



IN SEARCH OF THE DIFFERENTIAL SHIFT: INTEGRATING FIELDWORK INTO THE TAUGHT PROGRAMME IN INDUSTRIAL GEOGRAPHY

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ABSTRACT How fieldwork has been successfully incorporated into a programme of industrial geography at the University of Northumbria at Newcastle is demonstrated. The theme of shift-share analysis has been used to integrate the lecture programme, seminar work, field study and an assignment. The work has proved challenging to the students and some of the resulting written work has been of high quality. The fieldwork was identified by the students as a particularly successful component of the course in a subsequent course review.

KEYWORDS Industrial geography, teaching, shift-share analysis, fieldwork.

Introduction

A common problem in geography courses concerns the role of fieldwork in the learning process. While most, if not all, geographers would regard fieldwork as an essential element in undergraduate programmes, fieldwork activities are too easily viewed as separate from the rest of the taught programme, and of less importance in assessment. The exercise evaluated in this paper was developed for the second-year option in Industrial Geography within the BA (Hons) Geography degree at Northumbria University. It attempts to deal with the problem by integrating fieldwork into the core of the taught programme.

Fieldwork Integration

The traditional field excursion in industrial geography has tended to be based around a series of 'lectures in the field' which use the visual impact of particular industrial sites

to create a lasting impression on students. The conurbation of Tyne and Wear in North East England provides an impressive store of such opportunities, including the sole surviving shipyard of Swan Hunter at Wallsend (now in receivership), Vickers' tank factory in Scotswood, NEI Parsons power station equipment site at Heaton and, of course, the much discussed Nissan car plant in Sunderland. We have organised such tours and visits in past years and found that students respond very enthusiastically to the experience in a way which we hoped would feed enthusiasm into other activities such as seminars and written assignments.

Gold *et al.* (1991) have recently illustrated and confirmed the value of fieldwork in geographical teaching and learning. While the justification for fieldwork is argued effectively in terms of observation and other field-based skills, they concede that fieldwork is difficult to assess and evaluate as an activity. Also, we would add that little is known about the way in which fieldwork might contribute to the effectiveness of an otherwise classroom-based taught course and what would be 'lost' if the activity was not included. These issues arise, in part, because the traditional justification for fieldwork as an activity designed to demonstrate the links between human and physical phenomena in a regional setting has largely been overturned by contemporary systematic approaches to geography. Much contemporary geography is more interested in theories and processes affecting individual phenomena (e.g. industrial location) rather than empirical patterns and spatial associations between a wide range of phenomena (Gold *et al.*, 1991, p. 28). In the context of an undergraduate course in Industrial Geography, this distinction clearly raises issues about the precise role of fieldwork in a systematic option.

In 1991, as course tutors, we decided to review the role of fieldwork on our course in Industrial Geography. There was particular concern that this valuable experience did not seem to be of direct relevance to the rest of the programme and was not 'examined' in any rigorous fashion. The fieldwork was enjoyed by students, but the comments they made in their fieldwork reports did not often relate to any regional statistical trends nor were they couched in terms of any of the theoretical debates in industrial geography. Student opinion given on evaluation forms suggested that the fieldwork was considered to be very interesting but not particularly helpful in understanding the taught programme and in passing examinations. Our response has been to develop an integrated programme involving the following elements:

- (1) *lectures* which examine the meaning and significance of industrial structure based on a *textbook* account of the application of shift-share analysis (see below);
- (2) *seminars* which analyse industrial change in Tyne and Wear using the shift-share technique (for any one student, this involves two separate hours of work over two weeks);
- (3) a one-day *field excursion* to illustrate some of the reasons why manufacturing employment in Tyne and Wear has fallen much more than expected given the national employment performance of the industries found in the local economy;
- (4) a *written assignment* which can draw on the seminar workshop data analysis, lectures and wider reading as well as field observation to answer a specific question.

Lectures and Textbook

Early in the first term, students are introduced to the geographical significance of

industrial structure: different places have different mixes of industries inherited from past phases of industrialisation. Local industrial change, therefore, might be viewed as a product of different patterns of national growth and decline in those industries present. The shift-share technique provides a method for investigating the validity of this statement by dividing total change in an area into three components:

- *the national component*: local employment change associated with change in all industries nationally;
- *the structural component*: local employment change which can be attributed to the mix of industries present;
- *the differential component*: local employment change which cannot be explained by national trends or industry mix—this is interpreted as the local effect whereby industries in an area are performing better or worse than the same industries nationally.

Accounts of the use of the shift-share technique are widely available in various texts, including the one which is recommended for students on the course (Watts, 1987, pp. 46–47, 231–237). Students are also advised to consult applications of the technique, for example, by Fothergill and Gudgin (1982, pp. 48–67).

According to Watts (1987, p. 46):

application of the shift-share technique suggests that increasingly industrial structure is playing a relatively unimportant role in the spatial pattern of manufacturing employment change. This conclusion has been reached from analysis of both United States and United Kingdom data.

He concludes that “geographical patterns of industrial change cannot be explained away by ‘structural’ factors” (ibid; p. 47). This raises points of debate about why one cannot ‘read off’ local employment change from industrial structure (see hypotheses listed below). Prior to attending the seminars, therefore, the students have been exposed to these kinds of ideas.

Seminars

The first seminar was organised as a workshop, in which the students were required to calculate a shift-share analysis of Tyne and Wear using the 17 manufacturing orders of the 1986 Standard Industrial Classification (SIC) for 1978 to 1981, and the 19 two-digit classes of the 1980 SIC for 1981 to 1987. Data were entered into a spreadsheet which was used to calculate actual change, predicted change and the differential for each industry. The three components were then calculated by the students from this table. The students were made aware at the start of this exercise that the results would form the basis of the field investigations and would subsequently be vital to the coursework for the term. Each term’s assignment contributes 15% to overall course assessment.

The results of their analyses are summarised in Table I, which shows the national, structural and differential shifts for the whole of manufacturing industry in Tyne and Wear between 1978–81 and 1981–87. These equations confirm the textbook account of Watts in that the structural component is very small compared with the differential. The analysis performed by the students revealed the differential shifts for each of the 17 manufacturing orders. Some of these were strongly negative; for example, the

TABLE I. Summary of shift-share analysis Tyne and Wear manufacturing industry

Period	Total employment change	National component	Structural component	Differential component
1978-81	- 32,905	- 26,316	+ 2,535	- 9,124
1981-87	- 36,114	- 19,251	- 1,224	- 15,639

Source: Raw data from National Online Manpower Information Service, Durham University.

mechanical engineering industry on Tyneside lost 8913 jobs between 1978 and 1981, 5162 more than the national trend in that industry would have predicted. Others were strongly positive; the footwear and clothing industry in Tyne and Wear showed a job gain of 26.5% between 1981 and 1987 compared with a national loss in that industry of 2.8%, which leads to a positive differential shift of 1804 jobs.

The second seminar involved a group discussion to interpret the results of the shift-share analysis. Prior to the workshop, students were asked to say what they expected to find. Quite often, their response was that Tyne and Wear probably had a poor industrial structure—too many industries which are in rapid decline nationally and not enough of the more stable industries. Subsequently, students are genuinely surprised to learn that the structural component accounts for very little of the total shift, indicating that industrial structure (at least as it is measured here) has played a comparatively small role in explaining the poor performance of manufacturing in Tyne and Wear.

The reason for the poor performance of Tyne and Wear lies in the differential—that is, industries in the conurbation are losing jobs faster than the same industries nationally. This leads to a debate concerning the possible reasons for this differential shift. A sequence of hypotheses usually emerges from student group discussion. It is possible that:

- H1: firms in Tyne and Wear are not as competitive as similar firms in other places;
- H2: factories in Tyne and Wear are predominantly branch plants which tend to be closed down during recessions;
- H3: many factories in Tyne and Wear were set up in the 1960s under regional policy to produce the more mature products within an industry, those near the end of their life cycle;
- H4: many factories in Tyne and Wear have been the targets for aggressive takeovers followed by employment loss or culture.

Students' attention is also drawn to the fact that some industries in Tyne and Wear have a strong *positive* differential shift, notably in the clothing and vehicle industries. These relative gains, however, have not been sufficient to offset the negative shifts in most other industries, particularly in shipbuilding, mechanical engineering, electrical engineering, the food and drink industries and paper products.

Field Excursion

The purpose of the field trip is now firmly embedded in the minds of students: what lies behind this large differential shift in manufacturing employment? A full answer would

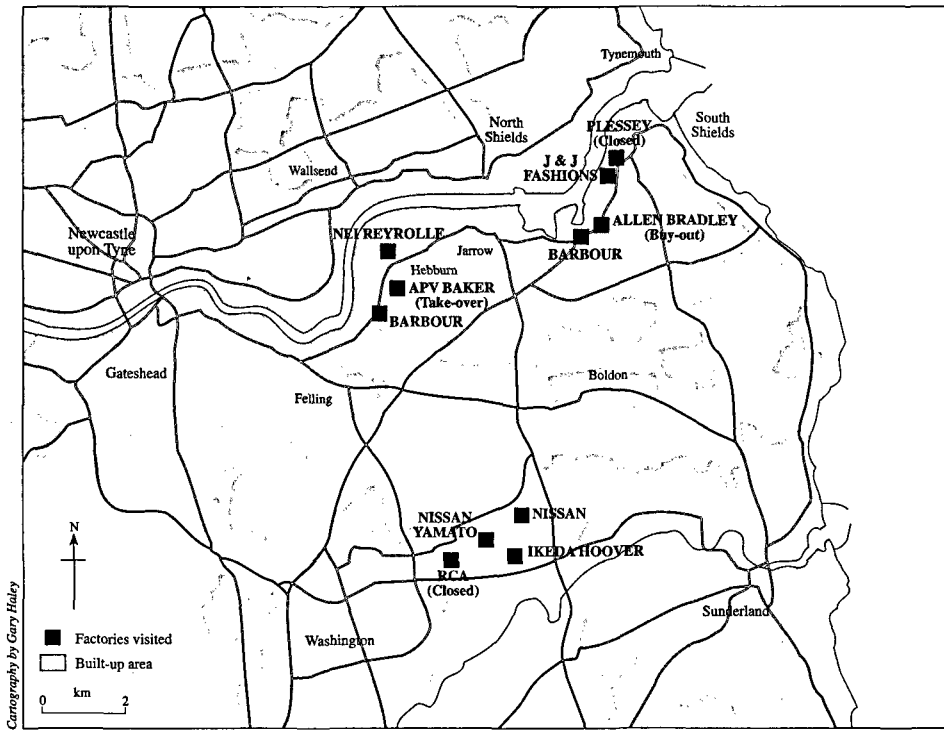


FIG. 1. Field excursion area in Tyne and Wear.

clearly require further data analysis and perhaps establishment surveys; this is not the objective of the field excursion. Rather, the educational purpose is to use the visit to particular industrial areas and specific firms to stimulate student inquiry about the possible causes of the negative differential shift.

In some respects, the activity is not much different from what one might have expected on a traditional 'look-see' lecture in the field. What is different, however, is the *context* within which this occurs. It emerges out of classroom-based activity and *has a precise focus*: to look for examples to illustrate the large differential shift. As a consequence, the students play a much more active role in interpreting what they see. Not only do they have knowledge of aggregate employment change, but they are also provided with press cuttings and entries in business directories as springboards for posing questions about particular sites. They are also supplied with data on site-specific employment change derived from industrial surveys. The activity, therefore, might more appropriately be described as a '*seminar in the field*' where students engage in group discussion and respond to questions posed by tutors.

The study area (Fig. 1) covers a variety of locations in Hebburn, Jarrow, South Shields and Washington. The sites have been carefully selected to illustrate specific points about the interpretation of the shift-share analysis. What processes, for example, might have contributed to the large negative differential shift in electrical engineering or mechanical engineering? This question is posed at several sites. In some cases, these are closures of branch factories which manufactured products near the end of their life cycle as in the case of the Plessey plant at South Shields which closed in 1981 and the RCA record factory at Washington. Other cases illustrate the complex role of ownership changes in

generating local employment change, including the closure of the Allen Bradley Electronics factory in Jarrow after a brief period of ownership under a local management team; and the takeover of Baker Perkins (industrial ovens) at Hebburn by APV which was followed by a period of employment loss.

Other locations were used to demonstrate some of the causes of positive differential shifts. In the case of vehicles, the causes are self-evident: the arrival of Nissan and its satellites in Sunderland. Other cases are less easy to explain, but the positive shift in the clothing industry could be linked to the competitiveness and design capability of local companies like Barbour Ltd. and J & J Fashions which have several factories and networks of subcontractors on Tyneside. J & J Fashions, for example, was founded in 1974 and in 1992 employed over 2000 workers in eight factories in the North East.

The stop at NEI Reyrolle (power switchgear) is a particularly important one, because it provides a basis for a critique of the shift-share method as calculated in the seminar. Clearly, one important reason why electrical engineering might have a large negative differential on Tyneside is because the industrial category 'electrical engineering' is far too broad. The shift-share will not be comparing like with like, as electrical engineering in Tyneside will be very different in character compared with electrical engineering in, say, Cambridge. If the shift-share was undertaken using a finer industrial classification, would the result alter? Students who can use the case of NEI Reyrolle to develop a critique of the method itself are rewarded at the assessment stage (see below).

Written Assignment

Each student is then required to submit a written analysis using appropriate illustrations from the fieldwork to answer the question:

To what extent can the relatively poor performance of manufacturing industry in Tyne and Wear since 1978 be attributed to weaknesses in the industrial structure of the conurbation?

The marking scheme used to assess these assignments covers several key areas of achievement: comprehension of the results of the shift-share analysis, an understanding of the term 'industrial structure' and use of local knowledge. A competent answer covering these three aspects could be awarded a mark in the 2.1 category. Beyond this, students who can also demonstrate the limitations of shift-share analysis and develop a coherent critique could expect to be awarded a first-class mark. The clarity of these objectives has ensured that good students can achieve high marks, while poorer ones have been awarded marks in the low 40s; in the 1993 cohort, marks ranged from 75% to 44%.

Conclusion

This paper has identified one way of integrating fieldwork into a taught programme in industrial geography. The process of developing this exercise has caused us to think much more clearly about the precise role of particular fieldwork exercises. In this case, fieldwork acts as a mechanism for reinforcing principles about how one interprets local employment change. By integrating fieldwork into the programme in this way it has proved possible to assess students' understanding of field observation in a more precise form. This is not to suggest that the traditional 'look-see' fieldwork has no value; it simply has a different (and equally valid) purpose. There is, however, a place for

developing fieldwork which has a more specific objective linked to a clearly defined set of ideas and leading to a precise form of assessment. Students need to develop skills in integrating textbook accounts with data analysis and field observation. Assignments submitted by our students confirm that this form of integration of different modes of teaching enables good students to produce very high-quality work. The value of the fieldwork was also recognised by students who singled it out for particular mention in the end-of-year course review.

The quality of understanding exhibited by some students, and the effective use of case material in the written assignments, persuades us that the case studies observed in the field have been more effective illustrations of a conceptual debate in industrial geography than any number of case studies presented in a more traditional written or narrative form. The power of the 'real' visual image is clearly illustrated by the students' assignments, and this in itself provides a significant justification for the continued incorporation of fieldwork into the learning process even in the context of systematic options.

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