Humberside | 5.49% | 3.80% | 8.60% |
| North West | 5.18% | 2.20% | 7.93% |
| Northern | 4.23% | 2.70% | 9.10% |
| Wales | 5.90% | 3.50% | 10.70% |
| Scotland | 4.21% | 1.40% | 20.30% |

Source: NOMIS

In Chapter 3 it was demonstrated that within regional boundaries there can be wide variations with respect to employment change. Table 4.6 illustrates a similar kind of heterogeneity with respect to VAT registrations.

The first column of Table 4.6 shows the registration rate for each region expressed as the number of registrations between 1984 and 1989 per 100 of labor force. The second column shows the *range of values* this same variable spans when measurements are made at the community level in the region's constituent LADs. This Table demonstrates clearly that the amount of variation in registration rates *within regions* far exceeds the variation of registration rates existing *between regions.*

Figure 4.2




Source: NOMIS

In other words, no matter how accurately regional conduciveness could be determined, that knowledge could not be used to predict, with any reasonable level of accuracy, the registration rates of the constituent LADs.

This can be tested as follows: if perfect knowledge of all of the factors that determine regional registration rates was available, then regional rates could be predicted with perfect accuracy. Would such perfect information allow constituent LAD level registrations to be predicted? This question can be answered by plotting for each constituent LAD, its *actual registration rate* against its *predicted registration rate* (where the predicted value is the host region's rate). If the regional information can be used to predict the constituent LAD performances the predicted and actual values should fall on a straight line but as Figure 4.2 shows this is not the case. These outcomes suggest that as a measure of influence at the LAD level, factors that determine *regional conduciveness* are of limited value. The second reason for exploring the issue of robustness further is that most of the work which sought to identify factors that influence registration rates has been done at the *county level.* It is fair to say that most of what is known about environmental factors that influence firm formation rates is in terms of properties possessed by Great Britain's 66 counties. Thus the conclusion, based on *regional* measures, that there is need for a robust small firm sector has ignored information from this significant body of research. In the next section, factors that influence firm formation at the county level are explored.

## The Relative Conduciveness of Britain's Counties

Since the 1980s a number of researchers (Westhead, 1990; Mason, 1991; Ashcroft, et. al., 1991; Barkham, 1987) have drawn attention to sharp variations in the rates of new firm formation across the *regions* and more particularly across the *counties* of Britain. Explanations of these observed variations tended to compare the environments of places where formation rates were relatively high with the environments of places where the formation rates were relatively low. In some cases (Moyes and Westhead, 1990) the comparisons explored a wide range of available variables and tested for their statistical significance. Others, like Ashcroft Love and Molloy, took a more theoretical approach, limiting their search to variables drawn from theoretical models of firm formation.

Recently, Keeble Walker and Robson (1993) have reviewed this work and reaffirmed the importance of certain environmental factors as variables which can be used to explain observed variations in small firm formation rates at the county level; their study also introduced some new factors such as antecedent population change and political representation which account for significant amounts of the observed variation. Figure 4.3 provides a summarised list of some factors known to be associated with variations in the rates of formation of small firms, and in the case of the *peripherality index,* (Owen & Coombes, 1983), a factor associated with the survival rates of recently established firms. The peripherality index is included in the list because figures reported in the Coombes study indicated a possible connection between the peripherality index and registration rates.

For each of the variables listed, a source has been identified and the direction (whether positive or negative) of the association with firm formation rates is indicated. Examination of Figure 4.3 shows that some of the factors demonstrated to be important influences at the regional level are similar to ones known to exert influence at the finer grained county level.

The NOMIS data base was used to assign values to most of these variables and in cases where this was impossible, alternative sources were used. Firm

| Figure 4.3 | |
|---|---|
| ***Sources*** | ***Regional Level Factors*** |
| Whittington, 1984 | % owner occupied |
| | dwellings +'ve |
| Whittington, 1984 | % manual workers -'ve |
| Whittington, 1984 | increases in |
| | unemployment rate +'ve |
| | ***County Level Factors*** |
| Ashcroft, Love & Malloy, 1991 | % of home ownership +'ve |
| | |
| Moyes & Westhead, 1990; | % of manufacturing labour force |
| Ashcroft, Love & Malloy, 1991 | employed in small mfg. firms +'ve |
| | |
| Moyes & Westhead, 1990; | increases in |
| Hamilton, 1989 | unemployment rate +'ve |
| | |
| Westhead & Moyes, 1991 | high % of managers |
| Coombes & Raybould, 1989 | and professionals +'ve |
| | |
| Moyes & Westhead, 1990; | % of manual workers -'ve |
| | |
| Moyes & Westhead, 1990; | % of employees in small firms +'ve |
| | |
| Moyes & Westhead, 1990; | level of self-employment +'ve |
| | |
| Ashcroft, Love & Malloy, 1991 | % of population in |
| | social groups I & II +'ve |
| | |
| Moyes & Westhead, 1990; | consistently high rates |
| Hamilton, 1989 | unemployment -'ve |
| | |
| Coombes & Raybould, 1989 | % owner occupied housing +'ve |
| | |
| Coombes & Raybould, 1989 | population growth 1981-85 +'ve |
| | |
| Coombes & Raybould, 1989 | level of peripherality -'ve |
| | |

registrations were drawn from VAT data and normalised using the 1981 labor force figures and the rate was multiplied by 100 to give the number of VAT registrations per 100 members of the labor force. VAT registrations spanned the period from 1980 to 1989 inclusive and included all VAT industrial sectors. In order to achieve consistency with LAD registrations figures which will used in later chapters the county registration figures were derived by aggregating VAT registrations for each of the constituent LADs.

Variables drawn from sources other than NOMIS were CHGPOP which measures changes in population over the period from 1975 to 1985; POPCHG75 which measures changes in population over the period from 1975 to 1980; and PCNTCOUN which expresses as a percentage of all elected officials those who represented the conservative party. For CHGPOP and POPCHG75 the sources used for this information were Regional Statistics 1975 and Regional Trends 1987. The earlier source, Regional Statistics, actually provided estimates of population changes for the period from 1975 to 1981; Regional Trends on the other hand, provided actual data for the period from 1980 to 1985. Given the rather small values of annual population change involved in these figures the overlap in the data for 1981 was ignored and CHGPOP was calculated simply as the sum of these two periods. POPCHG75 is the estimated population change for the period 1975 to 1981 reported in Regional Statistics 1975.

The source of PCNTCOUN was the 1988 Municipal Yearbook. PCNTCOUN expresses as a percentage of all elected officials the number who were elected as members of the conservative party. This variable is the converse of one used by Keeble Walker and Robson (1993). In their study the number of representatives from the Labour and Nationalist parties was expressed as a percentage of total representation and was expected to have a negative association with rates of firm formation. In fact the correlation, with rates of registration normalised by labour force, was strongly negative at -0.77

(Keeble, Walker, Robson, 1993). In this study PCNTCOUN was expected to have a positive correlation with the rate of registrations. The two variables differ as well in terms of their timing; the variable used by Keeble was drawn from the 1975 and 1984 Municipal Yearbooks, whereas the present study uses information from the 1988 Municipal Yearbook. In comparison to the variable used by Keeble the percentage of conservative representation (PCNTCOUN) is less strongly associated with registration rates and as expected, it differs in direction, that is, the variable is positively associated with registration rates.

Although the variables used in the multiple regression procedure attempt to reflect research findings reported in the literature on small firms, there is also an attempt wherever possible to select variables which measure attributes of the sixty-six counties as they were in 1981. The reason for this is to portray each environment as it existed at the start of the period under examination. For some variables it was impossible to maintain this time line. For instance, PCNTSMAL is a variable which measures the percentage of all employees who work in small firms. While data relating to manufacturing firms is available for 1981 the best measure of employees in "all" small firms is the Department of Employment's sizeband data which is only available from 1987 onward. In order to keep the variables comparable PCNTMFG, the percentage of all manufacturing employees working in small manufacturing firms was also drawn from the sizeband data base. PRFINDEX, the peripherality index, was first reported in 1983 (Owen and Coombes, 1983) but in terms of time sensitive components it uses employment data from 1977. Since a measure like relative peripherality is unlikely to change rapidly it is assumed that the values reported are a reasonable estimate of the state of affairs existing in 1981.

As just discussed CHGPOP measures changes in population over the period from 1975 to 1985. Like a similar variable introduced by Keeble, CHGPOP serves the dual roles of estimating (in the case of population increases) a growth in local demand as well as estimating increases in the pool of potential entrepreneurs. A related variable POPCHG75 uses estimates of population changes for the period from 1975 to 1981 for similar purposes but describes the state of affairs for the years prior to 1981.

The third variable that does not, and by its nature could not, represent the state of affairs as at 1981 is PCTFTE14 which measures the percentage change in FTE employment between 1981 and 1984. This variable is intended to measure (where the changes are negative) the increase in supply of recession pushed entrepreneurs midway through the decade. It is used in preference to unemployment figures which are more difficult to interpret as a result of definitional changes (Johnson, C., 1989). All other variables are measured as at 1981.

The variables compiled from NOMIS and other sources are presented as a reasonable representation of the factors identified by small firm research. Factors of this sort are believed to influence the formation rates of small firms at the county level. To test this claim, the variables are used in a multiple regression procedure to estimate the variation of registration rates over the period from 1980 to 1989 at the county level. The following section describes in detail how each variable was operationalized from NOMIS and other sources.

# CHART OF VARIABLES USED IN REGRESSION AND DISCRIMINANT ANALYSIS ALONG WITH THEIR SOURCES

| | |
|---|---|
| REGPR100 | VAT registrations in all vat-industry sectors for the period from 1980 to 1989.<br><br>Source, Nomis: data=vat,year=1980-1989,vat-industry=11,lad=1-459. |
| PCNTPRO | Percentage of the labor force who are professionals for the year 1981.<br><br>Source, Nomis: data=sas, year=1981, ratio=4817/4374, county=1-66. |
| PCNTMANU | Percent of employees in manual occupations in 1981.<br><br>Source, Nomis: data=occ, year=1981, ocstatus=6-7, broadwoc=6-7. |
| PCNTMAN2 | Percent of employees in manual occupations in 1981.<br><br>Source, Nomis: data=occ, year=1981, ocstatus=6-7, broadwoc=6. |
| PCNTGRUP | Percentage of the labor force in social groups I & II in 1981.<br><br>Source, Nomis: data=sas, year=1981, ratio=(4230+4238)/4374, county=1-66. |
| PCNTOWNR | Percentage of privately owned homes in 1981.<br><br>Source, Nomis: data=sas, year=1981, ratio=5408/4952 county=1-66. |
| PCNTMFG | Percentage of all manufacturing employees who work in firms with fewer than 25 employees in 1987. |

Source, Nomis: data=sb80, year=1987, division=1-4, item=2, sizeband=1-3 and sizeband=16, county=1-66.

| | |
|---|---|
| PCNTSMAL | Percentage of all employees who work in firms with fewer than 25 employees in 1987. |
| | Source, Nomis, data=sb80, year=1987, division=0-9, item=2, sizeband=1-3 and sizeband=16, county=1-66. |
| PCNTCOUN | Percentage of local elected officials who were members of the conservative party 198?. |
| | Source, Municipal Yearbook, 1988. |
| PCNTSELF | Percentage of the labor force who were self employed in 1981. |
| | Source, Nomis:data=occ, year=1981, ocstatus=1-2, broadwoc=1-6. |
| POPCHG | The sum of percentage changes in county populations between 1975 and 1985. |
| | Source, Regional Statistics No. 14, 1979 which provided estimates of population change 1975-1981. Regional Trends No. 22, 1987 which provided population changes for the period from 1980 to 1985. |
| CHGPOP75 | The percentage change in population between 1975 and 1981 in each county. |
| | Source, Regional Statistics No. 14, 1979. |
| PRFINDEX | A measure of the relative accessibility of each of the counties in 1981. |
| | Source, Owen, D. and Coombes, M., 1983, An Index of Peripherality for local areas in the United Kingdom, Regional Development Studies, University of Newcastle upon Tyne. |

PCFTE14C Percentage of FTE employment change occurring between 1981 and 1984.

Source, Nomis: data=ce80, division=0-9, year=1981-1984 sex=all-ftw,lad=1-459. Part-time employment is converted to FTE employment using a 2:1 ratio.

Some pairs of variables may be closely related since many of them attempt to function as surrogates for complex concepts like local demand and the general prosperity of county areas. Others, attempt to reflect the presence of a supply of entrepreneurs or other supply side concepts such as availability of capital.

As a preliminary step in the regression procedure Table 4.7 reports correlations among all pairs of variables. Correlations above 0.70 are highlighted in the table. The strongest correlations with the dependent variable (REGPR100) are PCNTSELF (0.647), PCNTOWNR (0.568) and PCNTFTE14 (0.515). The table also shows that the high correlation between registration rates and population change (0.68) reported by Keeble Walker and Robson (1993) is not repeated here (0.501). There are at least three differences which may account for this discrepancy: first, the periods over which the registrations are measured are different; second, the Keeble Walker and Robson (1993) study included Northern Ireland and aggregated the Island counties in Scotland for a total of sixty-four cases; finally, as was mentioned earlier, the figures used to compile population changes are different. Having measured PCNTCOUN, as the percentage of all representatives who are members of the conservative party the high negative correlation (-0.77) with the dependent variable reported by Keeble Walker and Robson (1993) is not matched. The correlation reported here is weaker (0.338). In its favour, PCNTCOUN is positively associated with the rate of registrations and is

TABLE 4.7 **Correlations Between Variables Used In Regression**

| | REGPR100 | PCNTPRO | PCNTMANU | PCNTMAN2 | PCNTGRUP | PCNTOWNR | PCNTMFG | PCNTSMAL | PCNTCOUN | PCNTSELF | POPCHG | CHGPOP75 | PRFINDEX | PCFTE14C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| REGPR100 | 1.000 | | | | | | | | | | | | | |
| PCNTPRO | 0.312 | 1.000 | | | | | | | | | | | | |
| PCNTMANU | -0.501 | -0.828 | 1.000 | | | | | | | | | | | |
| PCNTMAN2 | -0.363 | -0.769 | 0.937 | 1.000 | | | | | | | | | | |
| PCNTGRUP | 0.595 | 0.703 | -0.801 | -0.738 | 1.000 | | | | | | | | | |
| PCNTOWNR | 0.568 | 0.200 | -0.325 | -0.319 | 0.519 | 1.000 | | | | | | | | |
| PCNTMFG | 0.491 | 0.135 | -0.103 | 0.059 | 0.104 | 0.152 | 1.000 | | | | | | | |
| PCNTSMAL | 0.489 | -0.085 | 0.037 | 0.147 | 0.152 | 0.076 | 0.630 | 1.000 | | | | | | |
| PCNTCOUN | 0.338 | 0.380 | -0.546 | -0.497 | 0.076 | 0.517 | -0.163 | -0.215 | 1.000 | | | | | |
| PCNTSELF | 0.647 | -0.062 | 0.021 | 0.161 | 0.517 | 0.302 | 0.637 | 0.825 | -0.179 | 1.000 | | | | |
| POPCHG | 0.501 | 0.281 | -0.264 | -0.202 | 0.302 | 0.318 | 0.044 | 0.237 | 0.471 | 0.245 | 1.000 | | | |
| CHGPOP75 | 0.429 | 0.218 | -0.108 | -0.059 | 0.318 | 0.247 | 0.166 | 0.279 | 0.306 | 0.263 | 0.938 | 1.000 | | |
| PRFINDEX | 0.075 | 0.243 | -0.374 | -0.368 | 0.247 | 0.170 | -0.190 | -0.549 | 0.383 | -0.413 | -0.235 | -0.364 | 1.000 | |
| PCFTE14C | 0.515 | 0.343 | -0.421 | -0.366 | 0.170 | 0.404 | 0.091 | 0.146 | 0.595 | 0.209 | 0.738 | 0.594 | 0.080 | 1.000 |

weakly correlated with the other independent variables thus making problems of multicollinearity of less concern. The very weak connection between PRFINDEX and the dependent variable suggests that it might even be dropped from the regression. However, further inspection shows the PRFINDEX to be moderately correlated to several other independent variables PCNTSELF (-0.413) and PCNTSMAL (-0.549) which are themselves more strongly associated with registration rates. In light of this PRFINDEX was retained for its potential to function as a supressor variable.

The comparatively high correlations between several pairs of independent variables raise concerns that multicollinearity may be a problem and demonstrate when the correlations are positive, that some pairs of variables are surrogates for the same or very similar attributes. This relationship is illustrated in the case of PCNTSELF and PCNTSMAL (0.825); since each of these variables has a reasonably strong correlation with registration rates, the presence of both in any regression equation would merit further scrutiny. Similar comments hold for the pairs (PCNTPRO, PCNTMFG) and (PCNTGRUP, PCNTMFG). Finally, before leaving this table the correlation between PCTFTE14 and POPCHG (0.738) is interesting in that it suggests that perhaps part of what POPCHG measures is the migration of recession pushed entrepreneurs.

To reduce concerns with respect to multicollinearity a stepwise regression procedure was used along with a second regression which introduced all of the variables thereby providing a means of assessing the possibility of specification errors. A detailed report of the regression is included in the Appendix D while Table 4.8 summarises the highlights of the stepwise regression with T scores reported in brackets .

The stepwise regression introduced five variables into the solution yielding an Adjusted R Squared of 0.821 (indicating considerable explanatory power in the equation) and a standard error of 0.793 and F=60.7 (5,60) sig=0.0000.

| Table 4.8 | Summary of Stepwise Multiple Regression Results |
|---|---|
| Adjusted R Squared | 0.82127 |
| Standard Error | 0.79276 |
| F (5,60), sig = 0.0000 | 60.7337 |
| Durbin Watson | 2.0361 |
| Y=16.4329+0.369V1+0.045V2+0.216V3-0.191V4-0.279V5<br>{ (6.3) (11.5) (5.08) (6.3) (-5.9) (-3.16) }<br>** ** ** ** ** ** * | Sig.<br>**=.000<br>*=.003 |
| V1=PCNTSELF; V2=PRFINDEX; V3=CHGPOP75;<br>V4=PCNTMANU V5=PCNTPRO; CONSTANT=16.4329. | |

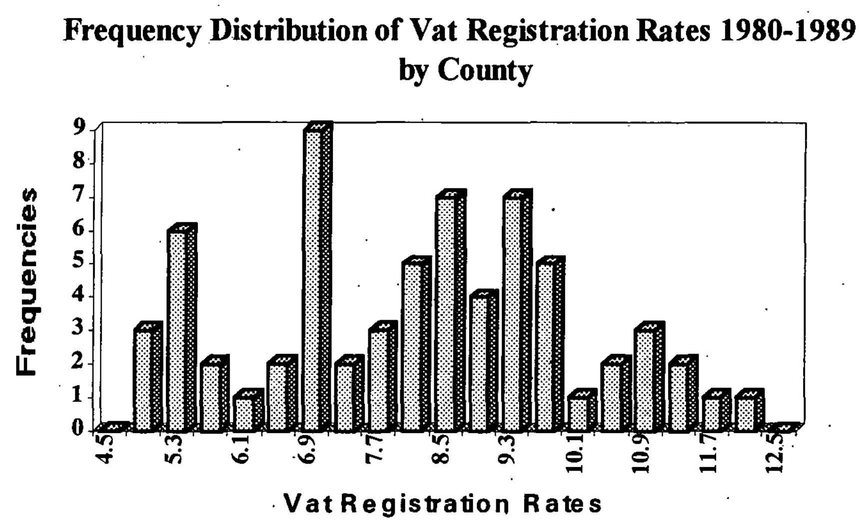
The high levels of significance achieved by all values of T along with the high value of F suggest that multicollinearity is not likely to be a problem. The coefficients of the variables are of the expected sign with the exception of PCNTPRO which enters to equation on the final step and assumes a negative coefficient in spite of its weak positive correlation with REGPR100 (0.308). A discussion of the plots (below) may hold a possible explanation for this occurrence. The Durbin Watson statistic was calculated as 2.036 which indicates that autocorrelation is not a likely feature of the data. A histogram of the standardised residuals (See Appendix D) appears to be very close to normally distributed, especially when the small number of points is taken into consideration. A plot of the standardised residuals against the standardised predicted scores appears to be randomly distributed. However, when plotted against the dependent variable REGPR100 the residuals show a slight tendency to increase as the dependent variable increases suggesting that the distribution of the dependent around the regression line may be slightly heteroscedastic. Plots of each of the independent variables with the dependent variable show the expected patterns including the relative weakness of the relationship between PRFINDEX and REGPR100. Of particular interest is the plot of PCNTPRO against REGPR100 which suggests that the two are negatively correlated when in fact they are weakly correlated in a positive direction. This may help to explain why, in the regression equation, the coefficient on PCNTPRO is negative (-0.279430). In addition PCNTPRO is strongly negatively correlated with PCNTMANU and may be functioning as a supressor variable in the regression.

The outcome of this regression is comparable to other reported regressions of county level firm registrations with county level environmental factors. Thus the five variables in this equation are able to "explain" a substantial proportion of the variation in firm registration rates which occurred across the counties of Great Britain. In combination these variables appear to be able to portray "something" about the counties that makes some of them better environments for small firms than others. It is contended here that these same variables can be used to operationalize the notion of conduciveness.

To operationalize the notion of conduciveness the predictor variables used in the multiple regression procedure are introduced into a discriminant analysis procedure. This procedure attempts to discriminate between different groups of counties based on the particular combination of environmental features possessed by each group. The groups (counties) to be distinguished here have been defined in terms of their relative VAT registration rates.

To create these groupings a frequency distribution of registration rates for the sixty-six counties was examined and is reproduced in Figure 4.4. The histogram suggests that the distribution is modestly irregular with groupings at both lower and upper extremes of the range. In an attempt to reflect this feature of the distribution, the data on registration rates was divided at the 33rd and 66th percentiles.

Figure 4.4




Source NOMIS

Originally counties were classified as belonging to one of three groups based on whether their registration rates belonged to the first, second or third tertial. While somewhat arbitrary, the division is intended to reflect the actual distribution of rates while also assuring some contrast between the groups. With such a division it was expected the group composed of counties in the lowest tertial would likely include many, but not necessarily all, of those counties whose environments are among the least conducive. Similarly, the group composed of counties with the highest rates is likely to include many, but not necessarily all, of those counties whose environments are among the most conducive.

The role to be played here by the discriminant analysis procedure is quite important and deserves some elaboration. If each county was labelled as "conducive" or "non-conducive" based solely on its firm registration rate, this would imply that a ranking in the top third of all rates would *guarantee that the county's environment was conducive.* Similarly for counties whose registration rates ranked in the bottom third of all cases the conclusion would be that the environments in those counties were non-conducive. *In other words, such a labelling procedure would mean that robustness was impossible by definition!* And yet registration rates are known to be heavily influenced by factors in the environment; so these influences cannot be ignored.

In contrast to the approach just described, counties could be compared in terms of their possession of a certain combination of independent factors that are known to be associated with firm registration rates. The regression procedure has provided such a list of factors. The technique of discriminant analysis can be used to provide a means of combining these factors so as to distinguish counties which offer conducive environments from counties that have non-conducive environments. Furthermore, under this approach the question of robustness is still open and can be tested for. That is, under this approach a county could be labelled non-conducive and still record a new firm registration rate that was in the top tertial.

The 'predictions' generated by the discriminant analysis procedure are taken here as a reasonable and accurate measure of what is meant by conduciveness. Thus where counties are "predicted" to belong to the lowest group (group=0) they are considered to be the counties with non-conducive environments. If in fact, any of them have registration rates that rank higher than the 33rd percentile then their performances would be considered robust; that is, their performances with respect to registration rates would be viewed as having overcome the limits imposed by their environments. Similarly, counties predicted to belong to the highest group (group=2) would be considered to have conducive environments and it is at least possible for a county in this group to have a registration rate that is ranked below the 68th percentile.

Like the regression analysis, discriminant analysis was run twice; once with all the variables using a direct method and a second time using the Wilk's Lambda method and the five variables that appeared in the solution to the stepwise regression. Differences in the "accuracy" of the predictions from these two runs varied only marginally with the full set of variables accurately predicting 84.8% of the classifications and the five variable run accurately predicting 83.8% of the cases. In total there were different classifications on seven of the sixty six counties when results of the two runs were compared; of these seven, only three cases involved shifts into or out of the category "non-conducive". The five variable discriminant analysis using the Wilk's Lambda method is reported here. Again, a detailed account of the procedure is included in the Appendix E while Table 4.9 summarises the highlights.

As Table 4.9 shows, all three F statistics for between pairs are significant at the 0.0000 level with values for F as follows: Groups (0,1) F=8.9986, Groups (0,2) F=30.0098 and Groups (1,2) F=6.996. As expected the value for F on

| Table 4.9 | Results of Discriminant Analysis Using Wilk's Lambda and Five Defining Variables Reported In The Stepwise Multiple Regression | | | | | |
|---|---|---|---|---|---|---|
| Fnc | Eigen | %Var | Canon. Corr. | Wilk's Lambda | Chi Squared | Level of Significance |
| 1 | 2.55 | 98.0 | 0.8474 | 0.2679 | 80.33 | 0.000 |
| 2 | 0.05 | 2.0 | 0.2224 | 1.9505 | 3.10 | 0.542 |
| /////// | //////////// | ////////// / | /////////// | //////////////////////////////// | PREDICTED | ///////////////////////////////////////// |
| Rank | Actual Number | | | 0 Non- Conducive | 1 Indeterminate | 2 Conducive |
| 0 | 22 | | | 20 90.9% | 1 4.5% | 1 4.5% |
| 1 | 22 | | | 2 9.1% | 17 77.3% | 3 13.6% |
| 2 | 22 | | | 1 4.5% | 3 13.6% | 18 81.8% |
| /////// | //////////// | ////////// | /////////// | Overall | 83.3% | ///////////////////////////////////////// |

pair (0,2) is greatest since these represent the extreme cases, that is, the lowest third and the highest third of registration rates. Of the two Canonical Discriminant functions, clearly function number one is the most important, explaining 98% of the total variance while function number two explains the remaining variance. The eigenvalue for function one is 48.9 times greater than that of function number two. The primary importance of function one is also indicated by the Chi Squared statistic (80.33) which is significant at the 0.0000 level. Because of the overwhelming importance of function one, comments concerning the coefficients of the standardised canonical discriminant function and the unstandardized functions will be confined to function one in each case.

The standardised canonical discriminant function coefficients indicate the relative importance of the five variables in each of the functions. In function number one, PCNTMANU contributes most to the discriminant score with a coefficient of -1.35747. It is followed in importance by PCNTSELF with a coefficient of 0.98827 and PCNTPRO with a value of -0.85078. PCNTMANU was the more broadly defined of two variables used to measure the proportion of manual workers in the labour force; it included craft workers and foremen. PCNTMANU had a standardised canonical discriminant function coefficient of -0.53971. The first discriminant function, when evaluated at the group centroid for group 0 (those counties with the lowest registrations), equals -1.95155; this suggests that some of these counties are areas with uncommonly high concentrations of people in manual or craft work with an average percentage of professionals in the labour force. In group 0 almost two thirds of the counties have values of PCNTPRO that range between 10.5% and 13.6% while PCNTMANU ranges between 46% and 54%. As Table 4.9 indicates twenty three of Great Britain's counties were categorised as non-conducive environments and twenty-two are considered to be conducive with the remainder being classified as indeterminate. Since the discriminant functions of environmental factors "predict" with 83.3% accuracy it can be seen that in only a handful of cases do actual county registration rates exceed or fall short of expected rates. Of more direct relevance is the question of how this distribution of conducive and non-conducive environments impacts on Britain's depleted communities? Table 4.10 shows the distribution of depleted communities among the three environmental categories.

| Table 4.10 | Distribution of Depleted and Non-Depleted Communities Among Conducive and Non-Conducive Environments | | | |
|---|---|---|---|---|
| | Counties with Non-conducive Environments | Counties with Indeterminate Environments | Counties with Conducive Environments | Totals |
| Non-Depleted | 58 | 109 | 143 | 310 |
| Depleted | 76 | 36 | 37 | 149 |
| Totals | 134 | 145 | 180 | 459 |

Comparisons of depleted and non-depleted communities in terms of their occupancy of conducive environments show the non-depleted group to be better positioned. Almost half (46.1%) of the non-depleted communities occupy conducive environments while only 24.8% of depleted communities are in conducive environments. In contrast, only 18.7% of non-depleted communities are in non-conducive environments while more than half (51%) of the depleted communities are in non-conducive environments. A complete list of the counties and their conduciveness is provided in the Appendix B.

***Based on these figures it can be concluded that for more than half of Britain's depleted communities, the prospect of small firm led recovery, depends upon the small firm sector showing robustness.*** **And if more than half of Britain's depleted communities were to recover then at least some of these communities would have to overcome the limitations which their environments impose.**

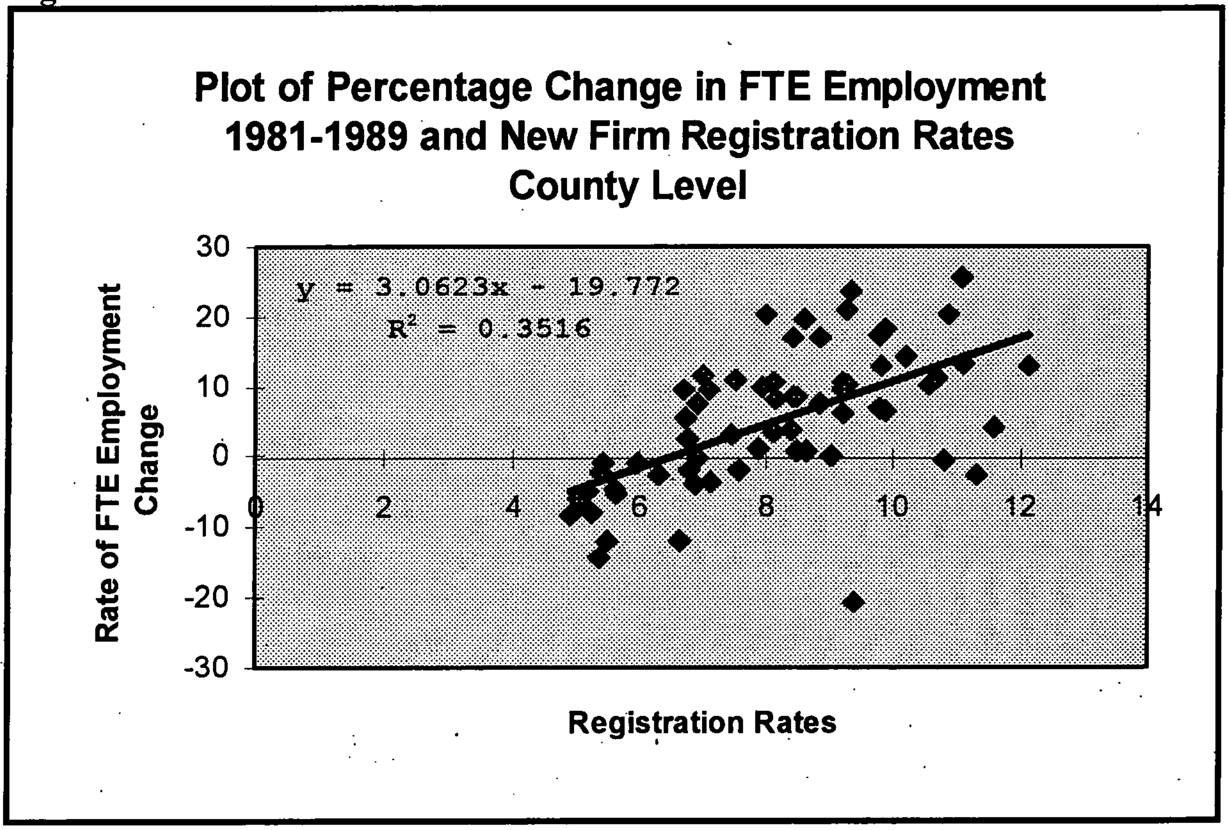
**Throughout this research it has been assumed that a certain relationship exists between registration rates and changes in employment during the 1980s. Recently Ashcroft and Love (1994) have reported on this association finding a strong link between county rates of registration lagged by one year and changes in total employment at the county level. A similar finding is reported here using the FTE employment statistics for the period 1981 to 1989 and registration rates for the entire period 1980 to 1989.**

**It might be expected that the FTE employment statistic would yield a weaker relationship than the one reported by Ashcroft especially if many of the positions created by new small firms were part-time. That inference can be based on the strong connections between increases in part-time work and the industrial sectors of 'banking, finance and insurance' as well as the 'other services' category (Champion and Townsend, 1990). Similar though not identical sectors in the VAT industrial classification showed substantial increases in the number of firms registered. There would probably be sufficient overlap between the categories that at least part of the employment growth was caused by new small firms.**

**However, the correlation of 0.589 between PCTFTE19 and REGPR100 compares favourably with the findings reported by Ashcroft and Love (1994). The variables are plotted in Figure 4.5. This is a significant finding in that it**

implies the net impact on the local economy of new small firms is perhaps even stronger than Ashcroft's figures suggest.

Figure 4.5




Source NOMIS

If, as these figures clearly imply, employment growth during the 1980s was associated with growth in registration rates of new firms; and growth in registration rates depended upon the conduciveness of the immediate environment, an issue of considerable relevance is whether the conduciveness of the environment had influenced employment change? This issue is explored in Chapter 5.

# CHAPTER FIVE
# CONDUCIVENESS AND EMPLOYMENT CHANGE

# CONTENTS

## Introduction

Chapter five explores changes in employment, particularly FTE employment, that occurred in the counties and communities of Great Britain during the 1980s. The main theme centres around whether a relationship exists between employment changes and the conduciveness of the environments in which they took place; that is, whether there is evidence of an environmental effect. Differences in the urban/rural character of host communities are also considered as potential sources of influence on employment change. It has been established that manufacturing employment in Britain showed a strong urban/rural shift during the 1970s (Keeble D., 1980) with rural areas undergoing growth while urban areas declined. The possibility of an urban/rural effect during the 1980s is explored here. Both the environmental and urban/rural effects are first assessed with reference to all communities. Later, several subsets, including depleted communities and recovering communities, are examined separately.

The analysis begins at the broadest level (all industrial sectors of employment and all communities) in an attempt to gauge the influence of both the urban/rural and environmental effects on employment. Later in the chapter, sectoral variations in employment growth are considered. FTE employment will be disaggregated into three broad groups: manufacturing employment, producer services employment and the remaining sectors. For each of these subsets of total employment, the possibilities of an environmental effect and/or an urban/rural effect are examined. Each effect is first explored over the entire set of communities and later within subsets of communities such as depleted communities and recovering communities.

A similar approach is taken with the growth of self employment (Champion A. and Townsend A., 1990), which is considered separately.

# PART I
## The Environmental Effect:
## All Sectors

As a first step in this analysis 1981LADs are disaggregated into three groups: the first group is composed of those 1981LADs that occupy environments that are the most conducive to new small firm formation, the second group is composed of those 1981LADs that occupy environments that are the least conducive to the formation of small firms and finally, the third group is made up of those 1981LADs occupying indeterminate environments. Communities from each environmental type are compared in terms of aggregate changes in their FTE employment. Table 5.1 shows the absolute and percentage increases (decreases) in aggregate FTE employment for the periods 1981-1984, 1984-1989 and 1981-1989.

TABLE 5.1

EMPLOYMENT CHANGES BY TYPE OF ENVIRONMENT
GREAT BRITAIN

| Environmental Type | FTE CHANGE 1981-1984 | % | FTE CHANGE 1984-1989 | % | FTE CHANGE 1981-1989 | % |
|---|---|---|---|---|---|---|
| Least Conducive | (357,475.50) | -6.1 | 176,304.00 | 3.2 | (181,171.50) | -3.1 |
| Indeterminate | (133,894.50) | -2.3 | 446,571.00 | 7.7 | 312,676.50 | 5.3 |
| Most Conducive | (29,532.00) | -0.4 | 382,908.00 | 5.2 | 353,376.00 | 4.8 |

Source NOMIS

The results reported in Table 5.1 suggest that when all sectors are included, a wide gap exists between the FTE employment changes occurring in communities from the least conducive environments and communities from either of the other two environmental types. In the period between 1984-1989 for instance, the aggregate rate of employment growth in communities occupying environments classified as indeterminate was more than twice the aggregate rate for communities occupying the least conducive environments. The contrast between aggregate rates of change in the indeterminate and most conducive environments is far less marked. These figures offer little evidence to suggest that the most conducive environments held any advantage over indeterminate environments in terms of employment growth in spite of the fact that rates of small firm registration were significantly higher in the most conducive environments. In fact, for the period from 1984-1989 aggregate rates of employment growth in indeterminate environments (7.7%) were higher than those in the most conducive environments (5.2%). But the data suggest that communities from the least conducive environments were by far the poorest performers with respect to employment change. To that extent then there appears to be some evidence of an environmental effect. That is, lower rates of FTE employment growth and higher rates of FTE employment loss appear to be associated with lower rates of new firm registration. However, these are aggregate figures and they may conceal numerous exceptions at the community level.

The depth of the differential between rates of employment change in communities from the least conducive environments and communities from the other environmental types is further tested by analyses of variance (ANOVA). The dependent variables used in the ANOVAs are FTE employment changes for all sectors normalised by FTE employment in the base year for each period examined. In other words, the dependent variable was the percentage of FTE employment change occurring over the indicated period in each constituent 1981LAD.

Results of the analysis of variance for the periods 1981-1989 and 1984-1989 are reported in Table 5.2. For each time interval examined, the results show that rates of job growth, or loss, in the least conducive environments were significantly lower than rates experienced by communities in either of the other environmental types. The differences are particularly strong for the longer 1981-1989 period with {F(2,456)=31.7, sig.=0.0000}. This suggests that not only were the least conducive environments lagging during the 1984-1989 period, (which was a period of general growth in

TABLE 5.2

**ANOVA FOR THE ENVIRONMENTAL EFFECT ON FTE EMPLOYMENT CHANGE 1981-1989, 1981LAD LEVEL, ALL SECTORS, GREAT BRITAIN**

**Analysis of Variance**

| Source | D.F. | Sum of Squares | Mean Squares | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 2 | 10823.9094 | 5411.9547 | 31.7071 | .0000 |
| Within Groups | 456 | 77832.7039 | 170.6858 | | |
| Total | 458 | 88656.6132 | | | |

**ANOVA FOR THE ENVIRONMENTAL EFFECT ON FTE EMPLOYMENT CHANGE 1984-1989, 1981LAD LEVEL, ALL SECTORS, GREAT BRITAIN**

**Analysis of Variance**

| Source | D.F. | Sum of Squares | Mean Squares | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 2 | 2508.7172 | 1254.3586 | 12.6085 | .0000 |
| Within Groups | 456 | 45365.3520 | 99.4854 | | |
| Total | 458 | 47874.0692 | | | |

Source: NOMIS

employment), but also that communities from the least conducive environments were harder hit by FTE employment losses during the 1981-1984 period. So there are grounds for claiming the existence of an environmental effect on total employment change. Thus the environmental effect manifests itself as relatively lower rates of FTE employment growth on the part of communities occupying environments that were the least conducive to new firm formation.

## The Urban/Rural Effect

Since the 1970s the phenomenon of the urban/rural shift has been observed and reported in the literature (Keeble, 1980). Although originally discussed in the context of manufacturing employment, the data presented in Table 5.3 show that during the 1980s the urban/rural effect also appeared to apply to sectors other than manufacturing. In this table the first eight rows identify various sub-classifications of urban-based 1981LADs and rows nine through sixteen identify sub-classifications of rural based 1981LADs. As the table shows, the contrast between rates of employment change in urban based and rural based communities is very sharp for the periods 1984-1989 and 1981-1989. The contrast is less clear for 1981-1984.

Comparisons of the first and second columns of Table 5.3 indicate that in the earlier period (1981-1984) the rates of loss were heaviest in urban areas and in the later period (1984-1989) rates of growth were considerably greater in rural areas. It is worth noting as well, that with the data presented in this form, the phenomenon of a North-South divide is also evident, especially when figures for northern rural based communities for the period from 1981-1989 are compared to figures from southern rural based communities. That is, rural based communities in the North consistently registered lower rates of FTE employment change when compared to rural based communities from the south. The situation is less clear when urban based communities are examined. For the 1981-1989 period, with the exception of cities in the south, it would appear that there was little or no net employment growth in urban areas. However, these are aggregate figures and they may conceal some exceptions to the trend.

TABLE 5.3

EMPLOYMENT CHANGE RATES: ALL SECTORS
BY URBAN CHARACTER OF COMMUNITY

| | 1981-1984 %FTE | 1984-1989 %FTE | 1981-1989 %FTE |
|---|---|---|---|
| Inner London | -2.21% | 1.97% | -0.15% |
| Outer London | -4.28% | 1.39% | -2.84% |
| Principal Cities | -7.93% | -0.43% | -8.19% |
| Other Metropolitan Centres | -5.81% | 3.18% | -2.76% |
| Cities South | -0.41% | 5.74% | 5.20% |
| Cities North | -5.14% | 5.09% | -0.63% |
| Industrial South | -2.39% | 5.40% | -2.83% |
| Industrial North | -5.28% | 4.89% | -0.58% |
| New Town South | -2.83% | 14.19% | 18.48% |
| New Town North | -3.22% | 11.13% | 7.91% |
| Resorts South | -0.09% | 10.24% | 9.94% |
| Resorts North | -5.70% | 12.43% | 5.88% |
| Mixed South | 4.52% | 10.42% | 15.17% |
| Mixed North | -0.59% | 9.35% | 8.62% |
| Outer Rural South | 1.85% | 11.25% | 13.07% |
| Outer Rural North | -0.60% | 9.06% | 8.42% |

Source: NOMIS

Like the environmental effect, the strength of the urban/rural effect has been gauged using analysis of variance with percentage changes in FTE employment (all sectors) as the dependent variable. The ANOVA covers two periods 1981-1989 and 1984-1989. Details of these analyses are recorded in Table 5.4. The result for the 1981-1989 period, {$F(1,457)=104.8$, sig.=0.0000}, indicates that shifts in the urban/rural character of communities were accompanied by significant differences in the rates of FTE employment change. In comparison to urban based 1981LADs, rural based 1981LADs recorded much higher rates of employment change between 1981 and 1989. The differential between urban and rural based communities was also evident during the period between 1984 and 1989 with rural based communities showing significantly higher rates of employment growth {F(1,457)=49.0903, sig.=0.0000}.

TABLE 5.4

ANOVA FOR THE URBAN-RURAL EFFECT ON
FTE EMPLOYMENT CHANGE 1981-1989, 1981LAD LEVEL,
ALL SECTORS,
GREAT BRITAIN

Analysis of Variance

| Source | D.F. | Sum of Squares | Mean Squares | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 1 | 16544.4331 | 16544.4331 | 104.8478 | .0000 |
| Within Groups | 457 | 72112.1802 | 157.7947 | | |
| Total | 458 | 88656.6132 | | | |

ANOVA FOR THE URBAN-RURAL EFFECT ON
FTE EMPLOYMENT CHANGE 1984-1989, 1981LAD LEVEL,
ALL SECTORS,
GREAT BRITAIN

Analysis of Variance

| Source | D.F. | Sum of Squares | Mean Squares | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 1 | 4643.7451 | 4643.7451 | 49.0903 | .0000 |
| Within Groups | 457 | 43230.3241 | 94.5959 | | |
| Total | 458 | 47874.0692 | | | |

Source: NOMIS

## Sectoral Differences In FTE Employment Change

In addition to the influence exerted by the urban/rural character and the influence exerted by the conduciveness of the environment, employment change in the 1980s also varied considerably depending upon the sectors involved. For some industrial sectors the 1980s was a period of decline while other sectors were experiencing more or less continuous growth over the decade. In this section three broad groupings: manufacturing, producer services and the remaining industrial sectors are examined.

## Manufacturing

Among the strongest of the sectoral trends was the heavy decline in manufacturing employment alluded to earlier in the discussion of de-industrialisation. For the purposes of this chapter manufacturing employment is defined, using the standard industrial classifications, as 1980 SIC 1-4. Between 1981 and 1989 over one million FTE jobs were lost in manufacturing. The erosion of manufacturing is of particular concern for at least three reasons: first, the importance of manufacturing as a key employer (in 1981 34.2% of all FTE employment was in the manufacturing sector); second, because of that sector's perceived importance as an instrument of regional development; and third, because of the difficulties associated with replacing lost manufacturing jobs with ones of equal quality in the effected regions. For these reasons manufacturing is examined separately in this chapter.

## Producer Services

As discussed in chapter two, growth of employment in services has been a clear trend throughout the 1980s. But one particular subset of this broad sector, known as producer services, has offered some of the best prospects for new growth and wealth creation in Great Britain. This subsector has become increasingly important as a source of new employment (Allen J. and

Massey D., 1990). Producer services are operationally defined on the basis of four digit activity headings used by Marshall (1988). Appendix A contains the details of the activity headings and their descriptions. As discussed in chapter two, producer services appear to be exportable; they have the potential to enhance the competitiveness of their client firms, and they create jobs in themselves. Employment growth in producer services has been both rapid and pervasive during the 1980s. For these reasons producer services are examined separately and the role played by producer services in the recovery of depleted communities is among the number of issues explored here.

## Remaining Sectors

Those sectors other than manufacturing and producer services represent the third and final subset of full time equivalent employees in employment to be examined. While something of a mixed bag this grouping is dominated by service sector employment. The remaining sectors accounted for 44.3% of total FTE employment in 1981. For all three sectoral groupings: manufacturing, producer services, and remaining sectors, analysis of FTE employment change covers three periods: 1981-1984, 1984-1989 and 1981-1989 and is presented in Tables 5.5, 5.10 and 5.15.

These tables record the aggregate changes in FTE employment and rates of change in these aggregates. All references to analysis of variance make use of percentage changes in FTE employment in the constituent 1981LADs as the dependent variable.

## Self - Employment

A final form of employment growth not included in the three groupings already discussed is self-employment. This too is examined. The numbers of

**individuals who are self-employed, with or without employees, has increased dramatically throughout the 1980s. An estimate of the growth in self employment between 1981-1989 is made based on data from the 1981 census and data from the 1991 census. Like the other forms of employment change, self employment will be examined to determine the influence of the urban/rural characteristics. The effect of variations in the conduciveness of the environment towards the formation of new small firms is also examined. Due to limitations with respect to the availability of data, the analysis of self-employment covers the single period between 1981-1989 and is presented in Table 5.20.**

## PART II:
## Manufacturing Employment

Perhaps the two most impressive features of employment changes in manufacturing are: 1. the pervasiveness of the losses - 340 out of 459 communities lost FTE manufacturing employment between 1981 and 1984, while 254 out of 459 lost FTE manufacturing employment between 1984 and 1989; and 2. the degree of decline in net FTE manufacturing employment, roughly (-17%) over the interval from 1981-1989.

Table 5.5 chronicles changes in manufacturing employment over the intervals 1981-1984, 1984-1989, and 1981-1989, for each type of environment. In row one, all communities are reported on; in subsequent rows the figures are disaggregated into the following categories: depleted communities, recovering communities, urban-based communities, rural-based communities, recovering urban, recovering rural, non-recovering urban and non-recovering rural. Rates expressed in the table are aggregate rates of change. With the data presented in this form it is possible to see the timing and degree of difference in rates of change under different environments and for different categories of community. Attention will focus on the influence of the environmental effect and the urban/rural effect. Of particular interest is whether these effects extend through to depleted and recovering communities. As each issue is raised the results of analyses of variances will be reported. Afterwards, discussion will return to Table 5.5 to identify the next issue.

## Environmental Effect:
## All Communities /Manufacturing

As the first row of Table 5.5 indicates, aggregate rates of manufacturing employment loss varied with the conduciveness of the environment. These differences were most marked for the 1981-1989 interval. The greatest aggregate loss (-21%) occurred in the group of communities whose environments were the least conducive to the formation of new small firms. The best performance (-11.5%) was from the group of communities whose environments were indeterminate with respect to the formation of new small firms. Generally, indeterminate environments recorded the best rates of manufacturing employment change; the aggregate rates from communities with the most conducive environments were only moderately lower than those recorded in the least conducive environments. In other words, rates of loss in the most conducive environments also differed sharply from the rates in the indeterminate environments.

These aggregate figures suggest that environmental differences may influence manufacturing performance. Table 5.6 reports an analysis of variance of percentage changes in FTE employment occurring at the 1981LAD level for both the 1981-1989 and 1984-1989 periods.

## MANUFACTURING

| Environmental Category | LEAST CONDUCIVE 1981 | | 1984 | | 1989 | | INDETERMINATE 1981 | | 1984 | | 1989 | | MOST-CONDUCIVE 1981 | | 1984 | | 1989 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ALL COMMUNITIES | 2,317,644.50 | | 1,969,510.00 | | 1,826,954.50 | | 2,261,922.50 | | 2,021,342.00 | | 2,002,187.00 | | 1,927,164.50 | | 1,742,706.00 | | 1,573,505.50 | |
| change 1981-1984; % change | (348,134.50) | -15% | | | | | (240,580.50) | -11% | | | | | (184,458.50) | -9.6% | | | | |
| change 1984-1989; % change | | | (142,555.50) | -7% | | | | | (19,155.00) | -1% | | | | | (169,200.50) | -9.7% | | |
| change 1981-1989; % change | | | | | (490,690.00) | -21% | | | | | (259,735.50) | -11.5% | | | | | (353,659.00) | -18.4% |
| DEPLETED COMMUNITIES | 1,603,834.0 | | 1,320,302.5 | | 1,183,234.50 | | 1,033,304.0 | | 854,859.5 | | 820,212.00 | | 510,526.0 | | 416,592.5 | | 350,854.50 | |
| change 1981-1984; % change | (283,531.50) | -17.68% | | | | | (178,444.50) | -17% | | | | | (93,933.50) | -18.4% | | | | |
| change 1984-1989; % change | | | (137,068.00) | -10% | | | | | (34,647.50) | -4% | | | | | (65,738.00) | -15.8% | | |
| change 1981-1989; % change | | | | | (420,599.50) | -26% | | | | | (213,092.00) | -20.6% | | | | | (159,671.50) | -31.3% |
| RECOVERING COMMUNITIES | 533,522.5 | | 450,255.5 | | 451,485.0 | | 526,131.0 | | 429,465.5 | | 439,496.0 | | 160,177.0 | | 132,415.5 | | 123,428.5 | |
| change 1981-1984; % change | (83,267.00) | -15.61% | | | | | (96,665.50) | -18% | | | | | (27,761.50) | -17.33% | | | | |
| change 1984-1989; % change | | | 1,229.50 | 0% | | | | | 10,030.50 | 2% | | | | | (8,987.00) | -7% | | |
| change 1981-1989; % change | | | | | (82,037.50) | -15% | | | | | (86,635.00) | -16% | | | | | (36,748.50) | -23% |
| URBAN COMMUNITIES | 2,015,571.5 | | 1,700,417.0 | | 1,555,136.50 | | 1,513,963.5 | | 1,314,087.0 | | 1,249,964.00 | | 940,203.0 | | 807,343.0 | | 660,145.00 | |
| change 1981-1984; % change | (315,154.50) | -15.64% | | | | | (199,876.50) | -13% | | | | | (132,860.00) | -14.13% | | | | |
| change 1984-1989; % change | | | (145,280.50) | -9% | | | | | (64,123.00) | -5% | | | | | (147,198.00) | -18% | | |
| change 1981-1989; % change | | | | | (460,435.00) | -23% | | | | | (263,999.50) | -17% | | | | | (280,058.00) | -30% |
| RURAL COMMUNITIES | 302,073.0 | | 269,092.0 | | 271,818.0 | | 747,959.0 | | 707,255.0 | | 752,223.0 | | 986,961.5 | | 935,363.0 | | 913,360.0 | |
| change 1981-1984; % change | (32,981.00) | -10.92% | | | | | (40,704.00) | -5% | | | | | (51,598.50) | -5.23% | | | | |
| change 1984-1989; % change | | | 2,726.00 | 1% | | | | | 44,968.00 | 6% | | | | | (22,003.00) | -2% | | |
| change 1981-1989; % change | | | | | (30,255.00) | -10% | | | | | 4,264.00 | 1% | | | | | (73,601.50) | -7% |
| RECOVERING URBAN | 486,911.0 | | 409,722.0 | | 412,506.5 | | 422,057.0 | | 343,419.0 | | 342,690.0 | | 88,172.0 | | 70,164.5 | | 60,661.0 | |
| change 1981-1984; % change | (77,189.00) | -15.85% | | | | | (78,638.00) | -19% | | | | | (18,007.50) | -20.42% | | | | |
| change 1984-1989; % change | | | 2,784.50 | 1% | | | | | (729.00) | 0% | | | | | (9,503.50) | -14% | | |
| change 1981-1989; % change | | | | | (74,404.50) | -15% | | | | | (79,367.00) | -19% | | | | | (27,511.00) | -31% |
| RECOVERING RURAL | 46,611.5 | | 40,533.5 | | 38,978.5 | | 104,073.5 | | 86,046.5 | | 96,805.5 | | 72,005.0 | | 62,251.0 | | 62,767.5 | |
| change 1981-1984; % change | (6,078.00) | -13.04% | | | | | (18,027.00) | -17% | | | | | (9,754.00) | -13.55% | | | | |
| change 1984-1989; % change | | | (1,555.00) | -4% | | | | | 10,759.00 | 13% | | | | | 516.50 | 1% | | |
| change 1981-1989; % change | | | | | (7,633.00) | -16% | | | | | (7,268.00) | -7% | | | | | (9,237.50) | -13% |
| NONRECOVERING URBAN | 981,812.5 | | 791,790.5 | | 665,499.0 | | 471,656.5 | | 394,627.0 | | 351,912.5 | | 300,084.5 | | 236,559.0 | | 188,740.0 | |
| change 1981-1984; % change | (190,022.00) | -19.35% | | | | | (77,029.50) | -16% | | | | | (63,525.50) | -21.17% | | | | |
| change 1984-1989; % change | | | (126,291.50) | -16% | | | | | (42,714.50) | -11% | | | | | (47,819.00) | -20% | | |
| change 1981-1989; % change | | | | | (316,313.50) | -32% | | | | | (119,744.00) | -25% | | | | | (111,344.50) | -37% |
| NON-RECOVERING RURAL | 88,499.0 | | 78,336.5 | | 66,250.5 | | 35,516.5 | | 30,767.0 | | 28,803.5 | | 50,264.5 | | 47,618.0 | | 38,686.0 | |
| change 1981-1984; % change | (10,162.50) | -11.48% | | | | | (4,749.50) | -13% | | | | | (2,646.50) | -5.27% | | | | |
| change 1984-1989; % change | | | (12,086.00) | -15% | | | | | (1,963.50) | -6% | | | | | (8,932.00) | -19% | | |
| change 1981-1989; % change | | | | | (22,248.50) | -25% | | | | | (6,713.00) | -19% | | | | | (11,578.50) | -23% |

The tests show that for each time interval examined, rates of manufacturing employment change in the least conducive environments were significantly lower than rates in either of the other environmental types. For the period

TABLE 5.6

**ANOVA FOR THE ENVIRONMENTAL EFFECT ON FTE EMPLOYMENT CHANGE 1981-1989, 1981LAD LEVEL, MANUFACTURING SECTOR, GREAT BRITAIN**

**Analysis of Variance**

| Source | D.F. | Sum of Squares | Mean Squares | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 2 | 13345.7784 | 6672.8892 | 13.1329 | .0000 |
| Within Groups | 456 | 231695.9668 | 508.1052 | | |
| Total | 458 | 245041.7452 | | | |

**ANOVA FOR THE ENVIRONMENTAL EFFECT ON FTE EMPLOYMENT CHANGE 1984-1989, 1981LAD LEVEL, MANUFACTURING SECTOR, GREAT BRITAIN**

**Analysis of Variance**

| Source | D.F. | Sum of Squares | Mean Squares | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 2 | 3819.4966 | 1909.7483 | 4.4884 | .0117 |
| Within Groups | 456 | 194019.6459 | 425.4817 | | |
| Total | 458 | 197839.1425 | | | |

Source: NOMIS

between 1981-1989 differences in rates were marked with {F(2,456)=13.133, sig.=0.000}. Contrasts were not as sharp for the 1984-1989 period. When compared to the F statistic calculated in Table 5.2 for all sectors {F(2,456)=31.71, sig.=0.000} the environmental effect on rates of change in manufacturing employment appears to be weaker than the environmental effect for the general case of all sectors.

As the mean percentage changes with respect to manufacturing employment are all negative it is difficult to say just what sort of effect is being observed here. One possibility is that the least conducive environments (where the greatest rates of manufacturing employment loss occurred) are those communities with older, larger manufacturing plants. Perhaps plants like these suffered the greatest losses in FTE manufacturing employment both in absolute and in percentage terms. Another possibility is that net losses in the more conducive environments were not as great because in those environments new small manufacturing firms were a more important factor in offsetting declining employment[1].

## Environmental Effect:
## Depleted And Recovering Communities/Manufacturing

The impact that changes in manufacturing employment have had on depleted communities and recovering communities is indicated by an examination of rows two and three of Table 5.5. Row two in Table 5.5 shows that in depleted communities the aggregate losses of FTE manufacturing employment were consistently heavy in all environments and through most time intervals. One exception to this is the 1984-1989 interval for indeterminate environments where losses nearly abated; otherwise, there appears to be no environmental effect evident in the aggregate figures for depleted communities. This result is not surprising when consideration of the way in which depleted communities were defined is taken into account.

For those depleted communities that eventually recovered (row three Table 5.5), a common feature is the sharp reduction in the aggregate rate of losses

[1] Recently Storey reported that between 1971 and 1987 the share of all manufacturing employment to be found in small firms rose from 21% to 31% (Storey & Johnson 1990).

in FTE manufacturing employment. That is, the performances of recovering communities for 1984-1989 period were substantially improved when compared to their performances for the earlier 1981-1984 interval. Of course, it would be expected that losses during the 1981-1984 period would be high; again, because of the way depleted communities are defined. *However, the arresting of these losses in the 1984-1989 period is not as tightly tied to definitions and is an important comment about how and why many depleted communities recovered.*

It seems reasonable to conclude that part of the reason why these communities recovered, while other depleted communities did not, lay in their ability to arrest or sharply reduce between 1984 and 1989, the heavy losses in FTE manufacturing employment that occurred between 1981-1984. One exception to this characterisation is the set of recovering communities that were both urban based and from conducive environments (row six, column one of Table 5.5). In those particular communities heavy losses in manufacturing employment continued throughout the 1984-1989 period. Thus the recovery of those communities may have depended upon very strong employment growth from sectors other than manufacturing. Growth in these other sectors would have to be very strong not only to overcome earlier manufacturing employment losses that occurred during 1981-1984 period, but to also offset the continued losses in manufacturing employment during the 1984-1989 period. In fact during the period between 1984 and 1989 aggregate growth in recovering communities among these other sectors reached 21% (see Tables 5-10 and 5-15).

Table 5.7 shows the results of an analysis of variance for both depleted and recovering communities. The dependent variable was the percentage change in FTE manufacturing employment over the period from 1984 to

1989 and the effect examined was environmental conduciveness. The ANOVA results {F(2,146)=7.09, sig. =0.001 for depleted communities and F(2,65)=2.4 sig. =0.097 for recovering communities} indicate important differences in the two sets of communities for the 1984-1989 period. By comparing the results in Tables 5.6 and 5.7 it can be seen that even though

TABLE 5.7

**ANOVA FOR THE ENVIRONMENTAL EFFECT ON FTE EMPLOYMENT CHANGE 1984-1989, 1981LAD LEVEL, MANUFACTURING SECTOR, DEPLETED COMMUNITIES**

**Analysis of Variance**

| Source | D.F. | Sum of Squares | Mean Square | F Ratio | F Prob |
|---|---|---|---|---|---|
| Between Groups | 2 | 3657.632 | 1828.816 | 7.093 | .001 |
| Within Groups | 146 | 37642.218 | 257.823 | | |
| Total | 148 | 41299.851 | 279.053 | | |

**ANOVA FOR THE ENVIRONMENTAL EFFECT ON FTE EMPLOYMENT CHANGE 1984-1989, 1981LAD LEVEL, MANUFACTURING SECTOR, RECOVERING COMMUNITIES**

**Analysis of Variance**

| Source | D.F. | Sum of Squares | Mean Square | F Ratio | F Prob |
|---|---|---|---|---|---|
| Between Groups | 2 | 1049.598 | 524.799 | 2.417 | .097 |
| Within Groups | 65 | 14113.809 | 217.136 | | |
| Total | 67 | 15163.407 | 226:320 | | |

Source: NOMIS

the influence of the environmental effect on manufacturing employment appears to taper off during the 1984-1989 period it remains significant for depleted communities but is not significant at the 5% level in the case of recovering communities. Once again the strongest rates of FTE manufacturing employment growth were registered by communities occupying environments classified as indeterminate. The strongest contrasts in rates of FTE manufacturing employment change were between communities from indeterminate environments and communities from the least conducive environments. In other words, communities from the most conducive environments tended to occupy middle ground as far as changes in manufacturing employment were concerned.

The strength of the environmental effect on 1984-1989 manufacturing employment change is itself quite important to the issue of recovery because 51% of all depleted communities were found in environments that were the least conducive to new firm registration. In the presence of a very strong environmental effect these communities would have little prospect of recovering. In fact the recovery rate for depleted communities from the least conducive environments was 33% as compared to a 60% rate of recovery for depleted communities from the most conducive environments and a 57% rate of recovery for communities from indeterminate environments. The fact that some communities from the least conducive environments did recover suggests that the environmental effect was not so strong an influence as to prevent overall employment growth. This point will be raised again.

## Urban/Rural Effect:
## All Communities/Manufacturing

Returning to Table 5.5, a very strong urban/rural effect is evident for both the 1981-1989 and 1984-1989 periods with rural areas consistently registering better performances (mostly in the sense of smaller aggregate rates of manufacturing employment loss) when compared to their urban counterparts. For the most part losses in FTE manufacturing employment continued throughout the 1984-1989 period in urban areas while rural areas actually recorded modest increases for these years. Table 5.8 records the results of analyses of variance for the urban/rural effect and manufacturing employment change for all communities. As expected, the

TABLE 5.8

### ANOVA FOR THE URBAN-RURAL EFFECT ON FTE EMPLOYMENT CHANGE 1981-1989, 1981LAD LEVEL, MANUFACTURING SECTOR, ALL COMMUNITIES

**Analysis of Variance**

| Source | D.F. | Sum of Squares | Mean Square | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 1 | 44285.860 | 44285.860 | 100.813 | .000 |
| Within Groups | 457 | 200753.287 | 439.285 | | |
| Total | 458 | 245039.147 | 535.020 | | |

### ANOVA FOR THE URBAN-RURAL EFFECT ON FTE EMPLOYMENT CHANGE 1984-1989, 1981LAD LEVEL, MANUFACTURING SECTOR, ALL COMMUNITIES

**Analysis of Variance**

| Source | D.F. | Sum of Squares | Mean Square | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 1 | 17270.706 | 17270.706 | 43.710 | .000 |
| Within Groups | 457 | 180568.410 | 395.117 | | |
| Total | 458 | 197839.116 | 431.963 | | |

Source: NOMIS

results indicate a very strong effect both for the 1981-1989 period {F(1,457)=100.813, sig. = 0.0000} and for the period between 1984-1989 {F(1,457)=43.710, sig. = 0.0000}. In contrast to the environmental effect, the urban/rural effect appears to have retained more of its influence throughout the 1984-1989 period. FTE manufacturing rates in urban based communities contrast sharply with rates from rural based communities. For the period between 1984 and 1989 the average rate of FTE manufacturing employment change in rural based communities was 4.95% while in urban based communities the average rate for the same period was -7.48%. By comparison, the strongest contrast generated by the environmental effect for the same period was an average growth of 3.7% in indeterminate environments compared to an average loss -3.5% in the least conducive environments. These numbers suggest that of the two effects examined, the urban/rural effect exerts a greater influence over

TABLE 5.9

ANOVA OF INTERACTION EFFECTS OF URBAN-RURAL AND ENVIRONMENTAL, MANUFACTURING SECTOR, ALL COMMUNITIES

Analysis of Variance

| Source of Variation | Sum of Squares | DF | Mean Square | F | Signif of F |
|---|---|---|---|---|---|
| Main Effects | 52684.819 | 3 | 17561.606 | 36.457 | .000 |
| ENVIRONMENTAL | 5513.368 | 2 | 2756.684 | 5.723 | .004 |
| URBAN/RURAL | 39138.144 | 1 | 39138.144 | 81.249 | .000 |
| 2-way Interactions | 1940.217 | 2 | 970.108 | 2.014 | .135 |
| ENVIRONMENT URBAN/RURAL | 1940.217 | 2 | 970.108 | 2.014 | .135 |
| Explained | 54625.036 | 5 | 10925.007 | 22.680 | .000 |
| Residual | 218213.590 | 453 | 481.708 | | |
| Total | 272838.626 | 458 | 595.718 | | |

Source: NOMIS

changes in manufacturing employment. While the aggregate figures suggest that the urban/rural effect is strong, there is less support from the aggregate figures for an "urban/rural - environmental" interaction. This is especially true in the urban communities where the worst aggregate performance (-30%) for 1981-1989 was recorded in communities occupying the most conducive environments. The possibility of an urban/rural - environmental interaction is explored using analysis of variance. Table 5.9 reports the results of an analysis of variance for the period 1984-1989 and the combined effects. The results show significant main effects with {F (3,453)=36.457, Sig. 0.000}. However, the two way interactions suggest there is no significant interaction effect {F(2,457)=2.014, sig= 0.135}.

At the 1981LAD level the most interesting manifestation of the urban/rural-environmental interaction was the apparent impact it had on communities whose environments were the most conducive to the formation of new firms. Urban based communities from the most conducive environments had the highest disaggregated rates of FTE manufacturing employment loss of any urban based communities; the average loss was (-12%). Rural based communities from the most conducive environments had the highest rates of FTE manufacturing employment change of any rural based communities averaging (5.6%). How can these interactions be interpreted?

In the rural based settings where rates of manufacturing employment change were highest, it may be that the higher levels of new firm formation associated with conducive environments contributed strongly to net manufacturing employment growth. This would require that existing manufacturing employment was at least stable. See Chapter Six for further comments on this issue.

In the case of urban based communities from the most conducive environments rates of loss in manufacturing employment were very high. It may be that the majority of new firms formed in these communities were started by recession pushed entrepreneurs who were part of a large group that had lost jobs in manufacturing. In this way their net impact on job creation would be negative or close to zero. Against a background of continuous heavy losses the new firms would do very little to affect net losses. Whatever the reasons, the urban based and rural based communities from the most conducive environments represent both extremes of manufacturing employment change for the period between 1984 and 1989.

## Manufacturing Employment Change And Sub-Categories Of Depleted Communities

In Table 5.5 depleted communities are subdivided into those that recovered and those that failed to recover. Each of these classifications is further subdivided into urban based and rural based communities. These community groupings appear in rows six through nine of Table 5.5. When recovering urban communities are contrasted with recovering rural communities for the period 1984-1989 it can be seen that the urban/rural effect appears to extend a modest influence to these levels. That is, with the exception of 1981LADs in the least conducive environments, recovering rural communities consistently out-performed recovering urban communities. There is also evidence to suggest that communities from the least conducive environments were negatively affected by the environmental influence. However, this is not a consistent pattern; in fact, as already highlighted, the worst performance (-37%) occurs in the most conducive environments.

The aggregate figures suggest that the non-recovering depleted communities, in marked contrast to communities that recovered, continued to experience heavy manufacturing employment losses throughout the period from 1984-1989. Once again a weak urban/rural effect is evident. That is, non-recovering rural areas consistently 'out-performed' non-recovering urban areas in the sense that the former had lower rates of loss in manufacturing employment. It appears that the urban/rural effect extends down to both recovering and non-recovering depleted communities. In contrast to the influence they appear to exert over recovering communities changes in the conduciveness environment appear to exert only limited influence over manufacturing employment in the non-recovering communities. Furthermore, the pattern is somewhat inconsistent at this level of disaggregation. In other words the influence of the environment does not appear to extend down to non-recovering depleted communities.

In summary, the changes in manufacturing FTE employment appear to be strongly influenced by the urban-rural character of the communities. This is not surprising as the urban/rural effect has been long established (Keeble D., 1980). What has been demonstrated here is that this influence extends through to those depleted communities that were recovering as well as to those depleted communities that failed to recover. In the case of recovering communities there was, during the period between 1984-1989, a clear abatement of the heavy losses in manufacturing employment that had characterised the earlier 1981-1984 period. Generally, the rural based communities were more successful in arresting the trend of heavy losses that had occurred between 1981-1984. For recovering communities, the influence of the environment on changes in manufacturing employment appears to be the weaker of the two effects. The very weak performance by urban based recovering communities from conducive environments illustrates how the negative urban effect overrides the positive environmental effect. There is no evidence of a consistent interaction between the urban-rural and environmental effects with communities from the most conducive environments registering extreme values of employment change.

It is important to note as well, that communities from different environments differed in terms of the relative importance of the manufacturing sector to total employment. For instance, in 1981 communities based in conducive environments had a much lower percentage (26.4%) of their total FTE employment in the manufacturing sector. Thus the high rates of manufacturing FTE employment losses in these communities did not translate into high absolute figures. By comparison manufacturing employment was much more important to communities from the least conducive environments where it accounted for (39.5%) of total employment in 1981.

Finally, as a source of net growth in jobs, the manufacturing sector appears to have had little to offer in the aggregate. Nonetheless, of the 68 communities that did recover, 54% experienced growth in net manufacturing employment during the 1984-1989 interval. Many of the remaining 46% of recovering communities were able, during the 1984-1989 period, to halt or at least greatly reduce the previous scale of losses in manufacturing FTE employment. Only 34% of the communities that recovered had rates of loss in manufacturing employment that exceeded -8% for the period between 1984 and 1989. In contrast, 78% of the communities that failed to recover had losses in manufacturing employment that exceeded -8% for the same period.

As for the environmental effect, manufacturing employment appears to be less influenced by shifts in the conduciveness of the environment than the set of all industrial sectors combined. Comparisons of the 1981-1989 percentage changes in FTE employment showed rural areas consistently and sharply outperforming urban areas regardless of the type of environment.

It would appear that as far as manufacturing employment is concerned, the urban/rural effect is the dominant influence especially in those cases where communities are recovering. It appears as well, that the manufacturing sector actually played an important role in the recovery of at least some communities in spite of the heavy losses that characterised the sector in general. For those communities that eventually recovered the influence of differences in environment appears to be weaker than the influence of the urban/rural effect.

## PART III:
## Producer Services

In marked contrast to the manufacturing sector, net FTE employment in producer services in Great Britain grew at a rate of 23.9% between 1981-1989 creating almost 1 million net new FTE jobs. The bulk of this growth occurred in the period between 1984-1989 when rates almost tripled those of the earlier 1981-1984 period. Table 5.10 summarises the aggregate changes in FTE employment in producer services for the various categories of environment and various sub-categories of community.

## Environmental Effect:
## All Communities/Producer Services

Like manufacturing, the impact of these employment changes was pervasive. Unlike manufacturing these employment changes were primarily increases, not decreases. In the 1981-1984 time interval, 358 of 459 1981LADs recorded increases in FTE producer service employment. In the 1984 and 1989 period a total of 400 communities recorded increases in FTE producer service employment. From these figures it is clear that growth in producer service employment was a feature of most communities.

When aggregate rates of 1981-1989 FTE employment change for communities from the least conducive and communities from the most conducive environments are compared, Table 5.10 shows a 5% differential. This suggests that the influence of the environment on changes in FTE employment for producer services may be weaker than that observed for manufacturing employment.

## PRODUCER SERVICES

| Environmental Category | LEAST CONDUCIVE | | | | | | INDETERMINATE | | | | | | MOST CONDUCIVE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1981 | | 1984 | | 1989 | | 1981 | | 1984 | | 1989 | | 1981 | | 1984 | | 1989 | |
| ALL COMMUNITIES | 984,220.0 | | 1,018,120.0 | | 1,167,866.0 | | 1,124,616.0 | | 1,206,938.5 | | 1,466,831.0 | | 1,994,999.5 | | 2,094,566.0 | | 2,451,165.5 | |
| change 1981-1984; %change | 33,900.0 | 3% | | | | | 82,322.5 | 7.3% | | | | | 99,566.5 | 5.0% | | | | |
| change 1984-1989; %change | | | 149,746.0 | 15% | | | | | 259,892.5 | 21.5% | | | | | 356,599.5 | 17.0% | | |
| change 1981-1989; %change | | | | | 183,646.0 | 18.7% | | | | | 342,215.0 | 30.4% | | | | | 456,166.0 | 22.9% |
| DEPLETED COMMUNITIES | 736,861.0 | | 739,252.0 | | 841,168.5 | | 473,274.0 | | 484,091.5 | | 576,108.5 | | 435,436.0 | | 419,073.0 | | 471,851.0 | |
| change 1981-1984; %change | 2,391.0 | 0.32% | | | | | 10,817.5 | 2.3% | | | | | -16,363.0 | -3.8% | | | | |
| change 1984-1989; %change | | | 101,916.5 | 14% | | | | | 92,017.0 | 19.0% | | | | | 52,778.0 | 12.6% | | |
| change 1981-1989; %change | | | | | 104,307.5 | 14.2% | | | | | 102,834.5 | 21.7% | | | | | 36,415.0 | 8.4% |
| RECOVERING COMMUNITIES | 272,930.0 | | 284,827.0 | | 340,221.5 | | 209,701.0 | | 221,567.5 | | 264,911.0 | | 129,682.5 | | 125,627.5 | | 149,586.5 | |
| change 1981-1984; % change | 11,897.0 | 4.36% | | | | | 11,866.5 | 5.7% | | | | | -4,055.0 | -3.1% | | | | |
| change 1984-1989; % change | | | 55,394.5 | 19% | | | | | 43,343.5 | 19.6% | | | | | 23,959.0 | 19.1% | | |
| change 1981-1989; % change | | | | | 67,291.5 | 24.7% | | | | | 55,210.0 | 26.3% | | | | | 19,904.0 | 15.3% |
| URBAN COMMUNITIES | 868,059.0 | | 893,813.0 | | 1,022,536.0 | | 754,827.5 | | 798,027.0 | | 950,640.5 | | 1,304,237.0 | | 1,317,209.5 | | 1,478,258.5 | |
| change 1981-1984; % change | 25,754.0 | 2.97% | | | | | 43,199.5 | 5.7% | | | | | 12,972.5 | 1.0% | | | | |
| change 1984-1989; % change | | | 128,723.0 | 14% | | | | | 152,613.5 | 19.1% | | | | | 161,049.0 | 12.2% | | |
| change 1981-1989; % change | | | | | 154,477.0 | 17.8% | | | | | 195,813.0 | 25.9% | | | | | 174,021.5 | 13.3% |
| RURAL COMMUNITIES | 116,160.5 | | 124,307.0 | | 145,330.0 | | 369,788.5 | | 408,911.5 | | 516,190.5 | | 690,762.5 | | 777,356.5 | | 972,907.0 | |
| change 1981-1984; % change | 8,146.5 | 7.01% | | | | | 39,123.0 | 10.6% | | | | | 86,594.0 | 12.5% | | | | |
| change 1984-1989; % change | | | 21,023.0 | 17% | | | | | 107,279.0 | 26.2% | | | | | 195,550.5 | 25.2% | | |
| change 1981-1989; % change | | | | | 29,169.5 | 25.1% | | | | | 146,402.0 | 39.6% | | | | | 282,144.5 | 40.8% |
| RECOVERING URBAN | 248,213.0 | | 258,060.0 | | 309,710.0 | | 159,600.0 | | 169,890.0 | | 205,627.5 | | 78,839.5 | | 74,859.5 | | 92,040.5 | |
| change 1981-1984; % change | 9,847.0 | 3.97% | | | | | 10,290.0 | 6.4% | | | | | -3,980.0 | -5.0% | | | | |
| change 1984-1989; % change | | | 51,650.0 | 20% | | | | | 35,737.5 | 21.0% | | | | | 17,181.0 | 23.0% | | |
| change 1981-1989; % change | | | | | 61,497.0 | 24.8% | | | | | 46,027.5 | 28.8% | | | | | 13,201.0 | 16.7% |
| RECOVERING RURAL | 24,717.5 | | 26,767.0 | | 30,511.5 | | 50,100.5 | | 51,677.5 | | 59,283.5 | | 50,843.0 | | 50,768.0 | | 57,546.0 | |
| change 1981-1984; % change | 2,049.5 | 8.29% | | | | | 1,577.0 | 3.1% | | | | | -75.0 | -0.1% | | | | |
| change 1984-1989; % change | | | 3,744.5 | 14% | | | | | 7,606.0 | 14.7% | | | | | 6,778.0 | 13.4% | | |
| change 1981-1989; % change | | | | | 5,794.0 | 23.4% | | | | | 9,183.0 | 18.3% | | | | | 6,703.0 | 13.2% |
| NONRECOVERING URBAN | 440,664.0 | | 432,770.0 | | 477,141.0 | | 252,316.0 | | 250,393.0 | | 296,271.0 | | 281,097.5 | | 269,492.0 | | 298,263.0 | |
| change 1981-1984; % change | -7,894.0 | -1.79% | | | | | -1,923.0 | -0.8% | | | | | -11,605.5 | -4.1% | | | | |
| change 1984-1989; % change | | | 44,371.0 | 10% | | | | | 45,878.0 | 18.3% | | | | | 28,771.0 | 10.7% | | |
| change 1981-1989; % change | | | | | 36,477.0 | 8.3% | | | | | 43,955.0 | 17.4% | | | | | 17,165.5 | 6.1% |
| NON-RECOVERING RURAL | 23,266.0 | | 21,655.0 | | 23,805.5 | | 11,257.0 | | 12,131.0 | | 14,926.5 | | 24,656.6 | | 23,954.0 | | 24,001.5 | |
| change 1981-1984; % change | -1,611.0 | -6.92% | | | | | 874.0 | 7.8% | | | | | -702.6 | -2.8% | | | | |
| change 1984-1989; % change | | | 2,150.5 | 10% | | | | | 2,795.5 | 23.0% | | | | | 47.5 | 0.2% | | |
| change 1981-1989; % change | | | | | 539.5 | 2.3% | | | | | 3,669.5 | 32.6% | | | | | -655.1 | -2.7% |

An analysis of variance (Table 5.11) only partially confirms this. The environmental effect is significant. For the 1981-1989 period the table shows {F(2,456)=4.0647, sig.=0.018}; the effect is not significant for the period between 1984-1989 with {F(2,456)=1.8665, sig. =0.1558}. In comparison to the measures recorded in Table 5.6 for manufacturing the

TABLE 5.11

ANOVA FOR THE ENVIRONMENTAL EFFECT ON
FTE EMPLOYMENT CHANGE 1981-1989, 1981LAD LEVEL,
PRODUCER SERVICES SECTOR,
ALL COMMUNITIES

Analysis of Variance

| Source | D.F. | Sum of Squares | Mean Squares | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 2 | 5131.3777 | 2565.6889 | 4.0647 | .0178 |
| Within Groups | 456 | 287832.1522 | 631.2109 | | |
| Total | 458 | 292963.5299 | | | |

ANOVA FOR THE ENVIRONMENTAL EFFECT ON
FTE EMPLOYMENT CHANGE 1984-1989, 1981LAD LEVEL,
PRODUCER SERVICES SECTOR,
ALL COMMUNITIES

Analysis of Variance

| Source | D.F. | Sum of Squares | Mean Squares | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 2 | 1546.9215 | 773.4607 | 1.8665 | .1558 |
| Within Groups | 456 | 188962.9546 | 414.3924 | | |
| Total | 458 | 190509.8760 | | | |

Source: NOMIS

environmental effect appears to exert slightly less influence over changes in producer service employment. One interesting difference that emerges when the two subsectors are compared is that the highest mean rates for producer services are recorded in the most conducive environments where as the indeterminate environments had the highest mean rates of manufacturing employment change. Thus the higher rates of new firm formation in the most conducive environments appear to hold part of the explanation of why these communities had such high rates of producer service employment growth. Since there is evidence of an environmental effect over all cases it is possible that the effect extended down to the depleted communities. This possibility is explored in the next section which begins with a discussion of rows two and three of Table 5.10.

## Environmental Effect: Depleted And Recovering Communities/Producer Services

For depleted communities, aggregate FTE employment growth in producer services was either very weak or absent during the 1981-1984 period - a feature which might be expected, given the way depleted communities are defined. The following period (1984-1989), saw much stronger growth, but differences in environmental conditions appear to have had only a modest influence on rates of employment change in producer services. When changes for 1984-1989 were compared across the different types of environment, the highest aggregate rate of change (19.0%) was recorded by communities in the indeterminate environment category. The lowest rate (12.6%) was registered by communities with the most conducive environments. These figures do not support the notion that the environmental effect described in Table 5.11 was operating in depleted communities.

The rates of FTE employment change (1984-1989) for producer services in recovering communities suggest that, in recovering communities as well, changes in the environment had very limited influence. Aggregate rates in different environments ranged from a high of 19.6% (in the indeterminate environments) to a low of 19.0% (in the least conducive environments). These figures suggest that for recovering communities employment changes in producer services were unaffected by variations in the conduciveness of environments. It can also be seen that aggregate rates in

TABLE 5.12

ANOVA FOR THE ENVIRONMENTAL EFFECT ON FTE EMPLOYMENT CHANGE 1984-1989, 1981LAD LEVEL, PRODUCER SERVICES SECTOR, DEPLETED COMMUNITIES

Analysis of Variance

| Source | D.F. | Sum of Squares | Mean Squares | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 2 | 449.1170 | 224.5585 | .8440 | .4321 |
| Within Groups | 146 | 38843.7212 | 266.0529 | | |
| Total | 148 | 39292.8382 | | | |

ANOVA FOR THE ENVIRONMENTAL EFFECT ON FTE EMPLOYMENT CHANGE 1984-1989, 1981LAD LEVEL, PRODUCER SERVICES SECTOR, RECOVERING COMMUNITIES

Analysis of Variance

| Source | D.F. | Sum of Squares | Mean Squares | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 2 | 107.4070 | 53.7035 | .1942 | .8240 |
| Within Groups | 65 | 17978.3842 | 276.5905 | | |
| Total | 67 | 18085.7912 | | | |

Source: NOMIS

recovering communities for the period between 1984 and 1989 compared quite favourably with aggregate rates for all communities which are recorded in row one of Table 5.10.

To further explore the influence of the environment on depleted and recovering communities Table 5.12 records the results of analysis of variance for the period 1984-1989. Results of the ANOVAs show that as expected, the environmental effect is not significant for depleted communities {$F(2,146)=0.8440$, sig. $=0.4321$} and is even less significant for recovering communities {$F(2,65)=0.1942$, sig. $= 0.8240$}. It may be concluded from these results that depleted communities occupying environments considered to be the least conducive to the formation of new small firms suffered no significant disadvantage as a consequence in so far as growth of producer service employment is concerned. One possible explanation of this lack of differential is that new small firms in the producer services sector were robust. Another explanation might be that in the least conducive environments, many more producer service jobs were generated by other sources - such as existing firms whether large or small. If that was the case then the greater contribution made by new small firms to communities in the most conducive environments would be rendered unobservable.

## Urban/Rural Effect: All Communities

Like the manufacturing sector, the producer services sector showed a clear urban-rural effect in the aggregate. Referring to Table 5.10 it can be seen in rows four and five that rural based communities had higher rates of growth than comparable urban based communities across all environments and all time periods. The aggregate figures also suggest that even though rural communities faired best, virtually every type of community benefited from growth in producer services. A very strong performance in the aggregate by rural communities in conducive environments (40.8% for the period from 1981-1989) may indicate an interaction effect between urban-rural and environmental effects. But as will be indicated below, these same influences appear to have the opposite effect on communities that did not recover.

Table 5.13 records the results of analysis of variance for the urban/rural effect on producer service employment. For the period 1981-1989 the influence of the urban/rural is quite strong {F(1,457)=10.937, sig. = 0.001}.

TABLE 5.13

ANOVA OF URBAN/RURAL EFFECT ON
FTE EMPLOYMENT CHANGE 1981-1989, 1981LAD LEVEL,
PRODUCER SERVICES SECTOR,
ALL COMMUNITIES

Analysis of Variance

| Source | D.F. | Sum of Squares | Mean Square | F Ratio | F Prob |
|---|---|---|---|---|---|
| Between Groups | 1 | 6847.505 | 6847.505 | 10.937 | .001 |
| Within Groups | 457 | 286116.025 | 626.074 | | |
| Total | 458 | 292963.530 | 639.658 | | |

ANOVA OF URBAN/RURAL EFFECT ON
FTE EMPLOYMENT CHANGE 1984-1989, 1981LAD LEVEL,
PRODUCER SERVICES SECTOR,
ALL COMMUNITIES

Analysis of Variance

| Source | D.F. | Sum of Squares | Mean Square | F Ratio | F Prob |
|---|---|---|---|---|---|
| Between Groups | 1 | 2497.306 | 2497.306 | 6.070 | .014 |
| Within Groups | 457 | 188012.570 | 411.406 | | |
| Total | 458 | 190509.876 | 415.960 | | |

Source: NOMIS

The mean rate in rural based communities was (34.8%); in comparison, the mean rate in urban communities was (26.9%). Rural based communities continued to outpace urban based communities in the period between 1984 and 1989 where again the differences were significant {F(1.457)=6.070, sig. 0.014}. So the influence of a change in urban/rural character on rates of producer service employment is significant. However, like the environmental effect, for producer services, the urban/rural effect does not appear to extend to recovering communities. In recovering communities the highest mean rates of producer service employment growth for the 1984-1989 period were recorded by urban based communities (23.6%).

TABLE 5.14

ANOVA OF INTERACTION EFFECTS OF URBAN-RURAL AND ENVIRONMENTAL, PRODUCER SERVICES SECTOR, ALL COMMUNITIES

Analysis of Variance

| Source of Variation | Sum of Squares | DF | Mean Square | F | Signif of F |
|---|---|---|---|---|---|
| Main Effects | 11691.210 | 3 | 3897.070 | 3.915 | .009 |
| Environment | 1667.516 | 2 | 833.758 | .838 | .433 |
| Urban rural | 7983.572 | 1 | 7983.572 | 8.020 | .005 |
| 2-way Interactions | 4376.244 | 2 | 2188.122 | 2.198 | .112 |
| Environment/ Urban-Rural | 4376.244 | 2 | 2188.122 | 2.198 | .112 |
| Explained | 16067.454 | 5 | 3213.491 | 3.228 | .007 |
| Residual | 450944.551 | 453 | 995.463 | | |
| Total | 467012.005 | 458 | 1019.677 | | |

Source: NOMIS

By comparison rural based recovering communities averaged (16.8%). In other words, *there were exceptions to the general trend and many of these exceptions can be found in the set of communities that recovered* because within this group of communities urban based LADs out-performed rural based LADs.

Table 5.14 summarises the results of an analysis of variance which seeks to gauge the significance of any interactions between the urban-rural and environmental effects for producer service employment. Like manufacturing, the interaction of the environmental and urban/rural effects is not significant at the 5% level {F=2.198, sig: 0.112}.

## Producer Service Employment Change And Sub-Categories Of Depleted Communities

Finally, an examination of the aggregate figures in rows six and seven of Table 5.10 shows a somewhat surprising reversal of the trends observed earlier. In marked contrast to the general trend which saw rural communities outpacing urban communities the opposite is true. In those sub-categories of recovering communities it was urban based recovering communities that steadily and substantially out-performed rural based recovering communities for the period 1984-1989. It can be concluded that with respect to producer services the recovering communities were not heavily influenced by the urban/rural effect. Thus the recovering communities harbour some exceptions to the more general trend.

Earlier it was established that in the case of manufacturing employment the urban/rural effect extended down to recovering communities. Therefore urban based recovering communities could not rely on manufacturing for net job growth between 1984 and 1989. This suggests that producer services were a *vitally important* source of jobs for those urban communities that did recover.

The non-recovering depleted communities also displayed a reverse of the general trend. That is, non-recovering urban based communities out-performed non-recovering rural based communities. There are variations

**in rates of FTE employment change across different types of environment but it is communities from the most conducive environments that register the lowest rates. So within this sub category of depleted community there is not much evidence of an environmental effect either. Although the set of cases is quite small, (in terms of the number of 1981LADs involved), the interaction of environmental conduciveness and rural character does record the only negative value (-2.7%) for the 1981-1989.**

**In summary, producer services have been an important source of new employment both in terms of <u>the number of jobs</u> and also in terms of <u>the pervasiveness</u> of this form of employment growth. With respect to producer service employment, recovering communities reversed a more broadly observable urban/rural trend. That is, in the aggregate, recovering urban based communities registered higher rates of growth than recovering rural based communities. In this way producer services played a key role in offsetting the FTE employment losses arising from manufacturing sector (which were highest in the urban settings). The tendency for employment gains in producer services to offset employment losses in manufacturing may also be related to some versions of the externalisation thesis where jobs shed by manufacturing are re-established as producer service jobs. For recovering communities, FTE employment in producer services grew by 23.3% creating 142,405.5 FTE jobs. However, over the same period the recovering communities had lost 205,420 FTE manufacturing jobs so overall, there was a shortfall. In comparison to its influence over manufacturing employment, the urban/rural effect was less pervasive in the case of producer services. That is, there were a number of exceptional cases where urban based communities had higher rates of growth than rural based communities. These exceptions were particularly evident in the**

depleted communities and particularly important for the recovery of urban based communities.

Similar remarks hold for the environmental effect. That is, in comparison to its influence over manufacturing employment, the environmental effect for producer services was less pervasive. This was particularly evident in the cases of depleted, and recovering communities where the effect was not significant. So recovering communities did not seem to be strongly influenced by either effect.

# PART IV:

## Sectors Other Than Manufacturing And Producer Services - The Remaining Sectors

**The composition of this third sectoral group, defined simply by exclusion of manufacturing and producer services from all FTE employment, is quite mixed and includes retailing, construction and various parts of the service sector. For convenience, this grouping will be referred to as the remaining sectors. The remaining sectors constitute a significant proportion of total FTE employment. In 1981 the remaining sectors represented 44% of total FTE employment in Great Britain. During the period from 1981-1989 overall growth was 7.2% in the remaining sectors. This generated approximately 607,000 additional FTE jobs with most of the growth (almost 94%) occurring in the period between 1984-1989. Table 5.15 displays the FTE employment history of this sector over the 1980s.**

## Environmental Effect: All Communities /Remaining Sectors

**As table 5.15 shows, the highest aggregate rate for the remaining sectors was registered by those communities occupying indeterminate environments. A comparison of aggregate rates achieved by those communities from the most conducive environments (7%) with the rates achieved by communities from the least conducive environments (5%) suggests that there was little in the way of an environmental effect. Like producer services, most of the growth in the remaining sectors occurred between 1984-1989; however, the rates for remaining sectors were generally lower than those achieved by producer services. Table 5.15 shows that, with only one exception, there was growth in all environments and in all time periods. The exception occurred in the 1981-1984 interval;**

## REMAINING SECTORS OTHER THAN MANUFACTUTRING AND PRODUCER SERVICES

| Environmental Category | LEAST CONDUCIVE 1981 | | 1984 | | 1989 | | INDETERMINATE 1981 | | 1984 | | 1989 | | MOST CONDUCIVE 1981 | | 1984 | | 1989 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ALL COMMUNITIES | 2,559,186.00 | | 2,515,945.00 | | 2,685,058.50 | | 2,517,678.50 | | 2,542,042.00 | | 2,747,875.50 | | 3,364,854.00 | | 3,420,214.00 | | 3,615,723.00 | |
| change 1981-1984; %change | (43,241.00) | -2% | | | | | 24,363.50 | 1% | | | | | 55,360.00 | 2% | | | | |
| change 1984-1989; %change | | | 169,113.50 | 7% | | | | | 205,833.50 | 8% | | | | | 195,509.00 | 6% | | |
| change 1981-1989; %change | | | | | 125,872.50 | 5% | | | | | 230,197.00 | 9% | | | | | 250,869.00 | 7% |
| DEPLETED COMMUNITIES | 1,782,757.0 | | 1,717,807.0 | | 1,816,699.0 | | 1,025,375.5 | | 988,848.5 | | 1,064,268.5 | | 727,373.5 | | 711,215.0 | | 739,928.0 | |
| change 1981-1984; %change | (64,950.00) | -3.64% | | | | | (36,527.00) | -4% | | | | | (16,158.50) | -2.22% | | | | |
| change 1984-1989; %change | | | 98,892.00 | 6% | | | | | 75,420.00 | 8% | | | | | 28,713.00 | 4% | | |
| change 1981-1989; %change | | | | | 33,942.00 | 2% | | | | | 38,893.00 | 4% | | | | | 12,554.50 | 2% |
| RECOVERING COMMUNITIES | 629,506.5 | | 597,465.0 | | 669,058.0 | | 534,187.0 | | 504,714.5 | | 572,351.0 | | 193,507.5 | | 176,561.0 | | 209,606.5 | |
| change 1981-1984; %change | (32,041.50) | -5.09% | | | | | (29,472.50) | -6% | | | | | (16,946.50) | -8.76% | | | | |
| change 1984-1989; %change | | | 71,593.00 | 12% | | | | | 67,636.50 | 13% | | | | | 33,045.50 | 19% | | |
| change 1981-1989; %change | | | | | 39,551.50 | 6% | | | | | 38,164.00 | 7% | | | | | 16,099.00 | 8% |
| URBAN COMMUNITIES | 2,141,512.5 | | 2,104,721.0 | | 2,233,704.5 | | 1,513,179.0 | | 1,511,832.5 | | 1,617,321.5 | | 1,735,502.5 | | 1,751,177.5 | | 1,787,405.0 | |
| change 1981-1984; %change | (36,791.50) | -1.72% | | | | | (1,346.50) | 0% | | | | | 15,675.00 | 0.90% | | | | |
| change 1984-1989; %change | | | 128,983.50 | 6% | | | | | 105,489.00 | 7% | | | | | 36,227.50 | 2% | | |
| change 1981-1989; %change | | | | | 92,192.00 | 4% | | | | | 104,142.50 | 7% | | | | | 51,902.50 | 3% |
| RURAL COMMUNITIES | 417,673.5 | | 411,224.0 | | 451,354.0 | | 1,004,499.5 | | 1,030,209.5 | | 1,130,554.0 | | 1,629,351.5 | | 1,669,036.5 | | 1,828,318.0 | |
| change 1981-1984; % change | (6,449.50) | -1.54% | | | | | 25,710.00 | 3% | | | | | 39,685.00 | 2.44% | | | | |
| change 1984-1989; % change | | | 40,130.00 | 10% | | | | | 100,344.50 | 10% | | | | | 159,281.50 | 10% | | |
| change 1981-1989; % change | | | | | 33,680.50 | 8% | | | | | 126,054.50 | 13% | | | | | 198,966.50 | 12% |
| RECOVERING URBAN | 540,797.5 | | 521,650.0 | | 580,650.0 | | 387,987.5 | | 365,794.5 | | 422,917.0 | | 66,663.0 | | 61,142.5 | | 76,099.5 | |
| change 1981-1984; % change | (19,147.50) | -3.54% | | | | | (22,193.00) | -6% | | | | | (5,520.50) | -8.28% | | | | |
| change 1984-1989; % change | | | 59,000.00 | 11% | | | | | 57,122.50 | 16% | | | | | 14,957.00 | 24% | | |
| change 1981-1989; % change | | | | | 39,852.50 | 7% | | | | | 34,929.50 | 9% | | | | | 9,436.50 | 14% |
| RECOVERING RURAL | 88,709.0 | | 75,815.0 | | 88,096.5 | | 146,199.5 | | 138,920.0 | | 149,434.0 | | 126,844.5 | | 115,418.5 | | 133,507.0 | |
| change 1981-1984; % change | (12,894.00) | -14.54% | | | | | (7,279.50) | -5% | | | | | (11,426.00) | -9.01% | | | | |
| change 1984-1989; % change | | | 12,281.50 | 16% | | | | | 10,514.00 | 8% | | | | | 18,088.50 | 16% | | |
| change 1981-1989; % change | | | | | (612.50) | -1% | | | | | 3,234.50 | 2% | | | | | 6,662.50 | 5% |
| NON-RECOVERING URBAN | 1,070,939.5 | | 1,041,072.0 | | 1,067,002.5 | | 455,678.0 | | 450,398.5 | | 457,688.5 | | 487,227.0 | | 491,130.0 | | 483,715.5 | |
| change 1981-1984; % change | (29,867.50) | -2.79% | | | | | (5,279.50) | -1% | | | | | 3,903.00 | 0.80% | | | | |
| change 1984-1989; % change | | | 25,930.50 | 2% | | | | | 7,290.00 | 2% | | | | | (7,414.50) | -2% | | |
| change 1981-1989; % change | | | | | (3,937.00) | 0% | | | | | 2,010.50 | 0% | | | | | (3,511.50) | -1% |
| NON-RECOVERING RURAL | 82,311.0 | | 79,270.0 | | 80,638.5 | | 35,510.5 | | 33,735.5 | | 34,229.0 | | 46,639.0 | | 43,524.0 | | 46,606.5 | |
| change 1981-1984; % change | (3,041.00) | -3.69% | | | | | (1,775.00) | -5% | | | | | (3,115.00) | -6.68% | | | | |
| change 1984-1989; % change | | | 1,368.50 | 2% | | | | | 493.50 | 1% | | | | | 3,082.50 | 7% | | |
| change 1981-1989; % change | | | | | (1,672.50) | -2% | | | | | (1,281.50) | -4% | | | | | (32.50) | 0% |

communities from the least conducive environments lost (-2%) of their FTE employment.

TABLE 5.16

ANOVA FOR THE ENVIRONMENTAL EFFECT ON
FTE EMPLOYMENT CHANGE 1981-1989, 1981LAD LEVEL,
REMAINING SECTORS,
ALL COMMUNITIES

Analysis of Variance

| Source | D.F. | Sum of Squares | Mean Square | F Ratio | F Prob |
|---|---|---|---|---|---|
| Between Groups | 2 | 2763.270 | 1381.635 | 8.163 | .000 |
| Within Groups | 456 | 77183.012 | 169.261 | | |
| Total | 458 | 79946.282 | 174.555 | | |

ANOVA FOR THE ENVIRONMENTAL EFFECT ON
FTE EMPLOYMENT CHANGE 1984-1989, 1981LAD LEVEL,
REMAINING SECTORS,
ALL COMMUNITIES

Analysis of Variance

| Source | D.F. | Sum of Squares | Mean Square | F Ratio | F Prob |
|---|---|---|---|---|---|
| Between Groups | 2 | 514.235 | 257.118 | 1.894 | .152 |
| Within Groups | 456 | 61918.166 | 135.785 | | |
| Total | 458 | 62432.402 | 136.315 | | |

Source: NOMIS

To test the strength of any environmental effect that may be influencing employment change in the remaining sectors an analysis of variance was performed. Table 5.16 provides results of an analysis of variance of the environmental effect and employment change for the remaining sectors over the periods 1981-1989 and 1984-1989. The greatest differentials in performance were between communities in the least conducive environments and communities in the indeterminate environments. Between 1981 and 1989 remaining sector FTE employment in communities from indeterminate environments averaged 11.61% while the average rate in communities from the least conducive environments was 6.35%. For the 1984-1989 period this gap closed somewhat but communities in indeterminate environments still registered the highest rates.

However, the weakest performances for the 1984-1989 period were registered by those communities in the most conducive environments. FTE employment in those communities grew at an average rate of 8.03% between 1984 and 1989. Therefore the significant difference reported in Table 5.16 is between performances in the indeterminate environments and performances in the most conducive environments. This suggests that in terms of its influence over net FTE employment change in the remaining sectors the attribute of conduciveness is relatively unimportant.

## Environmental Effect:
## Depleted Communities /Remaining Sector

In the context of remaining sector employment and depleted communities, the environmental influence appears to be rather limited. That is, the aggregate differences in performance for 1981-1989 in different environments were very slight. However, for the 1984-1989 period contrasts were sharper; the strongest growth was in indeterminate environments and the weakest growth was again in the most conducive environments. These aggregate differences for 1984-1989 were substantial with communities from the indeterminate category growing at three times the rate of communities in the most conducive environments. For the recovering communities the rates of growth were much higher than the national average for the period 1984-1989 and led to the creation of 172,269 FTE jobs. Recovering communities from the most conducive environments registered the highest aggregate growth rate at 18%.

TABLE 5.17

ANOVA FOR THE ENVIRONMENTAL EFFECT ON
FTE EMPLOYMENT CHANGE 1984-1989, 1981LAD LEVEL,
REMAINING SECTORS,
DEPLETED COMMUNITIES

Analysis of Variance

| Source | D.F. | Sum of Squares | Mean Square | F Ratio | F Prob |
|---|---|---|---|---|---|
| Between Groups | 2 | 301.310 | 150.655 | 1.390 | .252 |
| Within Groups | 146 | 15819.217 | 108.351 | | |
| Total | 148 | 16120.527 | 108.922 | | |

ANOVA FOR THE ENVIRONMENTAL EFFECT ON
FTE EMPLOYMENT CHANGE 1984-1989, 1981LAD LEVEL,
REMAINING SECTORS,
RECOVERING COMMUNITIES

Analysis of Variance

| Source | D.F. | Sum of Squares | Mean Square | F Ratio | F Prob |
|---|---|---|---|---|---|
| Between Groups | 2 | 385.623 | 192.811 | 2.361 | .102 |
| Within Groups | 65 | 5307.514 | 81.654 | | |
| Total | 67 | 5693.137 | 84.972 | | |

Source: NOMIS

However, while recovering communities from the most conducive environments led all recovering communities (in terms of aggregate growth rates), the differential (7%) with recovering communities from the least conducive environments was modest. This suggests that variations in the conduciveness of the environment may have had a limited influence on FTE employment growth for the remaining sectors.

**Table 5.17 reports the results of an analysis of variance for the period 1984-1989 and depleted and recovering communities. The results show no significant environmental effect for either depleted or recovering communities. For the period 1984-1989 the analysis of variance yields these results: {F(2,146)=1.39, sig. = 0.252 for depleted communities and for recovering communities F(2,65)=2.36, sig.=0.102}. *These results imply that variations in the conduciveness of environments of communities that recovered had little or no effect on the rates of remaining sector FTE employment growth.* Average rates of growth for the 1984-1989 period in recovering communities occupying the least conducive, indeterminate and most conducive environments were respectively: 11.8%, 13.3% and 17.8%.**

## Urban/Rural Effect:
## All Communities/Remaining Sectors

**For both the 1981-1989 and 1984-1989 periods, aggregate rates of remaining sector FTE employment change in rural based communities were consistently higher than aggregate rates in comparable urban based communities. The strength of the urban/rural effect is evident in the analysis of variance reported in Table 5.18 where {F(1,457)=14.234, sig.=0.000} for the 1981-1989 period. The average rate of change in urban based communities during this period was (7.29%) while the average rate in rural based communities was (11.93%).**

**The urban/rural effect remained strong for the 1984-1989 period with {F(1,457)=6.572, sig. = 0.011}. The average rate of change in urban based communities during this period was (7.63%) while the average rate in rural based communities was (10.44%). *Therefore, in both time periods rural based communities substantially out performed urban based communities*;**

TABLE 5.18

ANOVA FOR THE URBAN/RURAL EFFECT ON
FTE EMPLOYMENT CHANGE 1981-1989, 1981LAD LEVEL,
REMAINING SECTORS,
ALL COMMUNITIES

Analysis of Variance

| Source | D.F. | Sum of Squares | Mean Squares | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 1 | 2414.837 | 2414.837 | 14.234 | .000 |
| Within Groups | 457 | 77531.445 | 169.653 | | |
| Total | 458 | 79946.282 | 174.555 | | |

ANOVA FOR THE URBAN/RURAL EFFECT ON
FTE EMPLOYMENT CHANGE 1984-1989, 1981LAD LEVEL,
REMAINING SECTORS,
ALL COMMUNITIES

Analysis of Variance

| Source | D.F. | Sum of Squares | Mean Squares | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 1 | 885.078 | 885.078 | 6.572 | .011 |
| Within Groups | 457 | 61547.323 | 134.677 | | |
| Total | 458 | 62432.402 | 136.315 | | |

Source: NOMIS

*leading to the conclusion that changes in rates of remaining sector employment were subject to a strong urban/rural effect.*

**In the aggregate, rates of change were quite consistent across all environmental types with the exception of the least conducive environments where rates were somewhat lower. In general however, the aggregate figures do not suggest a significant interaction between environmental and urban/rural effects. Table 5.19 reports an analysis of variance which tests**

the strength of any interaction; the table shows that there is little evidence of interaction with {F=2.438, sig. =0.089}.

TABLE 5.19

ANOVA FOR THE URBAN/RURAL INTERACTION EFFECT ON FTE EMPLOYMENT CHANGE 1981-1989, 1981LAD LEVEL, REMAINING SECTORS, ALL COMMUNITIES

Analysis of Variance

| Source of Variation | Sum of Squares | DF | Mean Square | F | Signif of F |
|---|---|---|---|---|---|
| Main Effects | 4180.724 | 3 | 1393.575 | 8.422 | .000 |
| Environment | 1765.887 | 2 | 882.943 | 5.336 | .005 |
| Urban/Rural | 1417.453 | 1 | 1417.453 | 8.566 | .004 |
| 2-way Interactions | 806.745 | 2 | 403.373 | 2.438 | .089 |
| Environment Urban/Rural | 806.745 | 2 | 403.373 | 2.438 | .089 |
| Explained | 4987.469 | 5 | 997.494 | 6.028 | .000 |
| Residual | 74958.813 | 453 | 165.472 | | |
| Total | 79946.282 | 458 | 174.555 | | |

Source: NOMIS

## Employment Change In The Remaining Sectors And Sub-Categories Of Depleted Communities

In spite of its strength overall, the urban-rural effect is reversed in recovering communities. That is, urban based recovering communities consistently out performed rural based recovering communities during the period from 1981 to 1989. The contrasts are especially sharp in the conducive and indeterminate environments where urban based communities grew at rates that were three and four times the rates registered in the respective rural based communities. For those other depleted communities that did not recover, the distinction between urban

**and rural is less clear with rates of growth far below those of the recovering communities.**

***It can be concluded that the urban/rural effect is not a significant factor accounting for the recovery of depleted communities in so far as the remaining sectors are concerned.*** **That is, the urban/rural effect has its exceptions and did not function as a significant barrier to the recovery of urban based depleted communities. Similarly, there is little evidence to suggest that variations in the conduciveness of environments have significantly influenced growth in recovering communities. As far as recovering communities are concerned rates of employment growth in the remaining sectors were strong across all environments. It is also worth noting the importance of this form of employment growth in accounting for the recovery of depleted communities. For instance, recovering communities sharply out-performed other communities and even exceeded national levels of growth for the period between 1984 and 1989. It is this rate of employment growth (14%) that distinguishes recovering communities from other depleted communities (3.7%) and has allowed them to recover where other communities have not recovered.**

## PART V:
## Self Employment

In Great Britain the number of individuals who were self-employed (with or without employees) rose substantially throughout the 1980s; increasing by 60.8% between 1981 and 1991. By interpolating this rate[2] it is estimated that self-employment grew by 48.6% between 1981 and 1989. Much of this growth occurred in the service sector especially in the SIC categories 6, 8 and 9 (Storey and Johnson, 1990).

Table 5.20 presents a chronicle of changes in self-employment over the period from 1981 to 1989 showing aggregate changes and rates of change based on these aggregates. Unlike the earlier tables for employees in employment there is only one period (1981-1989) reported here.

## Environmental Effect:
### All Communities

An examination of row one of table 5.20 shows that it was communities from the least conducive environments that recorded the lowest rates of growth in self-employment between 1981 and 1989. Also in contrast with earlier tables, the highest rate of growth in self employment (50.4%) was registered by those communities that occupied the most conducive environments. In addition the contrasts are not as sharp as those observed for employees in employment. For example, there is very little difference between the aggregate rates of growth in self employment registered by communities from the most conducive environments and aggregate rates registered by communities from the least conducive environments.

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[2]All estimates for 1989 are arrived at by taking 80% of the 1981-1991 growth rate for each cell in Table 5.20

TABLE 5.20

## Self Employment Change

| Environmental Category | LEAST CONDUCIVE 1981 | LEAST CONDUCIVE 1989 | | INDETERMINATE 1981 | INDETERMINATE 1989 | | MOST CONDUCIVE 1981 | MOST CONDUCIVE 1989 | |
|---|---|---|---|---|---|---|---|---|---|
| SELF EMPLOYMENT | | | | | | | | | |
| ALL COMMUNITIES | 465,610.00 | 679,892.00 | | 591,370.00 | 879,406.00 | | 857,420.00 | 1,286,331.00 | |
| change 1981-1989; %change | | 214,282.00 | 46% | | 288,036.00 | 49% | | 428,911.00 | 50% |
| DEPLETED COMMUNITIES | 284,200.0 | 407,696.0 | | 200,270.0 | 283,205.0 | | 169,120.0 | 255,215.0 | |
| change 1981-1989; %change | | 123,496.00 | 43% | | 82,935.00 | 41% | | 86,095.00 | 51% |
| RECOVERING COMMUNITIES | 113,340.0 | 164,183.0 | | 128,110.0 | 180,652.0 | | 62,320.0 | 91,632.0 | |
| change 1981-1989; %change | | 50,843.00 | 45% | | 52,542.00 | 41% | | 29,312.00 | 47% |
| URBAN COMMUNITIES | 347,790.0 | 518,073.0 | | 267,550.0 | 398,759.0 | | 299,030.0 | 453,254.0 | |
| change 1981-1989; %change | | 170,283.00 | 49% | | 131,209.00 | 49% | | 154,224.00 | 52% |
| RURAL COMMUNITIES | 117,820.0 | 161,818.0 | | 323,820.0 | 480,646.0 | | 558,390.0 | 833,077.0 | |
| change 1981-1989; % change | | 43,998.00 | 37% | | 156,826.00 | 48% | | 274,687.00 | 49% |
| RECOVERING URBAN | 90,330.0 | 132,531.0 | | 82,960.0 | 119,976.0 | | 12,470.0 | 20,904.0 | |
| change 1981-1989; % change | | 42,201.00 | 47% | | 37,016.00 | 45% | | 8,434.00 | 68% |
| RECOVERING RURAL | 23,010.0 | 31,651.0 | | 45,150.0 | 60,675.6 | | 49,850.0 | 70,728.0 | |
| change 1981-1989; % change | | 8,641.00 | 38% | | 15,525.60 | 34% | | 20,878.00 | 42% |
| NON-RECOVERING URBAN | 151,910.0 | 217,841.0 | | 60,920.0 | 86,716.0 | | 96,120.0 | 147,378.0 | |
| change 1981-1989; % change | | 65,931.00 | 43% | | 25,796.00 | 42% | | 51,258.00 | 53% |
| NON-RECOVERING RURAL | 18,950.0 | 25,672.0 | | 11,240.0 | 15,836.0 | | 10,680.0 | 16,205.0 | |
| change 1981-1989; % change | | 6,722.00 | 35% | | 4,596.00 | 41% | | 5,525.00 | 52% |

It would be expected, based on these aggregate figures, that any environmental effect will be weak as far as self employment is concerned. This issue is explored further in Table 5.21. Table 5.21 reports the results of an analysis of variance for all communities. The values {F( 2, 456 )=0.131; sig=0.877 } indicate that, as anticipated, the environmental effect is not significant. The highest mean rate of self

**TABLE 5.21**

**ANOVA FOR THE ENVIRONMENTAL EFFECT ON SELF-EMPLOYMENT CHANGE 1981-1989, 1981LAD LEVEL, ALL COMMUNITIES**

**Analysis of Variance**

| Source | D.F. | Sum of Squares | Mean Square | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 2 | 285.055 | 142.527 | .131 | .877 |
| Within Groups | 456 | 494620.777 | 1084.695 | | |
| Total | 458 | 494905.832 | 1080.580 | | |

Source: NOMIS

employment growth (52.9%) was registered by communities occupying those environments that were the most conducive to new firm formation. The lowest mean rate (51%) was found in communities occupying environments that were indeterminate with respect to their conduciveness to new firm formation. The fact that these differences are not significant suggests that self employment is relatively robust across all communities. This distinguishes self employment from all earlier measures of employees in employment.

## Environmental Effect:
## Depleted And Recovering Communities/Self-Employment

The general behaviour of rates of self employment evident in all communities is repeated when attention is focused on those communities that had been depleted. These cases are presented in row two of Table 5.20. For depleted communities the highest aggregate rate of self employment growth was in those depleted communities occupying the most conducive environments. Depleted communities from the indeterminate environments registered the lowest rates. Generally though, differences in the aggregate rates are modest; suggesting that a strong environmental effect is unlikely. In row three of Table 5.20 the pattern is maintained. That is, for recovering communities the highest aggregate rates of self employment change are recorded by communities from the most conducive environments. Somewhat surprisingly, the aggregate rates of growth in depleted communities were equal to or higher than aggregate rates of growth in the recovering communities. This suggests that in some cases the aggregate rates of self employment in non-recovering communities were higher than aggregate rates of self employment in recovering communities. However, as with earlier cases, the differences in aggregate rates are not large. Again this leads to the expectation that any environmental effect at the level of depleted communities will be weak. Table 5.22 reports an analysis of variance for depleted and recovering communities with the dependent variable being the rate of change in self employment. The values of {$F(2, 142)=1.032$; sig. = 0.359} for depleted communities and {$F(2, 65)= 0.146$; sig. = 0. 864} for recovering communities are as expected. These outcomes suggest that variations in the conduciveness of environments toward rates of new firm formation have had no significant effect on rates of growth in self-employment.

## Urban/Rural Effect:
## All Communities/Self-Employment

**An examination of rows four and five of Table 5.20 indicates that in general urban areas had higher rates of growth in self-employment than rural areas. This result leads to the expectation that self employment might be influenced by the urban/rural character of the host community.**

**TABLE 5.22**

**ANOVA FOR THE ENVIRONMENTAL EFFECT ON SELF-EMPLOYMENT CHANGE 1981-1989, 1981LAD LEVEL, DEPLETED COMMUNITIES**

Analysis of Variance

| Source | D.F. | Sum of Squares | Mean Square | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 2 | 1145.878 | 572.939 | 1.032 | .359 |
| Within | 146 | 81026.837 | 554.978 | | |
| Total | 148 | 82172.715 | 555.221 | | |

**ANOVA FOR THE ENVIRONMENTAL EFFECT ON SELF-EMPLOYMENT CHANGE 1981-1989, 1981LAD LEVEL, RECOVERING COMMUNITIES**

Analysis of Variance

| Source | D.F. | Sum of Squares | Mean Square | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 2 | 123.082 | 61.541 | .146 | .864 |
| Within Groups | 65 | 27325.254 | 420.389 | | |
| Total | 67 | 27448.336 | 409.677 | | |

**Source: NOMIS**

**However, in the case of self employment, the expectation is the reverse of the urban/rural effect described earlier for employees in employment! That is, in this case it is the <u>urban communities</u> that are expected to register the highest rates of self employment.**

Table 5.23 reports the results of an analysis of variance for the urban/rural effect with the dependent variable being rates of change in self-employment. The results show {F( 1, 457)=2.0342 ; sig. =0.1545} which

**TABLE 5.23**

**ANOVA FOR THE URBAN/RURAL EFFECT ON SELF-EMPLOYMENT CHANGE 1981-1989, 1981LAD LEVEL, ALL COMMUNITIES**

**Analysis of Variance**

| Source | D.F. | Sum of Squares | Mean Squares | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 1 | 2193.1533 | 2193.1533 | 2.0342 | .1545 |
| Within Groups | 457 | 492712.6786 | 1078.1459 | | |
| Total | 458 | 494905.8319 | | | |

Source: NOMIS

implies that although the urban character of a community may exert some positive influence on the rate of change in self employment, it is not significant at the 5% level. In addition because the higher rates were registered by the urban based communities there is clearly no evidence of an urban/rural effect influencing self employment.

## Self-Employment Change And Sub-Categories Of Depleted Communities

Examining the last four rows of table 5.20 it can be seen that the urban/rural differences noted earlier extend down through these sub-categories of depleted community. The range of values is highlighted by a very strong performance from those recovering, urban based communities that occupied the most conducive environments. In those particular communities the aggregate rate of self employment growth was 68%. However, the same environmental conditions yielded a more modest aggregate rate of (42%), in the case of recovering rural based communities. In general, urban based recovering communities faired better than rural based recovering communities with respect to growth in self employment. What could account for this trend? One possible explanation is that urban based communities are able to provide more local market opportunities, especially niche markets that would encourage self employment.

# PART VI:
# Conclusion

## The Environmental Effect

The trend in FTE employment change for each broad sectoral category (manufacturing, producer services, or the remaining sectors) was the same. The highest rates of employment change were registered by those communities occupying indeterminate environments and the lowest rates of change were registered by those communities occupying the least conducive environments. Rates of employment change in communities from the most conducive environments fell in between. In general the differences in employment rates between communities from the most conducive environments and communities from indeterminate environments were small. Differences in rates of change between communities from either the most conducive or indeterminate environments and communities occupying the least conducive environments were much greater. Therefore, the environmental effect manifested itself as significantly lower rates of employment growth within those communities whose environments were the least conducive to the formation of new small firms. This effect was observed for total employment and for each of the subsectors examined (manufacturing, producer services and remaining sectors).

The average rate of new firm formation within the set of communities from the least conducive environments was, as would be expected, the lowest average registration rate of all environmental categories. Thus the lowest rates of new firm registration appear to be strongly associated with the lowest rates of employment growth. However, although this was the general trend there were exceptions.

When attention is focused on those communities that recovered, evidence of exceptions begins to emerge. Recovering communities encompass all depleted communities that have been able to partially or completely restore, by whatever means, FTE employment lost in the early part of the decade. In general[3], the environmental effect did not appear to significantly influence rates of employment in recovering communities. This suggests that there were important exceptions to the environmental effect and some of the exceptional cases involved communities from the least conducive environments. Somehow, recovering communities from the least conducive environments were able to overcome the limitations of their environmental conditions and generate above average FTE employment growth between 1984 and 1989. This is most clearly illustrated by employment change in producer services subsector. In marked contrast to the general trend average rates of growth in producer service net employment were highest in those recovering communities from the least conducive environments between 1984 and 1989. Similarly, rates of growth in the remaining sectors were also quite strong across all environments.

In contrast to producer services and remaining sectors, growth in manufacturing employment was consistently and strongly influenced by variations in the conduciveness of the environment. Even in recovering communities, variations in the conduciveness of the environment were associated with significant differences in the rates of manufacturing employment change. For recovering communities from the least conducive environments the mean rate of change in manufacturing employment between 1984 and 1989 was actually negative (-2.6%). So the environmental effect was most pervasive in the case of manufacturing

[3]This holds true for producer services, remaining sectors and self employment. However, in the case of manufacturing significant differences were evident in recovering communities.

employment. As a consequence of this pervasiveness it may be concluded that the nature of recovery in communities from the least conducive environments differed from the nature of recovery in communities from other environments. That is, communities from the least conducive environments were much more dependant upon growth from the service sectors for overall net job creation and they placed an especially heavy reliance on net growth in producer service employment.

So far, the environmental effect has been characterised in this way: the lowest rates of new firm registration appear to be strongly associated with the lowest rates of employment growth. However, the data presented in chapter five do not support the obverse of this statement. That is, communities whose environments were expected to cultivate the highest rates of new firm registration were not the communities with the highest rates of net employment growth. Communities from the most conducive environments did in fact generate the highest rates of new firm registration. So the analysis in chapter five suggests that high rates of formation within the small firm sector will not by themselves lead to exceptional net FTE employment growth.

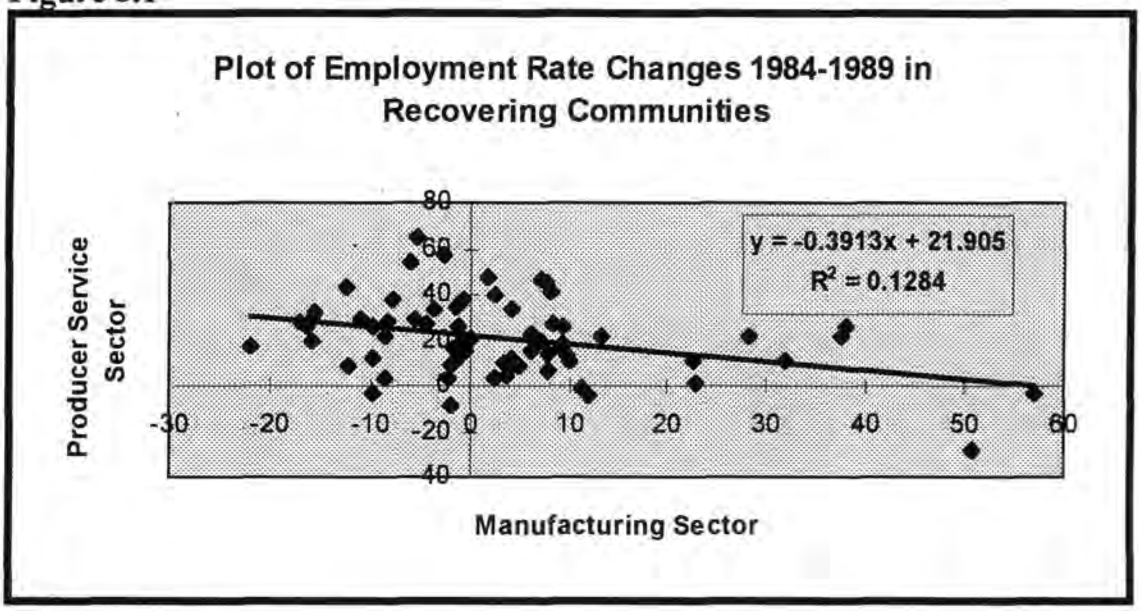
## Recovery Under Different Environmental Conditions

Depleted communities that occupied the least conducive environments had a lower rate of recovery than depleted communities in any other environmental categories. Seventy-six depleted communities occupied environments that were the least conducive to new firm formation; of these, 25 (or 33%) actually recovered. Those that did recover made strong showings in what has been referred to here as the remaining sectors. They also led all recovering communities, regardless of environmental conditions, with respect to rates of growth in the producer service category. Between

1984 and 1989 their average rate of growth in FTE producer service employment was 20.9%. Thus it was the service sectors that accounted for almost all of the net job growth in recovering communities from the least conducive environments.

Depleted communities that occupied indeterminate environ ments had the highest rates of recovery. Thirty-six depleted communities occupied environments that were indeterminate with respect to the formation of new firms; of these, 25 (or 70%) actually recovered. Those that recovered registered growth in each of the three sectoral categories: manufacturing, producer services and remaining sectors. These communities had the highest mean rate of growth in FTE manufacturing employment at 8%. So, unlike recovering communities in other environments those in indeterminate environments actually enjoyed growth in manufacturing employment; ultimately the manufacturing sector was to account for 16% of the total FTE employment increase between 1984 and 1989. The manufacturing sector rates of growth in these communities differed significantly from rates in recovering communities occupying the least conducive environments. In earlier chapters reference was made to the process of externalisation which describes a relationship between services (particularly producer services) and manufacturing. According to the externalisation thesis many of the 'new' jobs being recorded in the services category have actually migrated from manufacturing. One way to test for the importance of this phenomenon is to study the correlations between rates of employment change in the two sectors. If externalisation was the dominant phenomenon, this should show up as a negative correlation between the rates of employment change in these to sectors. Figure 5.1 plots the rates of change in producer service employment against the rates of change in manufacturing employment that occurred in recovering communities from indeterminate environments over the period between 1984 and 1989. The plot demonstrates that an inverse relationship exists between rates within the two sectors. The correlation (r=-0.36) is significant at the 0.01 level. Perhaps then externalisation was an important phenomenon in these particular communities. Similar correlations for the most conducive and the least conducive environments were also negative but these relationships were not significant at the 0.01 level.

Figure 5.1




Source NOMIS

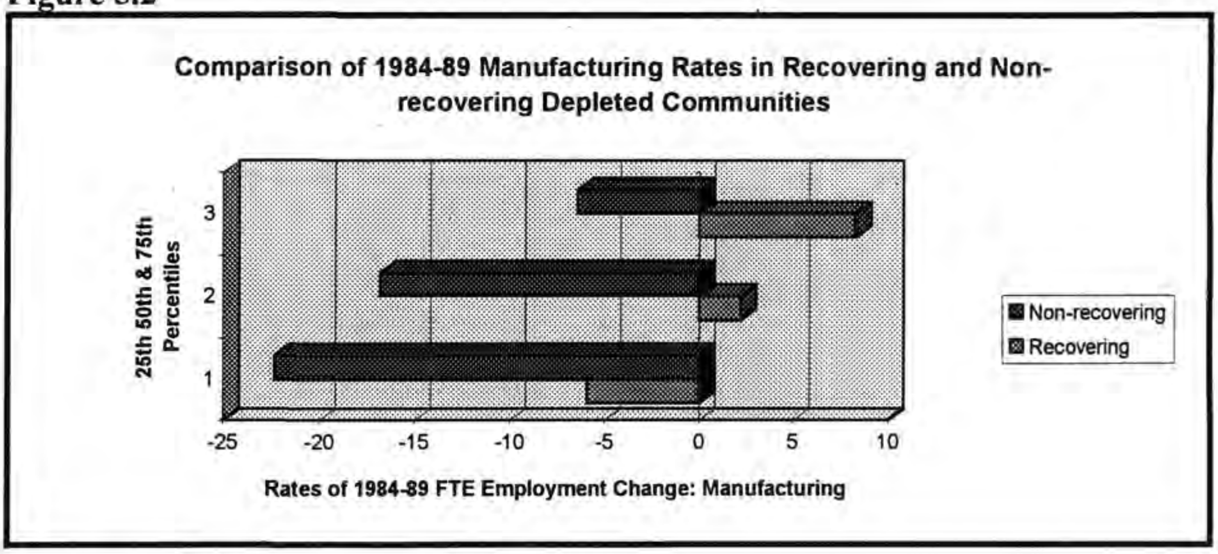
Eighteen of the thirty-seven depleted communities that occupied the most conducive environments managed to recover. In these communities prior losses in manufacturing employment were arrested, but there was little in the way of growth from the manufacturing sector during the 1984-1989 period. Thus recovery in these communities depended almost entirely on the producer service and the remaining sectors for employment growth. Of these, it was the remaining sectors that provided the largest share of net employment change.

## Recovery Compared to Non-Recovery

Two features distinguished those depleted communities that did recover from those that did not. First, FTE employment losses in manufacturing over the period 1984-1989 were much heavier and more widespread in communities that failed to recover than was the case in communities that recovered. To illustrate this very strong contrast between the two sets of communities Figure 5.2 compares the distributions of rates of manufacturing employment change for recovering and non-recovering communities using percentiles.

In the non-recovering communities the aggregate rate of decline in FTE manufacturing employment between 1984-1989 was (-15.1%) while in recovering communities there was actually a very modest gain of (0.002%). The losses occurring in non-recovering communities were

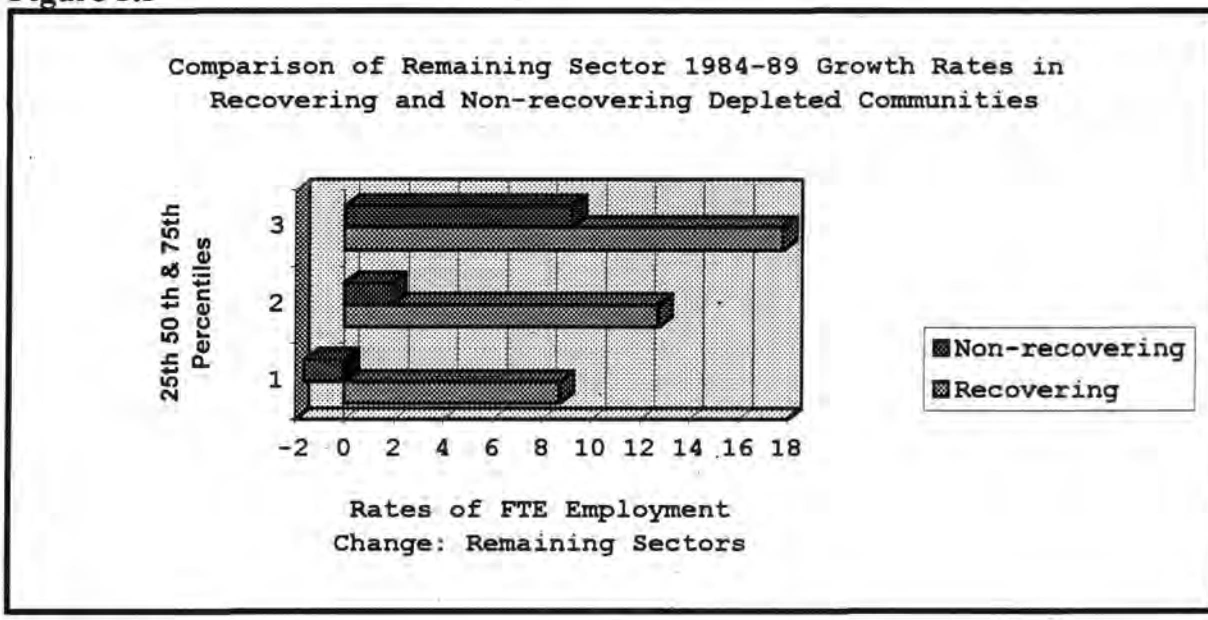
Figure 5.2




Source: NOMIS

basically continuations of losses that had been experienced between 1981-1984 when aggregate rates were (-18.06%). In several instances their 1984-1989 rates of decline were even greater. For recovering communities the 1981-1984 period was also a time of heavy losses (-17.02%) so the reversal in trends achieved by these communities was really quite marked. The second feature that distinguishes recovering from non-recovering communities is the much higher rates of remaining sector employment change registered by the recovering communities over the 1984-1989

Figure 5.3

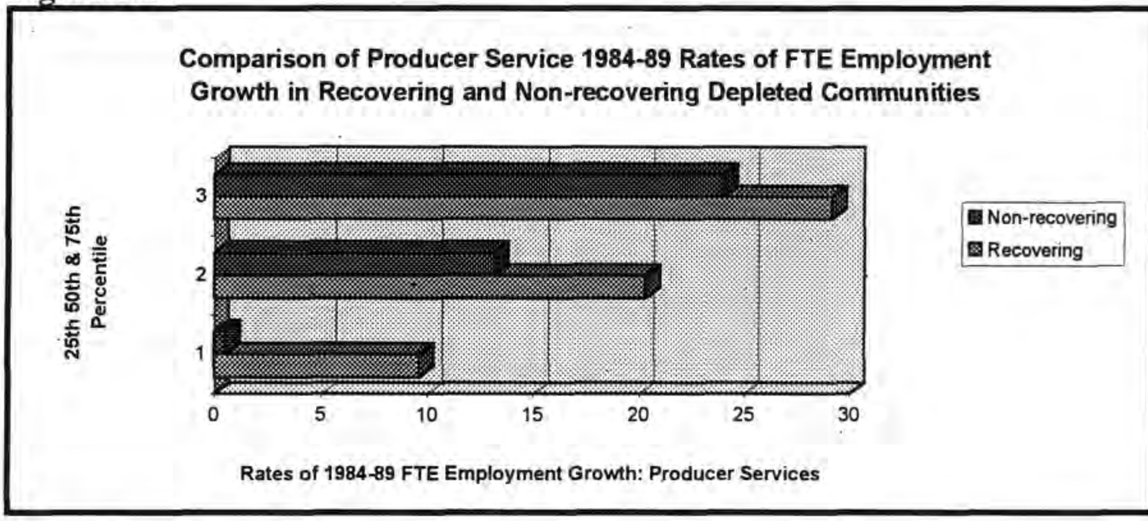



Source: NOMIS

period. To illustrate this very strong contrast between the two sets of communities figure 5.3 compares the distributions of rates of remaining sector employment change for recovering and non-recovering communities using percentiles. The average rate of FTE employment growth for the remaining sectors was more than three times greater in recovering communities (13.5%) than in non-recovering communities (3.5%). In the non-recovering communities FTE employment in these sectors actually declined (-0.5%) between 1981 and 1989. In recovering communities growth in remaining sectors was also pervasive. For the interval 1984-1989 gains in employment in the remaining sectors were recorded in 97% of all recovering communities.

While producer services played an important role in many recoveries, this sector also provided considerable employment to those communities that did not recover. In several cases the rates of growth in recovering communities were unmatched by rates recorded in communities that failed

Figure 5.4




Source: NOMIS

to recover but in general the contrasts were not as sharp as those provided by the difference in performance on remaining sectors. Like the remaining sectors, growth in producer service employment was pervasive. Unlike the remaining sectors rates of growth were high in both recovering and in non-recovering communities. *As a consequence of this last feature rates of growth in producer services do little to explain why some communities recovered and others did not.*

Chapter five has shown that variations in the conduciveness of environments toward the formation of new firms are strongly and significantly linked to variations in changes of net FTE employment over the 1980s. Although this environmental effect is widespread there are exceptions to the general trend. Recovering communities encompass all depleted communities that have achieved above average net employment growth during the 1984-1989 period by whatever means. In these recovering communities the environmental effect was not a significant influence on net employment change for any sub-sector[4]. At least some communities in adverse environmental conditions were able to overcome the limitations of their environments. What is still unclear is whether these exceptions indicate robustness on the part of the small firm sector. Chapter six will address that issue.

[4] It should be mentioned , however, that at a 10% level of confidence the environmental effect on recovering communities *was* significant for manufacturing.

# CHAPTER SIX
# NEW FIRMS AND EMPLOYMENT CHANGE

# CONTENTS

## Introduction

In chapter four it was argued that the majority of Britain's depleted communities faced the challenge of restoring employment lost in the early 1980s while occupying environments that were among the least conducive to the formation of new small firms. Many of these depleted communities responded to this challenge by creating FTE employment at rates that exceeded the national rate for the period between 1984 and 1989. These communities were among those recovering.

In chapter five the nature of employment change over the 1980s was examined. Among the issues addressed in chapter five was the matter of whether variations in the conduciveness of environments (with respect to the formation of small firms) influenced employment change. Several analyses of job creation reported in the literature during the 1980s, had concluded that small firms were the only net creators of employment (Storey and Johnson, 1987; Daly and Galagher 1989). On the basis of those reported results an 'environmental effect' was expected; that is, it was anticipated that communities whose environments were among the least conducive to the formation of new firms would exhibit weaker rates of employment growth during the 1980s than communities in other circumstances. Results of analysis of variance reported in chapter five supported this expectation.

When all industrial sectors and all communities were taken into account there *was* evidence of a significant *environmental effect.* It was found that communities from the least conducive environments had rates of FTE employment change throughout the 1980s that were significantly lower than communities from either of the other two environmental categories. Even when employment change was disaggregated into particular sectoral clusters, the environmental effect was shown to exert a significant influence on the rates of change in each cluster. That is, variations in the conduciveness of environments appeared to influence rates of employment change in manufacturing, in producer services and in the remaining sectors. But there were sectoral *differences* as well.

In terms of these sectoral divisions, the environmental effect appeared to have its strongest influence over the manufacturing sector. During the 1980s the manufacturing sector continued to lose employment (Artis, 1992) as a result, the environmental effect manifested itself in the following way: in comparison to communities from other environments, those from the least conducive environments registered significantly greater *declines* in FTE manufacturing employment.

Contrasting most sharply with manufacturing was employment change in the producer service sector. The majority of Great Britain's communities experienced *growth* in FTE producer service employment and differences in rates of employment growth between communities from the least conducive environments and communities from other environments were certainly less marked than similar comparisons of manufacturing employment change. In fact, of all three sectoral clusters examined, producer services appeared to be least influenced by variations in the conduciveness of the environment.

Just as the influence of the environmental effect varied, depending upon the industrial sector examined, *variations* in the influence of the environmental effect were also evident depending upon the sub-set of communities examined. For instance, within the set of recovering communities, there were cases where FTE employment grew strongly even when the environment was not conducive to small firm growth. While it was true generally that communities from the least conducive environments were the poorest performers (in terms of net job generation), there were exceptions. For instance, in the recovering communities, the environmental effect did not appear to be as significant an influence as it was for the set of all communities. In fact, for recovering communities, the environmental effect was not a statistically significant influence for either producer service employment change or employment change within the remaining sectors. Even in the case of manufacturing employment change, the environmental influence was not significant at the 5% level in the recovering communities. *From these results it may be concluded that the environmental effect was not so strong as to preclude exceptions to the general trend.* These exceptions lead to questions about the origins of new employment in recovering communities; more precisely, they raise the possibility that some communities occupying the least conducive environments may have generated a significant proportion of their employment growth from newly created small firms in spite of the limitations imposed by their environments. If this was the case, it would be evidence of robustness within the small firm sector.

Chapter six tests the importance of newly formed, small firms as sources of job creation and as sources of net employment growth. These issues are examined for Great Britain as a whole, for those depleted communities that recovered from employment losses suffered during the early part of the 1980s, and for those communities occupying environments that were the least conducive to small firm formation. If new small firms were critically important to local economies there should be two levels of evidence to show this. First, there should be evidence to show that small firms have created jobs in large numbers. Second, there should be evidence to show that these

**job generating efforts have had a positive effect on net employment. The performance of newly formed firms will be evaluated in both respects.**

## PART ONE:
## Job Creation

**As a first step in evaluating the contribution made by newly formed firms a means must be developed of estimating the number of jobs new firms have created. This involves construction of *a model of small firm population growth and job creation*. As this label suggests, the model estimates changes in the population of firms as well as changes in the levels of job creation originating from new small firms. The first aspect of the model to be discussed here is firm population growth.**

### Firm Population Growth

**The *model of small firm population growth and job creation* is based in part on VAT firm registration data for Great Britain. It also utilises information on the <u>rates and timing</u> of firm failures, as reported in various elements of the UK literature. The model separates firms into two cohorts: the first cohort is made up of those firms that had registered for VAT prior to 1981; the second cohort is composed of those firms that registered for VAT between 1981 and 1989. The second cohort is referred to, albeit inaccurately, as the '1980s generation of firms'.**

**For the first cohort, i.e., for those firms that had registered for VAT prior to 1981, the model generates an estimate of the number of these businesses that would still be operating as at year end 1989. For the second cohort, i.e., for those firms that registered for VAT after 1980, the model calculates an annual year end total for each of the nine years between 1981 and 1989.**

The annual total for any given year represents the number of firms born after 1980 that were still operating at the end of that year. By year end 1989, the annual total would be composed of all those firms born between 1981 and 1989 that had managed to survive until year end 1989.

Finally, in terms of the second cohort, the model calculates for each year between 1981 and 1989, a weighted average number of firms (from the 1980s generation of firms). For purposes of this calculation failures are assumed to occur *evenly* throughout the year. Thus the weighted average figure takes the mean of the number of firms at year beginning and the number at year ending. In the case of firms that will register during the year, the number of firms at year beginning is set at zero. As an illustration, if 88 out of 100 newly registered firms survive the first twelve month period their weighted average number of firms for that first year would be (0+88)/2 = 44 firms. When these nine annual weighted averages are aggregated, their sum is referred to as the number of 'firm years'. A firm started in 1981 for instance, which operated for three full years and finally ceased operations at the end of 1983, would have contributed three 'firm years' to this total.

The model also generates a figure for the *total stock* of firms as at year end 1989 regardless of year of birth. The figure for total stock is determined by combining the estimated stock of pre 1981 firms as at 1989 with the estimated stock of post 1980 firms as at 1989. This figure for total stock will be compared to the actual stock of firms recorded on the VAT register at year end 1989. The comparison allows the model to be tested. In addition to estimating the total stock of firms as at year end 1989, the model implicitly 'ages' the firm population. In the simplest case the model generated population estimate as at year end 1989 can be separated into firms from two age groups: those that registered prior to 1981, and those that registered after 1980. However, for that segment of the population registering after 1980 a more detailed ageing by year of registration is also possible.

## New Firm Job Creation

The second aspect of the model to be discussed concerns its ability to estimate job creation. Of particular interest is the number of jobs created by firms from the 1980s generation. In terms of total employment in 1989 for instance, it would be of interest to know approximately how many jobs were provided by firms that had registered for VAT after 1980.

Model generated estimates of the number of jobs created by this cohort of firms are intended to be conservative. To achieve this, the model relies on approaches used in the past to estimate employment in newly formed firms. As with model generated estimates of total firm stock, model generated employment estimates will also be tested. To do this the model makes use of employment sizeband data provided by the Department of Employment through the NOMIS database. The number of jobs as at 1989 attributed to firms from the 1980s generation is compared to the number of jobs found in firms from the lowest sizebands in the NOMIS system. The comparison allows the accuracy of the model generated estimate to be tested.

The model generated employment estimates allow assessment of the contribution of newly formed small firms to job creation. The assessment is made for the general case (that is, for all communities), but also for the case of those depleted communities that recovered, and for the case of those communities occupying the least conducive environments. Originally, these estimates were to be contrasted with changes in the number of employees working in small establishments between 1984 and 1989 as recorded in sizeband data provided on the NOMIS system. However, data for the year 1984 is not available in a usable form and efforts to secure the 1984 sizeband data from the Department of Employment were unsuccessful. As a result, only 1987 and 1989 sizeband data sets are available in usable form. The 1989 sizeband data are used here to measure the number of employees holding jobs in establishments of various sizes. This comparison allows the accuracy of the model generated estimate to be tested. Discussion now turns to the design of the model itself.

## A Model To Estimate Growth In The Population Of New Firms Between 1981 And 1989

The literature dealing with small firms includes several pieces of research that report on the rates and timing of business failures. Some of these estimates are for all firms while others deal especially with new small firms. The most comprehensive work on rates and timing of business failures is by Ganguly (1985). Although they make reference to the same work, Storey and Johnson (1987C) present their findings in a slightly different manner. Information on the life spans of business registrations is provided by Daly (1987).

Stanworth and Gray (1993) also provide information on rates and timing of business failures. It is worth noting that while there is some evidence to suggest that between (1980 - 1990) the rates of failure among small firms decreased modestly, in order to keep the estimates conservative the rates of failure employed here are not adjusted downwards for such changes.

There are then several sources of statistics on rates of failure of firms. These are compiled in Table 6.1 which provides a summary of the rates and timing of business failures for a particular group of firms. The timing is expressed in terms of firm age and the percentages are rates of attrition of the original cohort. With this information a group of firms can be traced over a ten year period. At the end of each year an estimate of the proportion of the original group that failed in that year can be provided. This information on the rates and timing of firm failures forms an integral part of the model.

TABLE 6.1

| Failure Rate | Age of Firm | Sources |
|---|---|---|
| 12% | 0 - 1 years | Stanworth & Gray, 1993; Daly, 1987 |
| 14% | 1 - 2 years | Stanworth and Gray, 1993 ; Daly, 1987 |
| 10% | 2 - 3 years | Stanworth & Gray, 1993 |
| 10% | 3 - 4 years | Storey and Johnson, 1987C; Ganguly, 1985 |
| 6.6% | 4 - 5 years | Ganguly, 1985 |
| 4.8% | 5 - 6 years | Ganguly, 1985 |
| 4% | 6 - 7 years | Ganguly, 1985 |
| 3% | 7 - 8 years | Ganguly, 1985 |
| 2% | 8 - 9 & 9 - 10 | Ganguly, 1985 |

Table 6.2 constructs a model which traces the changes occurring in the generation of firms born between 1981 and 1989. In 1981 the VAT register recorded 148,931 new firm registrations for Great Britain. These firms are traced in the model for a period of nine years beginning in 1981 and ending in 1989. The model begins with the number of firms registering for 1981, this number is reduced by the appropriate rate of failures for year one (12%) in order to give a year end figure. The year end figure is carried forward to the next year where it is reduced by the appropriate rate of

failures for year two (14%) to give a year end figure for 1982. The process is repeated for each successive year. By year end 1989, it is estimated that approximately 34% of the firms that had registered for VAT in 1981 were still operating. This process is repeated in column two for the 162,381 firms registering for VAT in 1982. Charting their eight year course towards 1989 it is estimated that 36% of these firms were still registered at year end 1989. The model repeats this process for firms born in each of the years from 1983 to 1989.

Since the estimates of rates of failure include the possibility of failure in the year of birth, a weighted average figure is provided for each year including the first year. These figures appear in the second last column of the table. The assumption made here is that the failures *occurred evenly* over each twelve month interval. The figure in the second last column in Table 6.2 , which is labelled a "weighted average", represents the average number of firms from the 1980s generation operating throughout any given year.

When these nine weighted average figures are aggregated, their total represents the number of "firm years" of the 1980s generation. More will be said about this figure shortly. The last column in Table 6.2 provides a figure for the number of 1980s generation firms still registered for VAT at the end of any given year. The very last row of Table 6.2 represents the number of firms still operating at year end 1989, by year of origin. When these figures are aggregated they represent the model generated estimate of the average number of firms born since the beginning of 1981 that were registered for VAT at year end 1989. This figure represents the number of "1980s generation firms" still operating at year end 1989.

The assumptions with respect to rates of firm attrition are also applied to the existing cohort of firms; that is, the assumptions with respect to timing and rates of failure were applied to those firms that had already registered for VAT by the beginning of 1981. In applying rates of failure to these firms it was estimated that 52% of them would have de-registered by 1989. These two estimates: (1) of the number of firms born between 1981 and 1989 that were still registered at the end of 1989, and (2), of the number of firms already registered at the beginning of 1981 that survived through to the end of 1989, are combined. *This summation represents the model generated estimate of the population of firms registered for VAT as at year end 1989.* The accuracy of that estimate is evaluated by comparing it to *actual VAT registrations* as at year end 1989.

The weighted average figures for each year (1981 to 1989) which appear in the last column of Table 6.2 are also aggregated. This sum represents the number of 'firm years' provided by the 1980s generation of firms; it is somewhat analogous to the more conventional "person years" statistic which is often used to measure employment associated with construction projects. The total number of "firm years" is used to estimate the person years of employment generated by the 1980s generation of firms.

Keeble (1990B) used the following assumptions to estimate employment in new small firms: 28.5% of the firms should be considered to each employ a single person and the remaining 71.5% should be estimated to each employ an average of 5.8 people. Under these assumptions the average firm size would be just over four people. Using this same approach, estimates of the employment in new small firms as at year end 1989 can be made. The model is first applied to Great Britain as a whole in Table 6.2 . In Table 6.3 it is applied to the special case of recovering communities. Finally in Table 6.4

estimates are developed for the case of communities occupying the least conducive environments. The results of each application are discussed in turn.

## Small Firm Population Growth And Job Creation: The General Case

Table 6.2 shows that the number of firms registering for VAT (the italicised figures) increased steadily between 1981 and 1989. It is estimated that of the approximately 1.5 million firms registering for VAT between the beginning of 1981 and the end of 1989, a total of 967,400 were still operating in December of 1989. These are the firms of the 1980s generation. At the beginning of 1981 the stock of VAT registrations was 1,261,110 firms. Applying the rates of attrition used in the model to this cohort it is estimated that by the end of 1989, as many as 605,332 of these firms were still registered for VAT. The sum of this figure and the 967,400 firms from the 1980s generation provides an estimate of the total stock of firms registered for VAT as at year end 1989. The estimate generated by the model was that 1,572,733 firms would be registered at year end 1989. Actual VAT registrations show that 1,610,884 firms were registered for VAT in 1989. This is a difference of -2.4%, with the model generated estimate slightly understating actual stock.

Based on the model generated figures the proportion of VAT registered firms less than 10 years old was estimated to be 61.5% as at year end 1989. When compared to similar estimates provided by private consulting firms the model generated proportion was similar but slightly lower than one provided by Business Trends[1]. That is, according to private firms an even

[1] They estimated that the proportion of all firms less than 10 years old would be approximately 60 -62%.

higher proportion of firms was less than 10 years old. *Based on these comparisons the model generated estimates of 1980s generation firms still operating at the end of 1989 (967,400) and the proportion of all firms that were 1980s generation firms as at 1989 (59.6%) are believed to be reasonable.*

From these figures it is possible to develop some sense of the contribution to job creation made by these newly formed firms over the 1980s. The number of jobs attributable to the cohort of 1980s generation firms can be estimated following Keeble (1990B). On average there were 13.8 employees per registered firm in Great Britain in 1989. However, newly formed firms are generally small at start up and most of those that survive, do not grow rapidly (Storey and Johnson, 1987C). As mentioned, for newly formed firms, Keeble suggested that as many as 28.5% would create only one job; the remaining new firms could be estimated to each create 5.8 jobs on average. The reasonableness of these assumptions can be evaluated using the Department of Employment's sizeband data. According to the sizeband data, establishments with fewer than 25 employees provided 30% of all employment and represented 88% of all establishments as at 1989. Even allowing for the possibility that some small firms may have multiple establishment operations it seems likely that this sizeband captures 60% of all small firms. The average establishment in this sizeband had 5.8 employees. By contrast the average firm in the model is assumed to have 4.4 employees. Therefore the sizeband data suggest that the assumptions used in the model to estimate employment are conservative. Applying these assumptions to the model generated number of firms less than ten years old, it was estimated that these young firms accounted for just under 4.3 million jobs in 1989. This substantial contribution to employment represented 17.1% of all jobs (including self-employed) as at year end 1989. At 17.1%

TABLE 6.2

## GREAT BRITAIN

### A MODEL TO ESTIMATE GROWTH IN THE POPULATION OF NEW FIRMS 1981-1989
### USING VAT REGISTRATIONS AND LITERATURE ESTIMATES OF RATES AND TIMING OF FIRM DEATHS

ALL FIGURES WITHIN THE TABLE ARE IN (000'S) ANNUAL VAT REGISTRATIONS* APPEAR IN ITALICS

| TIMING | ESTIMATED FAILURE RATE** | CUMULATIVE FAILURE RATE | YEAR | FIRMS BORN IN 1981 | FIRMS BORN IN 1982 | FIRMS BORN IN 1983 | FIRMS BORN IN 1984 | FIRMS BORN IN 1985 | FIRMS BORN IN 1986 | FIRMS BORN IN 1987 | FIRMS BORN IN 1988 | FIRMS BORN IN 1989 | ANNUAL WEIGHTED AVERAGE | NEW FIRM STOCK YEAR END | YEAR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1ST YEAR | 12.00% | 12.00% | 1981 registering | *148.90* | | | | | | | | | | | |
| | | | 1981 ending | 131.03 | | | | | | | | | 65.52 | 131.03 | 1981 |
| 2ND YEAR | 14.00% | 26.00% | 1982 beginning | 131.03 | *162.40* | | | | | | | | | | |
| | | | 1982 ending | 110.19 | 142.91 | | | | | | | | 192.07 | 253.10 | 1982 |
| 3RD YEAR | 10.00% | 36.00% | 1983 beginning | 110.19 | 142.91 | *176.50* | | | | | | | | | |
| | | | 1983 ending | 95.30 | 120.18 | 155.32 | | | | | | | 311.95 | 370.79 | 1983 |
| 4TH YEAR | 10.00% | 46.00% | 1984 beginning | 95.30 | 120.18 | 155.32 | *178.50* | | | | | | | | |
| | | | 1984 ending | 80.41 | 103.94 | 130.61 | 157.08 | | | | | | 421.41 | 472.03 | 1984 |
| 5TH YEAR | 6.60% | 52.60% | 1985 beginning | 80.41 | 103.94 | 130.61 | 157.08 | *179.20* | | | | | | | |
| | | | 1985 ending | 70.43 | 87.70 | 112.96 | 132.09 | 157.70 | | | | | 516.45 | 560.87 | 1985 |
| 6TH YEAR | 4.80% | 57.40% | 1986 beginning | 70.43 | 87.70 | 112.96 | 132.09 | 157.70 | *188.60* | | | | | | |
| | | | 1986 ending | 63.43 | 76.82 | 95.31 | 114.24 | 132.61 | 165.97 | | | | 604.62 | 648.37 | 1986 |
| 7TH YEAR | 4.00% | 61.40% | 1987 beginning | 63.43 | 76.82 | 95.31 | 114.24 | 132.61 | 165.97 | *206.50* | | | | | |
| | | | 1987 ending | 57.48 | 69.18 | 83.48 | 96.39 | 114.69 | 139.56 | 181.72 | | | 695.44 | 742.50 | 1987 |
| 8TH YEAR | 3.00% | 64.40% | 1988 beginning | 57.48 | 69.18 | 83.48 | 96.39 | 114.69 | 139.56 | 181.72 | *236.30* | | | | |
| | | | 1988 ending | 53.01 | 62.69 | 75.19 | 84.43 | 96.77 | 120.70 | 152.81 | 207.94 | | 798.02 | 853.54 | 1988 |
| 9TH YEAR | 2.00% | 66.40% | 1989 beginning | 53.01 | 62.69 | 75.19 | 84.43 | 96.77 | 120.70 | 152.81 | 207.94 | *252* | | | |
| | | | 1989 ending | 50.03 | 57.81 | 68.13 | 76.04 | 84.76 | 101.84 | 132.16 | 174.86 | 221.76 | 910.47 | 967.40 | 1989 |

TOTAL NUMBER OF "FIRM YEARS" 4515.94

NUMBER OF FIRMS LESS THAN 10 YEARS OLD AT 1989 ENDING 967.40

*SOURCE: NOMIS

**VARIOUS SOURCES

ESTIMATE OF EMPLOYMENT FROM FIRMS OF THIS GENERATION AS AT 1989 ENDING 967.4(0.285) + 967.4(0.715)(5.8) = 4,287.52

ESTIMATE OF PERSON YEARS OF EMPLOYMENT FOR THE PERIOD 1981-89 4515.94(0.285) + 4515.94(0.715)(5.8) = 20,014.66

this estimate of the share of employment provided by the most recent generation of firms is considerably higher than an estimate made by Johnson (1986) who placed the figure at 10%. What might account for this discrepancy?

First, at least part of the difference can be attributed to the very rapid growth of VAT registrations in the second half of the 1980s. VAT Registrations across Great Britain grew steadily between 1981 and 1989 with a sharp upturn between 1986 and 1989. As a result of this increase and the general pattern of growth in registrations throughout the 1980s, by 1989, small firms of the "eighties generation" constituted a high proportion of all firms. Furthermore, many of them were very young. In fact, it is estimated that over half of the firms in this generation were less than four

Table 6.3 AN INDEX OF VAT REGISTRATIONS BETWEEN 1981 AND 1989: ALL COMMUNITIES, RECOVERING COMMUNITIES & LEAST CONDUCIVE

| YEAR | Great Britain | Recovering Communities | Least Conducive Communities |
|---|---|---|---|
| 1981 | 1.00 | 1.00 | 1.00 |
| 1982 | 1.09 | 1.10 | 1.09 |
| 1983 | 1.18 | 1.18 | 1.17 |
| 1984 | 1.20 | 1.16 | 1.15 |
| 1985 | 1.20 | 1.14 | 1.14 |
| 1986 | 1.27 | 1.20 | 1.22 |
| 1987 | 1.39 | 1.29 | 1.30 |
| 1988 | 1.59 | 1.51 | 1.49 |
| 1989 | 1.69 | 1.62 | 1.62 |

Source: NOMIS

years old by year end 1989. Even in sub-national categories like *the recovering communities* the national pattern was repeated. Table 6.3 reports indices of growth for both the nation as a whole, for recovering communities and for communities from the least conducive environments. The index uses 1981 as a base year. Compared to national rates, the relative growth of registrations in recovering communities was generally lower although there are exceptions. More importantly, most of the differences were slight. The pattern was repeated for communities from the least conducive environments. So part of the reason why the estimated share (17%) is higher than previous estimates is because there were more small young firms in 1989.

A second difference which helps to account for the discrepancy relates to the sectors involved - Johnson worked with data related to the manufacturing sector, whereas the present study includes all sectors. In comparison to other sectors the average number of employees per firm is much higher in manufacturing; in turn this would lower the share of total employment to be found in newer smaller firms.

Third, the model generated estimate of 17.1% does not distinguish between employees and the self employed. Fuller (1992) estimates that as many as 1.4 million self employed individuals were registered for VAT in 1989. In contrast to this, Johnson's estimate is confined to employees in employment. If the model generated estimate of employment was reduced by 1.4 million the adjusted figure would represent 13% of employees in employment as at 1989.

Certainly many new firms *do* fail and the small firm sector is also characterised by high levels of turbulence (Coombes and Raybould, 1989). Therefore, much of the importance of new small firms is perhaps best reflected by measures like the total number of person years of employment that the sector has generated. Table 6.2 includes a figure for the total number of "firm years" arising from the 1980s generation of firms. As was explained earlier this figure is derived by summing the figures in the "weighted average" column for each of the years from 1981 to 1989 inclusive. The total number of firm years reported in Table 6.2 is 4.3 million. If it is assumed that 28.5% of the firms in any given year each employed only one person and the remaining 71.5% each employed an average of 5.8% persons an estimate of the number of person years of employment can be made. Using this approach it is estimated that between the beginning of 1981 and the end of 1989 Britain's small firms sector created 20.014 million person years of work. That is roughly 10% of the total person years of work for the period. Perhaps more than any other statistic this one makes clear the vitally important role played by new small firms in Great Britain over the 1980s.

## Small Firm Population Growth And Job Creation: The Recovering Communities

Table 6.4 re-applies the model to those depleted communities that were able to recover from employment losses suffered earlier in the 1980s. Sixty-eight communities fell into this category. Results reported in Table 6.4 are similar to those reported in Table 6.2. The firm population for recovering communities was deduced by adding the total of the 1980s generation of firms still registered in 1989 to the number of firms "born before 1981" and still registered for VAT in 1989. The model predicted a population of 236,537 firms for 1989. Actual registrations for 1989 amounted to 237,859 firms. This represents a discrepancy of -0.5% with the model understating the actual registrations slightly. Thus the model generated estimates appear to be reasonable.

New, small, VAT registered firms are estimated to have accounted for 15.5% of all jobs (including self employment) as at year end 1989. The lower percentage (15.5% for recovering communities compared to 17.5% for all communities) is a reflection of lower rates of new firm formation in recovering communities (see Table 6.3). Nonetheless a contribution of approximately 634,710 jobs to 68 communities is very important. The total person years of work provided by new firms of the 1980s generation was estimated to be 3.007 million. For communities suffering from above average job losses new small firms played a key role in minimising the damage.

*Based on these figures it is claimed that in the case of recovering communities new small firms registering for VAT between 1981 and 1989 made a substantial contribution to job creation over the 1980s and accounted for approximately 16% of the jobs in these communities at year end 1989. The level of performance was comparable to national levels.*

The scale of job creation attributed to newly formed firms operating in recovering communities implies that these communities have depended on this sector for their recoveries. In fact, considering the numbers of jobs created in all 459 communities it may be said that *most* communities relied on new small firms for much of their employment growth. But, if this is the case, then those communities whose environments were among the least conducive to new small firm formation could be expected to have experienced a much weaker contribution from the newly formed small firm sector. And this in turn would make strong employment growth in these environments less likely.

TABLE 6.4

RECOVERING COMMUNITIES

A MODEL TO ESTIMATE GROWTH IN THE POPULATION OF NEW FIRMS 1981-1989

USING VAT REGISTRATIONS AND LITERATURE ESTIMATES OF RATES AND TIMING OF FIRM DEATHS

ALL FIGURES WITHIN THE TABLE ARE IN (000'S) ANNUAL VAT REGISTRATIONS* APPEAR IN *ITALICS*

| TIMING | ESTIMATED FAILURE RATE** | CUMULATIVE FAILURE RATE | YEAR | FIRMS BORN IN 1981 | FIRMS BORN IN 1982 | FIRMS BORN IN 1983 | FIRMS BORN IN 1984 | FIRMS BORN IN 1985 | FIRMS BORN IN 1986 | FIRMS BORN IN 1987 | FIRMS BORN IN 1988 | FIRMS BORN IN 1989 | ANNUAL WEIGHTED AVERAGE | NEW FIRM STOCK YEAR END | YEAR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1ST YEAR | 12.00% | 12.00% | 1981 registering | *23.00* | | | | | | | | | | | |
| | | | 1981 ending | 20.24 | | | | | | | | | 10.12 | 20.24 | 1981 |
| 2ND YEAR | 14.00% | 26.00% | 1982 beginning | 20.24 | *25.24* | | | | | | | | | | |
| | | | 1982 ending | 17.02 | 22.21 | | | | | | | | 29.74 | 39.23 | 1982 |
| 3RD YEAR | 10.00% | 36.00% | 1983 beginning | 17.02 | 22.21 | *27.16* | | | | | | | | | |
| | | | 1983 ending | 14.72 | 18.68 | 23.90 | | | | | | | 48.26 | 57.30 | 1983 |
| 4TH YEAR | 10.00% | 46.00% | 1984 beginning | 14.72 | 18.68 | 23.90 | *26.57* | | | | | | | | |
| | | | 1984 ending | 12.42 | 16.15 | 20.10 | 23.38 | | | | | | 64.68 | 72.05 | 1984 |
| 5TH YEAR | 6.60% | 52.60% | 1985 beginning | 12.42 | 16.15 | 20.10 | 23.38 | *26.23* | | | | | | | |
| | | | 1985 ending | 10.88 | 13.63 | 17.38 | 19.66 | 23.08 | | | | | 78.34 | 84.64 | 1985 |
| 6TH YEAR | 4.80% | 57.40% | 1986 beginning | 10.88 | 13.63 | 17.38 | 19.66 | 23.08 | *27.56* | | | | | | |
| | | | 1986 ending | 9.80 | 11.94 | 14.67 | 17.00 | 19.41 | 24.25 | | | | 90.85 | 97.07 | 1986 |
| 7TH YEAR | 4.00% | 61.40% | 1987 beginning | 9.80 | 11.94 | 14.67 | 17.00 | 19.41 | 24.25 | *29.65* | | | | | |
| | | | 1987 ending | 8.88 | 10.75 | 12.85 | 14.35 | 16.79 | 20.39 | 26.09 | | | 103.58 | 110.10 | 1987 |
| 8TH YEAR | 3.00% | 64.40% | 1988 beginning | 8.88 | 10.75 | 12.85 | 14.35 | 16.79 | 20.39 | 26.09 | *34.76* | | | | |
| | | | 1988 ending | 8.19 | 9.74 | 11.57 | 12.57 | 14.16 | 17.64 | 21.94 | 30.59 | | 118.25 | 126.40 | 1988 |
| 9TH YEAR | 2.00% | 66.40% | 1989 beginning | 8.19 | 9.74 | 11.57 | 12.57 | 14.16 | 17.64 | 21.94 | 30.59 | *37.17* | | | |
| | | | 1989 ending | 7.73 | 8.99 | 10.48 | 11.32 | 12.41 | 14.88 | 18.98 | 25.72 | 32.71 | 134.81 | 143.21 | 1989 |

TOTAL NUMBER OF "FIRM YEARS" 678.63

NUMBER OF FIRMS LESS THAN 10 YEARS OLD AT 1989 ENDING 143.21

*SOURCE: NOMIS

**VARIOUS SOURCES

ESTIMATE OF EMPLOYMENT FROM FIRMS OF THIS GENERATION AS AT 1989 ENDING 143.21(0.285) + 143.21(0.715)(5.8) = 634.71

ESTIMATE OF PERSON YEARS OF EMPLOYMENT FOR THE PERIOD 1981-89 678.63(0.285) + 678.63(0.715)(5.8) = 3,007.71

## Small Firm Population Growth And Job Creation: Least Conducive Environments

Table 6.5 re-applies the model to communities occupying environments that were the least conducive to new firm formation. One hundred and twenty-seven communities fell into this category. It is estimated that new small firms in these environments created just under one million jobs which accounted for 13.4% of all jobs as at year end 1989. So even in the least conducive environments new small firms appear to make significant contributions. However, this percentage is considerably lower than similar estimates reported in Tables 6.2 and 6.4 for the nation and recovering communities respectively. The difference is partly explained by lower formation rates in these communities. The average rate of registration for these communities was 4.7% compared to 6.7% for the nation as a whole and 6.1% for the recovering communities. The model predicted a population of 367,058 firms as at year end 1989 while the actual number of VAT registrations was 368,948 a difference of -0.5% with the model overstating actual registrations slightly.

The model generated estimates of firm population as at year end 1989 are all within +/- 3% of the actual VAT registrations. Model generated estimates of the ages of firms place the proportion of the firm population less than ten years old at 61% . This figure agrees with estimates provided by a private consulting firm involved in assessing business trends. The assumptions used in the model to generate these estimates are conservative. Based on these comparisons the figures generated by the model in each of its three applications are believed to be reasonable.

TABLE 6.5

**GREAT BRITAIN: LEAST CONDUCIVE ENVIRONMENTS**
**A MODEL TO ESTIMATE GROWTH IN THE POPULATION OF NEW FIRMS 1981-1989**
**USING VAT REGISTRATIONS AND LITERATURE ESTIMATES OF RATES AND TIMING OF FIRM DEATHS**
ALL FIGURES WITHIN THE TABLE ARE IN (000'S) ANNUAL VAT REGISTRATIONS* APPEAR IN ITALICS

| TIMING | ESTIMATED FAILURE RATE** | CUMULATIVE FAILURE RATE | YEAR | FIRMS BORN IN 1981 | FIRMS BORN IN 1982 | FIRMS BORN IN 1983 | FIRMS BORN IN 1984 | FIRMS BORN IN 1985 | FIRMS BORN IN 1986 | FIRMS BORN IN 1987 | FIRMS BORN IN 1988 | FIRMS BORN IN 1989 | ANNUAL WEIGHTED AVERAGE | NEW FIRM STOCK YEAR END | YEAR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1ST YEAR | 12.00% | 12.00% | 1981 registering | *35.20* | | | | | | | | | | | |
| | | | 1981 ending | 30.98 | | | | | | | | | 15.49 | 30.98 | 1981 |
| 2ND YEAR | 14.00% | 26.00% | 1982 beginning | 30.98 | *38.21* | | | | | | | | | | |
| | | | 1982 ending | 26.05 | 33.62 | | | | | | | | 45.32 | 59.67 | 1982 |
| 3RD YEAR | 10.00% | 36.00% | 1983 beginning | 26.05 | 33.62 | *41.25* | | | | | | | | | |
| | | | 1983 ending | 22.53 | 28.28 | 36.30 | | | | | | | 73.39 | 87.10 | 1983 |
| 4TH YEAR | 10.00% | 46.00% | 1984 beginning | 22.53 | 28.28 | 36.30 | *40.45* | | | | | | | | |
| | | | 1984 ending | 19.01 | 24.45 | 30.53 | 35.60 | | | | | | 98.34 | 109.58 | 1984 |
| 5TH YEAR | 6.60% | 52.60% | 1985 beginning | 19.01 | 24.45 | 30.53 | 35.60 | *39.97* | | | | | | | |
| | | | 1985 ending | 16.65 | 20.63 | 26.40 | 29.93 | 35.17 | | | | | 119.19 | 128.79 | 1985 |
| 6TH YEAR | 4.80% | 57.40% | 1986 beginning | 16.65 | 20.63 | 26.40 | 29.93 | 35.17 | *42.81* | | | | | | |
| | | | 1986 ending | 15.00 | 18.07 | 22.28 | 25.89 | 29.58 | 37.67 | | | | 138.64 | 148.48 | 1986 |
| 7TH YEAR | 4.00% | 61.40% | 1987 beginning | 15.00 | 18.07 | 22.28 | 25.89 | 29.58 | 37.67 | *45.79* | | | | | |
| | | | 1987 ending | 13.59 | 16.28 | 19.51 | 21.84 | 25.58 | 31.68 | 40.30 | | | 158.63 | 168.77 | 1987 |
| 8TH YEAR | 3.00% | 64.40% | 1988 beginning | 13.59 | 16.28 | 19.51 | 21.84 | 25.58 | 31.68 | 40.30 | *52.53* | | | | |
| | | | 1988 ending | 12.53 | 14.75 | 17.57 | 19.13 | 21.58 | 27.40 | 33.88 | 46.23 | | 180.93 | 193.08 | 1988 |
| 9TH YEAR | 2.00% | 66.40% | 1989 beginning | 12.53 | 14.75 | 17.57 | 19.13 | 21.58 | 27.40 | 33.88 | 46.23 | *56.9* | | | |
| | | | 1989 ending | 11.83 | 13.60 | 15.92 | 17.23 | 18.91 | 23.12 | 29.31 | 38.87 | 50.07 | 205.97 | 218.86 | 1989 |

TOTAL NUMBER OF "FIRM YEARS" 1035.89

NUMBER OF FIRMS LESS THAN 10 YEARS OLD AT 1989 ENDING 218.86

*SOURCE: NOMIS
**VARIOUS SOURCES

ESTIMATE OF EMPLOYMENT FROM FIRMS OF THIS GENERATION AS AT 1989 ENDING 218.86(0.285) + 218.86(0.715)(5.8) = 969.97

ESTIMATE OF PERSON YEARS OF EMPLOYMENT FOR THE PERIOD 1981-89 1035.89(0.285) + 1035.89(0.715)(5.8) = 4,591.06

## PART TWO:

## Changes In Rates Of Net Employment 1981-1989 And Rates Of New Firm Registration 1981-1989:

**Part Two of chapter 6 examines the extent to which changes in net FTE employment rates 1981-1989 are associated with rates of change in new firm registrations. Part Two is divided into three sections:**

- **section one deals with the general case of all communities,**
- **section two examines the case of depleted communities,**
- **section three looks at the case of recovering communities**

## Section One:

## The General Case - All Communities

**It is apparent that new small firms have created large numbers of jobs over the nine year span examined. This appears to be true for the nation as a whole, for the recovering communities and even for those communities operating in the least conducive environments. However, it remains to be seen if these new jobs have led to *net* FTE employment gains for the host communities. Clearly jobs created by new small firms are not necessarily "additional jobs". They could be *replacements* for lost jobs (as would be true of some recession pushed entrepreneurs) or newly created jobs could also *displace existing jobs* through competition. The contributions made by newly formed small firms to *net employment growth* are gauged by comparing changes in FTE employment at the community level with changes in VAT firm registrations at the community level. In Chapter Four evidence at the *county* level was presented which suggested that as rates of new firm formation increased, they were accompanied by increases in rates of net FTE employment change (see Figure 4.5 p. 125). Figure 6.1 plots rates of firm registration by rates of FTE employment change for each of Britain's 459 local authority districts with reference to the period between**

1981 and 1989. The figure indicates, in contrast to figure 4.5 which plotted similar phenomena at the county level, that *at the local authority district level, rates of employment change vary widely with given rates of new firm registration.* As a result, the scatter plot exhibits considerably more dispersion than was evident in the plot of county level data. Greater dispersion means a weaker correlation between the variables, other things being equal, but greater dispersion does not necessarily mean that small firms are not consistently contributing to job creation and even net job growth at the LAD level.

But there can be dispersion even when new firms contribute to net employment growth. There are at least three possibilities.

- First, the stock of previously existing firms may experience exceptional growth which in turn could raise the net employment growth rate well above a level that might be reasonably accounted for by new firm registrations.
- Second, successful strategies of inward investment could create significant numbers of FTE jobs with only a few new large enterprises. In this case, like the previous one, the rates of net FTE employment growth would be well above levels that might be reasonably accounted for by new firm registrations.
- Third, differences in job creation rates of newly formed firms themselves could lead to greater dispersion; for instance, it is possible for a group of newly formed firms in one community to 'outperform' similar groups of newly formed firms in other communities (see Mason and Harrison, 1989) thereby contributing to variations of the sort observed in Figure 6.1.

**Dispersion may also arise when small firms are contributing to job creation but not job growth.**

- **First, it is possible that jobs created by newly formed firms displace an unusually large number of existing jobs, thereby weakening the link between new firm formation and net job creation.**

- **Second, the number of jobs created by new small firms may be dwarfed by job losses in more mature firms including large firms.**

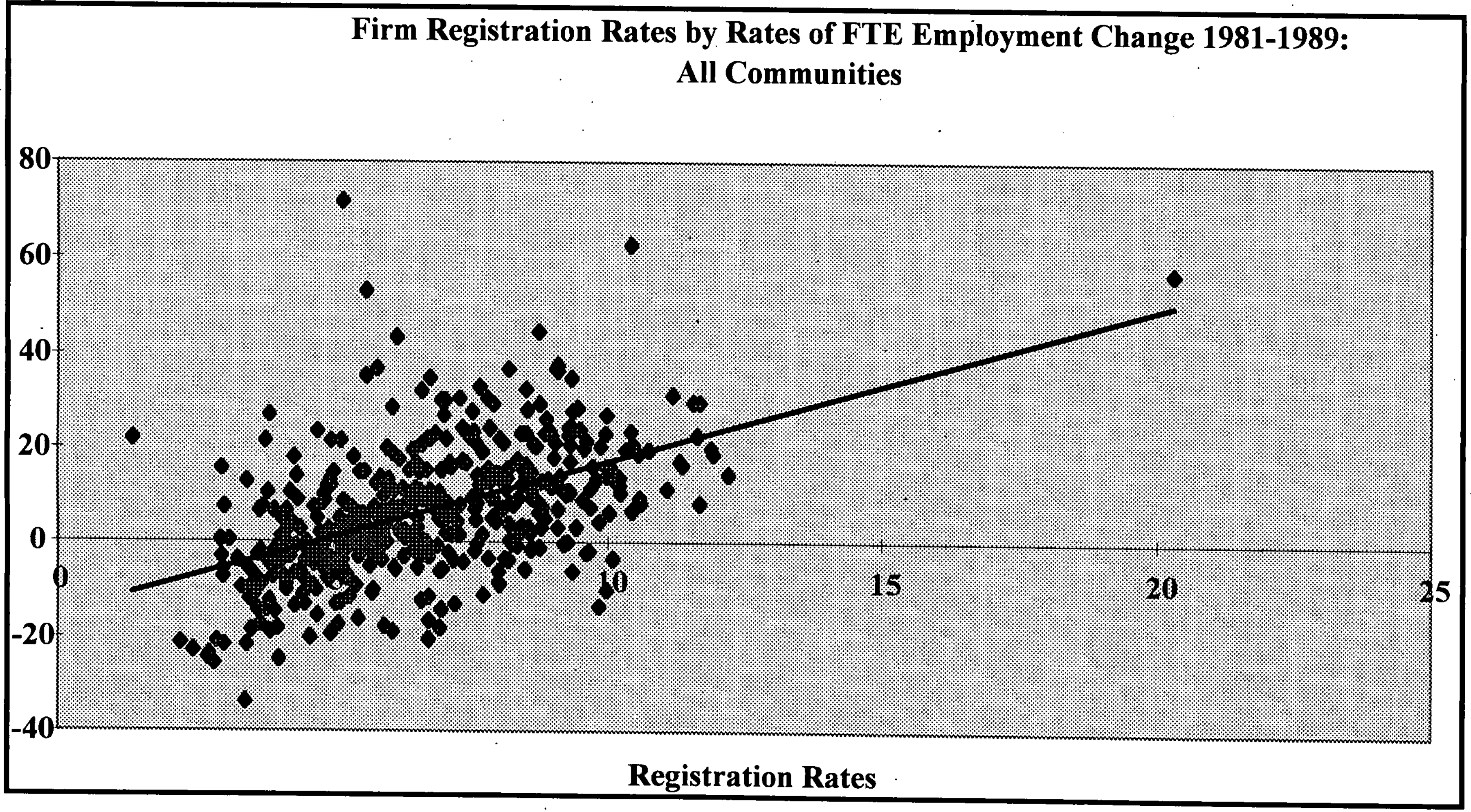
- **Third, the jobs created by new small firms may be replacing jobs lost in other firms with no net gain.**

**Therefore, a weaker correlation between rates of employment change and rates of new firm formation does not necessarily imply a lack of contribution to job creation on the part of newly formed firms.**

***In spite of the level of dispersion evident in Figure 6.1, there is, nonetheless, a statistically significant positive correlation {R=0.51, sig=0.001} between these variables; that is, in general, as rates of firm formation for the period from 1981-1989 rose, so did rates of net FTE employment change.*** **Furthermore, when registration rates exceed 6.6% (which is the median value for all 459 LADs) the probability that net employment change between 1981 and 1989 would be positive was 82%.**

**Generally speaking then, the relationship between these variables at the community level is similar to the relationship reported earlier in chapter**

Figure6.1




Source: NOMIS

five using county level data. It is also similar to the county level results reported by Ashcroft et. al., 1994, although unlike the Ashcroft article this study distinguishes between full-time and part-time employment. *It may be concluded that a significant positive relationship between these variables means that newly formed firms are consistently creating jobs in sufficient numbers to contribute to net employment growth in their communities.*

## The Influence Of The Environment - All Communities

While the association between net FTE employment change and rates of new firm formation is positive for all communities taken as a whole, this says little about the effect of changes in the conduciveness of the environment. The environmental effect has been shown to influence both the rates of new firm registrations and the rates of FTE employment change. But it is not known if the strength and nature of correlations between these variables will also change with differences in the conduciveness of the immediate environment. These issues are explored in Table 6.6 by presenting a series of correlations between rates of new firm formation and rates of FTE employment change under various classifications of community and various classifications of the environment.

The first row of Table 6.6 shows that statistically significant positive correlations between rates of 1981-89 FTE net employment change and rates of new firm registration are recorded for *each* environmental type. When the results in different environments are compared, the strongest correlation {R=0.49, Sig.=0.001}, was recorded in that set of communities whose environments were indeterminate. For communities whose environments were the least conducive to the formation of new firms the correlation between rates of net employment and rates of firm formation

TABLE 6.6

**CORRELATIONS BETWEEN RATES OF FIRM REGISTRATION FOR 1981-1989 AND RATES OF NET FTE EMPLOYMENT CHANGE FOR 1981-1989**

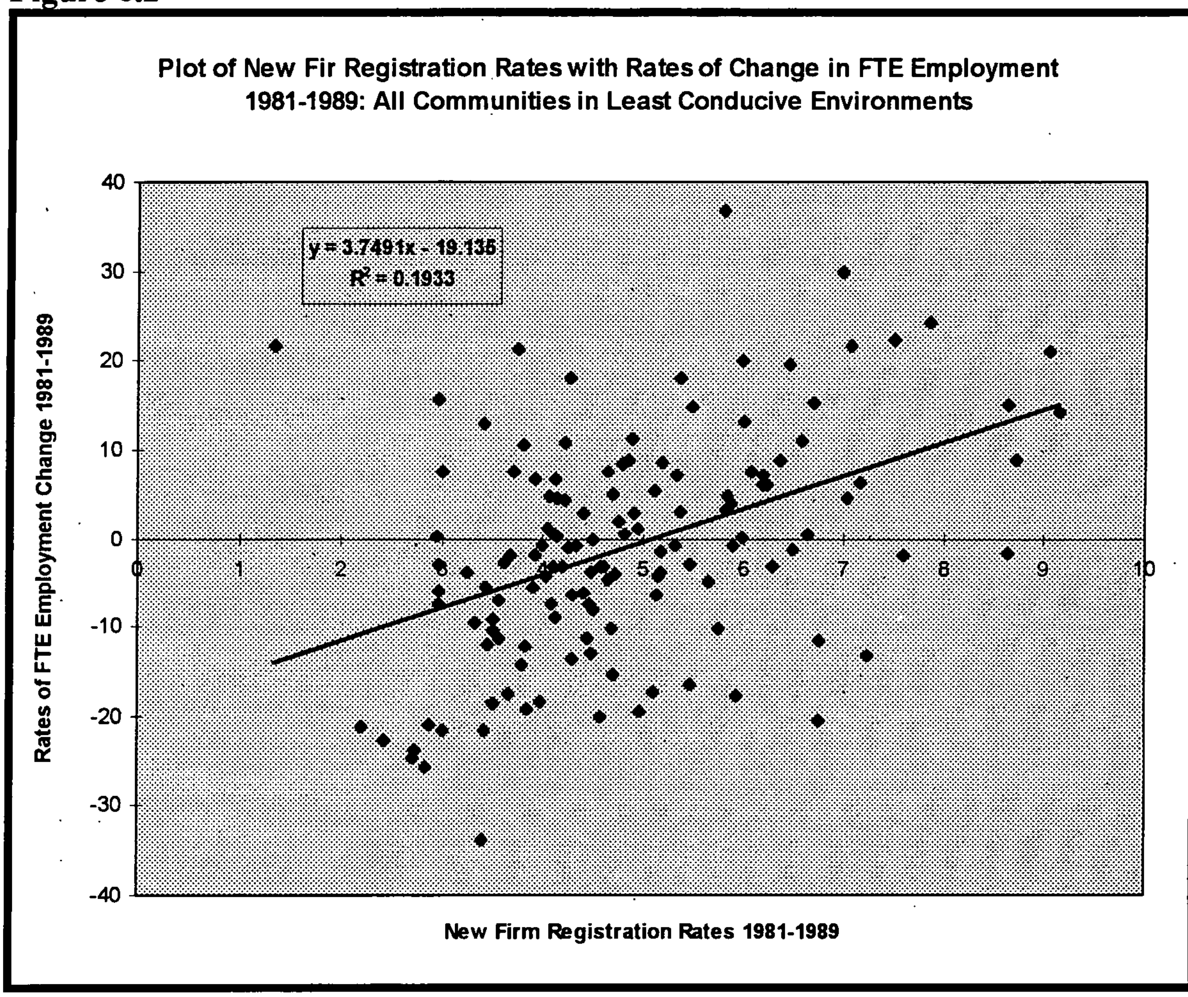
| | LEAST CONDUCIVE ENVIRONMENTS | | INDETERMINANT ENVIRONMENTS | | MOST CONDUCIVE ENVIRONMENTS | | ALL ENVIRONMENTS | |
|---|---|---|---|---|---|---|---|---|
| | 1981-89 | 1984-89 | 1981-89 | 1984-89 | 1981-89 | 1984-89 | 1981-89 | 1984-89 |
| ALL COMMUNITIES | 0.44** | 0.39** | 0.49** | 0.27** | 0.39** | 0.35** | 0.51** | 0.36** |
| DEPLETED COMMUNITIES | 0.37** | 0.38** | 0.09 | -0.03 | 0.42* | 0.50** | 0.38** | 0.40** |
| RECOVERING COMMUNITIES | 0.03 | -0.13 | 0.05 | -0.22 | 0.02 | 0.24 | 0.08 | 0.17 |

* Significant at 0.01; ** Significant at 0.001

Source: NOMIS

was not much different {R=0.44, sig.=0.001}. These results suggest that shifts in environment have little influence on correlations. In other words, *regardless of the conduciveness of the immediate environment to the formation of new firms, it is generally the case that as the rates of new firm formation rose (fell) so too did the rates of net FTE.*

**Figure 6.2**




**Source: NOMIS**

**Figure 6.2 provides a closer look at this case by displaying a plot of rates of new firm formation with rates of FTE employment change for the period between 1981 and 1989 for all those communities occupying environments that were classified as the least conducive to the formation of new firms.**

This plot shows considerable dispersion. Average rates of firm registration in the least conducive environments were in the 4% to 5% range which is well below the national median rate of 6.6%. The figure also indicates that employment changes were frequently negative; therefore, *the positive correlation suggests that for many communities in the least conducive environments, jobs created by new small firms would at most help to offset employment losses. In these situations, at best, the jobs created by new small firms limited net employment losses within these communities; alternatively, the jobs created by new small firms may have simply displaced other jobs in which case there would be no net gain.*

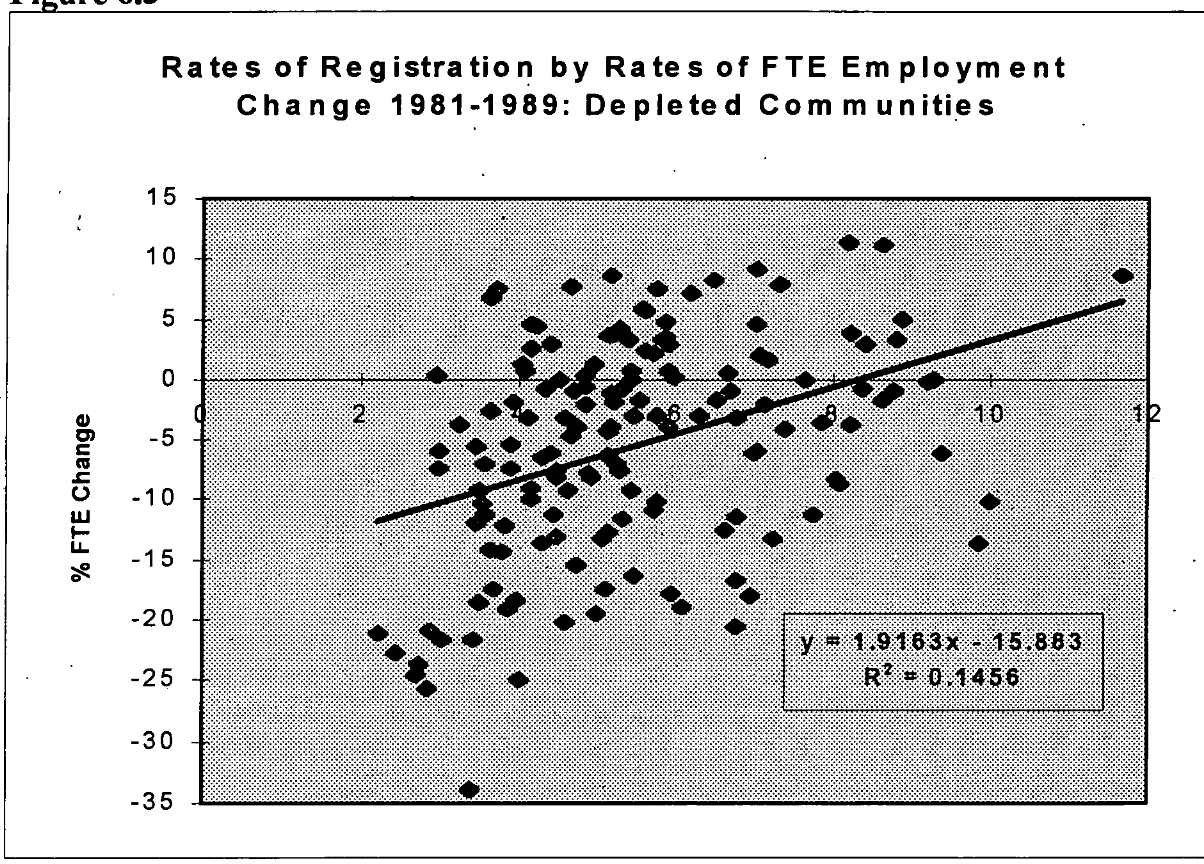
Figure 6.2 also makes clear that in communities occupying the least conducive environments high firm formation rates are definitely not a necessary condition of positive net employment change. There are many cases where FTE employment change was positive and formation rates were low. However, where formation rates exceeded 6.6% (the median registration value for all 459 communities) there was a high probability (72%) that net employment change would be positive.

This "threshold" feature of the relationship between rates of formation and rates of FTE employment change is repeated for the other environments as well; that is, when formation rates exceeded the median value of 6.6% in communities occupying the most conducive environments the probability of net gains in employment was 84% and in the indeterminate environments it was 79%. *Thus, regardless of the type of environment occupied it was very likely that net employment would be growing in the community if local firm registration rates in the community exceeded the national median rate.*

## Section Two:
## The General Case - All Depleted Communities

**Row two of Table 6.6 reports on depleted communities. In the right hand column of Table 6.6 the correlation (R=0.38) between new firm formation rates and rates of FTE employment change 1981-1989 is recorded. The association between these variables is somewhat weaker in depleted communities than was the case for all communities.**

**Figure 6.3**




**Source NOMIS**

**Figure 6.3 shows the relationship between rates of formation and rates of employment change for all depleted communities. The most prominent feature here is the very large number of cases where employment change was negative. Even in those cases where rates of formation are above average, most communities lost jobs. These cases provide a reminder of the**

massive scale of employment losses suffered in some communities. Even an active small firm sector would have difficulty in overcoming large scale employment losses. The plot indicates that there is considerable dispersion about each level of new firm formation. Finally, there is no evidence in this plot of a threshold rate of new firm formation above which rates of employment are predominantly positive.

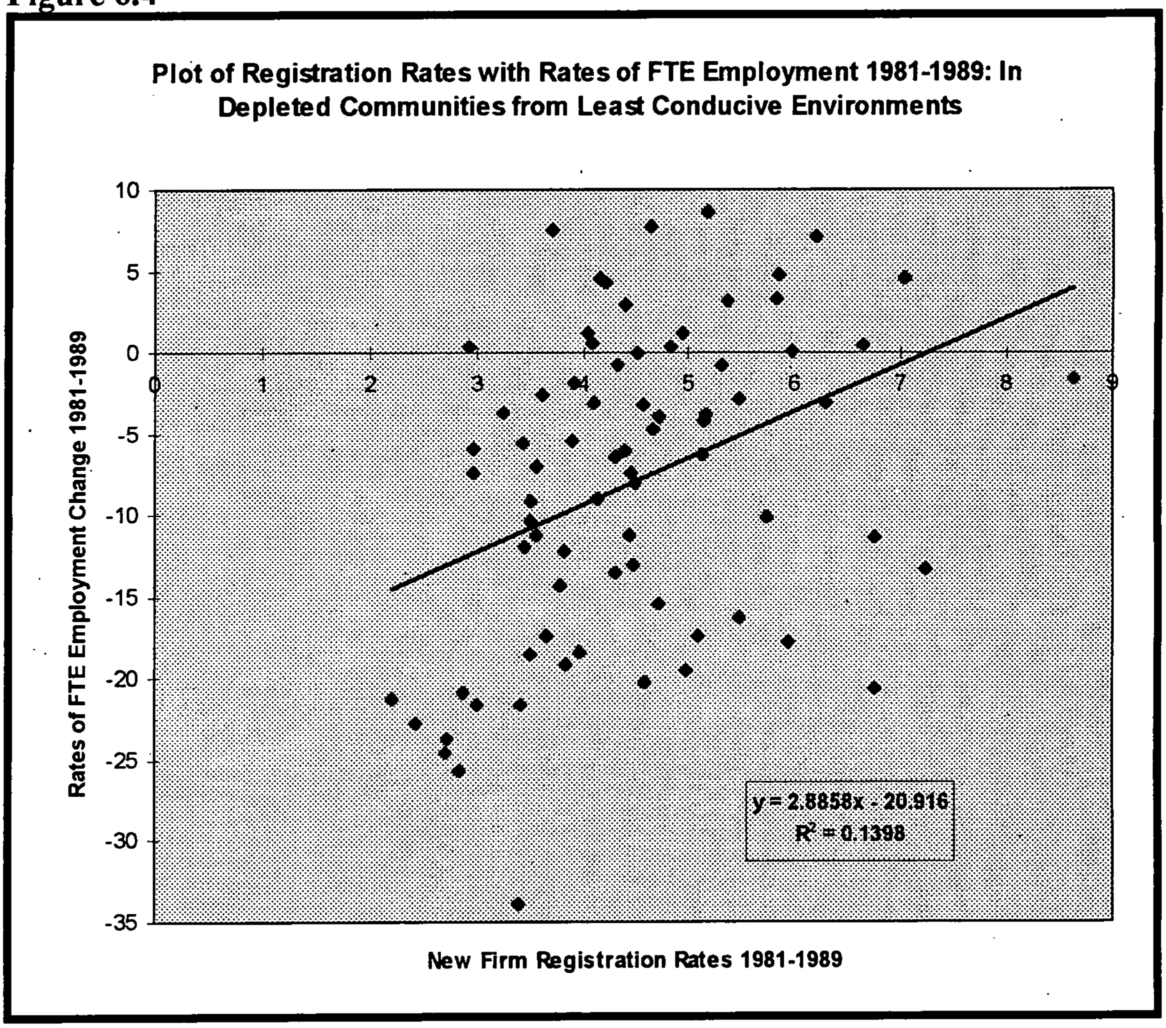
## The Influence Of The Environment: Depleted Communities

Although weaker (there are fewer statistically significant correlations), the trends for depleted communities are similar to those reported in row one of Table 6.6 for the set of all communities. There is one notable exception: depleted communities from indeterminate environments showed virtually no relationship between rates of new firm formation and rates of employment change. In these communities registration rates were quite high averaging 5.8% but there is no evidence of a threshold above (below) which net employment change is generally positive (negative). There was a sharp increase in rates of employment between 1984 and 1989 which does not appear to be tied to the creation of new small firms.

Again, as was the case for all communities, when the correlations in different environments are compared, one of the strongest correlations {R=0.37, Sig.=0.001} is found in those depleted communities occupying environments that are the least conducive to the formation of new small firms.

In order to examine this particular relationship more closely Figure 6.4 shows a plot of rates of FTE employment change for 1981-1989 with rates of new firm formation for depleted communities occupying the least conducive environments. It shows that for depleted communities in these circumstances the great majority of new firm registration rates lie between 2% and 5%; not surprisingly these rates are significantly below the registration rates recorded in depleted communities from other types of environment. From the plot it can also be seen that the majority of these communities experienced net employment losses and in many cases the rates of loss are quite large. There is considerable dispersion in the figure with rates of FTE employment change varying widely (+10% to -35%)

**Figure 6.4**




Source: NOMIS

over a rather narrow band of registration rates (2% to 9% with most communities having rates between 2% and 5%). Therefore, linkages

**between the variables are weak, which suggests that one or more of the situations described earlier (page 215-16) may be in force. Again, there is no evidence of a threshold rate of new firm registrations above which rates of FTE employment are positive.**

***For these depleted communities and this particular environment, rates of new firm registration were below average and most communities were losing jobs. It may be concluded that while the impact of newly formed firms was, in general, positive, the relationship between the variables is not a simple one.***

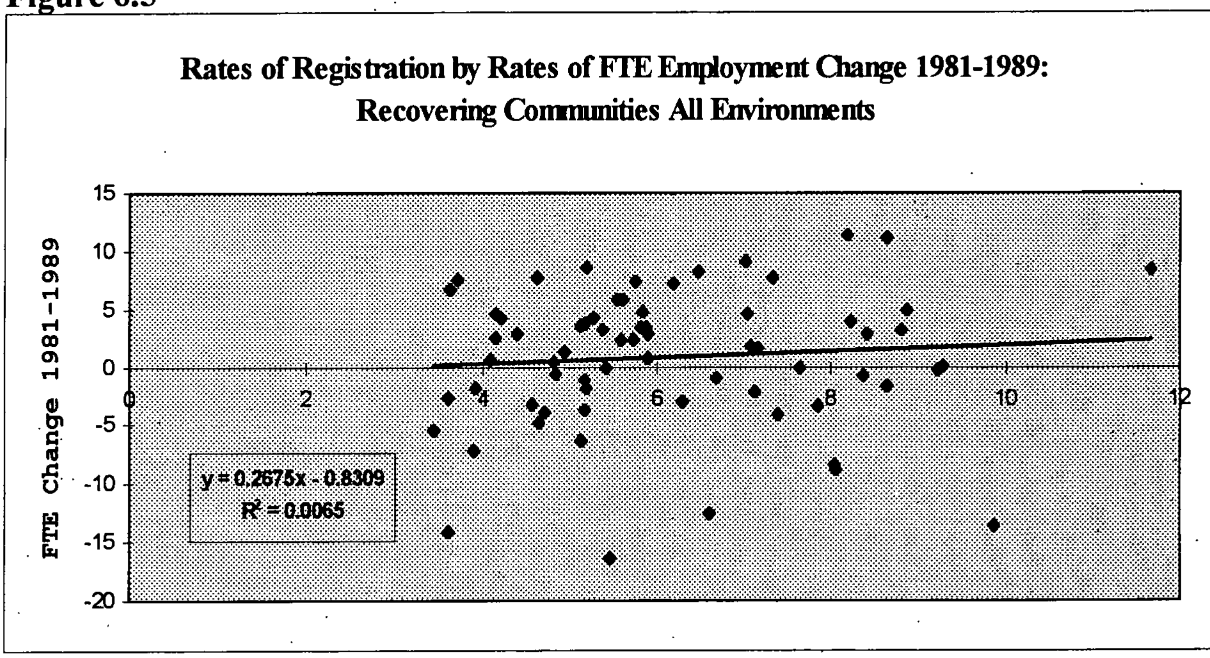
## Section Three:
## The General Case - All Recovering Communities

**By far the weakest correlations reported in Table 6.6 are those found in row three which reports results for depleted communities that recovered. This is the most salient feature of Table 6.6. In the recovering communities *none of the correlations between rates of formation and rates of FTE employment change are statistically significant.* This result is interesting because it shows that rapid net employment growth in the late 1980s did not always depend upon high rates of new firm formation. This suggests that there must be alternative ways in which communities are able to create net employment growth.**

**Figure 6.5 displays a plot of the rates of new firm registration with rates of FTE employment change for all recovering communities, regardless of environment. In the figure registration rates cover a wide range of values (3.5% to 12%) but have no apparent influence over net FTE employment change.**

*For recovering communities the correlation between rates of new firm registration and rates of FTE employment change is so weak it can be said that there is virtually no association between these variables, nor does the "lack of relationship' change with changes in environment. In many of these cases it appears as though the contributions to job creation made by new small firms led to displacement or were substitutions for jobs lost elsewhere.*

**Figure 6.5**




**Source: NOMIS**

*That is, the contributions do not appear to be large enough to offset job losses arising from other sources. There is no evidence of a threshold rate of new firm registrations above which rates of FTE employment are positive. In other cases where employment growth was positive it also seems clear that at least some of the recovering communities were able to rely on sources of new jobs other than new small firms. By definition the recovering communities include all 1981LADs that recovered employment lost in the 1981-1984* *period regardless of the means by which this was achieved. So, the set of recovering communities very likely includes several distinct situations.*

**In summary, the broad message provided by Table 6.6 with reference to all communities is that:** ***although a positive relationship between rates of registration and rates of FTE employment change is generally evident it is by no means a simple and straight forward one. There are cases where employment grew when relatively few new firms were forming. And there are cases where many new firms were started but employment did not grow. The situation seems to be particularly complex in the case of recovering communities. Nonetheless, the positive correlations do support generalisations found in the literature which contend that over the long run, those communities creating more new firms per capita are also creating more net employment*** **(Mason, 1991). But Barkham's (1987a) criticism that aspatial government policies with respect to small firms will actually exacerbate current disparities is weakened by this finding. That is, in some communities, net employment is increasing in spite of low rates of new firm formation.**

## PART III

## The Importance Of Employment Changes Between 1984 And 1989

**Depleted communities were defined as those 1981 LADs that had experienced levels of FTE employment change that were below expected values during the early 1980s. Some of these communities continued to lose employment for the remainder of the decade; the others reversed this trend and showed above average rates of employment growth between 1984 and 1989 - these were the recovering communities.**

Each depleted community, whether it recovered or not, should have had a considerable supply of recession pushed entrepreneurs because of the heavy job losses suffered between 1981 and 1984. However, because of the way depleted communities are defined, the impact of these potential entrepreneurs, together with the general effects of newly formed firms, might be very difficult to detect so long as employment change is examined over the 1981-1989 period. That is, the sharp drop in employment experienced by these communities between 1981 and 1984 could mask any gains achieved between 1984 and 1989. So detection of the impact of recession pushed entrepreneurs is not simple. Unless recession pushed entrepreneurs created businesses that employed others as well as themselves their impact on net employment over the 1981-1989 period would be zero; that is, without additional employees the entrepreneur would have restored his/her lost employment and no more. This would constitute a zero net gain. So for depleted communities in general, and especially for recovering communities, the association between rates of new firm formation and rates of change in FTE employment over the 1984-1989 period is of particular interest. There are at least two reasons why this is so. First, the 1984-1989 period extends beyond the period when most depleted communities suffered their heaviest losses. Second, for those displaced workers who were no longer employed as at 1984 the subsequent interval, 1984-1989, would constitute a period of response when entrepreneurial potential may have been realised. In this 1984-1989 period employment gains would not be masked by losses that occurred earlier. When examining depleted and recovering communities therefore, employment changes occurring between 1984 and 1989 are particularly relevant.

## Some Further Contrasts Within The Set Of Recovering Communities: Focusing On Employment Change 1984 - 89

**Because in recovering communities, FTE employment grew strongly (the median rate was 10.4%) during the 1984-1989 period, the very weak correlation between this variable and rates of new firm formation (R= 0.17) recorded in row three of Table 6.6 suggests that many recovering communities did not depend entirely on high rates of new firm growth in order to achieve high rates of FTE employment growth.**

**To illustrate this lack of dependence on new small firms Table 6.7 shows a cross tabulation of the 68 recovering communities. In this each community is classified as being either *above* or *below* the national median rate of firm registrations and either *above* or *below* the national median rate of FTE employment change for 1984-1989.**

**It can be seen that *almost two thirds of the recovering communities have rates of registration which are below the median value and yet 80% of these communities had rates of FTE employment growth that were above the median value for the period between 1984 and 1989.* The Chi squared statistic {2.86, sig=0.09} indicates that the two classifications used in Table 6.7 are independent of each other.**

***It may be concluded, therefore, that within the entire set of recovering communities there is little ground for claiming an association between rates of new firm formation and rates of net FTE employment change occurring during the 1984-1989 period.* By definition FTE employment increased in every recovering community between 1984 and 1989. *Because* employment increased in every case, and because there is virtually no association**

between rates of new firm formation and rates of employment, it may be concluded that *at least some* recovering communities achieved employment growth through expansion of existing enterprises.

In the light of the general trend just described, the absence within the set of recovering communities of any association between rates of new firm

TABLE 6.7 CROSS TABULATION FOR RECOVERING COMMUNITIES

| | COMMUNITIES WITH BELOW MEDIAN RATES OF FTE CHANGE 1984-89 | COMMUNITIES WITH ABOVE MEDIAN RATES OF FTE CHANGE 1984-89 | TOTALS |
|---|---|---|---|
| COMMUNITIES WITH BELOW MEDIAN RATES OF REGISTRATION 1984-89 | 9 | 34 | 43 |
| COMMUNITIES WITH ABOVE MEDIAN RATES OF REGISTRATION 1984-89 | 10 | 15 | 25 |
| TOTALS | 19 | 49 | 68 |

Source: NOMIS

registration and rates of net FTE employment change is somewhat exceptional. Of special interest are those cases where there was employment growth inspite of low rates of new firm formation. These cases raise the possibility of alternative sources of job creation - a view recently expressed in the literature (Konings, 1995). It would, however, be incorrect to conclude, based solely on the weakness of the correlations presented here, that new small firms were unimportant to the recovery of depleted communities.

Correlations are just one measure of new small firm involvement. Other measures of the contribution made by new small firms include the model generated estimates, presented earlier, of jobs created by newly formed firms. Those estimates support the contention that new small firms have made a substantial contribution (634,710 jobs) to employment growth in recovering communities. Further evidence, which also suggests that newly formed small firms were important to the recovery of depleted communities, is provided in Table 6.8 below, where depleted communities that recovered and those that did not recover are contrasted for differences in firm formation rates.

## Some Contrasts Between Recovering And Non-Recovering Communities

Table 6.8 presents results of an analysis of variance which contrasts new firm formation rates in those depleted communities that recovered with new

Table 6.8

**ANOVA**
**Registration Rates 1981-1989, for Recovering and Non-recovering Depleted Communities: All Environments**

**Analysis of Variance**

| Source | D.F. | Sum of Squares | Mean Squares | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 1 | 56.3797 | 56.3797 | 19.7635 | 0.0000 |
| Within Groups | 147 | 419.3499 | 2.8527 | | |
| Total | 148 | 475.7296 | | | |

Source: NOMIS

firm formation rates in those depleted communities that did not. *These* *results indicate that recovering communities had significantly higher rates of firm registration {F=19.76, sig=0.0000} than non-recovering depleted communities.*New firm registration rates averaged 6.1% in recovering communities. The mean registration rate for non-recovering depleted communities was 4.9%. Even though differences between the communities are statistically significant, an absolute difference of 1.2% is not great in comparison to differences reported in the literature. For instance, new formation rates in some regions of the UK were two and one half times the formation rates of other regions (Reynolds, Storey and Westhead, 1994).

Nonetheless the analysis of variance approach presents a picture which differs from the one provided in Table 6.6. The analysis shows that in general, recovering and non-recovering communities can be distinguished by their levels of new firm registration. Therefore, even if an association between rates of registration and rates of employment change is not evident *within* the entire set of recovering communities *part of the explanation of why some depleted communities recovered while others did not appears to lie in the higher levels of new firm registrations found in the recovering communities.*

When rates of new firm formation were plotted with rates of FTE employment change for depleted communities in the least conducive environments (Figure 6.4), little or no association between the variables was found. Although Table 6.8 establishes that in general, recovering and non-recovering communities can be distinguished by their levels of new firm registration; this may not be true for those communities occupying the most hostile environments.

Table 6.9 reports the results of an analysis of variance of the rates of new firm formation for the period 1981 and 1989. The groups compared were drawn from those depleted communities whose environments were among the least conducive to new firm formation. Even though registration rates in the least conducive environments were considerably lower than registration rates in other types of environment, the analysis of variance clearly indicates that recovering communities in these environments had significantly higher rates of firm registration {F=8.62, Sig.=0.004} than non-recovering communities in similar environments. Thus the distinction between recovering and non-recovering communities described in Table 6.8 appears to extend even to communities occupying the least conducive environments. Under these environmental conditions recovering

Table 6.9

Analysis of Variance

Registration Rates 1981-1989, for Recovering and Non-recovering Depleted Communities in the Least Conducive Environments

| Source | D.F. | Sum of Squares | Mean Square | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 1 | 11.916 | 11.916 | 8.620 | .004 |
| Within Groups | 14 | 102.300 | 1.382 | | |
| Total | 15 | 114.216 | 1.523 | | |

Source: NOMIS

communities averaged 5.04 new firm registrations per 100 potential entrepreneurs. The average for non-recovering depleted communities in these environments was 4.2. The fact that these recovering communities had significantly higher rates of new firm registration than their non-recovering counterparts suggests that even in the least conducive environments *part of the reason why some communities recovered and others did not rests in the higher numbers of new small firms in the recovering communities and it also suggests a modest level of robustness from this group of communities.* Again, however, it must be recognised that even though the difference is statistically significant, the absolute difference between 5.04% and 4.2% is very small.

While contrasts *between* recovering and non-recovering communities uncover differences in rates of registration that are statistically significant the point remains that there is little evidence *from within* the entire set of recovering communities itself to suggest a positive association between rates of registration and rates of employment growth.

Based on these results it seems reasonable to conclude that *recovering communities restored their employment by several means and were not wholly dependent on new small firms for job creation.* However, reliance on jobs generated by new small firms could still be one of those means. In light of the apparent complexity associated with recovering communities perhaps certain sub-classifications within this set of communities could provide clearer evidence of a positive association between new firm formations and FTE employment change where the aggregate figures do not. One well established basis for sub-classifying these recovering communities is their urban/rural character. In the next section this dimension of recovering communities is explored.

## PART IV:
## Recovering Communities And The Urban/Rural Influence

**Recovering communities are diverse, both in terms of their urban/rural characteristics and in terms of the conduciveness of their environments. The environmental effect and the urban/rural effect have each been shown to exert considerable influence on rates of new firm formation <u>and</u> on rates of FTE employment change. But, would either effect influence the strength of correlations between these rates?**

**Already the question of whether the environmental effect influences the level of correlation between rates of formation and rates of FTE employment change has been answered. Results in Table 6.6 showed how levels of correlation (between these rates) change with variations in the conduciveness of the environment. The strongest correlations were recorded in the indeterminate environments. But the differences in correlation values, from one type of environment to another, were not great and it may be concluded that generally, differences in the conduiveness of the environment had little observable effect on correlations. Similar remarks hold for the strength of correlations between 1984-89 rates of FTE employment change and rates of new firm registration which also appear in Table 6.6.**

**Furthermore, when attention was confined to the recovering communities, any apparent environmental effect was weakened even further. For instance, from row three of Table 6.6 it was clear that shifts in the type of environment failed to bring out any important differences in correlations between rates of new firm registration and rates of FTE employment change. *Therefore, within the entire set of recovering communities there is***

*little or no evidence to suggest that differences in the environment exert any influence on levels of correlation between rates of formation and rates of FTE employment.* However, the question of whether differences in the urban/rural character of communities might influence levels of association is as yet unexamined.

In chapter five the urban/rural effect was discussed in terms of its influence over rates of FTE employment change. From Table 5.4, it is known that the highest rates of FTE employment change are in the smaller rural based communities. For instance, during the period between 1984 and 1989 the average rate of FTE employment change in rural based communities was 10.40% while in urban communities the average rate was only 3.95%. Later in this chapter evidence will be provided which establishes that rural based communities also significantly out-performed their urban based counterparts with respect to rates of new firm registrations (Table 6.11). But do changes in the urban/rural character of communities influence levels of *association* between these variables?

As a first step in determining if such an urban /rural influence is operating within depleted or recovering communities, Table 6.10 displays correlations between rates of new firm registrations 1981-1989 and rates of FTE employment change 1984-1989 for both urban based and rural based communities. The initial results showed little or no correlation for the urban communities. In the results presented here the notion of urban has been refined. Excluded from the set of urban communities are London and the large metropolitan areas. These larger urban areas are excluded on the grounds that each represents a unique and highly complex economic system which is atypical of the other communities.

The results recorded in Table 6.10 contain both striking similarities and marked contrasts to the correlations presented earlier in Table 6.6. This is particularly evident in the case of recovering communities. For example, the correlation between rates for all rural based recovering communities (R=0.08) is very weak; this is similar to the finding reported in Table 6.6.

Table 6:10

CORRELATIONS OF RATES OF FTE EMPLOYMENT CHANGE 1984-1989 AND RATES OF NEW FIRM FORMATION 1981-1989

| | URBAN BASED COMMUNITIES | RURAL BASED COMMUNITIES |
|---|---|---|
| RECOVERING COMMUNITIES | 0.60** | 0.08 |

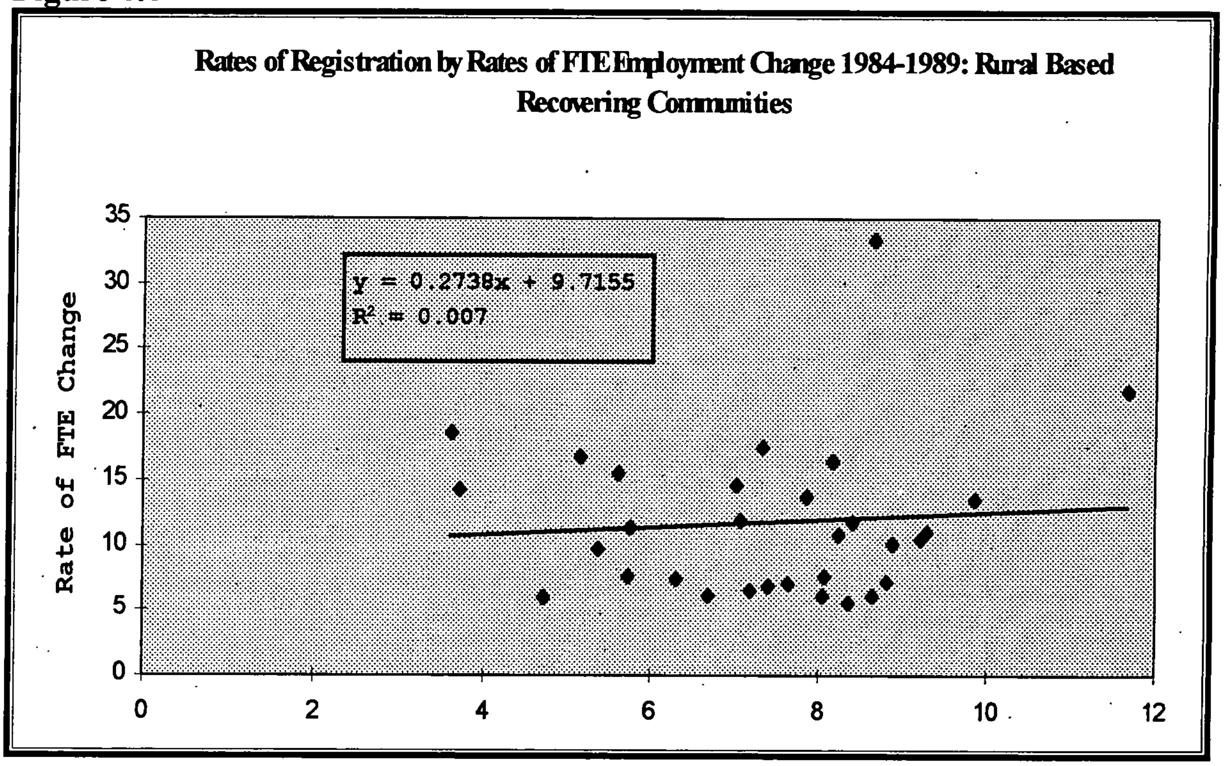
* = SIGNIFICANT AT 0.01 ** = SIGNIFICANT AT 0.001

Source: NOMIS

But in marked contrast to this, is the case of urban based communities that recovered lost employment. Returning to Table 6.10, *a rather strong pattern of association between the rates emerges* when attention shifts to urban based recovering communities from all environments. The correlation between rates of formation and rates of FTE employment change for urban based communities is statistically significant {R=0.6; Sig. = 0.001}. This result is in marked contrast to the results reported earlier in Table 6.6 where, for the entire set of recovering communities, virtually no association was evident (R=0.17, Sig >0.01). Each case (rural based and urban based recovering communities) is examined further.

Figure 6.6 plots rates of registration with rates of 1984-1989 FTE employment change for those recovering communities that are rural based. The coefficient of determination is very weak {$R^2$= 0.007}. *The figure indicates that in rural based recovering communities drawn from all environments, there is virtually no association between the rates of registration and rates of FTE employment change (1984-1989).* It can be seen from the figure that most of these communities have above average

Figure 6.6




Source: NOMIS

rates of new firm registrations which indicates that many of these communities have active small firm sectors. However, rates of FTE employment change 1984-1989 remain relatively stable over a wide range of new firm registration rates.

*These features imply that rural based recovering communities were not solely dependent on small new firms as a means of generating employment. The high rates of FTE employment change do suggest however, that these communities did benefit from their active small firm sectors.*

**Figure 6.7 plots rates of FTE employment change between 1984 and 1989 with rates of new firm registration 1981-1989 for the urban based recovering communities. The plot shows that rates of firm formation in these communities are considerably lower than the formation rates of rural based recovering communities (just discussed in Figure 6.6). Almost all of the cases fall below the national median rate of 6.6%. In spite of this, the urban based communities compare favourably with rural based communities in terms of rates of 1984-89 FTE employment change.**

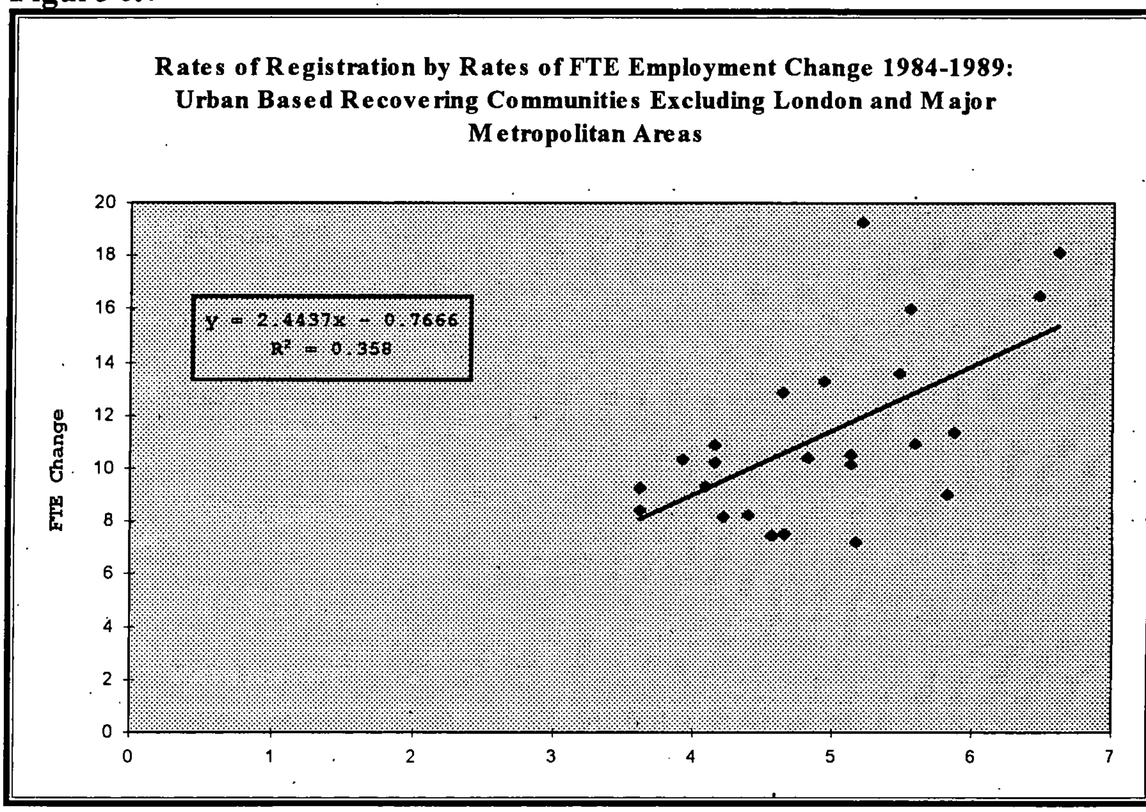
***It would appear that in comparison to the rural based LADs, urban based recovering communities placed greater reliance on the jobs generated by new small firms as a means of achieving their recoveries.*** **It might also be said that urban communities achieved their recoveries more efficiently in the sense that similar rates of employment growth were reached with much lower rates of new firm formation (4.9% versus 7.4%).**

**Unfortunately the figure does not provide much information on the contribution to net employment of each firm registering for VAT. The slope of the trend line reported in Figure 6.7 {m=2.44} must be treated with caution. Rates plotted in this figure use different normalising factors making it difficult to interpret the results beyond stating that a definite positive relationship is clearly evident.**

However, there is a more direct way of assessing the contribution made to net FTE employment by each newly registered small firm. The approach is to plot absolute values of FTE employment change with absolute changes in registrations. This is done in Figure 6.9.

Before discussing the characteristics of this plot of absolute figures some features of the data should be noted. First, although the number of new

Figure 6.7




Source: NOMIS

registrations varies from community to community the variable is always positive. Because figure 6.9 utilises absolute figures, with the comparisons made over communities of different sizes, there may be a bias in them; that is, large communities may tend to have large numbers of firms <u>and</u> large numbers of employees while small communities may tend to have comparatively small numbers of firms and small numbers of employees. The extent to which this is the case will depend upon the rates of registration and the rates of FTE employment change. For example, if the rate of firm formation was constant in all recovering communities at say 5% and the rate of employment change was also constant at say 9% then there would be a high correlation between *the number* of new jobs and *the number* of new firms. The high correlation would be traceable to differences in community size .

But the situation for recovering communities is not characterised by constant rates. In recovering communities registration rates for new firms range from 3.4% to 11.7%. Therefore, rates of new firm registration vary from community to community and the same holds true for rates of employment change. Since rates do vary, the relationship between rates and community size becomes important. If, for example, smaller communities have much higher rates of new firm registration and/or much higher rates of employment growth, then the potential influence of variations in community size would be greatly reduced. So it is important to develop some sense of the relationship between these rates and the size of communities.

Urban/rural character is a dichotomous variable that crudely reflects differences in community size. Urban based communities are on average much larger than rural based communities. Table 6.11 may be interpreted using the urban/rural character of communities as a proxy for size. The ANOVA compares the rates of new firm registration of 'big' (urban) communities with the formation rates in 'small' (rural) ones. Table 6.11 shows that rates of new firm registration are subject to a strong urban/rural influence with {F= 206; Sig.=0.0000}. The mean rate for new firm registrations in all urban communities was 5.3% and the mean rate for

Table 6.11

**Analysis of Variance**
**Rates of Registration 1981-1989 by Urban/Rural Character: All Communities**

| Source | D.F. | Sum of Squares | Mean Squares | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 1 | 692.5602 | 692.5602 | 206.0071 | .0000 |
| Within Groups | 457 | 1536.3545 | 3.3618 | | |
| Total | 458 | 2228.9147 | | | |

Source: NOMIS

all rural communities is 7.8%. On average then, urban communities would have to be at least 1.47 times larger than rural communities in order for variations in community size to influence correlations.

*So when all 459 communities were examined, urban communities were found to have <u>significantly lower rates</u> of new firm formation <u>and</u> <u>significantly lower rates</u> of FTE employment change.* What is not clear from these results is whether those communities with the highest (lowest) formation rates are also the communities with the highest (lowest) rates of employment change.

Unlike firm registrations the variable representing absolute changes in FTE employment may be either positive or negative. In this respect it differs from the absolute number of firms registering for VAT which is always positive. Because it can assume both negative and positive values the employment variable is less easily described in relation to the size of communities. At least some large communities have suffered heavy employment losses and at least some small communities have enjoyed large employment gains. Cases like these represent part of the phenomenon known as the urban/rural shift (Keeble, 1980). The contrasts between urban and rural performances are very sharp. For the period between 1984 and 1989 FTE employment change in urban based communities averaged 3.95% while employment change in rural based communities averaged 10.4%. In general the direction of these rate differences would offset the effect that differences in community size might otherwise have. On average then urban communities would have to be at least 2.6 times larger than rural communities in order for variations in size to exert a measurable influence. However the recovering communities represent a special case. Unlike most urban based communities, rates of FTE employment change for the 1984-1989 period are quite high in the urban based recovering communities. In fact, as far as employment change is concerned, the urban based recovering communities give no indication of being influenced by the urban/rural effect. The analysis of variance reported in Table 6.12 shows that recovering urban based communities had rates of FTE employment growth that were very similar to the rural based recovering communities. In this respect the urban based recovering communities are *atypical*; generally urban communities had much lower rates of employment growth than rural communities. Table 6.12 shows that there is *no significant difference* {F=0.14; Sig. 0.71} between the urban based *recovering* communities and rural based *recovering* communities with respect to rates of employment change. Both types of community enjoyed rather high rates of FTE employment growth between 1984 and 1989: for recovering rural communities the average rate was 11.7% while the urban based communities averaged 11.2%. Thus the potential for community size to become a factor of some influence is much greater for recovering communities than for the general population of communities.

Table 6.12

**Analysis of Variance**
**Rates of FTE Employment Change 1984-1989**
**by Urban[2]/Rural Character:**
**Recovering Communities**

| Source | D.F. | Sum of Squares | Mean Squares | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 1 | 3.4201 | 3.4201 | .1382 | .7115 |
| Within Groups | 53 | 1311.1585 | 24.7388 | | |
| Total | 54 | 1314.5786 | | | |

Source: NOMIS

Urban based and rural based recovering communities differ considerably when rates of firm formation are compared. Table 6.13 reports an analysis of variance with registration rates as the dependent variable. The results {F=38.3; Sig=0.000} suggest a significant difference between the rates of formation within the two sub-categories of recovering communities.

Rural based recovering communities had significantly higher rates of new firm formation averaging 7.4% while urban based recovering communities averaged 4.9%. Although statistically significant, the difference in rates would do little to offset differences in size. So for recovering communities variations in size are only modestly offset by differences in rates of formation or rates of FTE employment change. Although absolute correlations for recovering communities do have the potential to overstate

[2]Where urban excludes London and the major metropolitan areas.

the association between variables, (because of the influence of variations in community size), a strong linear relationship is by no means a foregone conclusion.

Table 6.13

**Analysis of Variance**
**Rates of Registration 1981-1989 by Urban/Rural Character: Recovering Communities**

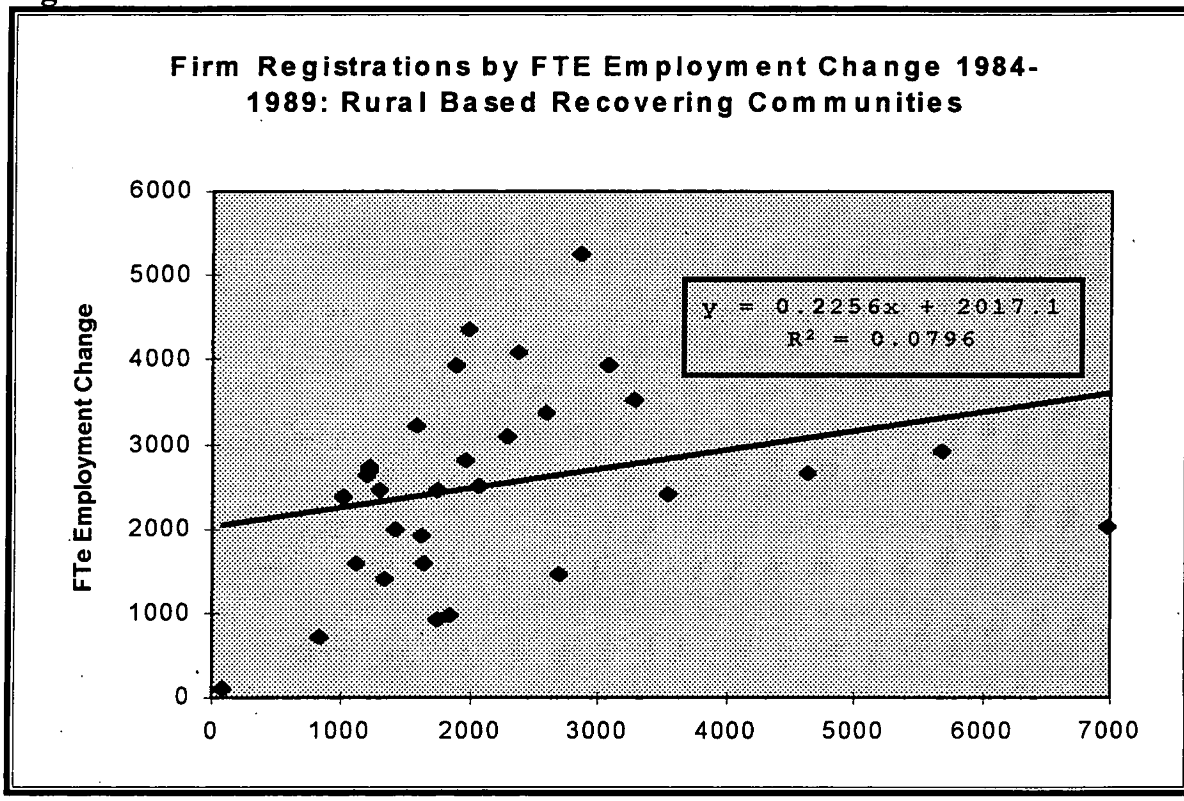
| Source | D.F. | Sum of Squares | Mean Squares | F Ratio | F Prob. |
|---|---|---|---|---|---|
| Between Groups | 1 | 81.6892 | 81.6892 | 38.3047 | .0000 |
| Within Groups | 53 | 113.0286 | 2.1326 | | |
| Total | 54 | 194.7178 | | | |

Source: NOMIS

To illustrate this, Figure 6.8 shows the plot of absolute figures (the number of firm registrations against the number of net new jobs 1984-1989) for rural based recovering communities. As Figure 6.8 shows, for some recovering communities, the association between the number of firms registering and the number of new FTE jobs is practically non-existent {$R^2$ =0.08}.

The results shown in Figure 6.8 are in marked contrast to the outcome reported in Figure 6.9 which plots the absolute registrations with absolute changes in FTE employment over the period 1984 to 1989 in urban based recovering communities. This figure indicates a very strong linear relationship {$R^2$=0.78 and a slope = 0.60}. The value of the slope {M = 0.597} suggests that on average every five new firms registering for VAT between 1981 and 1989 accounted for a net increase of 3 FTE jobs.

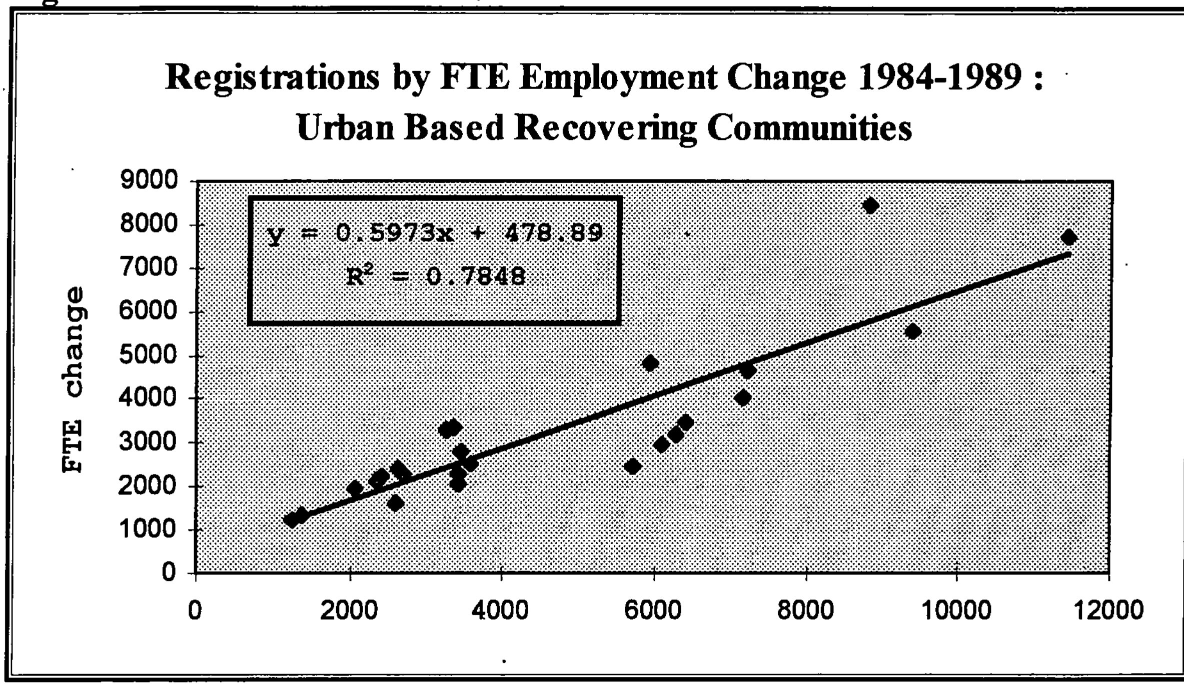
**Figure 6.8**




**Source: NOMIS**

***The very strong relationship reported in figure 6.9 cannot be dismissed as a mere artefact of the effect of variations in community size. Based on these outcomes it may be said that there is evidence confirming that new small firms "led recovery" in urban based recovering communities. That is, under the conditions provided by these urban based recovering communities a strong positive relationship between the number of new firms forming and the number of people employed overall is clearly evident. This is in contrast to rural based communities where generally there was little or no evidence of such linkages.***

Figure 6.9




Source :NOMIS

# CHAPTER SEVEN
# IMPLICATIONS FOR POLICY AND FURTHER RESEARCH

## CONTENTS

## New Firm Led Growth: The General Case

In the broadest terms Chapter Six established that new small firms do contribute to net FTE employment growth at the community level. When all 459 communities were examined it was found that as rates of new firm formation rose (fell), rates of net FTE employment also rose (fell). In general this relationship does not appear to depend upon the conduciveness of the environment. For instance, there is little evidence to suggest that in general as environments become more conducive, the association between net employment and firm registrations grows stronger. In fact, the opposite is true. The strongest association between these variables was observed in the least conducive environments where rates of firm formation were lowest. Should this be interpreted as a positive result which demonstrates that *all* communities benefit from their small firm sectors? That conclusion would be premature. What can be said is that in general the level of association between rates of formation and rates of FTE employment change did not depend on some threshold level of registrations.

Nonetheless there does appear to be a threshold registration rate above which net employment change is almost always positive. Eighty-two percent of those communities having rates of new firm formation above 6.6% (the national median rate) experienced net FTE employment growth over the period between 1981 and 1989. Similarly, there is evidence of a threshold registration rate below which net employment change is likely to be negative. In comparison to all others, a community whose firm registration rate was at or below the 33rd percentile of all rates was almost twice as likely to have suffered a net loss in FTE jobs between 1981 and 1989. So, for communities in the least conducive environments (where in fact rates of registration were quite low), it is less likely that the small firm sector contributed to net employment growth even though the association between these variables may have been positive.

## New Firm Led Growth: Depleted Communities

When those communities that had experienced heavy employment losses during the early 1980s (the depleted communities) were examined separately, a somewhat weaker association between rates of registration and rates of net FTE employment was observed in comparison to all cases. Although weaker, the association between rates of formation and rates of FTE employment change was positive, and like the general case the association was statistically significant.

In theory these depleted communities should have had a relative abundance of recession pushed entrepreneurs available to start new firms. But the average rate of formation in depleted communities was 5.46% compared to an average rate of 7.3% for all other communities. Considering the large number of communities involved, these results give a clear indication that the disadvantages which have led to heavy employment losses were not made up for by recession pushed entrepreneurs. In fact, the results cast serious doubts on the assumption that the supply of such entrepreneurs had increased substantially. By definition depleted communities were places where net employment change for the 1981-1989 period was likely to be negative. At best, for those depleted communities that did not recover, the employment contributions of new small firms would help to lessen the impact of employment losses occurring elsewhere. In other cases though, depleted communities were able to generate substantial employment growth in the latter part of the decade. Perhaps evidence of new firm led growth would be found in these "recovering communities".

## New Firm Led Growth: Recovering Communities

In terms of the comparisons made in Chapter 6 the association between rates of registration and rates of employment change were weakest in the set of recovering communities. In fact there was virtually no association between the variables. This led to a more detailed analysis of the recovering communities using their urban/rural character as a basis of sub-classification.

The role played in recovery by new small firms appeared to differ depending upon whether the community was urban based or rural based. In some urban based communities there was general evidence to suggest that small firms were important sources of new jobs and that as rates of new firm formation rose so did rates of net employment growth. This relationship did not depend upon environmental conditions, rather it was true generally. Recovering urban based communities had lower rates of new firm formation than recovering rural based communities but similar rates of FTE employment change for the period between 1984 and 1989. These facts may be interpreted in at least two ways: first, it could be inferred that new urban based firms were much more efficient at creating jobs which in turn led to greater net employment in these communities via their new small firms; or alternatively, in urban areas it might be inferred that alternative sources of employment 'supplemented' the employment generating efforts of the new firm sector to a greater extent than was evident in rural based communities. The latter is the less heroic assumption. In either case though it is assumed that the nature of recovery differed in urban and rural contexts.

## Urban Based Recovery

In urban based communities it was estimated that for every five new VAT registrations a net increase of three FTE jobs accrued to the host (urban based) community. These are modest gains. Moreover, they underscore the dependence of the small firm sector. That is, in spite of the fact that small firms created large numbers of jobs in urban based communities over the eighties, it is clear that their impact on net employment change depended upon the stability provided by other employers. If other firms in the community were <u>unable</u> to continue providing a stable baseline of jobs, there would be little or no evidence of a positive net impact from the new small firm sector. Where urban based communities did not recover there is evidence which suggests that the baseline of jobs was not stable. Particularly important in this regard is the role played by urban based firms in the manufacturing sector.

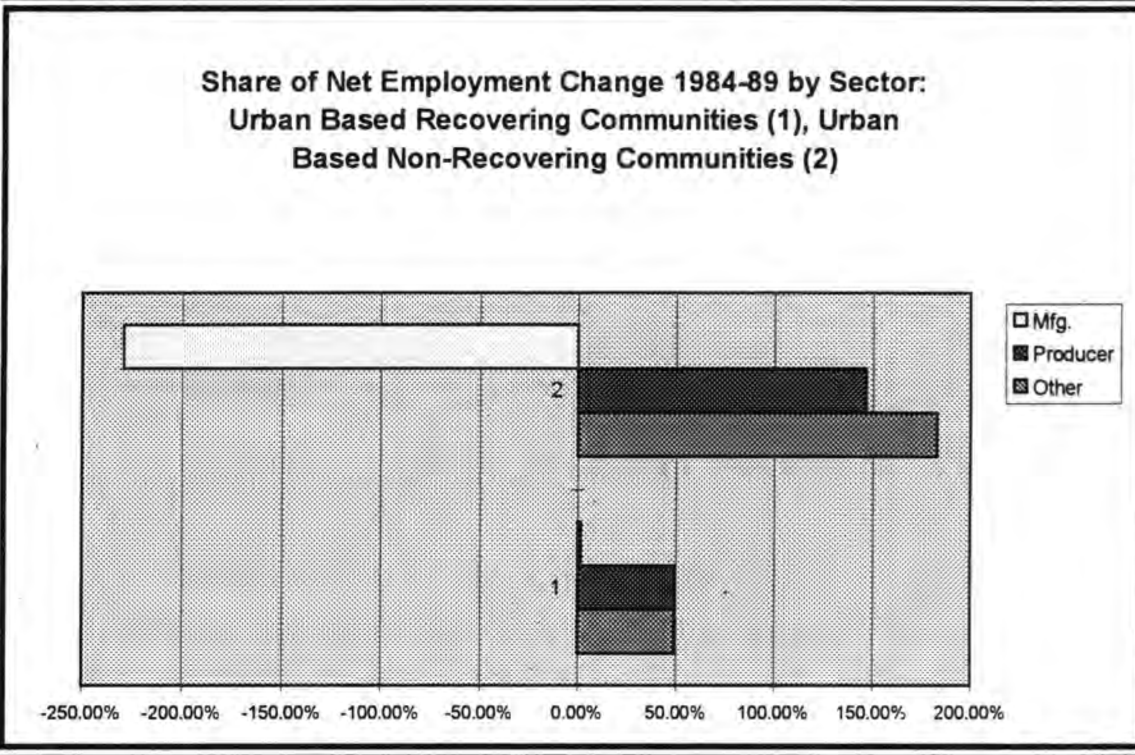
In those urban based depleted communities that failed to recover there was a very strong correlation between the rate of overall net employment change (all sectors) and the rate of employment change for the manufacturing sector {R=0.87; Sig.=0.001}. In these communities, overall rates of employment rose (dropped) when rates of change in manufacturing employment were highest (lowest). In short, for the non-recovering urban based communities it would be correct to say - as manufacturing goes, so goes total employment.

There were 27 urban based depleted communities that did not recover. Of these, 23 experienced losses in manufacturing employment over the 1984-1989 period. Even the impact of those small firms creating jobs in sectors other than manufacturing were canceled. The gains made in these other sectors were more than over taken by losses in manufacturing employment ; that is, employment changes in these other sectors were strongly negatively correlated with employment changes in manufacturing {R=- 0.64; Sig=0.001}. In general, urban based communities that failed to recover were communities where the manufacturing sector was a strong influence on overall employment change and where losses in manufacturing sector employment continued throughout the 1984-1989 period.

While the non-recovery of these urban based communities appears to be explained by changes in the manufacturing sector the obverse is not true. That is, urban based recovery was not explained by a burst of employment growth in the manufacturing sector. Urban based recovering communities were far less influenced, either negatively or positively, by their constituent manufacturing sectors. For instance, the correlation between rates of change in manufacturing and rates of change in overall employment were not statistically significant in urban based recovering communities. In fact, overall employment change did not appear to be strongly influenced by any particular sector. Generally, what little influence the manufacturing sector did have was positive. Of the 24 urban based communities that recovered, 13 had positive rates of manufacturing employment over the 1984-1989 period. In most cases these gains were rather minor and the average contribution to overall net employment from the manufacturing sector was not great.

Again the conclusion to be reached here is that in urban based environments, there is evidence of small firm led recovery but, recovery also depended upon stability; especially stability in the manufacturing sector. Without this stability, the small firm sector did not contribute to net employment growth. In seeking an answer as to why some urban based communities recovered and others did not, very little is explained by differences in rates of new firm formation between the recovering and non-recovering urban based communities: the average rate of new firm formation in non-recovering urban based communities was 4.2% while in recovering urban based communities the average rate was 4.9%. However, the dominant role played by the manufacturing sector in either establishing stability or creating instability is

Figure 7.1




Source NOMIS

very clear. This can be seen when those non-recovering urban based communities with positive employment changes for the period 1984-1989 are compared to the urban based communities that recovered. The comparisons are made in terms of the average sectoral composition of net employment change and are reported in Figure 7.1 which displays this information for urban based communities. In those cases where urban based communities recovered, the average contribution of the manufacturing sector to net employment was 1.5% compared to -229.5% for those urban based communities that remained depleted.

Therefore, while it is true that newly formed small firms made significant contributions to job creation and net employment growth in urban based recovering communities, it would be misleading to describe these as cases where rapid growth in the number of small firms was sufficient to create above average gains in net employment . This was not the case!

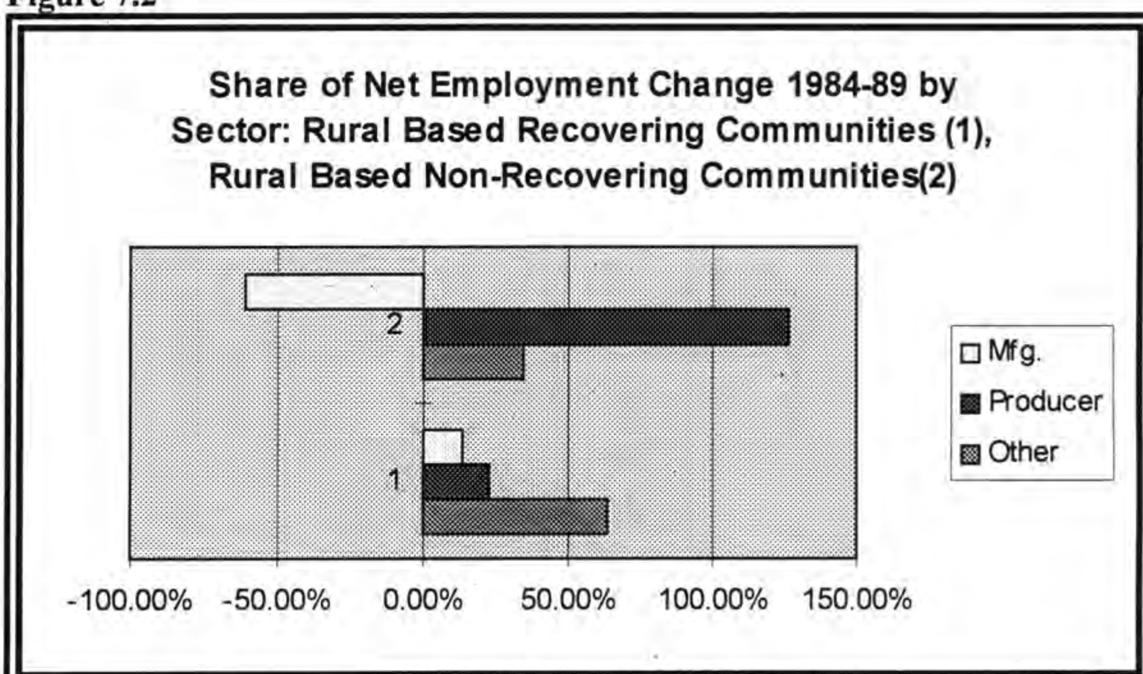
The differences between recovering and non-recovering urban based communities were found to be primarily in terms of changes in the manufacturing sector employment rather than in terms of levels of new firm registration. Furthermore, only in those urban based communities with relatively stable manufacturing employment are the contributions of small firms to net job creation observable. Finally, Figure 7.1 confirms that in those urban based communities that recovered it was service sector growth that accounted for the new jobs.

## Rural Based Recovery

The role played by newly formed small firms in rural based recovering communities is quite different from the role they played in urban based recovering communities. In the case of rural based communities the association between rates of formation and rates of FTE employment change was very weak. Even when absolute growth figures were plotted there was no real evidence of a linear association between numbers of new firms registering and numbers of net new jobs created. So for rural based communities in general, it is not the case that as rates of new firm formation increase, rates of employment also increase. Nor is it the case that as the number of new firms registering increases the number of FTE jobs increases. The situation contrasts sharply with urban based communities.

In comparison to its impact on urban based communities, the manufacturing sector played a very different role in these rural based communities. In the rural communities manufacturing was strongly associated with overall employment change {R=0.79; Sig=0.01}. But in this case it was the recovering rural communities that exhibited strong links to manufacturing, not the non-recovering ones (as was true for urban based communities). And in the case of rural based communities, the link to manufacturing was evidenced by a positive correlation, not a negative one (as was true of urban based communities). In other words, in rural settings, the manufacturing sector

Figure 7.2

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played the role of ***contributor*** rather than the role of ***de-stabilizer***. Also, unlike their urban counterparts, these rural based recovering communities experienced growth in their manufacturing sectors which has translated into a much more substantial contribution to net employment. That is, for recovering rural based communities the average contribution of the manufacturing sector to net employment growth was 13.2%.

As was true of the urban based communities, those rural based communities that did not recover received weak performances from the manufacturing sectors. These features are conveyed in Figure 7.2 which portrays the contribution by various sectors to net employment growth in rural based communities - both recovering and non-recovering.
In the figure it can be seen that changes in manufacturing employment played a similar role with respect to the rural based non-recovering communities. That is, losses tended to characterize the input of the manufacturing sector to rural based communities that did not recover. In recovering rural based communities the contribution of the manufacturing sector was, relatively speaking, much stronger than had been the case with urban based communities, averaging slightly over 13%. Recovering rural based communities were economies dominated by small firms. The average firm size was 6.9 employees per firm which is almost half the national average. The model generated estimate of employment in firms less than ten years old was 50,480 representing 25.5% of all jobs in these communities. Again this proportion is well in excess of the national figure which was estimated to be 17.5%. In these communities there is good reason to believe that small firms accounted for an exceptional proportion of employment growth. Unlike the urban based recovering communities where recovery was almost entirely service led, the rural communities experienced growth in both services and manufacturing.

These comparisons suggest that the phenomenon known as the urban/rural shift may be contrasting two situations where the manufacturing sector has behaved very differently: the manufacturing sector as 'de-stabilizer' and the manufacturing sector as a 'contributor to growth'. In the final section of this chapter the emphasis shifts from the urban/rural issue and focuses on the influence of the manufacturing sector.

## Small Firms and Manufacturing

Research into the small firm sector in the UK has helped to identify a series of environmental attributes that can be shown to influence the rate at which new firms are formed. With this advance in understanding it is possible to characterize various environments as conducive, or non-conducive to the formation of new firms. When depleted communities were characterized in this way (chapter four) the majority of them were shown to occupy environments that were among the least conducive to the formation of new firms. One implication of this finding was that if most depleted communities were to recover, then at least some of them would have to achieve this whilst occupying non-conducive environments. Furthermore, if it is assumed that new small firms are the primary source of new jobs, then the majority of depleted communities could be said to be disadvantaged.

## Small Firm Led Recovery

For the period examined (the 1980s), the analysis presented in chapters five and six strongly suggests that depleted communities occupying environments hostile to the formation of new firms *were* disadvantaged. That is, of all depleted communities, those from the least conducive environments were the least likely to recover from employment losses suffered in the early 1980s. In fact, depleted communities from other environments were almost twice as likely to recover from their employment losses. This result appears to support the idea that recovery was small firm led in that places most hostile to the formation of new firms were shown to have much lower rates of recovery.

But it would be premature to infer that communities from the least conducive environments had lower rates of recovery simply because they had lower rates of new firm formation. The situation is quite complex. If the low frequency of recovery among the depleted communities from the least conducive environments had been caused solely by the lower rates on new firm formation there should have been at least some evidence of a linear relationship between net employment change and numbers of firms registered. That is, as new firm registrations increased there should have been some observable increase in net FTE employment. But in fact there is very little evidence of this. Results presented in chapter six (Table 6.10) indicated that rates of new firm formation are not consistently linked to net employment change in the recovering communities. For instance, correlations between rates of new firm formation and rates of net FTE employment growth in recovering communities were very weak (Table 6.6, Figure 6.5 and Table 6.10). These outcomes raise the possibility of a more complex situation involving other influences.

## The Influence of Manufacturing

Together, lower rates of recovery, combined with the lack of any observable linear relationship between net employment change and new firm registrations, suggest that the environments which have been characterized as the least conducive to the growth of new firms may have some feature which makes net increases in FTE employment less likely, irrespective of the level of small firm activity.

What kind of feature might do this? It is argued here that recovery is influenced by changes in manufacturing sector employment. Furthermore, this influence is pervasive in that it extends to all depleted communities, not just those from the least conducive environments. The influence of manufacturing on recovery will be demonstrated in two ways:

1. By comparing net FTE employment change with net manufacturing employment change both in recovering communities and communities that did not recover.

2. By comparing rates of recovery between depleted communities whose 1984-89 rates of manufacturing change were above average and depleted communities whose 1984-89 rates of manufacturing employment were below average.

The first comparison is made by plotting changes in manufacturing employment 1984-89 with changes in net employment 1984-89. This is done in figure 7.3. Since the intention is to show how manufacturing employment influences recovery, the figure shows two distinct cases: first, it shows the case of recovering depleted communities {figure 7.3(A)}; then, it shows the case of non-recovering depleted communities {figure 7.3(B)}. Each case will be discussed in turn. In figure 7.3(A) it can be seen that most recovering communities experienced very minor changes in manufacturing employment between 1984 and 1989. Furthermore, the correlation between manufacturing employment change and overall employment change was very weak within the recovering communities; in fact the connection was practically non-existent (R= -0.01).

Contrasting with this case is the case of non-recovering depleted communities {figure 7.3(B)}. In this case manufacturing employment changes tended to be negative. Also, in contrast to the case of recovering communities, changes in manufacturing employment appear to have exerted a much stronger influence on total employment change in the non-recovering communities; as evidenced by a positive correlation (R=0.41, Sig 0.001). In the second comparison depleted communities are divided into two groups: those communities with above average rates of manufacturing employment change for the period 1984-89 and those communities with below average rates of manufacturing employment change. Of the 74 depleted communities with above average rates of manufacturing employment change, 52 recovered,

Figure 7.3 (A)

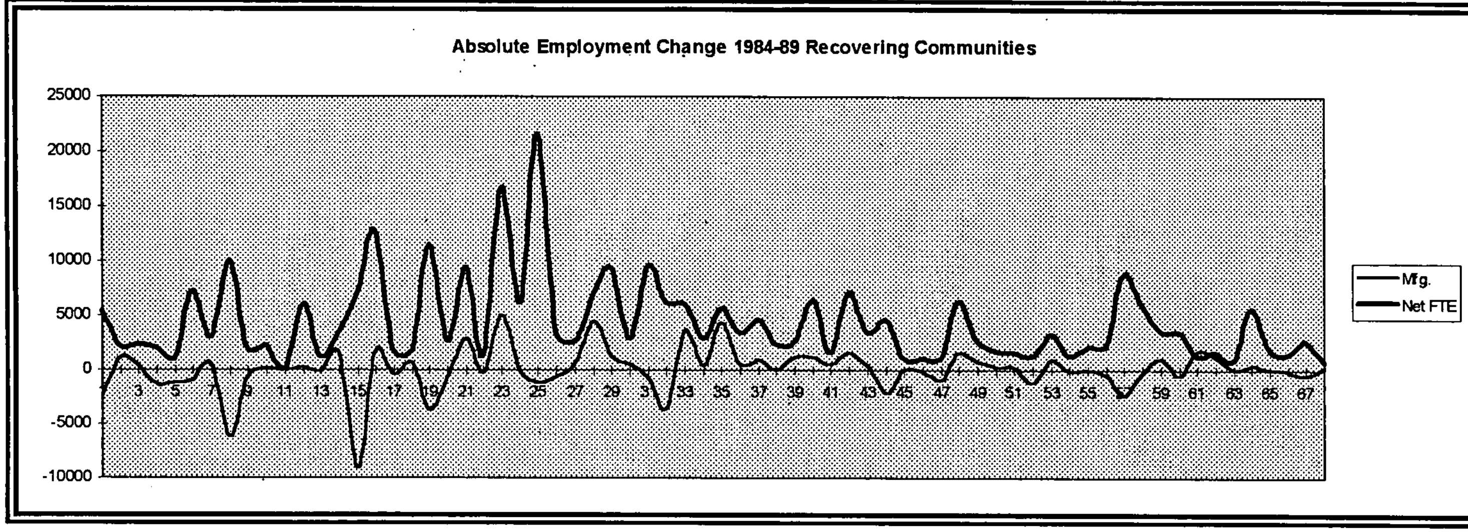
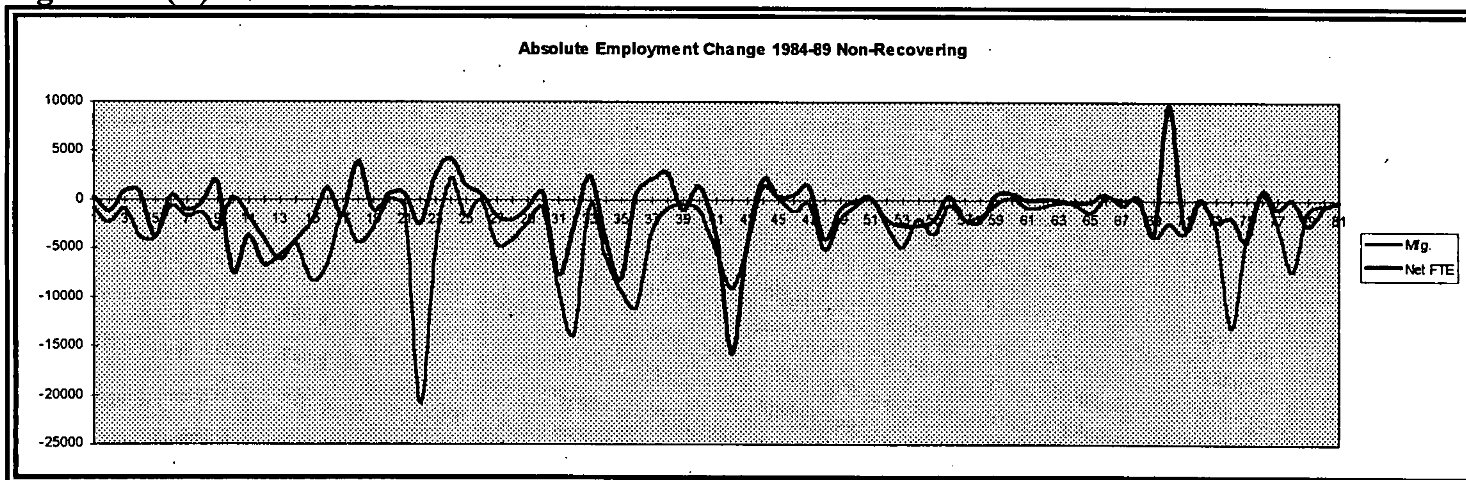



Figure 7.3 (B)




Source:NOMIS

for a recovery rate of 70%. Of the 75 depleted communities with below average rates of manufacturing employment change only 16 recovered, for a recovery rate of 21%. In other words, a depleted community with an above average rate of manufacturing employment for the period 1984-89 was almost 3.5 times more likely to recover. What do the results of these comparisons imply?

They imply that in depleted communities there may be two factors influencing net employment growth and recovery:

1. levels of new firm formation;
2. changes in FTE manufacturing employment.

These outcomes also suggest that the impact of differences in new firm formation on net employment may only be observable under certain conditions. They may only be observable when changes in manufacturing employment are relatively stabilized. To test this, depleted communities were sub-divided into those with below average rates of manufacturing employment change for the period 1984-89 and those with above average rates. For each sub-category of depleted community a plot of FTE employment change with new firm registrations was made. The results are presented in Figures 7.4 and Figure 7.5.

In those situations where rates of manufacturing employment change were all below average (Figure 7.4) there was virtually *no evidence* of a linear relationship between net FTE employment change and new firm registrations. The coefficient of determination was practically zero {$R^2$=0.0002}. The slope of the regression line indicates that virtually no gain in net FTE employment arises when a new firm is established. Most of these communities suffered manufacturing employment losses between 1984 and 1989.

**The situation was very different for depleted communities whose rates of manufacturing employment were above average. In those communities *there***

**Figure 7.4**

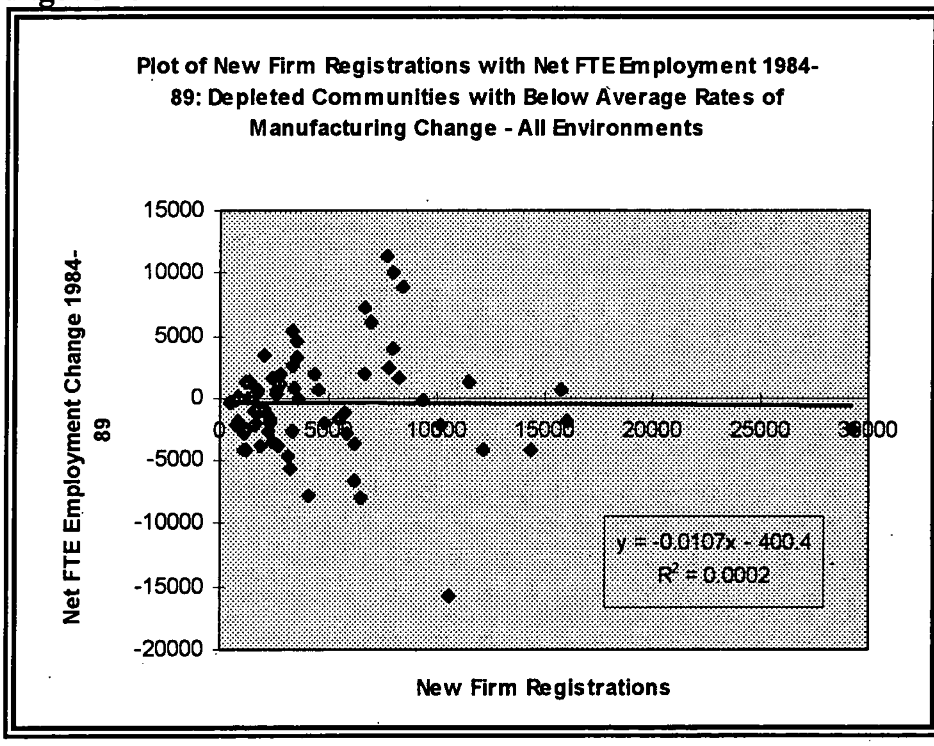
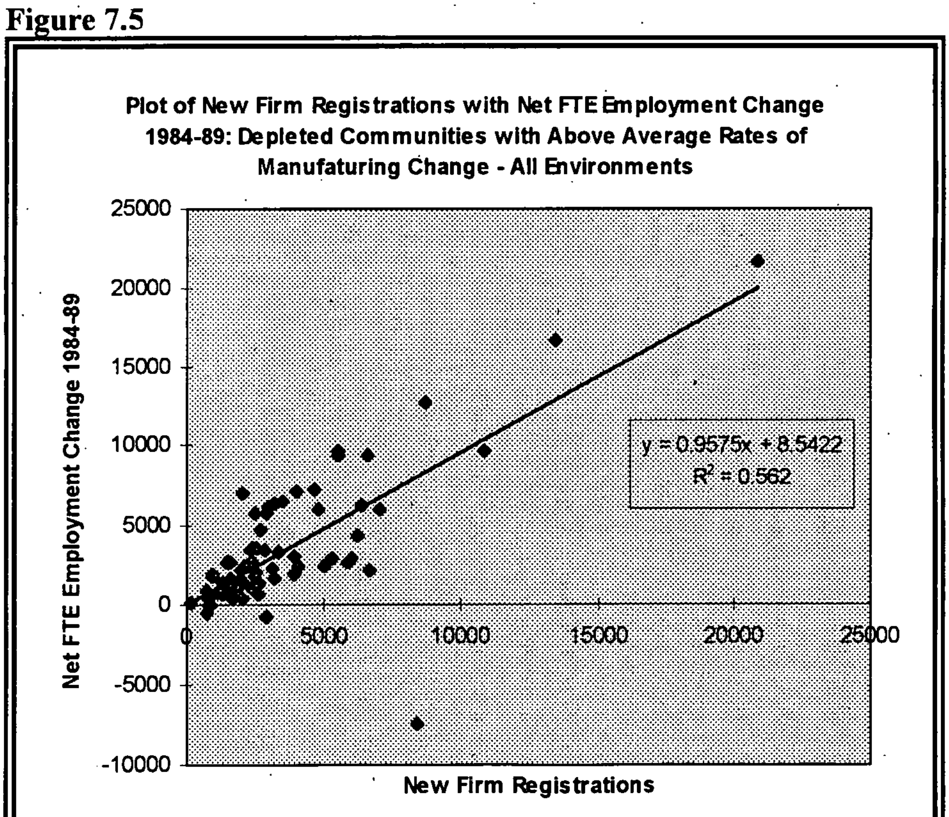


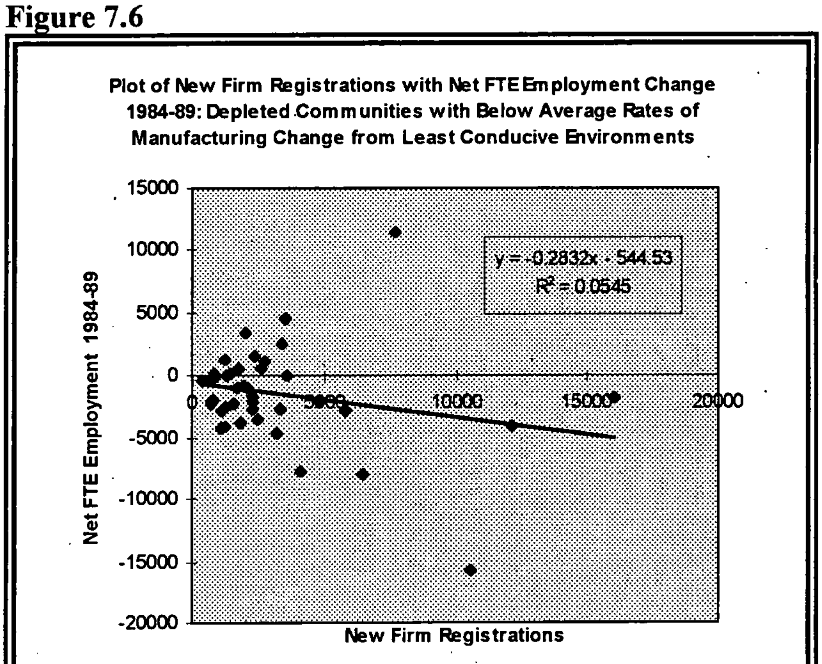

**Figure 7.5**




**Source: NOMIS**

*was* evidence of a linear relationship (Figure 7.5). The coefficient of determination indicated that over half of the variation in net employment could be explained by levels of new firm formation {$R^2$=0.56}. The slope of the regression line is very nearly one {m = 0.96} indicating that for every new firm registering, on average, net employment increased by nearly one FTE job. *It is important to emphasize that these are not cases where manufacturing 'led recovery'. Correlations between manufacturing employment change and overall employment change are quite weak in recovering communities. Rather, it seems more appropriate to characterize these as cases where the 'stability' provided by the manufacturing sector made small firm led recovery possible.* The influence of the manufacturing sector cuts accross all environments.

Figure 7.6

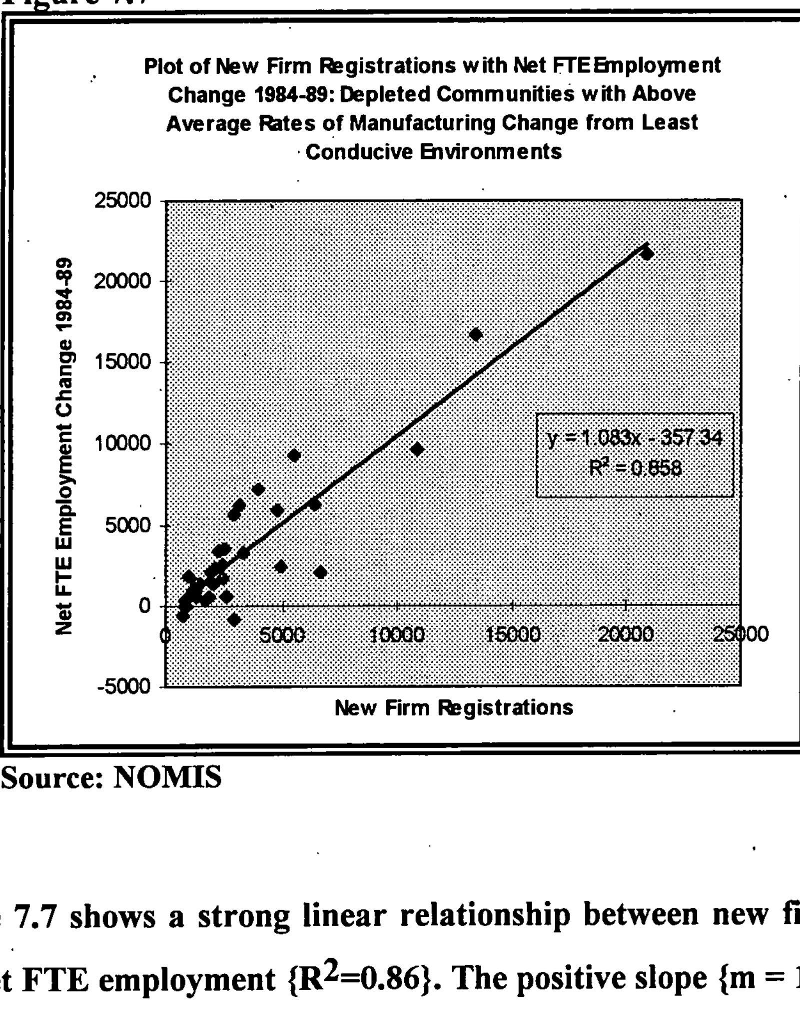



Source: NOMIS

Even within the least conducive environments a linear relationship between new firm registrations and net employment change was observable. Here again the results show that for new firms to register a systematic and observable impact on net employment, the manufacturing sector must be relatively stable. Figures 7.6 and 7.7 show plots of these variables for twocases: first, for the case when rates of manufacturing employment are below average, and second, for the case when rates of manufacturing employment are above average.

In figure 7.6 there is virtually no evidence of a linear relationship with the coefficient of determination near zero {$R^2$=0.05}. The negative slope of the regression line {m = -0.28} suggests that no contribution was made to net employment upon the formation of a new firm.

Figure 7.7




Source: NOMIS

Figure 7.7 shows a strong linear relationship between new firm registrations and net FTE employment {$R^2$=0.86}. The positive slope {m = 1.08} indicates that for every new firm registering net employment increased by roughly one FTE job. These results suggest that in general, recovery may have depended as much upon whether a depleted community *avoided* employment losses in manufacturing as it depended upon levels of job creation of indigenous new firms. Assuming that there *are* two factors influencing net employment growth, how might these influences have affected rates of recovery in depleted communities from the least conducive environments?

## Implications for Recovery of Depleted Communities from the Least Conducive Environments

If there *are* two factors influencing net employment growth, this may help to explain the very low rates of recovery experienced by depleted communities from the least conducive environments. Those particular communities may have felt *the combined effects* of low rates of new firm formation *and* manufacturing employment losses. But for this explanation to be plausible several conditions would have to prevail.

- First, changes in manufacturing employment would have to be strongly connected to total employment change in these communities. When tested, changes in manufacturing employment *were* found to be strongly, and positively, correlated with changes in total employment (R=0.70) in depleted communities from the least conducive environments.
- Second, the changes in manufacturing employment would have to be predominantly negative changes. This condition was also met; on average, depleted communities from these environments *lost* 1803 FTE manufacturing jobs between 1984 and 1989.

- Third, these depleted communities should have significantly lower rates of new firm formation when compared to depleted communities from all other environments. This condition was also met.

*So, in depleted communities from the least conducive environments the conditions necessary for a 'combined effect' were in place.* The combination, of lower levels of new firm formation and a manufacturing sector that was unable to provide stability, would help to explain why rates of recovery were so low in these particular communities.

## Robustness and Small Firm Led Recovery

As for the phenomenon of robust small firm led recovery there is little evidence to support its existence. Of the sixty-eight recovering communities only fifteen had rates of firm formation *and* rates of FTE employment change that were both above the national median levels. None of these fifteen communities occupied an environment that was characterized as least conducive to firm formation. Out of 76 depleted communities occupying the most hostile environments only 25 recovered. A chi squared test of independence was applied to these cases. The resulting chi squared value of 10.19 with one degree of freedom led to rejection of the null hypothesis at an alpha level of 0.01. *In other words, chances for recovery were affected by the environment.* Depleted communities occupying the least conducive environments were *significantly less likely* to attain recovery than depleted communities occupying other environments.

Twenty-five of the sixty-eight recovering communities occupied environments that were among the least conducive to new firm formation. Clearly these communities were particularly disadvantaged. The average rate of new firm registrations in these communities was 4.9% which is well below the national median rate. In spite of these low formation rates the average rate of employment change for the period between 1984 and 1989 was 10.04%. Such high rates of employment growth coupled with relatively low formation rates raise doubts about an earlier assumption, namely that older larger firms are not net creators of jobs. While that assumption may be true generally, at this level of dis-aggregation there could be exceptions to the general case. Given the way in which recovering communities are defined any exceptions to the general rule would most likely be included in their number.

Even in the most hostile environments new small firms contributed to job creation. Whether these contributions would be detected really depended upon the stability of the baseline employment, particularly in the manufacturing sector. With the exception of those rural based recovering communities from the most conducive environments it seems the best the small firm sector could do was to ameliorate, but not overcome, employment losses arising from structural changes and industrial decline. Small firm led growth is contingent on the stability of existing employment. In other words with respect to local recovery there are limits as to what may be expected from the small firm sector. The sector cannot provide a remedy for every problem. Small firms are clearly a key source of new jobs in all environments. Some would argue that small firms inherently have more potential to create jobs than large firms (Robson and Gallagher, 1994). But on their own, small firms cannot be expected to reverse the effects of enormous structural change in the space of time examined here.

Generally there was little or no evidence of robustness. Rates of new firm registration from the least conducive environments were significantly lower than registration rates in other environments. Only eleven cases were observed where the rate of new firm registration in a community from a hostile environment was equal to or greater than the national median rate of 6. 6%. Of this number, three were depleted communities and only one was a recovering community. So not only were there very few cases where, at the community level, new firm registration rates were higher than the environmental conditions would suggest they "should be", but furthermore, there was no guarantee that an abundance of new firms would lead to net employment growth!

In general there is little evidence to suggest that recovery depended upon the small firm sector (the correlation between rates of registration and rates of employment change was practically zero). Nor was there much evidence to suggest that high registration rates would lead to recovery since many depleted communities failing to recover had high registration rates. So high rates of new firm registration were neither a necessary nor a sufficient condition of recovery. Notwithstanding these comments with respect to recovery, there was evidence of a threshold registration rate above which employment change was almost always positive. This suggests that the set of recovering communities contained a number of exceptions to the general trend. Given the way in which they were defined this should not be surprising.

The highest rates of new firm registration were recorded in communities from the most conducive environments. The highest rates of net employment change were recorded in communities occupying indeterminate environments. *When juxtaposed these two facts suggest that in general there may be a limit on the potential of the small firm sector to produce net increases in employment.* For instance, it could be that beyond a certain level of new firm registrations, job displacement might be a significant factor. If this is the case it is a fact with important implications for policy. For example, increases in the rate of new firm formation may not be an appropriate measure of success. It may be that government agencies could better spend their efforts trying to stimulate new firm activity in areas with lower levels of registration even if the result is fewer firms!

**Outcomes of this research have other policy implications as well. This research suggests a two tier approach should be taken in attempts to stimulate employment growth: urban based communities appear to require one approach and rural based communities appear to require another. Evidence gathered here suggests that in urban areas a policy to create employment through the small firm sector is unlikely to be successful unless there are concurrent efforts to stabilize existing employment, particularly in the manufacturing sector. There are at least two measures that could be taken. First, although opportunities are limited and competition is very strong, at least some effort should be devoted toward attracting inward investment - especially inward investment in the manufacturing sector. In Corby (Hudson, R., Sadler, D., and Townsend, A., 1992) for instance, where the community was successful in some of its efforts to recover lost employment, new inward investment was an important component of the overall strategy. Second, existing enterprises under threat should be identified and, where feasible, attempts should be made to secure their positions within the industry. In Canada for example, a community based venture capital company has been successful in rescuing faltering enterprises (MacLeod and Johnstone, 1995). A study of SMEs and manufacturing employment in the UK indicates that efforts should be focused on ensuring that these small manufacturing firms survive as a high proportion of job loss was attributed to firm deaths (North, D., Smallbone, D., Leigh, R., 1994). Without steps like these, which are aimed to stabilize existing employment, the impact of the new small firm sector on employment growth may be quite limited.**

**With respect to the small firm sector the following comments are in order. In the literature there has been speculation that at least some, and perhaps even a significant number of entrepreneurs migrate. It is believed that these individuals tend to re-locate to areas that are generally regarded as attractive**

and as offering a better lifestyle. In short, the migration appears to have a definite direction and that is: out of the urban areas and into the rural areas. It is possible then, that urban areas are losing some of their best entrepreneurs. That is, urban areas may be losing those individuals who are able to recognize and act on opportunities with little or no outside assistance. If this phenomenon is occurring at any significant level, it would have consequences for policy in the urban based communities. Since high levels of job loss are common in many urban areas the supply of potential entrepreneurs (of the recession pushed variety) in these communities should remain quite high. However, one impact of a migration like that just described is that urban areas may have a greater need for specialized training. Second, programs like the Enterprise Allowance Scheme are very likely to meet genuine needs in these communities as many potential entrepreneurs are likely to be out of work. This point is further bolstered by evidence provided in this research which shows that, left to their own devices, the vast majority of individuals who are at least potentially 'recession pushed entrepreneurs' appear never to make it to market[1]. In other words, it is unrealistic and naive to assume that every redundant worker (in virtue of having lost his/her job) has become, by definition, an entrepreneur.

In rural based communities it seems the prospect of raising employment levels through stimulation of the small firm sector holds greater promise. Policies aimed at encouraging new firm formation in these communities might lead to employment growth. Policy measures related to migrating entrepreneurs who may be influenced in their choice of location could prove important. Efforts to influence the flow of migrating entrepreneurs could, as a possibility at least, also involve emphasis on particular sectors. Among the sorts of government

[1] As Audretsch points out there are limits attached to analysis based on cross sectional data. (Audretsch, and Jin, 1994)

supported programs that could stimulate these rural based economies are ones which focus on infrastructure including efforts to establish state of the art computerized networks. Research suggests that computer related infrastructure can go some way towards reducing the disadvantages of peripherality (Goddard, 1991). Entrepreneurship training and programs like the Enterprise Allowance Scheme are less likely to meet the needs of rural based communities if, as the literature speculates, a significant number of these entrepreneurs have migrated to these communities for positive reasons.

This research has established that high rates of new firm registration are neither a necessary nor a sufficient condition for net employment growth. As such this raises the issue of cost effectiveness of blanket policies aimed at stimulating new firm start ups (Storey, D., 1992). In the UK considerable research effort has gone into determining which factors influence rates of firm registration. Unfortunately, for those intending to stimulate new firm registration rates, many of the factors seen to influence rates of new firm registration are difficult to alter (Reynolds, 1993). But even if policy could stimulate higher rates of firm formation the result may not be what was hoped for. What the current research suggests is that more information is needed about the differences in conditions between communities where net employment grew when firm registration rates were high and communities where net employment did not grow when firm registration rates were high. Secondly, more research must be devoted to identifying methods of overcoming the particular problems faced by the pool of potential recession pushed entrepreneurs. Evidence presented here establishes that many redundant workers are currently unable to make the transition to recession pushed entrepreneurship. Lack of information on this topic is perhaps the greatest weakness in the literature dealing with small firms.

# Appendices

## Appendix A

### PRODUCER SERVICES

| SIC | Activity | Great Britain employment, 1981 (000s) |
|---|---|---|
| 61-3 | Wholesale distribution/scrap dealing, etc. | 876 |
| 723 | Road haulage | 194 |
| 831-2 | Auxiliary services to Banking/Insurance | 88 |
| 837-8 | Professional/technical services; Advertising | 199 |
| 839 | Business services | 257 |
| 841-3 | Hiring out machinery, equipment, etc. | 47 |
| 849 | | |
| 94 | Research and development | 121 |
| 9631 | Trade unions, business & professional associations | 37 |
| | TOTAL | 1,819 |

### MIXED PRODUCER/CONSUMER SERVICES: PREDOMINANTLY PRIVATE

| SIC | Activity | Great Britain employment, 1981 (000s) |
|---|---|---|
| 664 | Canteens | 113 |
| 671 | Repair/servicing of motor vehicles | 211 |
| 71 | Railways | 174 |
| 726 | Transport nes | 2 |
| 74 | Sea transport | 66 |
| 75 | Air transport | 70 |
| 76 | Support services to transport | 100 |
| 77 | Miscellaneous transport services nes | 168 |
| 7901 | Postal services | 183 |
| 7902 | Telecommunications | 240 |
| 814 | Banking | 368 |
| 815 | Other financial institutions | 111 |
| 82 | Insurance | 225 |
| 834 | House and estage agents | 63 |
| 835 | Legal services | 121 |
| 836 | Accountants, auditors, tax experts | 104 |
| 848 | Hiring out transport equipment | 15 |
| 85 | Owning and dealing in real estate | 98 |
| 933 | Education nes and vocational training | 225 |
| 981 | Laundries, dry cleaners, etc. | 61 |
| | TOTAL | 2,718 |

Source: Marshall, J.N., et. al., 1988, pp. 23 -26

# Appendix B

## UK COUNTIES AND THEIR STATUS WITH RESPECT TO CONDUCIVENESS TOWARD NEW FIRM FORMATION

| | |
|---|---|
| Bedfordshire | Indeterminate |
| Berkshire | Most Conducive |
| Buckinghamshire | Most Conducive |
| East Sussex | Most Conducive |
| Essex | Most Conducive |
| Hampshire | Indeterminate |
| Hertfordshire | Most Conducive |
| Isle of Wight | Most Conducive |
| Kent | Most Conducive |
| Oxfordshire | Indeterminate |
| Surrey | Most Conducive |
| West Sussex | Most Conducive |
| Cambridgeshire | Most Conducive |
| Norfolk | Most Conducive |
| Suffolk | Indeterminate |
| Inner London Boroughs | Most Conducive |
| Avon | Indeterminate |
| Cornwall | Most Conducive |
| Devon | Most Conducive |
| Dorset | Most Conducive |
| Gloucestershire | Indeterminate |
| Somerset | Most Conducive |
| Wiltshire | Most Conducive |
| Hereford & Worcester | Indeterminate |
| Shropshire | Indeterminate |
| Staffordshire | Least Conducive |
| Warwickshire | Indeterminate |
| West Midlands | Indeterminate |
| Derbyshire | Least Conducive |
| Leicestershire | Indeterminate |
| Lincolnshire | Indeterminate |
| Northamptonshire | Indeterminate |
| Nottinghamshire | Least Conducive |
| Humberside | Least Conducive |
| North Yorkshire | Most Conducive |
| South Yorkshire | Least Conducive |
| West Yorkshire | Least Conducive |
| Cheshire | Indeterminate |

Appendix B

| | |
|---|---|
| Greater Manchester | Indeterminate |
| Lancashire | Indeterminate |
| Merseyside | Least Conducive |
| Cumbria | Least Conducive |
| Cleveland | Least Conducive |
| Durham | Least Conducive |
| Northumberland | Least Conducive |
| Tyne& Wear | Least Conducive |
| Clwyd | Indeterminate |
| Dyfed | Most Conducive |
| Gwent | Least Conducive |
| Gwynedd | Most Conducive |
| Mid. Glamorgan | Least Conducive |
| Powys | Most Conducive |
| South Glamorgan | Indeterminate |
| West Glamorgan | Least Conducive |
| Borders | Least Conducive |
| Central | Least Conducive |
| Dumfries & Galloway | Least Conducive |
| Fife | Least Conducive |
| Grampian | Indeterminate |
| Highland | Indeterminate |
| Lothian | Least Conducive |
| Strathclyde | Least Conducive |
| Tayside | Least Conducive |
| Orkney Islands | Most Conducive |
| Shetland Islands | Least Conducive |
| Western Islands | Indeterminate |

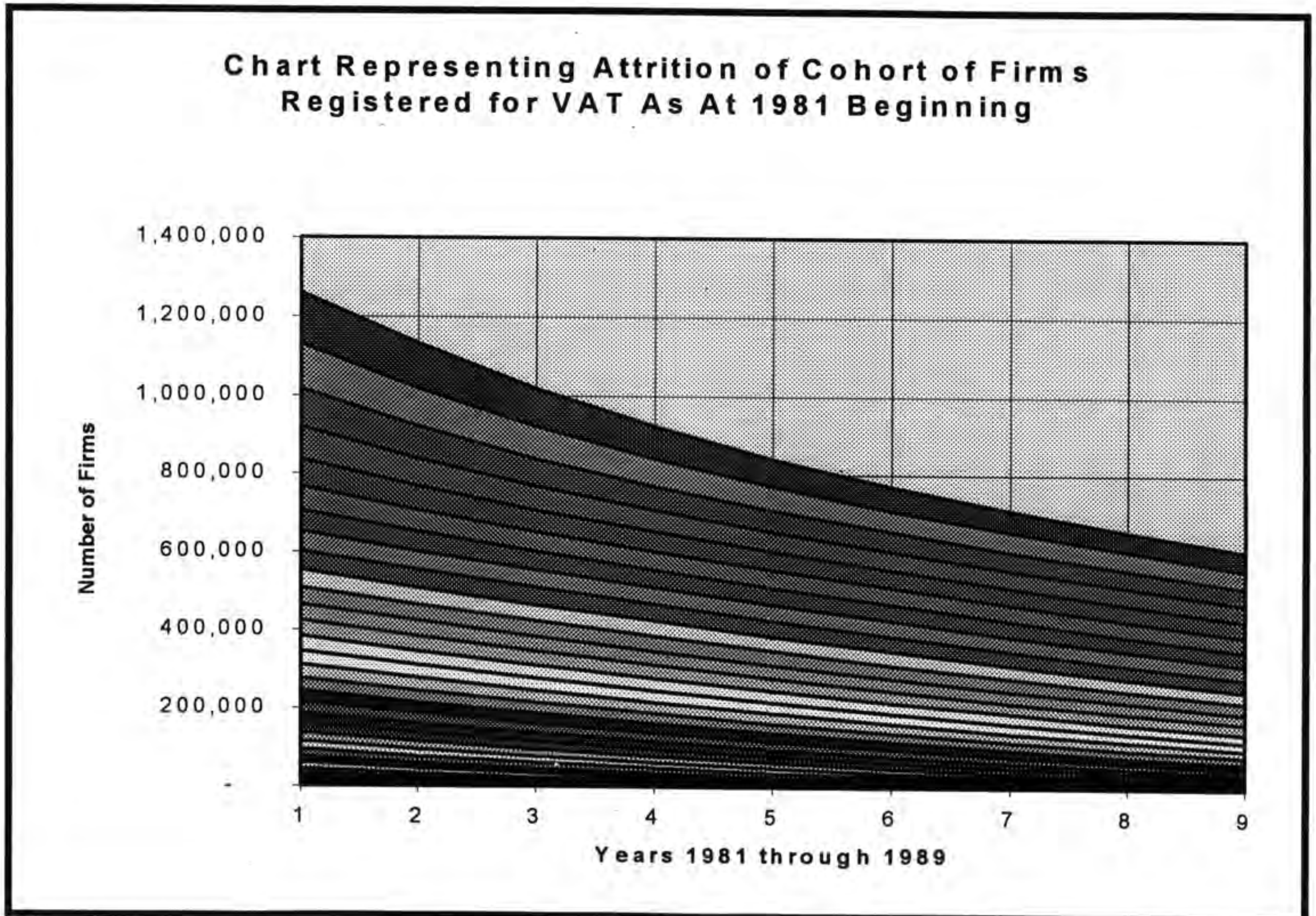


Chart Representing Attrition of Cohort of Firms
Registered for VAT As At 1981 Beginning
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
-
Number of Firms
1
2
3
4
5
6
7
8
9
Years 1981 through 1989

Appendix D

# REGRESSION ANALYSIS

# Appendix D

```
-> regression descriptives all/vars=regpr100 pcntpro pcntmanu pcntman2
pcntgrup
->  pcntownr pcntmfg pcntsmal pcntcoun pcntself popchg chgpop75 prfindex
pcfte14c
->  /dep=regpr100
->  /method=stepwise/residuals=default/scatterplot (*res,*pre)(*res,
regpr100)/
->  partialplot.


          * * * *   M U L T I P L E   R E G R E S S I O N   * * * *


Listwise Deletion of Missing Data

              Mean  Std Dev  Variance  Label

REGPR100     8.127    1.875     3.516
PCNTPRO     12.897    2.068     4.276
PCNTMANU    46.357    5.892    34.718
PCNTMAN2    27.196    4.233    17.920
PCNTGRUP    11.580    2.035     4.142
PCNTOWNR    56.268   10.199   104.019
PCNTMFG     16.411    8.806    77.537
PCNTSMAL    31.128    5.433    29.518
PCNTCOUN    32.500   18.890   356.838
PCNTSELF     6.901    3.479    12.102
POPCHG       3.045    5.408    29.249
CHGPOP75     1.917    3.279    10.750
PRFINDEX    26.350   14.370   206.483
PCFTE14C    -2.076    5.827    33.952

N of Cases =     66
```

# Appendix D

* * * * M U L T I P L E   R E G R E S S I O N * * * *

Correlation, Covariance, 1-tailed Sig, Cross-Product:

| | REGPR100 | PCNTPRO | PCNTMANU | PCNTMAN2 | PCNTGRUP | PCNTOWNR | PCNTMFG |
|---|---|---|---|---|---|---|---|
| REGPR100 | 1.000 | .312 | -.501 | -.363 | .595 | .568 | .491 |
| | 3.516 | 1.211 | -5.530 | -2.884 | 2.269 | 10.868 | 8.100 |
| | . | .005 | .000 | .001 | .000 | .000 | .000 |
| | 228.554 | 78.702 | -359.448 | -187.435 | 147.483 | 706.431 | 526.468 |
| PCNTPRO | .312 | 1.000 | -.828 | -.769 | .703 | .200 | .135 |
| | 1.211 | 4.276 | -10.084 | -6.730 | 2.958 | 4.215 | 2.456 |
| | .005 | . | .000 | .000 | .000 | .054 | .140 |
| | 78.702 | 277.927 | -655.483 | -437.456 | 192.287 | 273.965 | 159.617 |
| PCNTMANU | -.501 | -.828 | 1.000 | .937 | -.801 | -.325 | -.103 |
| | -5.530 | -10.084 | 34.718 | 23.369 | -9.611 | -19.515 | -5.362 |
| | .000 | .000 | . | .000 | .000 | .004 | .204 |
| | -359.448 | -655.483 | 2256.663 | 1518.994 | -624.733 | -1268.448 | -348.506 |
| PCNTMAN2 | -.363 | -.769 | .937 | 1.000 | -.738 | -.319 | .059 |
| | -2.884 | -6.730 | 23.369 | 17.920 | -6.357 | -13.778 | 2.213 |
| | .001 | .000 | .000 | . | .000 | .005 | .318 |
| | -187.435 | -437.456 | 1518.994 | 1164.788 | -413.184 | -895.568 | 143.850 |
| PCNTGRUP | .595 | .703 | -.801 | -.738 | 1.000 | .519 | .104 |
| | 2.269 | 2.958 | -9.611 | -6.357 | 4.142 | 10.783 | 1.862 |
| | .000 | .000 | .000 | .000 | . | .000 | .203 |
| | 147.483 | 192.287 | -624.733 | -413.184 | 269.246 | 700.909 | 121.010 |
| PCNTOWNR | .568 | .200 | -.325 | -.319 | .519 | 1.000 | .152 |
| | 10.868 | 4.215 | -19.515 | -13.778 | 10.783 | 104.019 | 13.669 |
| | .000 | .054 | .004 | .005 | .000 | . | .111 |
| | 706.431 | 273.965 | -1268.448 | -895.568 | 700.909 | 6761.227 | 888.475 |
| PCNTMFG | .491 | .135 | -.103 | .059 | .104 | .152 | 1.000 |
| | 8.100 | 2.456 | -5.362 | 2.213 | 1.862 | 13.669 | 77.537 |
| | .000 | .140 | .204 | .318 | .203 | .111 | . |
| | 526.468 | 159.617 | -348.506 | 143.850 | 121.010 | 888.475 | 5039.907 |
| PCNTSMAL | .489 | -.085 | .037 | .147 | .077 | .076 | .630 |
| | 4.979 | -.960 | 1.185 | 3.383 | .852 | 4.193 | 30.140 |
| | .000 | .248 | .384 | .119 | .269 | .273 | .000 |
| | 323.608 | -62.379 | 76.999 | 219.917 | 55.359 | 272.543 | 1959.083 |
| PCNTCOUN | .338 | .380 | -.546 | -.497 | .707 | .517 | -.163 |
| | 11.970 | 14.850 | -60.732 | -39.726 | 27.197 | 99.579 | -27.033 |
| | .003 | .001 | .000 | .000 | .000 | .000 | .096 |
| | 778.077 | 965.255 | -3947.552 | -2582.205 | 1767.780 | 6472.635 | -1757.115 |
| PCNTSELF | .647 | -.062 | .021 | .161 | .074 | .302 | .637 |
| | 4.223 | -.446 | .422 | 2.375 | .521 | 10.719 | 19.510 |
| | .000 | .311 | .435 | .098 | .278 | .007 | .000 |
| | 274.520 | -28.980 | 27.435 | 154.353 | 33.892 | 696.706 | 1268.123 |
| POPCHG | .501 | .281 | -.264 | -.220 | .435 | .318 | .044 |
| | 5.085 | 3.138 | -8.424 | -5.041 | 4.793 | 17.541 | 2.115 |
| | .000 | .011 | .016 | .038 | .000 | .005 | .362 |
| | 330.530 | 203.945 | -547.570 | -327.640 | 311.547 | 1140.196 | 137.492 |
| CHGPOP75 | .429 | .218 | -.108 | -.059 | .291 | .247 | .166 |
| | 2.640 | 1.478 | -2.080 | -.817 | 1.945 | 8.263 | 4.804 |
| | .000 | .039 | .195 | .319 | .009 | .023 | .091 |
| | 171.617 | 96.065 | -135.179 | -53.096 | 126.429 | 537.087 | 312.240 |
| PRFINDEX | .075 | .243 | -.374 | -.368 | .373 | .170 | -.190 |
| | 2.022 | 7.222 | -31.661 | -22.369 | 10.906 | 24.933 | -23.985 |
| | .275 | .025 | .001 | .001 | .001 | .086 | .064 |
| | 131.426 | 469.462 | -2057.959 | -1453.980 | 708.871 | 1620.673 | -1559.010 |

* * * * M U L T I P L E   R E G R E S S I O N * * * *

| | REGPR100 | PCNTPRO | PCNTMANU | PCNTMAN2 | PCNTGRUP | PCNTOWNR | PCNTMFG |
|---|---|---|---|---|---|---|---|
| PCFTE14C | .515 | .343 | -.421 | -.366 | .568 | .404 | .091 |
| | 5.629 | 4.128 | -14.448 | -9.034 | 6.731 | 24.014 | 4.686 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | .000 | .002 | .000 | .001 | .000 | .000 | .233 |
| | 365.913 | 268.299 | -939.126 | -587.218 | 437.500 | 1560.890 | 304.621 |

* * * * M U L T I P L E R E G R E S S I O N * * * *

| | PCNTSMAL | PCNTCOUN | PCNTSELF | POPCHG | CHGPOP75 | PRFINDEX | PCFTE14C |
|---|---|---|---|---|---|---|---|
| REGPR100 | .489 | .338 | .647 | .501 | .429 | .075 | .515 |
| | 4.979 | 11.970 | 4.223 | 5.085 | 2.640 | 2.022 | 5.629 |
| | .000 | .003 | .000 | .000 | .000 | .275 | .000 |
| | 323.608 | 778.077 | 274.520 | 330.530 | 171.617 | 131.426 | 365.913 |
| PCNTPRO | -.085 | .380 | -.062 | .281 | .218 | .243 | .343 |
| | -.960 | 14.850 | -.446 | 3.138 | 1.478 | 7.222 | 4.128 |
| | .248 | .001 | .311 | .011 | .039 | .025 | .002 |
| | -62.379 | 965.255 | -28.980 | 203.945 | 96.065 | 469.462 | 268.299 |
| PCNTMANU | .037 | -.546 | .021 | -.264 | -.108 | -.374 | -.421 |
| | 1.185 | -60.732 | .422 | -8.424 | -2.080 | -31.661 | -14.448 |
| | .384 | .000 | .435 | .016 | .195 | .001 | .000 |
| | 76.999 | -3947.552 | 27.435 | -547.570 | -135.179 | -2057.959 | -939.126 |
| PCNTMAN2 | .147 | -.497 | .161 | -.220 | -.059 | -.368 | -.366 |
| | 3.383 | -39.726 | 2.375 | -5.041 | -.817 | -22.369 | -9.034 |
| | .119 | .000 | .098 | .038 | .319 | .001 | .001 |
| | 219.917 | -2582.205 | 154.353 | -327.640 | -53.096 | -1453.980 | -587.218 |
| PCNTGRUP | .077 | .707 | .074 | .435 | .291 | .373 | .568 |
| | .852 | 27.197 | .521 | 4.793 | 1.945 | 10.906 | 6.731 |
| | .269 | .000 | .278 | .000 | .009 | .001 | .000 |
| | 55.359 | 1767.780 | 33.892 | 311.547 | 126.429 | 708.871 | 437.500 |
| PCNTOWNR | .076 | .517 | .302 | .318 | .247 | .170 | .404 |
| | 4.193 | 99.579 | 10.719 | 17.541 | 8.263 | 24.933 | 24.014 |
| | .273 | .000 | .007 | .005 | .023 | .086 | .000 |
| | 272.543 | 6472.635 | 696.706 | 1140.196 | 537.087 | 1620.673 | 1560.890 |
| PCNTMFG | .630 | -.163 | .637 | .044 | .166 | -.190 | .091 |
| | 30.140 | -27.033 | 19.510 | 2.115 | 4.804 | -23.985 | 4.686 |
| | .000 | .096 | .000 | .362 | .091 | .064 | .233 |
| | 1959.083 | -1757.115 | 1268.123 | 137.492 | 312.240 | -1559.010 | 304.621 |
| PCNTSMAL | 1.000 | -.215 | .825 | .237 | .279 | -.549 | .146 |
| | 29.518 | -22.024 | 15.600 | 6.949 | 4.974 | -42.832 | 4.628 |
| | . | .042 | .000 | .028 | .012 | .000 | .121 |
| | 1918.665 | -1431.557 | 1013.976 | 451.716 | 323.314 | -2784.108 | 300.812 |
| PCNTCOUN | -.215 | 1.000 | -.179 | .471 | .306 | .383 | .595 |
| | -22.024 | 356.838 | -11.749 | 48.134 | 18.979 | 103.995 | 65.522 |
| | .042 | . | .075 | .000 | .006 | .001 | .000 |
| | -1431.557 | 23194.500 | -763.710 | 3128.700 | 1233.650 | 6759.650 | 4258.919 |
| PCNTSELF | .825 | -.179 | 1.000 | .245 | .263 | -.413 | .209 |
| | 15.600 | -11.749 | 12.102 | 4.601 | 2.996 | -20.626 | 4.246 |
| | .000 | .075 | . | .024 | .017 | .000 | .046 |
| | 1013.976 | -763.710 | 786.646 | 299.048 | 194.730 | -1340.702 | 275.974 |
| POPCHG | .237 | .471 | .245 | 1.000 | .938 | -.235 | .738 |
| | 6.949 | 48.134 | 4.601 | 29.249 | 16.640 | -18.297 | 23.243 |
| | .028 | .000 | .024 | . | .000 | .029 | .000 |
| | 451.716 | 3128.700 | 299.048 | 1901.184 | 1081.600 | -1189.280 | 1510.768 |
| CHGPOP75 | .279 | .306 | .263 | .938 | 1.000 | -.364 | .594 |
| | 4.974 | 18.979 | 2.996 | 16.640 | 10.750 | -17.141 | 11.355 |
| | .012 | .006 | .017 | .000 | . | .001 | .000 |
| | 323.314 | 1233.650 | 194.730 | 1081.600 | 698.752 | -1114.155 | 738.073 |

* * * * M U L T I P L E R E G R E S S I O N * * * *

| | PCNTSMAL | PCNTCOUN | PCNTSELF | POPCHG | CHGPOP75 | PRFINDEX | PCFTE14C |
|---|---|---|---|---|---|---|---|
| PRFINDEX | -.549 | .383 | -.413 | -.235 | -.364 | 1.000 | .080 |
| | -42.832 | 103.995 | -20.626 | -18.297 | -17.141 | 206.483 | 6.664 |
| | .000 | .001 | .000 | .029 | .001 | . | .263 |
| | -2784.108 | 6759.650 | -1340.702 | -1189.280 | -1114.155 | 13421.405 | 433.142 |
| PCFTE14C | .146 | .595 | .209 | .738 | .594 | .080 | 1.000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 4.628 | 65.522 | 4.246 | 23.243 | 11.355 | 6.664 | 33.952 |
| .121 | .000 | .046 | .000 | .000 | .263 | . |
| 300.812 | 4258.919 | 275.974 | 1510.768 | 738.073 | 433.142 | 2206.856 |

```
          * * * *   M U L T I P L E   R E G R E S S I O N   * * * *

Equation Number 1    Dependent Variable..   REGPR100

  Descriptive Statistics are printed on Page    2

Block Number  1.  Method:  Stepwise     Criteria   PIN  .0500   POUT  .1000


Variable(s) Entered on Step Number
   1..     PCNTSELF


Multiple R                     .64743
R Square                       .41916
Adjusted R Square        .41008
Standard Error           1.44023

Analysis of Variance
                       DF       Sum of Squares       Mean Square
Regression              1             95.80091          95.80091
Residual               64            132.75351           2.07427

F =       46.18528         Signif F =  .0000

------------------ Variables in the Equation ------------------

Variable                 B          SE B        Beta          T  Sig T

PCNTSELF           .348976      .051350     .647426      6.796  .0000
(Constant)        5.718607      .396260                 14.431  .0000
```

------------- Variables not in the Equation -------------

| Variable | Beta In | Partial | Min Toler | T | Sig T |
|---|---|---|---|---|---|
| PCNTPRO | .353753 | .463272 | .996159 | 4.149 | .0001 |
| PCNTMANU | -.514053 | -.674354 | .999576 | -7.249 | .0000 |
| PCNTMAN2 | -.480155 | -.621774 | .973998 | -6.301 | .0000 |
| PCNTGRUP | .549833 | .719485 | .994577 | 8.223 | .0000 |
| PCNTOWNR | .410123 | .512985 | .908737 | 4.743 | .0000 |
| PCNTMFG | .131558 | .133083 | .594379 | 1.066 | .2906 |
| PCNTSMAL | -.143269 | -.106140 | .318796 | -.847 | .4001 |
| PCNTCOUN | .468672 | .605043 | .968034 | 6.032 | .0000 |
| POPCHG | .364927 | .464289 | .940203 | 4.161 | .0001 |
| CHGPOP75 | .278614 | .352738 | .931014 | 2.992 | .0040 |
| PRFINDEX | .412384 | .492887 | .829750 | 4.496 | .0000 |
| PCFTE14C | .397036 | .509401 | .956129 | 4.699 | .0000 |

* * * * M U L T I P L E R E G R E S S I O N * * * *

Equation Number 1 Dependent Variable.. REGPR100

Variable(s) Entered on Step Number
2.. PCNTGRUP

| | |
|---|---|
| Multiple R | .84843 |
| R Square | .71984 |
| Adjusted R Square | .71094 |
| Standard Error | 1.00816 |

Analysis of Variance

| | DF | Sum of Squares | Mean Square |
|---|---|---|---|
| Regression | 2 | 164.52193 | 82.26096 |
| Residual | 63 | 64.03250 | 1.01639 |

F = 80.93453 Signif F = .0000

Variables in the Equation ---------------

| Variable | B | SE B | Beta | T | Sig T |
|---|---|---|---|---|---|
| PCNTSELF | .327150 | .036043 | .606934 | 9.077 | .0000 |
| PCNTGRUP | .506584 | .061608 | .549833 | 8.223 | .0000 |
| (Constant) | .002841 | .748419 | | .004 | .9970 |

------------- Variables not in the Equation -------------

| Variable | Beta In | Partial | Min Toler | T | Sig T |
|---|---|---|---|---|---|
| PCNTPRO | -.074274 | -.098515 | .492101 | -.780 | .4386 |
| PCNTMANU | -.205900 | -.230555 | .349517 | -1.866 | .0668 |
| PCNTMAN2 | -.135650 | -.163879 | .408903 | -1.308 | .1957 |
| PCNTOWNR | .150415 | .230889 | .660142 | 1.869 | .0664 |
| PCNTMFG | .079285 | .115166 | .591114 | .913 | .3648 |
| PCNTSMAL | -.171423 | -.182784 | .318531 | -1.464 | .1483 |
| PCNTCOUN | .128931 | .162674 | .445995 | 1.298 | .1990 |
| POPCHG | .148474 | .245344 | .764996 | 1.993 | .0507 |
| CHGPOP75 | .128145 | .224064 | .856551 | 1.810 | .0751 |
| PRFINDEX | .180773 | .278765 | .666222 | 2.286 | .0257 |
| PCFTE14C | .117043 | .178223 | .649606 | 1.426 | .1588 |

* * * * M U L T I P L E R E G R E S S I O N

# Appendix D

Equation Number 1 Dependent Variable.. REGPR100

Variable(s) Entered on Step Number
3.. PRFINDEX

| | |
|---|---|
| Multiple R | .86117 |
| R Square | .74161 |
| Adjusted R Square | .72911 |
| Standard Error | .97597 |

Analysis of Variance

| | DF | Sum of Squares | Mean Square |
|---|---|---|---|
| Regression | 3 | 169.49788 | 56.49929 |
| Residual | 62 | 59.05655 | .95252 |

F = 59.31529 Signif F = .0000

------------------ Variables in the Equation ------------------

| Variable | B | SE B | Beta | T | Sig T |
|---|---|---|---|---|---|
| PCNTSELF | .370265 | .039665 | .686922 | 9.335 | .0000 |
| PCNTGRUP | .439049 | .066559 | .476532 | 6.596 | .0000 |
| PRFINDEX | .023590 | .010321 | .180773 | 2.286 | .0257 |
| (Constant) | -.134234 | .727003 | | -.185 | .8541 |

------------- Variables not in the Equation -------------

| Variable | Beta In | Partial | Min Toler | T | Sig T |
|---|---|---|---|---|---|
| PCNTPRO | -.049554 | -.067937 | .412960 | -.532 | .5968 |
| PCNTMANU | -.186661 | -.216900 | .332226 | -1.735 | .0877 |
| PCNTMAN2 | -.136885 | -.172196 | .377635 | -1.365 | .1772 |
| PCNTOWNR | .127419 | .201644 | .642732 | 1.608 | .1130 |
| PCNTMFG | .064366 | .097043 | .486756 | .762 | .4493 |
| PCNTSMAL | -.063347 | -.062230 | .249357 | -.487 | .6280 |
| PCNTCOUN | .122093 | .160325 | .417264 | 1.269 | .2094 |
| POPCHG | .268976 | .418813 | .544723 | 3.602 | .0006 |
| CHGPOP75 | .268241 | .427308 | .510009 | 3.691 | .0005 |
| PCFTE14C | .134187 | .211938 | .557731 | 1.694 | .0954 |

* * * * M U L T I P L E R E G R E S S I O N * * * *

Equation Number 1 Dependent Variable.. REGPR100

Variable(s) Entered on Step Number
4.. CHGPOP75

| | |
|---|---|
| Multiple R | .88814 |
| R Square | .78879 |
| Adjusted R Square | .77494 |
| Standard Error | .88959 |

Analysis of Variance

| | DF | Sum of Squares | Mean Square |
|---|---|---|---|
| Regression | 4 | 180.28115 | 45.07029 |
| Residual | 61 | 48.27328 | .79137 |

F = 56.95257 Signif F = .0000

------------------ Variables in the Equation ------------------

| Variable | B | SE B | Beta | T | Sig T |
|---|---|---|---|---|---|
| PCNTSELF | .370329 | .036154 | .687040 | 10.243 | .0000 |
| PCNTGRUP | .316403 | .069170 | .343416 | 4.574 | .0000 |
| PRFINDEX | .042809 | .010752 | .328052 | 3.981 | .0002 |
| CHGPOP75 | .153411 | .041560 | .268241 | 3.691 | .0005 |
| (Constant) | .485131 | .683566 | | .710 | .4806 |

------------- Variables not in the Equation -------------

| Variable | Beta In | Partial | Min Toler | T | Sig T |
|---|---|---|---|---|---|
| PCNTPRO | -.050987 | -.077314 | .358286 | -.601 | .5503 |
| PCNTMANU | -.260011 | -.328887 | .266513 | -2.698 | .0091 |
| PCNTMAN2 | -.214982 | -.292852 | .293430 | -2.372 | .0209 |
| PCNTOWNR | .094609 | .164257 | .492735 | 1.290 | .2021 |
| PCNTMFG | .059344 | .098946 | .486695 | .770 | .4442 |
| PCNTSMAL | .001071 | .001151 | .243892 | .009 | .9929 |
| PCNTCOUN | .024677 | .034117 | .402220 | .264 | .7924 |
| POPCHG | .104501 | .068172 | .089886 | .529 | .5986 |
| PCFTE14C | -.020259 | -.029596 | .450762 | -.229 | .8194 |

* * * *   M U L T I P L E   R E G R E S S I O N   * * * *

Equation Number 1    Dependent Variable..    REGPR100

Variable(s) Entered on Step Number
5..    PCNTMANU

| | |
|---|---|
| Multiple R | .90091 |
| R Square | .81163 |
| Adjusted R Square | .79594 |
| Standard Error | .84707 |

Analysis of Variance

| | DF | Sum of Squares | Mean Square |
|---|---|---|---|
| Regression | 5 | 185.50270 | 37.10054 |
| Residual | 60 | 43.05173 | .71753 |

F =    51.70599    Signif F =  .0000

------------------ Variables in the Equation ------------------

| Variable | B | SE B | Beta | T | Sig T |
|---|---|---|---|---|---|
| PCNTSELF | .377847 | .034539 | .700988 | 10.940 | .0000 |
| PCNTGRUP | .113431 | .099997 | .123115 | 1.134 | .2612 |
| PRFINDEX | .043189 | .010239 | .330959 | 4.218 | .0001 |
| CHGPOP75 | .172638 | .040210 | .301858 | 4.293 | .0001 |
| PCNTMANU | -.082747 | .030674 | -.260011 | -2.698 | .0091 |
| (Constant) | 6.572781 | 2.348672 | | 2.799 | .0069 |

------------- Variables not in the Equation -------------

| Variable | Beta In | Partial | Min Toler | T | Sig T |
|---|---|---|---|---|---|
| PCNTPRO | -.322566 | -.397529 | .199071 | -3.328 | .0015 |
| PCNTMAN2 | -.024271 | -.017558 | .084995 | -.135 | .8932 |
| PCNTOWNR | .123760 | .225255 | .236566 | 1.776 | .0809 |
| PCNTMFG | .029549 | .051542 | .263596 | .396 | .6932 |
| PCNTSMAL | .031243 | .035381 | .241569 | .272 | .7866 |
| PCNTCOUN | .037282 | .054503 | .210035 | .419 | .6765 |

| | | | | | |
|---|---|---|---|---|---|
| POPCHG | .026380 | .017999 | .087692 | .138 | .8905 |
| PCFTE14C | -.037142 | -.057298 | .257106 | -.441 | .6609 |

* * * * M U L T I P L E R E G R E S S I O N * * * *

Equation Number 1 Dependent Variable.. REGPR100

Variable(s) Removed on Step Number
6.. PCNTGRUP

| | |
|---|---|
| Multiple R | .89866 |
| R Square | .80760 |
| Adjusted R Square | .79498 |
| Standard Error | .84906 |

Analysis of Variance

| | DF | Sum of Squares | Mean Square |
|---|---|---|---|
| Regression | 4 | 184.57943 | 46.14486 |
| Residual | 61 | 43.97500 | .72090 |

F = 64.00992 Signif F = .0000

------------------ Variables in the Equation ------------------

| Variable | B | SE B | Beta | T | Sig T |
|---|---|---|---|---|---|
| PCNTSELF | .386304 | .033804 | .716677 | 11.428 | .0000 |
| PRFINDEX | .047694 | .009460 | .365484 | 5.042 | .0000 |
| CHGPOP75 | .192924 | .036099 | .337328 | 5.344 | .0000 |
| PCNTMANU | -.108928 | .020251 | -.342278 | -5.379 | .0000 |
| (Constant) | 8.884057 | 1.170935 | | 7.587 | .0000 |

------------- Variables not in the Equation -------------

| Variable | Beta In | Partial | Min Toler | T | Sig T |
|---|---|---|---|---|---|
| PCNTPRO | -.308137 | -.377504 | .270139 | -3.158 | .0025 |
| PCNTMAN2 | -.039313 | -.028220 | .094111 | -.219 | .8276 |
| PCNTGRUP | .123115 | .144898 | .266513 | 1.134 | .2612 |
| PCNTOWNR | .135264 | .258554 | .540510 | 2.073 | .0425 |
| PCNTMFG | .020490 | .035558 | .501919 | .276 | .7838 |
| PCNTSMAL | .062176 | .072269 | .259940 | .561 | .5767 |
| PCNTCOUN | .070317 | .114577 | .510840 | .893 | .3752 |
| POPCHG | .057754 | .039441 | .089730 | .306 | .7609 |
| PCFTE14C | -.018314 | -.028461 | .464690 | -.221 | .8262 |

* * * * M U L T I P L E R E G R E S S I O N * * * *

Equation Number 1 Dependent Variable.. REGPR100

Variable(s) Entered on Step Number
7.. PCNTPRO

| | |
|---|---|
| Multiple R | .91379 |
| R Square | .83501 |
| Adjusted R Square | .82127 |
| Standard Error | .79276 |

Analysis of Variance

| | DF | Sum of Squares | Mean Square |
|---|---|---|---|
| Regression | 5 | 190.84628 | 38.16926 |
| Residual | 60 | 37.70815 | .62847 |

F = 60.73369 Signif F = .0000

------------------ Variables in the Equation ------------------

| Variable | B | SE B | Beta | T | Sig T |
|---|---|---|---|---|---|
| PCNTSELF | .368630 | .032055 | .683888 | 11.500 | .0000 |
| PRFINDEX | .045073 | .008871 | .345397 | 5.081 | .0000 |
| CHGPOP75 | .216233 | .034504 | .378084 | 6.267 | .0000 |
| PCNTMANU | -.190873 | .032108 | -.599767 | -5.945 | .0000 |
| PCNTPRO | -.279430 | .088489 | -.308137 | -3.158 | .0025 |
| (Constant) | 16.432957 | 2.628708 | | 6.251 | .0000 |

------------- Variables not in the Equation -------------

| Variable | Beta In | Partial | Min Toler | T | Sig T |
|---|---|---|---|---|---|
| PCNTMAN2 | .007447 | .005750 | .071490 | .044 | .9649 |
| PCNTGRUP | .155538 | .196761 | .199071 | 1.541 | .1285 |
| PCNTOWNR | .110573 | .226149 | .257997 | 1.783 | .0797 |
| PCNTMFG | .066728 | .122520 | .267723 | .948 | .3469 |
| PCNTSMAL | .015830 | .019664 | .254572 | .151 | .8804 |
| PCNTCOUN | .004090 | .006893 | .212266 | .053 | .9580 |
| POPCHG | -.142917 | -.099339 | .076908 | -.767 | .4462 |
| PCFTE14C | -.059856 | -.099087 | .243763 | -.765 | .4474 |

* * * * M U L T I P L E R E G R E S S I O N * * * *

Equation Number 1 Dependent Variable.. REGPR100

Residuals Statistics:

| | Min | Max | Mean | Std Dev | N |
|---|---|---|---|---|---|
| *PRED | 5.1467 | 12.5193 | 8.1270 | 1.7135 | 66 |
| *RESID | -2.4711 | 1.9026 | .0000 | .7617 | 66 |
| *ZPRED | -1.7393 | 2.5633 | .0000 | 1.0000 | 66 |
| *ZRESID | -3.1170 | 2.4000 | .0000 | .9608 | 66 |

Total Cases = 66

Durbin-Watson Test = 2.03610

* * * * * * * * * * * * * * * * * * * * * * * * * * * * *

Outliers - Standardized Residual

| Case # | *ZRESID |
|---|---|
| 22 | -3.11703 |
| 65 | 2.40002 |
| 52 | -2.07864 |
| 48 | 1.77247 |
| 61 | -1.61043 |
| 41 | -1.59241 |
| 45 | -1.48995 |
| 30 | 1.48881 |
| 49 | 1.43267 |

```
      46        -1.19593

Histogram - Standardized Residual

 N Exp N        (* = 1 Cases,     . : = Normal Curve)
 0   .05    Out
 0   .10   3.00
 0   .26   2.67
 1   .59   2.33 :
 0  1.20   2.00 .
 1  2.21   1.67 *.
 3  3.62   1.33 ***.
 6  5.32   1.00 ****:*
10  7.01    .67 ******:***
 7  8.27    .33 *******.
15  8.74    .00 ********:******
 4  8.27   -.33 ****    .
 6  7.01   -.67 ******.
 6  5.32  -1.00 ****:*
 3  3.62  -1.33 ***.
 2  2.21  -1.67 *:
 1  1.20  -2.00 :
 0   .59  -2.33 .
 0   .26  -2.67
 1   .10  -3.00 *
 0   .05    Out
```

```
Normal Probability (P-P) Plot
Standardized Residual
   1.0  +---------+---------+---------+---------*
        |                                     **|
        |                                   .** |
        |                                 ****  |
        |                               ***     |
    .75 +                            ***        +
        |                          **           |
 E      |                        **             |
 x      |                       **              |
 p      |                     .*                |
 e .5   +                ******                 +
 c      |             ***  .                    |
 t      |                 .                     |
 e      |           .***                        |
 d      |           *.                          |
   .25  +        ****                           +
        |        *                              |
        |     ***                               |
        |  **                                   |
        | **                                    |
        **---------+---------+---------+---------+ Observed
                 .25        .5        .75       1.0
```

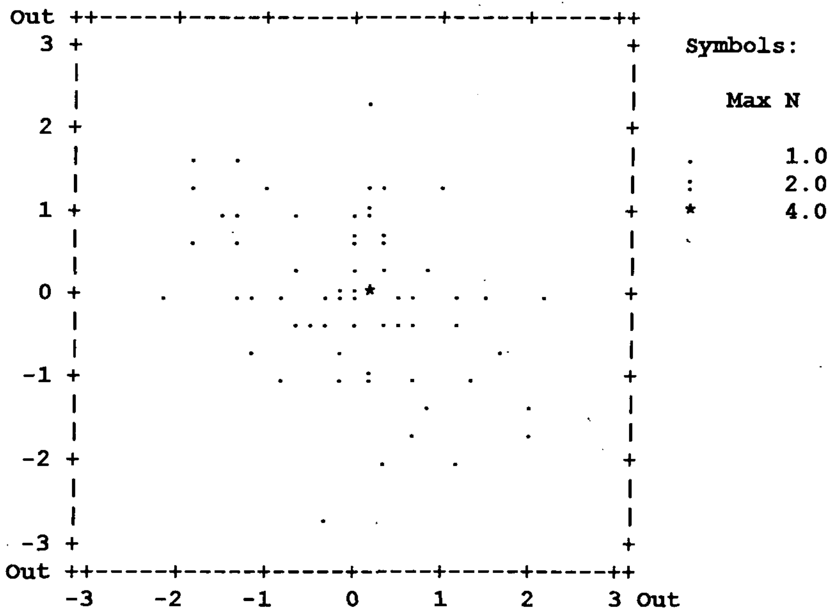
# Appendix D

```
Standardized Scatterplot
Across - *PRED       Down - *RESID
Out ++-----+-----+-----+-----+-----+-----++
  3 +                                     +   Symbols:
    |                                     |
    |                .                    |     Max N
  2 +                                     +
    |                      .              |   .     1.0
    |          .    .           .         |   :     2.0
  1 +          .        :  .   .  .       +
    |            ... .. .  :  ..          |
    |         .     .     : :    .        |
  0 +        :   .::...:  .. .            +
    |         ..         ..               |
    |           .       .: .      .       |
 -1 +         .  .    .    .  :           +
    |           . .         .             |
    |             :                       |
 -2 +                                 .   +
    |                                     |
    |                                     |
 -3 +                      .              +
Out ++-----+-----+-----+-----+-----+-----++
    -3    -2    -1     0     1     2     3 Out
```

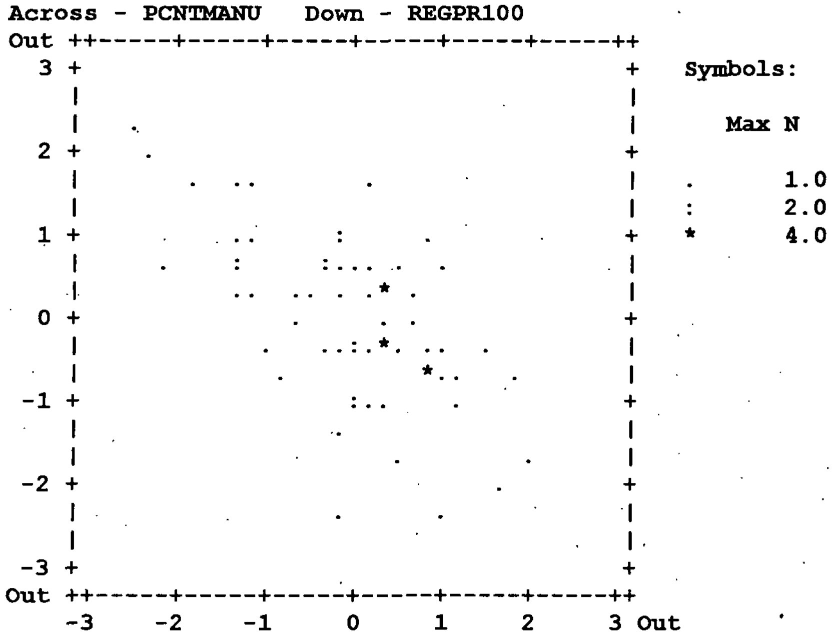
```
Standardized Scatterplot
Across - REGPR100   Down - *RESID
Out ++-----+-----+-----+-----+-----+-----++
  3 +                                     +   Symbols:
    |                                     |
    |                      .              |     Max N
  2 +                                     +
    |                           .         |   .     1.0
    |              .    .         .       |   :     2.0
  1 +             .       ..  .  .  .     +   *     4.0
    |              .... . . :  . .        |
    |           .    .    ....  .         |
  0 +        ..  . *...: ..  .            +
    |         ..       ..                 |
    |          .       :..     .          |
 -1 +        . .   .    . ..              +
    |        ..          .                |
    |         :                           |
 -2 +                           .         +
    |                                     |
    |                                     |
 -3 +              .                      +
Out ++-----+-----+-----+-----+-----+-----++
    -3    -2    -1     0     1     2     3 Out
```

# Appendix D

Standardized Partial Regression Plot
Across - PCNTPRO     Down - REGPR100

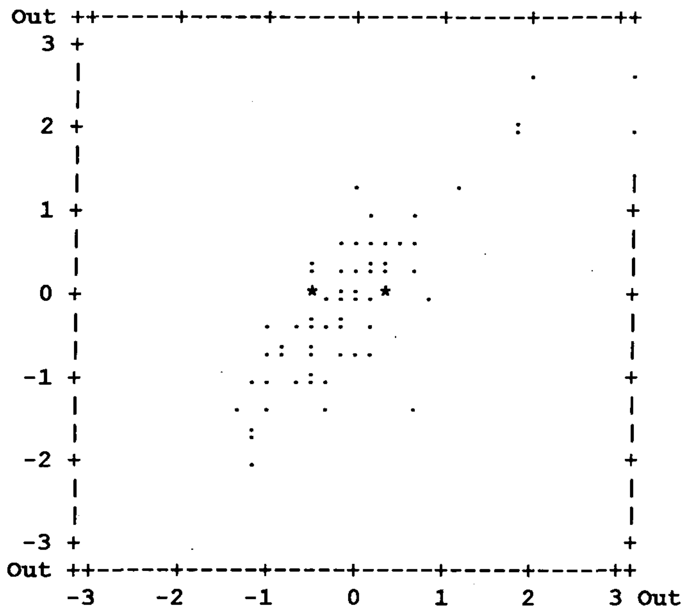



Standardized Partial Regression Plot
Across - PCNTMANU    Down - REGPR100



# Appendix D

```
Standardized Partial Regression Plot
Across - PCNTSELF    Down - REGPR100
```

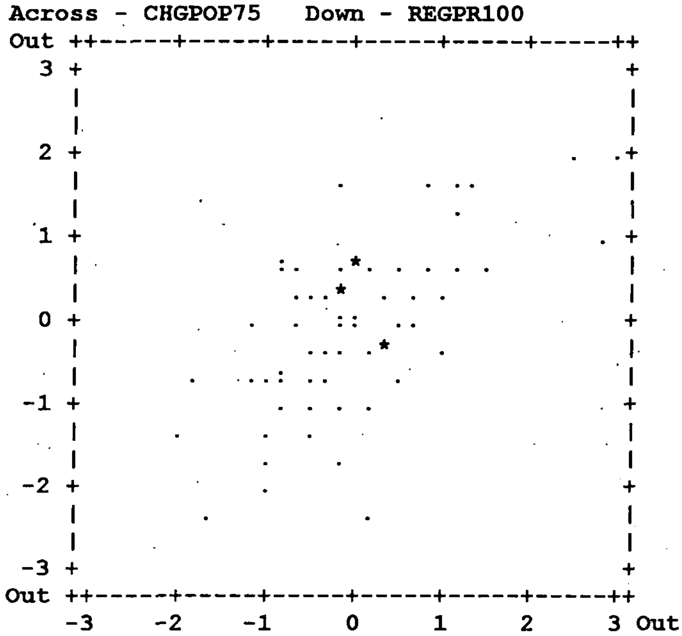



```
Symbols:

  Max N

  .      1.0
  :      2.0
  *      3.0
```

```
Standardized Partial Regression Plot
Across - CHGPOP75    Down - REGPR100
```




```
Symbols:

  Max N

  .      1.0
  :      2.0
  *      4.0
```

# Appendix D

```
Standardized Partial Regression Plot
Across - PRFINDEX   Down - REGPR100
Out ++-----+-----+-----+-----+-----+-----+
  3 +                                     .   Symbols:
    |
    |                                     |      Max N
  2 +                                     +
    |                   .    .            |   .      1.0
    |           .           .      .      |   :      2.0
  1 +                ...   : :  :         +   *      3.0
    |               .   .  .              |
    |           ..*:  .    :              |
  0 +           . ..:.  *..               +
    |             * .  :.  .:             |
    |         :  .  . ..                  |
 -1 +       .       .  .        .         +
    |            .  .   .                 |
    |        .     .                      |
 -2 +                                     +
    |         .                           |
    |                 .                   |
 -3 +                                     +
Out ++-----+-----+-----+-----+-----+-----++
    -3    -2    -1     0     1     2     3 Out
```

# Appendix E

# DISCRIMINANT ANALYSIS

# Appendix E

```
-> /method=wilks/statistics all/plots all.
-> discriminant groups=threes(0,2)/vars= pcntpro pcntmanu pcntself chgpop75
prfindex /method=wilks/statistics all/ plots all.

There are 200,472 bytes of memory available.
The largest contiguous area has 200,472 bytes.

Since analysis= was omitted for the first analysis all variables
on the variables= list will be entered at level 1.


This DISCRIMINANT analysis requires 12268 bytes of memory.

 - - - - - - - -   D I S C R I M I N A N T   A N A L Y S I S   - - - - - -
- -

On groups defined by THREES


            66 (Unweighted) cases were processed.
             0 of these were excluded from the analysis.
            66 (Unweighted) cases will be used in the analysis.
```

Number of cases by group

| THREES | Number of cases Unweighted | Weighted | Label |
|---|---|---|---|
| 0 | 22 | 22.0 | |
| 1 | 22 | 22.0 | |
| 2 | 22 | 22.0 | |
| Total | 66 | 66.0 | |

Group means

| THREES | PCNTPRO | PCNTMANU | PCNTSELF | CHGPOP75 |
|---|---|---|---|---|
| 0 | 12.06909 | 50.21436 | 4.91590 | .02273 |
| 1 | 13.00091 | 46.03402 | 6.35210 | 2.35455 |
| 2 | 13.62136 | 42.82217 | 9.43634 | 3.37273 |
| Total | 12.89712 | 46.35685 | 6.90145 | 1.91667 |

| THREES | PRFINDEX |
|---|---|
| 0 | 23.61818 |
| 1 | 28.98636 |
| 2 | 26.44545 |
| Total | 26.35000 |

Group standard deviations

| THREES | PCNTPRO | PCNTMANU | PCNTSELF | CHGPOP75 |
|---|---|---|---|---|
| 0 | 1.56553 | 3.87078 | 2.05415 | 2.26441 |
| 1 | 1.92845 | 5.04222 | 1.85246 | 2.68341 |
| 2 | 2.40536 | 6.18596 | 4.31627 | 3.84264 |
| Total | 2.06780 | 5.89219 | 3.47883 | 3.27872 |

| THREES | PRFINDEX |
|---|---|

| | |
|---|---|
| 0 | 9.04095 |
| 1 | 13.43203 |
| 2 | 19.02229 |
| Total | 14.36952 |

Pooled within-groups covariance matrix with 63 degrees of freedom

| | PCNTPRO | PCNTMANU | PCNTSELF | CHGPOP75 |
|---|---|---|---|---|
| PCNTPRO | 3.9852 | | | |
| PCNTMANU | -8.3834 | 26.2244 | | |
| PCNTSELF | -1.6553 | 6.1771 | 8.7605 | |
| CHGPOP75 | .5931 | 2.2522 | .5729 | 9.0314 |
| PRFINDEX | 6.5422 | -28.5710 | -22.7539 | -19.9434 |

| | PRFINDEX |
|---|---|
| PRFINDEX | 208.0018 |

Pooled within-groups correlation matrix

| | PCNTPRO | PCNTMANU | PCNTSELF | CHGPOP75 | PRFINDEX |
|---|---|---|---|---|---|
| PCNTPRO | 1.00000 | | | | |
| PCNTMANU | -.82006 | 1.00000 | | | |
| PCNTSELF | -.28015 | .40754 | 1.00000 | | |
| CHGPOP75 | .09886 | .14634 | .06440 | 1.00000 | |
| PRFINDEX | .22723 | -.38685 | -.53304 | -.46014 | 1.00000 |

Wilks' Lambda (U-statistic) and univariate F-ratio
with 2 and 63 degrees of freedom

| Variable | Wilks' Lambda | F | Significance |
|---|---|---|---|
| PCNTPRO | .90335 | 3.3701 | .0407 |
| PCNTMANU | .73211 | 11.5261 | .0001 |
| PCNTSELF | .70160 | 13.3976 | .0000 |
| CHGPOP75 | .81428 | 7.1847 | .0015 |
| PRFINDEX | .97636 | .7627 | .4707 |

Covariance matrix for group 0,

| | PCNTPRO | PCNTMANU | PCNTSELF | CHGPOP75 |
|---|---|---|---|---|
| PCNTPRO | 2.4509 | | | |
| PCNTMANU | -4.8428 | 14.9829 | | |
| PCNTSELF | -.6427 | 1.8394 | 4.2195 | |
| CHGPOP75 | 1.2628 | .3603 | 1.4329 | 5.1276 |
| PRFINDEX | -.6133 | -1.7472 | -7.6702 | -5.7271 |

| | PRFINDEX |
|---|---|
| PRFINDEX | 81.7387 |

## Appendix E

Covariance matrix for group 1,

| | PCNTPRO | PCNTMANU | PCNTSELF | CHGPOP75 |
|---|---|---|---|---|
| PCNTPRO | 3.7189 | | | |
| PCNTMANU | -8.5450 | 25.4240 | | |
| PCNTSELF | -.5307 | 2.4484 | 3.4316 | |
| CHGPOP75 | 1.1442 | -.3473 | 2.2640 | 7.2007 |
| PRFINDEX | 2.0756 | -16.0800 | -16.5723 | -23.7602 |

| | PRFINDEX |
|---|---|
| PRFINDEX | 180.4193 |

Covariance matrix for group 2,

| | PCNTPRO | PCNTMANU | PCNTSELF | CHGPOP75 |
|---|---|---|---|---|
| PCNTPRO | 5.7857 | | | |
| PCNTMANU | -11.7625 | 38.2661 | | |
| PCNTSELF | -3.7927 | 14.2436 | 18.6302 | |
| CHGPOP75 | -.6278 | 6.7436 | -1.9783 | 14.7659 |
| PRFINDEX | 18.1642 | -67.8859 | -44.0191 | -30.3430 |

| | PRFINDEX |
|---|---|
| PRFINDEX | 361.8474 |

Total covariance matrix with 65 degrees of freedom

| | PCNTPRO | PCNTMANU | PCNTSELF | CHGPOP75 |
|---|---|---|---|---|
| PCNTPRO | 4.2758 | | | |
| PCNTMANU | -10.0844 | 34.7179 | | |
| PCNTSELF | -.4459 | .4221 | 12.1022 | |
| CHGPOP75 | 1.4779 | -2.0797 | 2.9958 | 10.7500 |
| PRFINDEX | 7.2225 | -31.6609 | -20.6262 | -17.1408 |

| | PRFINDEX |
|---|---|
| PRFINDEX | 206.4832 |

- - - - - - - - D I S C R I M I N A N T   A N A L Y S I S - - - - - -
- -

On groups defined by THREES

Analysis number 1

```
Stepwise variable selection
     Selection rule:  minimize Wilks' Lambda
     Maximum number of steps.................       10
     Minimum tolerance level.................   .00100
     Minimum F to enter...................... 3.84000
     Maximum F to remove..................... 2.71000

Canonical Discriminant Functions

     Maximum number of functions.............        2
     Minimum cumulative percent of variance...  100.00
     Maximum significance of Wilks' Lambda....  1.0000
```

# Appendix E

```
Prior probability for each group is  .33333

---------------- Variables not in the Analysis after Step 0 ---------------
-

                            Minimum
Variable  Tolerance  Tolerance  F to Enter    Wilks' Lambda

PCNTPRO   1.0000000  1.0000000    3.3700539     .9033539
PCNTMANU  1.0000000  1.0000000   11.5260889     .7321140
PCNTSELF  1.0000000  1.0000000   13.3975545     .7015972
CHGPOP75  1.0000000  1.0000000    7.1846648     .8142762
PRFINDEX  1.0000000  1.0000000     .7627141     .9763593
 * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* * *
At step 1, PCNTSELF was included in the analysis.
                                    Degrees of Freedom  Signif.   Between
Groups
Wilks' Lambda          .70160       1    2         63.0
Equivalent F         13.39755            2         63.0   .0000

---------------- Variables in the Analysis after Step 1 ----------------

Variable  Tolerance  F to Remove   Wilks' Lambda

PCNTSELF  1.0000000      13.3976


---------------- Variables not in the Analysis after Step 1 ---------------
-

                            Minimum
Variable  Tolerance  Tolerance  F to Enter    Wilks' Lambda

PCNTPRO    .9215142   .9215142    6.0962664     .5862993
PCNTMANU   .8339113   .8339113   19.7550152     .4285195
CHGPOP75   .9958523   .9958523    4.5918904     .6110806
PRFINDEX   .7158699   .7158699    5.8014672     .5909958


F statistics and significances between pairs of groups after step 1
Each F statistic has 1 and 63 degrees of freedom.

                       Group        0           1

   Group

      1                      2.5900
                              .1125

      2                     25.6583     11.9444
                              .0000       .0010
 * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* * *


At step 2, PCNTMANU was included in the analysis.

                                    Degrees of Freedom  Signif.   Between
Groups
Wilks' Lambda          .42852       2    2         63.0
Equivalent F         16.35615            4        124.0   .0000


---------------- Variables in the Analysis after Step 2 ----------------
```

| Variable | Tolerance | F to Remove | Wilks' Lambda |
|---|---|---|---|
| PCNTMANU | .8339113 | 19.7550 | .7015972 |
| PCNTSELF | .8339113 | 21.9627 | .7321140 |

---------------- Variables not in the Analysis after Step 2 ---------------

| Variable | Tolerance | Minimum Tolerance | F to Enter | Wilks' Lambda |
|---|---|---|---|---|
| PCNTPRO | .3239984 | .2931978 | 2.1089646 | .4008053 |
| CHGPOP75 | .9785560 | .8194277 | 4.6473048 | .3718591 |
| PRFINDEX | .6813714 | .6682003 | 1.4157078 | .4095114 |

F statistics and significances between pairs of groups after step 2
Each F statistic has 2 and 62 degrees of freedom.

| Group | 0 | 1 |
|---|---|---|
| 1 | 7.9491<br>.0008 | |
| 2 | 40.3286<br>.0000 | 13.0590<br>.0000 |

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

At step 3, CHGPOP75 was included in the analysis.

| | | Degrees of Freedom | | | Signif. | Between Groups |
|---|---|---|---|---|---|---|
| Wilks' Lambda | .37186 | 3 | 2 | 63.0 | | |
| Equivalent F | 13.01080 | | 6 | 122.0 | .0000 | |

---------------- Variables in the Analysis after Step 3 ----------------

| Variable | Tolerance | F to Remove | Wilks' Lambda |
|---|---|---|---|
| PCNTMANU | .8194277 | 19.6210 | .6110806 |
| PCNTSELF | .8338881 | 17.9096 | .5902151 |
| CHGPOP75 | .9785560 | 4.6473 | .4285195 |

---------------- Variables not in the Analysis after Step 3 ---------------

| Variable | Tolerance | Minimum Tolerance | F to Enter | Wilks' Lambda |
|---|---|---|---|---|
| PCNTPRO | .2751825 | .2483965 | 5.1587069 | .3172976 |
| PRFINDEX | .5167330 | .5167330 | 5.6908267 | .3125670 |

F statistics and significances between pairs of groups after step 3

```
Each F statistic has 3 and 61 degrees of freedom.

                    Group         0            1

   Group

      1                        8.0923
                                .0001

      2                       32.7153       9.2153
                                .0000        .0000

 * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* * *

At step 4, PRFINDEX was included in the analysis.

                                   Degrees of Freedom  Signif.   Between
Groups
Wilks' Lambda         .31257        4    2        63.0
Equivalent F        11.82994             8       120.0   .0000

---------------- Variables in the Analysis after Step 4 ----------------

Variable  Tolerance  F to Remove   Wilks' Lambda

PCNTMANU   .7932274      10.2388       .4192436
PCNTSELF   .6300113      24.4318       .5671199
CHGPOP75   .7421095       9.3047       .4095114
PRFINDEX   .5167330       5.6908       .3718591

---------------- Variables not in the Analysis after Step 4 --------------
-

                     Minimum
Variable  Tolerance  Tolerance  F to Enter    Wilks' Lambda

PCNTPRO    .2740704   .2478469      4.9090922      .2679735

F statistics and significances between pairs of groups after step 4
Each F statistic has 4 and 60 degrees of freedom.

                    Group         0            1

   Group

      1                        9.1326
                                .0000

      2                       30.5932       7.3803
                                .0000        .0001
 * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* * *

At step 5, PCNTPRO  was included in the analysis.

                                   Degrees of Freedom  Signif.   Between
Groups
```

| | | | | | |
|---|---|---|---|---|---|
| Wilks' Lambda | .26797 | 5 | 2 | 63.0 | |
| Equivalent F | 10.99482 | | 10 | 118.0 | .0000 |

---------------- Variables in the Analysis after Step 5 ----------------

| Variable | Tolerance | F to Remove | Wilks' Lambda |
|---|---|---|---|
| PCNTPRO | .2740704 | 4.9091 | .3125670 |
| PCNTMANU | .2478469 | 14.4184 | .3989481 |
| PCNTSELF | .6198806 | 23.2409 | .4790901 |
| CHGPOP75 | .6402607 | 13.2475 | .3883113 |
| PRFINDEX | .5146447 | 5.4299 | .3172976 |

F statistics and significances between pairs of groups after step 5
Each F statistic has 5 and 59 degrees of freedom.

| Group | 0 | 1 |
|---|---|---|
| 1 | 8.9986<br>.0000 | |
| 2 | 30.0098<br>.0000 | 6.9960<br>.0000 |

F level or tolerance or VIN insufficient for further computation.

Summary Table

| Step | Action Entered | Removed | Vars in | Wilks' Lambda | Sig. | Label |
|---|---|---|---|---|---|---|
| 1 | PCNTSELF | | 1 | .70160 | .0000 | |
| 2 | PCNTMANU | | 2 | .42852 | .0000 | |
| 3 | CHGPOP75 | | 3 | .37186 | .0000 | |
| 4 | PRFINDEX | | 4 | .31257 | .0000 | |
| 5 | PCNTPRO | | 5 | .26797 | .0000 | |

Classification function coefficients
(Fisher's linear discriminant functions)

| THREES = | 0 | 1 | 2 |
|---|---|---|---|
| PCNTPRO | 26.2790404 | 25.3811436 | 24.6539098 |
| PCNTMANU | 11.3179973 | 10.7928175 | 10.3056323 |
| PCNTSELF | -1.3253490 | -.7133691 | -.0478722 |
| CHGPOP75 | -3.7083314 | -3.0522231 | -2.7017153 |
| PRFINDEX | .3411012 | .4528666 | .5030121 |
| (Constant) | -444.5720076 | -415.2104705 | -391.5325824 |

# Appendix E

Canonical Discriminant Functions

| Fcn | Eigenvalue | Pct of Variance | Cum Pct | Canonical Corr | | After Fcn | Wilks' Lambda | Chi-square | df | Sig |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | : | 0 | .267974 | 80.329 | 10 | .0000 |
| 1* | 2.5471 | 98.00 | 98.00 | .8474 | : | 1 | .950518 | 3.096 | 4 | .5420 |
| 2* | .0521 | 2.00 | 100.00 | .2224 | : | | | | | |

* Marks the 2 canonical discriminant functions remaining in the analysis.

Standardized canonical discriminant function coefficients

| | Func 1 | Func 2 |
|---|---|---|
| PCNTPRO | -.85078 | -.12644 |
| PCNTMANU | -1.35747 | .16759 |
| PCNTSELF | .98827 | -.43952 |
| CHGPOP75 | .79688 | .75258 |
| PRFINDEX | .61619 | .77087 |

Structure matrix:

Pooled within-groups correlations between discriminating variables and canonical discriminant functions
(Variables ordered by size of correlation within function)

| | Func 1 | Func 2 |
|---|---|---|
| PCNTMANU | -.37878* | -.09591 |
| PCNTPRO | .20436* | .10882 |
| PCNTSELF | .39626 | -.69823* |
| PRFINDEX | .05454 | .56529* |
| CHGPOP75 | .29423 | .38160* |

* denotes largest absolute correlation between each variable and any discriminant function.

Unstandardized canonical discriminant function coefficients

| | Func 1 | Func 2 |
|---|---|---|
| PCNTPRO | -.4261804 | -.0633371 |
| PCNTMANU | -.2650805 | .0327266 |
| PCNTSELF | .3338954 | -.1484952 |
| CHGPOP75 | .2651664 | .2504249 |
| PRFINDEX | .0427252 | .0534499 |
| (Constant) | 13.8463935 | -1.5637909 |

# Appendix E

Canonical discriminant functions evaluated at group means (group centroids)

| Group | Func 1 | Func 2 |
|---|---|---|
| 0 | -1.95155 | -.14677 |
| 1 | .08667 | .31501 |
| 2 | 1.86488 | -.16823 |

Test of Equality of Group Covariance Matrices Using Box's M

The ranks and natural logarithms of determinants printed are those of the group covariance matrices.

| Group Label | Rank | Log Determinant |
|---|---|---|
| 0 | 5 | 9.038149 |
| 1 | 5 | 9.977041 |
| 2 | 5 | 14.473547 |
| Pooled within-groups covariance matrix | 5 | 12.199865 |

| Box's M | Approximate F | Degrees of freedom | | Significance |
|---|---|---|---|---|
| 65.32805 | 1.92661 | 30, | 12576.6 | .0017 |

# Appendix E

```
Symbols used in territorial map

Symbol  Group  Label
------  -----  --------------------

   1       0
   2       1
   3       2
   *           Group centroids

 Territorial Map  * indicates a group centroid

                         Canonical Discriminant Function 1
        -6.0      -4.0      -2.0        .0       2.0       4.0       6.0
          +---------+---------+---------+---------+---------+---------+
C     6.0 +                 12                       23               +
a         |                  12                      23               |
n         |                  12                     23                |
o         |                   12                    23                |
n         |                   12                   23                 |
i         |                   12                   23                 |
c     4.0 +         +         +12       +         23        +         +
a         |                    12                 23                  |
l         |                    12                 23                  |
          |                     12               23                   |
D         |                     12               23                   |
i         |                      12             23                    |
s     2.0 +         +         +  12     +       23+         +         +
c         |                      12            23                     |
r         |                       12           23                     |
i         |                       12          23                      |
m         |                       12          23                      |
i         |                        12   *    23                       |
n      .0 +         +         *    12   +    23   +         +         +
a         |                         12       23  *                    |
n         |                         12      23                        |
t         |                         12      23                        |
          |                          12    23                         |
F         |                          12    23                         |
u    -2.0 +         +         +       12+ 23      +         +         +
n         |                          12  23                           |
c         |                          12 23                            |
t         |                            1223                           |
i         |                            123                            |
o         |                            123                            |
n    -4.0 +         +         +         13        +         +         +
          |                             13                            |
2         |                             13                            |
          |                             13                            |
          |                             13                            |
          |                             13                            |
     -6.0 +                             13                            +
          +---------+---------+---------+---------+---------+---------+
        -6.0      -4.0      -2.0        .0       2.0       4.0       6.0
```

# Appendix E

| Case Number | Mis Val | Sel | Actual Group | Highest Probability Group | P(D/G) | P(G/D) | 2nd Highest Group | P(G/D) | Discrim Scores |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | | 1 | 1 | .4679 | .8327 | 2 | .1357 | .3486 |
| | | | | | | | | | 1.5194 |
| 2 | | | 2 | 2 | .5440 | .6194 | 1 | .3786 | 1.4665 |
| | | | | | | | | | .8608 |
| 3 | | | 2 | 2 | .0076 | .9328 | 1 | .0672 | 3.1613 |
| | | | | | | | | | 2.6730 |
| 4 | | | 2 | 2 | .3206 | .9857 | 1 | .0143 | 3.0334 |
| | | | | | | | | | -1.1220 |
| 5 | | | 2 | 2 | .5321 | .9143 | 1 | .0856 | 2.4948 |
| | | | | | | | | | .7618 |
| 6 | | | 1 | 1 | .6849 | .5314 | 2 | .4585 | .9567 |
| | | | | | | | | | .3087 |
| 7 | | | 1 ** | 2 | .5411 | .6957 | 1 | .3033 | 1.6737 |
| | | | | | | | | | .9235 |
| 8 | | | 2 | 2 | .8048 | .8877 | 1 | .1118 | 1.8963 |
| | | | | | | | | | -.8266 |
| 9 | | | 1 ** | 2 | .7774 | .7049 | 1 | .2937 | 1.5790 |
| | | | | | | | | | .4814 |
| 10 | | | 1 | 1 | .6946 | .5942 | 2 | .3945 | .8898 |
| | | | | | | | | | .6046 |
| 11 | | | 2 | 2 | .4846 | .6860 | 1 | .3058 | 1.1097 |
| | | | | | | | | | -1.1056 |
| 12 | | | 2 | 2 | .9933 | .8498 | 1 | .1496 | 1.8556 |
| | | | | | | | | | -.2838 |
| 13 | | | 2 | 2 | .0579 | .8339 | 1 | .1660 | 2.4470 |
| | | | | | | | | | 2.1471 |
| 14 | | | 2 | 2 | .7675 | .6260 | 1 | .3708 | 1.3421 |
| | | | | | | | | | .3376 |
| 15 | | | 1 | 1 | .5300 | .5928 | 2 | .3995 | .9991 |
| | | | | | | | | | .9761 |
| 16 | | | 2 | 2 | .2727 | .8693 | 1 | .1307 | 2.3900 |
| | | | | | | | | | 1.3559 |
| 17 | | | 1 | 1 | .8912 | .7255 | 2 | .1820 | .1340 |
| | | | | | | | | | -.1626 |
| 18 | | | 2 | 2 | .1282 | .9919 | 1 | .0081 | 3.1959 |
| | | | | | | | | | -1.6968 |
| 19 | | | 2 | 2 | .5595 | .9486 | 1 | .0513 | 2.2808 |
| | | | | | | | | | -1.1624 |
| 20 | | | 2 | 2 | .5103 | .9783 | 1 | .0217 | 2.9217 |
| | | | | | | | | | -.6465 |
| 21 | | | 2 ** | 1 | .9126 | .7103 | 2 | .2289 | .3044 |
| | | | | | | | | | -.0531 |
| 22 | | | 0 ** | 2 | .6655 | .6028 | 1 | .3880 | 1.0516 |
| | | | | | | | | | -.5593 |
| 23 | | | 2 | 2 | .6143 | .6788 | 1 | .3199 | 1.5910 |
| | | | | | | | | | .7803 |
| 24 | | | 2 ** | 1 | .6923 | .6130 | 2 | .3750 | .8637 |
| | | | | | | | | | .6780 |
| 25 | | | 1 | 1 | .7348 | .5957 | 2 | .3913 | .8524 |
| | | | | | | | | | .4885 |
| 26 | | | 0 | 0 | .4643 | .7011 | 1 | .2969 | -1.5687 |
| | | | | | | | | | 1.0313 |
| 27 | | | 1 | 1 | .5876 | .5503 | 0 | .4346 | -.9199 |
| | | | | | | | | | .5395 |
| 28 | | | 1 | 1 | .2802 | .5311 | 0 | .4623 | -1.1460 |
| | | | | | | | | | 1.3273 |
| 29 | | | 0 | 0 | .7632 | .9281 | 1 | .0717 | -2.2846 |
| | | | | | | | | | .5086 |
| 30 | | | 1 | 1 | .3910 | .5494 | 0 | .4415 | -1.0507 |
| | | | | | | | | | 1.0795 |
| 31 | | | 1 | 1 | .8398 | .6335 | 2 | .3435 | .6667 |
| | | | | | | | | | .2025 |
| 32 | | | 2 ** | 1 | .1116 | .6244 | 2 | .3726 | 1.2282 |
| | | | | | | | | | 2.0707 |
| 33 | | | 0 | 0 | .7009 | .8947 | 1 | .1050 | -2.1188 |
| | | | | | | | | | .6796 |
| 34 | | | 1 ** | 0 | .9407 | .8280 | 1 | .1700 | -1.6272 |
| | | | | | | | | | -.2773 |
| 35 | | | 1 ** | 2 | .5973 | .6325 | 1 | .3582 | 1.0612 |
| | | | | | | | | | -.7887 |
| Case Number | Mis Val | Sel | Actual Group | Highest Probability Group | P(D/G) | P(G/D) | 2nd Highest Group | P(G/D) | Discrim Scores |
| 36 | | | 0 | 0 | .6569 | .9676 | 1 | .0324 | -2.6744 |
| | | | | | | | | | .4169 |
| 37 | | | 1 ** | 0 | .7032 | .6587 | 1 | .3366 | -1.3396 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | .4276 | |
| 38 | 0 ** | 1 | .6085 | .7570 | 0 | .2116 | -.5357 | 1.0936 |
| 39 | 1 | 1 | .6722 | .6625 | 0 | .3132 | -.7084 | .7180 |
| 40 | 1 | 1 | .8735 | .7163 | 0 | .2021 | -.2806 | -.0534 |
| 41 | 0 | 0 | .8851 | .8055 | 1 | .1917 | -1.5272 | -.3996 |
| 42 | 0 | 0 | .5118 | .8654 | 1 | .1318 | -1.5569 | -1.2348 |
| 43 | 0 | 0 | .7005 | .8604 | 1 | .1391 | -1.9653 | .6968 |
| 44 | 0 | 0 | .4315 | .9925 | 1 | .0075 | -3.2341 | -.3375 |
| 45 | 0 | 0 | .9360 | .8664 | 1 | .1322 | -1.7361 | -.4398 |
| 46 | 0 | 0 | .9961 | .9121 | 1 | .0874 | -2.0363 | -.1223 |
| 47 | 1 | 1 | .8683 | .6865 | 2 | .2609 | .3764 | -.1305 |
| 48 | 2 | 2 | .1882 | .6389 | 1 | .3407 | .8506 | -1.6885 |
| 49 | 0 | 0 | .7877 | .9740 | 1 | .0259 | -2.6191 | -.3243 |
| 50 | 2 | 2 | .3451 | .7485 | 1 | .2448 | 1.1875 | -1.4602 |
| 51 | 0 | 0 | .6313 | .9766 | 1 | .0233 | -2.8092 | .2827 |
| 52 | 2 | 2 | .0309 | .9979 | 1 | .0021 | 3.9112 | -1.8322 |
| 53 | 1 | 1 | .6654 | .6536 | 2 | .2788 | .3256 | -.5554 |
| 54 | 0 | 0 | .8620 | .9651 | 1 | .0349 | -2.4752 | -.2978 |
| 55 | 0 | 0 | .9315 | .8385 | 1 | .1597 | -1.6444 | -.3651 |
| 56 | 0 | 0 | .7039 | .9773 | 1 | .0227 | -2.7687 | .0394 |
| 57 | 0 | 0 | .5792 | .8616 | 1 | .1357 | -1.5668 | -1.1184 |
| 58 | 0 | 0 | .8105 | .9629 | 1 | .0370 | -2.5402 | .1244 |
| 59 | 1 | 1 | .7018 | .6032 | 0 | .3586 | -.6295 | -.1268 |
| 60 | 1 | 1 | .9645 | .7515 | 2 | .1995 | .3279 | .4337 |
| 61 | 0 | 0 | .7620 | .7503 | 1 | .2443 | -1.3380 | -.5556 |
| 62 | 0 | 0 | .2462 | .9940 | 1 | .0060 | -3.1154 | -1.3503 |
| 63 | 0 | 0 | .6941 | .9169 | 1 | .0822 | -1.8705 | -.9976 |
| 64 | 2 | 2 | .0448 | .9748 | 1 | .0251 | 2.3010 | -2.6217 |
| 65 | 2 ** | 0 | .4000 | .5290 | 1 | .4417 | -.8053 | -.8671 |
| 66 | 1 | 1 | .3342 | .5219 | 0 | .4230 | -.5825 | -1.0056 |

# Appendix E

```
Symbols used in plots

Symbol  Group  Label
------  -----  --------------------

  1         0
  2         1
  3         2
  *            Group centroids
              All-groups Scatterplot - * Indicates a group centroid

                        Canonical Discriminant Function 1
        out      -4.0      -2.0        .0       2.0        4.0       out
          X---------+---------+---------+---------+---------+---------X
     out X                                                             X
C        |                                                             |
a        |                                                             |
n        |                                                             |
o        |                                                             |
n        |                                                             |
i    4.0 +                                                             +
c        |                                                             |
a        |                                                             |
l        |                                                             |
         |                                              3              |
D        |                                                             |
i    2.0 +                                    3     3                  +
s        |                                2                            |
c        |                        2                 3                  |
r        |                      1  2 1       2 32                      |
i        |                   11   22        3   3   3                  |
m        |                11     2      * 2222 32                      |
i     .0 +                11  *      2 2 22                            +
n        |              1  11  11               *                      |
a        |                       1        2  2   3     3               |
n        |                     11   32        3    3   3               |
t        |              1       1             3                        |
         |                                  3           3   3          |
F   -2.0 +                                                             +
u        |                                                             |
n        |                                          3                  |
c        |                                                             |
t        |                                                             |
i        |                                                             |
o   -4.0 +                                                             +
n        |                                                             |
         |                                                             |
2        |                                                             |
         |                                                             |
         |                                                             |
     out X                                                             X
          X---------+---------+---------+---------+---------+---------X
        out      -4.0      -2.0        .0       2.0        4.0       out
```

# Appendix E

```
         Group       0                        * Indicates a group centroid

                        Canonical Discriminant Function 1
        out        -4.0      -2.0       .0       2.0       4.0       out
          X---------+---------+---------+---------+---------+---------X
      out X                                                           X
C         |                                                           |
a         |                                                           |
n         |                                                           |
o         |                                                           |
n         |                                                           |
i      4.0 +                                                           +
c         |                                                           |
a         |                                                           |
l         |                                                           |
          |                                                           |
D         |                                                           |
i      2.0 +                                                           +
s         |                                                           |
c         |                                                           |
r         |                     1    1                                |
i         |                  11                                       |
m         |               11                                          |
i       .0 +               11  *                                       +
n         |             1  11  11                                     |
a         |                      1           1                        |
n         |                    11                                     |
t         |             1       1                                     |
          |                                                           |
F     -2.0 +                                                           +
u         |                                                           |
n         |                                                           |
c         |                                                           |
t         |                                                           |
i         |                                                           |
o     -4.0 +                                                           +
n         |                                                           |
          |                                                           |
2         |                                                           |
          |                                                           |
          |                                                           |
      out X                                                           X
          X---------+---------+---------+---------+---------+---------X
        out        -4.0      -2.0       .0       2.0       4.0       out
```

# Appendix E

```
        Group        1                        * Indicates a group centroid

                        Canonical Discriminant Function 1
        out      -4.0      -2.0        .0       2.0       4.0        out
          X---------+---------+---------+---------+---------+---------X
      out X                                                           X
C         |                                                           |
a         |                                                           |
n         |                                                           |
o         |                                                           |
n         |                                                           |
i     4.0 +                                                           +
c         |                                                           |
a         |                                                           |
l         |                                                           |
          |                                                           |
D         |                                                           |
i     2.0 +                                                           +
s         |                               2                           |
c         |                       2                                   |
r         |                        2         2  2                     |
i         |                        22       2                         |
m         |                      2      * 2222  2                     |
i      .0 +                          2 2 22                           +
n         |                     2                                     |
a         |                               2  2                        |
n         |                          2                                |
t         |                                                           |
          |                                                           |
F    -2.0 +                                                           +
u         |                                                           |
n         |                                                           |
c         |                                                           |
t         |                                                           |
i         |                                                           |
o    -4.0 +                                                           +
n         |                                                           |
          |                                                           |
2         |                                                           |
          |                                                           |
          |                                                           |
      out X                                                           X
          X---------+---------+---------+---------+---------+---------X
        out      -4.0      -2.0        .0       2.0       4.0        out
```

# Appendix E

```
        Group       2                        * Indicates a group centroid

                        Canonical Discriminant Function 1
        out      -4.0      -2.0        .0       2.0       4.0         out
          X---------+---------+---------+---------+---------+---------X
     out X                                                             X
C        |                                                             |
a        |                                                             |
n        |                                                             |
o        |                                                             |
n        |                                                             |
i    4.0 +                                                             +
c        |                                                             |
a        |                                                             |
l        |                                                             |
         |                                              3              |
D        |                                                             |
i    2.0 +                                    3     3                  +
s        |                                                             |
c        |                                          3                  |
r        |                                     3                       |
i        |                                  3   3   3                  |
m        |                                     3                       |
i     .0 +                                3                            +
n        |                                       *                     |
a        |                                       3     3               |
n        |                          3         3    3   3               |
t        |                                    3                        |
         |                                  3           3   3          |
F   -2.0 +                                                             +
u        |                                                             |
n        |                                          3                  |
c        |                                                             |
t        |                                                             |
i        |                                                             |
o   -4.0 +                                                             +
n        |                                                             |
         |                                                             |
2        |                                                             |
         |                                                             |
         |                                                             |
     out X                                                             X
          X---------+---------+---------+---------+---------+---------X
        out      -4.0      -2.0        .0       2.0       4.0         out
```

# Appendix E

Classification results -

| Actual Group | | No. of Cases | Predicted Group Membership 0 | 1 | 2 |
|---|---|---|---|---|---|
| Group | 0 | 22 | 20<br>90.9% | 1<br>4.5% | 1<br>4.5% |
| Group | 1 | 22 | 2<br>9.1% | 17<br>77.3% | 3<br>13.6% |
| Group | 2 | 22 | 1<br>4.5% | 3<br>13.6% | 18<br>81.8% |

Percent of "grouped" cases correctly classified: 83.33%

Classification processing summary

66 (Unweighted) cases were processed.
0 cases were excluded for missing or out-of-range group codes.
0 cases had at least one missing discriminating variable.
66 (Unweighted) cases were used for printed output.

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