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SWP 13/89 SMALL FIRMS AND JOB STRUCTURES

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SMALL FIRMS AND JOB STRUCTURES

Sue Birley and Paul Westhead

During the late 1970's many developed economies experienced a significant shift in their industrial structure. The crippling impact of OPEC's pricing strategy, competition from the newly developing countries of the Pacific Basin, and rapidly changing technologies, all contributed to the decline of many of the traditional industries upon which economies had been built. Large, multi-national companies became increasingly uncompetitive, even in their home markets. Strategies of expansion and diversification changed to ones of contraction and concentration - "sticking to the knitting" [Peters and Waterman, 1982] became the order of the day. In the United States, the prosperous Mid-West, home of the automobile and steel industries became known as the "rust belt" of America as firms shed labour and plants were left idle [Norburn, Manning and Birley, 1986]. As a result, unemployment grew to levels which had become almost inconceivable during the previous three decades.

A potential solution to the problem arose out of a study conducted in Massachusetts by Birch [1979] which examined the employment change in 5.6 million business establishments in the manufacturing and private service sector in the United

States between 1969 and 1976. The study showed that approximately 50% of gross jobs created by "openings" were produced by independent, free-standing entrepreneurs. Further, firms employing less than 20 people generated approximately 66% of net new jobs. In his later study [Birch 1987], he concludes that in the period 1981-1985, "very small firms [1-19 employees] have created about 88% of all net new jobs". In both Europe and America these results have been used as the basic rationale for creating new regional policies and schemes aimed at creating new firms, and encouraging existing small firms to grow. The basis for evaluation of the new schemes was job creation. Beyond this, however, little regard was paid either to the types of new jobs created, and their fit with the unemployed, nor the particular characteristics of the employment patterns within the established small firm sector.

THE EVIDENCE

Small Firms and Job Generation: The data which Birch [1979, 1987] used in his studies, and which have been replicated in the United Kingdom by Gallagher and Doyle [1986], was drawn from the Dun and Bradstreet Market Identifier files and, whilst this data source has been shown to be unreliable [Armington and Odle 1982], particularly in identifying new firms [Birley 1984], the conclusion that small firms have created a disproportionate amount of new jobs was generally

accepted. However, subsequent studies in the United States [Birley 1986] and the United Kingdom [Johnson 1987] note that this increase in the small firm sector's share of total employment is not necessarily due to any change in the sectoral employment creation pattern but rather to the concurrent contraction of large firms [Shutt and Whittington 1984]. Indeed, in their study of the Job Generation Process in Great Britain Fothergill and Gudgin [1979] note that they could find no real evidence that small and new firms are an "overwhelming source of new jobs". Further, in his evaluation of the Gallagher and Doyle [1986] study, Hart [1987] concludes that "their case is not proven, although there are features of recent experience which may point in that direction."

New Firms and Job Generation: The evidence regarding the job generation characteristics of new firms remains sparse. In many instances, this is due to the particularly difficult problems associated with data capture [Birley 1984, Westhead 1988a, Aldrich 1988]. However, two conclusions predominate. First, there is a remarkable similarity in the average number of jobs created per firm. For example, in their study of the job generation characteristics of small firms in California between 1977 and 1979 Teitz et al found the jobs gained per new firm to vary between 7.5 and 8.0: in South Bend, Indiana, Birley [1986] found the mean to vary between 4.8 and 9.7, with an annual average of 7.7; Reynolds and Miller [1987]

found the average new jobs created in 1986 in Minnesota was 9.1, but that the range was from zero to 300; and Westhead [1986] found that new manufacturing firms in Wales between 1979 and 1985 created a mean of 7.7 jobs per firm, with a median of 4 jobs per firm. Second, these results mask a highly skewed pattern. In reality, most new firms create very few jobs, and a very few create a large number. Birch [1984] notes, for example, that the majority of American firms have fewer than five employees, a figure which does not take account of the significant, and growing number of the self-employed [Economist 1983]. This conclusion has led a number of researchers to suggest policies aimed at picking the "high flyers" [see, for example, Storey 1985: Storey, Keasey, Watson and Wynarczyk 1987]. However, whilst it may be possible to identify them ex-post, there is no guidance from the literature as to how they may be usefully identified ex-ante. Thus, in their study of new firms and their economic contributions in Minnesota, Reynolds and Miller [1987] conclude that whilst the capacity to predict variation in jobs was high "the number of variables was large, and few seemed obvious candidates for policy intervention."

Spatial Patterns: Evidence from both the United States [Birch 1979, 1987] and the United Kingdom [Ganguly 1982] has pointed to regional variations in new firm formation. Crude analyses in the United Kingdom have suggested differences between urban and rural areas [Gudgin 1978, Mason 1982, Gould and

Keeble 1984, O'Farrell and Crouchley 1984, Westhead 1988], and between the North and South [Mason and Harrison 1985, Johnson and Cathcart 1979, Gudgin and Fothergill 1984]. This was further refined by Storey [1982] in his creation of a regional entrepreneurial index.

In his study of new firm formation rates in Wales within Travel to Work Areas [TTWAs], Westhead [1988a] attempted to explain these locational variations. Basing his analysis upon 18 surrogate "ecological incubator" variables identified from the literature as being associated with either promoting or impeding new firm formation, he identified five distinct "ecological incubator environments". This method of analysis was extended by Moyes and Westhead [1988]. Using Value Added Tax [VAT] registrations in the production sector as a surrogate for new firms between 1980 and 1983 within Great Britain, they found eight ecological incubator environments when analysing the data at the county level.

Industrial Patterns: In her study of job generation and new firms in South Bend, Birley [1985] found clear differences between the sizes of firms in different industries. Variation in industrial patterns was also noted by Gould and Keeble [1984] in East Anglia, by Storey [1985] in the North-East of England, and by Birch [1979] in the United States. Similarly, Westhead [1988c] found that, whilst there was no significant difference between the number of new firms

in rural and urban areas by industrial category, there was a difference in the types of particular sectors represented. Thus, for example, mechanical engineering [SIC 7], and timber and furniture [SIC 17] tended to predominate in rural areas, and other manufacturing [SIC 19], metal goods [SIC 12], and electrical goods [SIC 9] in urban areas.

THIS RESEARCH

The main conclusion which can be drawn from the literature described above is that the understanding of the job generation characteristics of new and small firms is limited, although there is some suggestion that it may vary from region to region, and amongst industries. Beyond this, there is limited evidence as to the nature of jobs created. Storey [1985] noted the average employment in 1978 of males and females, both full-time and part-time by industrial sector. Hunt, Jackson and Marceau [1979] compared the skill patterns of small manufacturing firms in France, Scotland and Ireland. In their analysis of occupation and employment trends to 1990, Rajan and Hayday [1986] conclude first that "a disproportionate number of jobs are expected to be full-time rather than part-time"; and second that "the occupational structure is likely to change.....the share of managers and support personnel are likely to decline and that of operatives to increase." By contrast, a similar study by the Institute of Manpower Studies [1986] arrives at the opposing

conclusion that a growing proportion of the new jobs will be part-time, particularly in service organisations, and will be filled by female employees. What is clear from both these studies, however, is that it is expected that the nature of employment in the small firm sector is changing, and that younger firms are likely to have a different job-structure than older, more established firms.

This research analyses the employment patterns of a random sample of small firms and poses two research questions:

1. Are there any differences between the employment patterns in different industries.
2. Are there any differences in the employment patterns of firms of different ages?

Sample: Three significant problems are encountered when attempting to collect comprehensive data from small firms.

1. It is not possible to create a demographically representative sample of small firms in the United Kingdom since the appropriate population data is not available. Moreover, it is entirely possible that the sample would vary according to the type of base chosen.

2. Owner-managers are notoriously suspicious of researchers.

3. The costs of data collection for a sample of any size are prohibitive.

It is for these reasons that the Cranfield Small Firms Data Base, a complete audit of a sample of small firms, was established. During 1987, data was collected from 249 small firms by "conduit sponsors" - those organisations currently working with the small firm, and which agreed to collect data from a small sample of client firms. Conduit sponsors included national accounting firms, local economic development units, and membership organisations. Each conduit sponsor was asked to collect data from a spread of clients. In this way, the data base included a mix of, for example, size, age, location, and industry. For a more detailed discussion see Birley and Westhead [1988].

Data for this study was drawn from the data base. The characteristics of the firms in the sample, and thus of this study, are -

* 81% incorporated

* 57.5% first generation, 23.7% current owners no relationship to founders

- * Mean age 26.6 years, range 1 year - 240 years

- * Mean sales revenue between £500,000 and £1m
28.8% of firms with sales less than £250,00
10.4% of firms with sales greater than £3m

- * Mean trading profit between £50,000 and £75,000, 80.2%
of firms were profitable

Data was collected on the current employment structure, classified by full-time, part-time, and casual, and by male and female, under the following headings -

- * Skilled - apprentice or other forms of training lasting 4 or more years.

- * Semi-skilled - apprentice or other forms of training lasting between 6 months and 4 years.

- * Unskilled - training lasting less than 6 months.

- * Professional [mainly] - degree or professional qualification.

- * Managerial [mainly].

- * Clerical

RESULTS

In total, 7890 people were employed in the 249 (but only 245 supplying employment data) firms surveyed, with the each firm employing, on average 32.2 people. Moreover, by far the largest number [85%] were full-time employees, with 10.6% being in part-time employment, and the rest being casual labour [See Table 1 below].

Insert Table 1 About Here

As was expected, the aggregate results in Table 1 clearly mask differences between the firms surveyed. Table 2 below shows the employment distribution of the by skill base. It is clear from this table that the firms surveyed had a predominantly male workforce, with females being employed in the unskilled and clerical categories.

Insert Table 2 About Here

The data in table 2 shows some evidence of variety in both the nature of the jobs, and the gender of the employees. Therefore the data was further analysed to determine the extent to which employment patterns varied according to the

industry sector, and the extent to which they varied according to the age of the firm.

Industrial Patterns

At the aggregate level, analysis of variance tests were conducted for total employment for full-time [$F(1,211) = 0.5838$, Sig. = 0.4457], part-time [$F(1,211) = 2.98$, Sig. = 0.0858], and casual labour [$F(1,211) = 1.2392$, Sig. = 0.2669] between manufacturing and service. No significant differences were observed. Thus, despite expectations to the contrary, analysis of this aggregate data did not highlight any particular bias between manufacturing and service small firms. However, individual chi-squared analyses of the data for full-time employment indicated some variation in the results when comparing the level of employment in the manufacturing industries with that in the service industries [See Table 3 below].

Insert Table 3 About Here

Thus, manufacturing industries tended to have larger work forces of skilled full-time males, semi-skilled full-time males whilst service companies tended to have larger professional workforces of both sexes. Surprisingly, results for part-time employees and for casual labour indicated no

significant differences.

The total employment data was further analysed using the nine major SIC (1980) industrial groupings. This more powerful analysis supports the results indicated above although there is some tendency for the firms in the sectors of agriculture, transport and communication, and other services to be consistently smaller than firms in the other sectors. Beyond this, there is one further exception - casual labour predominates in the two firms in the agricultural industry. Table 4 below shows the results for total full-time employment, and Table 5 below the mean employment per firm for all categories of employment.

Insert Tables 4 & 5 About Here

Age Effects

It is clear from the data reported above that the firms surveyed varied significantly in the size of their work-force. They also varied in age between 1 year and 240 years. Therefore, to identify the nature of any age effects, Pearson Correlation Coefficients were first computed for total employment. Significant results were obtained in two out of three cases. Thus, older firms tended to employ more full-time people [$r = 0.3822$, $n = 242$, $p = 0.00$], more

part-time people [$r = 0.1929$, $n = 242$, $p = 0.001$], but not necessarily more casual labour [$r = 0.0915$, $n = 242$, $p = 0.078$]. More detailed analysis of the data indicated significant differences in employment patterns [See Table 6 Below].

Insert Table 6 About Here

Older firms employed more full-time skilled males, more unskilled labour in all except the full-time female category, and more male managers. Older firms also were more likely to employ more clerical labour. Since the older firms were the larger firms, this is consistent with the beginnings of an administration structure.

CONCLUSION

This paper has analysed the employment patterns in 245 small firms. The results indicate clear differences between the magnitude and pattern of male and female employment, and between industries. Moreover, there is no evidence from these firms of a shift away from full-time to part-time employees, nor from male to females. The results highlight the complexity of employment patterns in the sector, and demonstrate the importance of a better understanding of the detailed picture if local and national job creation schemes are to be properly targetted.

TABLE 1: EMPLOYEES BY EMPLOYMENT STATUS

Employee Status	Total Number Employees	Mean Number Employees Per Firm
Full-Time	6732	27.5
Part-Time	839	3.4
Casual	319	1.3
Total	7890	32.2

TABLE 2: NUMBER OF EMPLOYEES BY SKILL BASE

	Mean	Standard Deviation	Median
SKILLED			
Full-Time Male	6.9	11.3	3
Full-Time Female	1.0	4.0	0
Part-Time Male	0.06	0.39	0
Part-Time Female	0.13	0.65	0
Casual Male	0.02	0.17	0
Casual Female	0.00	0.06	0
SEMISKILLED			
Full-Time Male	4.18	8.64	1
Full-Time Female	0.59	4.10	0
Part-Time Male	0.21	1.63	0
Part-Time Female	1.04	3.49	0
Casual Male	0.02	0.17	0
Casual Female	0.12	0.14	0
UNSKILLED			
Full-Time Male	3.45	7.60	0
Full-Time Female	1.73	8.75	0
Part-Time Male	0.73	7.69	0
Part-Time Female	0.76	3.38	0
Casual Male	0.49	5.20	0
Casual Female	0.46	5.22	0
PROFESSIONAL			
Full-Time Male	2.25	7.38	0
Full-Time Female	0.30	1.60	0
Part-Time Male	0.10	0.56	0
Part-Time Female	0.03	0.17	0
MANAGERIAL			
Full-Time Male	2.68	3.26	2
Full-Time Female	0.33	0.79	0
Part-Time Male	0.04	0.23	0
Part-Time Female	0.04	0.23	0
Casual Male	0.09	1.28	0
Casual Female	0.06	0.95	0
CLERICAL			
Full-Time Male	0.93	2.21	0
Full-Time Female	2.43	4.21	1
Part-Time Male	0.08	0.96	0
Part-Time Female	0.64	1.30	0
Casual Male	0.04	0.64	0
Casual Female	0.10	1.27	0

TABLE 3: ANALYSIS OF SKILL BASE BY INDUSTRY

	Chi- Squared	Significance Level
Total Employment	4.51	NS
Skilled Male	2.61	**
Skilled Female	0.17	NS
Semi-Skilled Male	11.94	**
Semi-Skilled Female	3.43	NS
Unskilled Male	1.89	NS
Unskilled Female	2.47	NS
Professional Male	8.47	**
Professional Female	6.53	*
Managerial Male	0.72	NS
Managerial Female	0.54	NS
Clerical Male	1.48	NS
Clerical Female	3.03	NS

NS = Not Significant

** = Significant at 1% level

* = Significant at 5% level

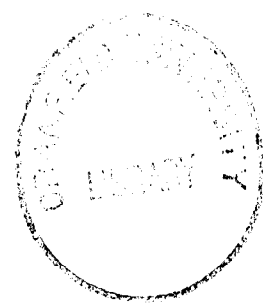


TABLE 4: TOTAL EMPLOYEES BY INDUSTRY

Industry	Mean	S.D.	N
Agriculture, Forestry and Fishing	12.5	7.8	2
Energy, Minerals and Ores and Metal Manufacture	32.2	33.7	18
Metal Goods	26.1	21.9	50
Other Manufacturing	29.7	34.6	45
Construction	32.2	30.8	29
Distribution, Hotels, Catering	27.1	26.1	45
Transport and Communication	17.1	13.6	10
Banking and Finance	27.1	29.8	30
Other services	18	23.3	16
Total	28	28.1	245

$F(8,36) = 0.630$, Significance Level = .522

TABLE 5: MEAN EMPLOYMENT PER FIRM BY INDUSTRY

Industry	FT	PT	Casual
Agriculture, Forestry and Fishing	12.5		
Energy, Minerals and Ores and Metal Manufacture	32.2	1.5	80.0
Metal Goods		6.0	0.3
Other Manufacturing	26.0	2.2	0.3
Construction	29.7	2.8	0.4
Distribution, Hotels, Catering	32.2	0.9	0.4
Transport and Communication	27.9	7.9	0.1
Banking and Finance	17.5	2.3	1.0
Other services	27.4	2.3	2.2
	18.9	4.8	1.6
Total	27.5	3.4	1.3

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