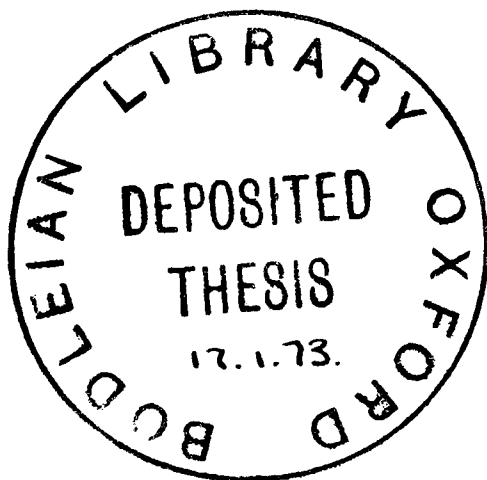


INTER-INDUSTRY LABOUR MOBILITY
IN BRITAIN SINCE 1959

by

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A thesis submitted for the degree of Doctor
of Philosophy to the Board of the Faculty of
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To Elizabeth and Jonathon

ABSTRACT

The present study is an analysis of inter-industry labour flows between 1959 and 1968. The data were provided by the Department of Employment (DE) and are derived from an annual one per cent sample survey of employees holding national insurance cards. Their reliability is subject to several limitations but on the whole they provide good approximations of the actual figures.

The study begins with an introductory chapter in which the findings of macro analyses of labour supply and micro investigations into local labour markets are examined in order to demonstrate the need for the inter-industry approach taken here. The manpower flow data are introduced at the end of this chapter where their limitations are discussed.

The main body of the thesis is contained in the next six chapters. These can be divided into two parts. Chapters II-IV analyze the role of non-cyclical forces in determining manpower flows between industries. Chapter II examines net flows between manufacturing and non-manufacturing. It analyzes the contribution these net flows make to overall changes in industrial employment levels and demonstrates that manufacturing relies heavily on net recruitment from certain non-manufacturing industries which, in turn, experience large net intakes of persons outside employment. The chapter also shows that there is a tendency for young persons to enter and leave the labour force through the service sector and to spend the prime of their working lives in manufacturing where wages are higher.

Chapter III analyzes gross manpower movements in and out of

industries. The first half examines each industry's total inflows and outflows as a proportion of its employment level. This provides a measure of the industry's labour turnover rate. Industries with high turnover rates were found with two exceptions either to have high rates of employment growth or to pay low average wages. The second half examines the relative sizes of labour flows between industries and demonstrates that manpower movements between certain pairs of industries are much greater than would occur if flows were randomly determined. In other words, the industry a mobile worker enters is to some extent a function of his previous industry of employment.

Chapter IV analyzes the causes of these neighbourhood relationships between industries. The first half constructs a measure of locational and occupational similarities between industries. The resulting formula provides estimates of the degree of neighbourliness between industries that are remarkably close to those derived from the inter-industry mobility data. The chapter also considers the importance of relative wages in determining neighbourhood relationships and reports that these play a subordinate role.

Chapter V begins the discussion of the trade cycle's impact. The first half examines net movements of manpower between manufacturing and non-manufacturing and finds that they are positive in upswings and negative in downswings. Moreover, net flows increase as a proportion of total manufacturing employment changes in the late stages of each upswing. This reflects the favourable manufacturing wage differential and the intensification of competition for manpower already in employment as the number of persons without jobs and seeking work dwindles. Net manufacturing

inflows were, however, found to decline in absolute terms in the late stages of each upswing.

The second half of the chapter examines gross manpower flows between manufacturing and non-manufacturing. It shows that the decline in net male flows during the late stages of each upswing is due both to a fall in gross inflows and a rise in outflows. The lower inflow is due to a decline in the number of persons in non-manufacturing suitable for recruitment into manufacturing while the higher outflow reflects increasing competition from the non-manufacturing sector. Net female flows fall by much less in the late stages of an upswing. Gross inflows continue to increase but outflows rise faster. This is because the female labour supply is more elastic and movements of women between manufacturing and non-manufacturing respond more readily to relative demand changes.

Chapter 6 analyzes in greater depth the effects of a tightening labour market on the inter-industry mobility process. It shows that the manufacturing sector suffers most from manpower shortages at the peak of the cycle even though its plants pay the highest wages. This is attributable to greater cyclical fluctuations in manufacturing labour demand, greater skill requirements, and increasing competition from non-manufacturing. The relative importance of each of the last two factors can be expected to vary between individual manufacturing industries. Engineering and metals plants should experience greater recruitment difficulties owing to skill differences, while plants in industries that are close neighbours to non-manufacturing industries could be expected to suffer from increasing competition from the non-manufacturing sector. These theories are tested

econometrically on manpower flow data for movements between non-manufacturing and individual manufacturing industries and are supported by the results.

Chapter 7 analyzes manpower flows between the engineering and metals industries. These are shown to be affected strongly by changes in the composition of final product demand. Post war cycles in Britain have been led by the swings in consumer expenditure on durable goods and lagged by fluctuations in plant and machinery investment. Plants producing both types of goods are found in engineering and metals industries. In some cases both types of goods may be produced in the same factory. Consequently there is considerable competition for scarce manpower between these two sectors of final demand. The effect of the lag in the timing of demand recovery between them is, however, to provide consumer durables producers with a competitive advantage. Since their manpower requirements start to expand at a time when the labour market is relatively slack, they have the opportunity to pre-empt the labour supply. Capital goods producers must then wait until the start of the downswing before they can recruit all the manpower they require. This suggests that capital goods producers face the most serious manpower shortages at the peak of the boom and an investigation of cyclical fluctuations in the time customers have to wait for deliveries of plant and machinery provides qualified support for this view.

Chapter 8, the conclusion, contains a summary of the findings of the study and a discussion of its implications for future research and policy making. It considers various methods of achieving a change in the industrial distribution of employment and argues that the introduction of relative wage changes to

achieve this objective is best regarded as a policy of last resort implemented only after its likely impact on flow patterns and comparability claims have been carefully analyzed. The advantages of discriminatory taxes on labour - such as the Selective Employment Tax - over relative wage changes is that they do not induce comparability claims from workers who lose their position in the earnings structure. More research into inter-industry mobility patterns is recommended to provide a basis for future manpower planning and the possible introduction of new types of discriminatory employment taxes to assist in the implementation of such plans.

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KEY TO ABBREVIATIONS

C.S.O.	Central Statistical Office
DE	Department of Employment
DEP	Department of Employment and Productivity (Same as Department of Employment)
G.D.P.	Gross Domestic Product
MoL	Ministry of Labour (Same as Department of Employment)
N.E.S.	New Earnings Survey
O.E.C.D.	Organization for Economic Cooperation and Development.
S.I.C.	Standard Industrial Classification.

KEY TO INDUSTRY REFERENCE NUMBERS

1. Agriculture, Forestry, Fishing
2. Mining and Quarrying
3. Food, Drink and Tobacco
4. Chemicals and Allied Industries
5. Metal Manufacture
6. Engineering and Electrical Goods
7. Shipbuilding and Marine Engineering
8. Vehicles
9. Metal Goods n.e.s.
10. Textiles
11. Leather, Leather Goods and Fur
12. Clothing and Footwear
13. Bricks, Pottery, Glass, Cement, etc.
14. Timber, Furniture, etc.
15. Paper, Printing and Publishing
16. Other Manufacturing Industries
17. Construction
18. Gas, Electricity and Water
19. Transport and Communication
20. Distributive Trades
21. Insurance, Banking and Finance
22. Professional and Scientific Services
23. Miscellaneous Services
24. Public Administration and Defence.

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CHAPTER I

Introduction

Post war government policy has had four major objectives: full employment, a favourable balance of payments, stable prices, and a high rate of economic growth. Each one has implications for manpower policy. Full employment entails scarce labour resources. In such conditions employment policy must turn from the problem of finding jobs for all to an examination of the factors determining the distribution of manpower between competing demands. Comprehension of the mechanism by which manpower is allocated between industries is essential for balance between aggregate demand and supply at the full employment level. If this balance is not achieved and some sectors suffer acute labour shortages before the entire labour force can be found jobs, then the increase in incomes required to ensure full employment will lead to a level of imports endangering the balance of payments and to inflation. In such a situation manpower redeployment will be necessary to achieve full employment.

An acceleration in the rate of economic growth also has implications for labour mobility. Since industries grow at varying rates high growth requires that labour move from contracting to expanding industries.¹ Moreover, growth and full employment are not always compatible policy objectives. An increase in the growth rate at full employment requires an acceleration in the rate of increase of labour productivity. This necessitates changes in production processes and installation of new capital, which in turn

¹See W.E.G. Salter, Productivity and Technical Change 2nd edition (Cambridge, Cambridge University Press, 1969), p. 103 et passim.

leads to changes in the structure of demand for labour. Both the producers and the users of these new capital goods encounter shortages of manpower trained to produce and operate them, while workers previously employed on obsolete machinery find their skills are no longer required. If these changes in the structure of demand are not matched by complementary adjustments on the supply side, growth policies may either fail completely or succeed only partially and at the cost of rising structural unemployment. Thus identification and analysis of the mechanism by which the labour supply adjusts to changes in the structure of demand is necessary not only to raise the growth rate but also to reconcile its acceleration with full employment.

The Aggregate Labour Supply

The labour supply can be examined from several points of view. The macro-approach is to study trends and cyclical fluctuations in aggregate labour supply defined to include the number of persons available for employment in the entire economy. Strictly speaking, account should also be taken of the number of hours each person is prepared to work, but data limitations usually prevent anything more comprehensive than a consideration of average hours of employment.

Within the aggregate labour supply, a distinction can readily be made between two kinds of persons who seek jobs.¹

¹ See R.C. Wilcock, "The Secondary Labor Force and The Measurement of Unemployment" in National Bureau of Economic Research, The Measurement and Behaviour of Unemployment (Princeton, Princeton University Press, 1957), p. 169 et passim.

First, People who have a primary commitment to paid employment for most of their adult lives comprise the primary labour supply. This category includes men and unmarried women.

The second group are a more transitory element. These are the housewives, students, semi-retired and casual workers who flow in and out of the labour force at various times in their lives. This group is called the secondary labour supply and its members are distinguished by a less permanent attachment to paid employment. Housewives are the largest component of the secondary labour supply. They account for about two-thirds of female employment in Britain.¹

The justification for this distinction between primary and secondary labour supply is that ^{each has a} ~~they have~~ different elasticity ~~ies~~ with respect to changes in economic conditions. Unless rates of net migration are large as in post war Germany for example, the primary labour supply can change very little in the short run. Those who lose their jobs during recessions must actively search for alternative employment or face, if not starvation, then certainly drastic reductions in living standards, boredom, unhappiness, and a loss of self respect. Admittedly, if the period of unemployment is prolonged a man may give up searching. The associated frustration could even make him unemployable in which case he would no longer be counted in the labour supply. But in the absence of severe and prolonged depression such cases will be relatively rare although there is no doubt that even in the post war

¹ Audrey Hunt, A Survey of Women's Employment (London, H.M.S.O., 1968), p. 9.

period they do occur.¹

The primary labour supply is not entirely unresponsive to changes in economic conditions. Working hours may rise in booms and fall in slumps,² and the propensity of the young to stay in school and the old to retire may vary inversely with employment opportunity. Consequently the primary labour force is not totally fixed by the number of men and unmarried women of working age.

But its elasticity with respect to economic variables is certainly much less than that of the secondary labour supply. The increase in job openings for married women and young persons during cyclical upswings causes secondary participation rates to rise more rapidly to peak levels. These are not sustained in subsequent recessions despite the fact that in many cases secondary workers face greater pressure to seek work owing to the unemployment of the main breadwinner in the family.³

¹ See, for example, Dorothy Wedderburn, Redundancy and the Railwaymen (Cambridge, Cambridge University Press, 1965), p. 47.

² The responsiveness of working hours to economic conditions is mitigated by institutionalized overtime; that is, the tendency for workers (with the tacit agreement of management) to work slowly during regular hours so that overtime will be necessary to achieve production targets. These practices frequently become woven into the institutional framework governing work methods within the plant. Consequently Ullman found that between 1951 and 1965 "levels of overtime in the United Kingdom tended to be relatively independent of relative levels of demand. See Lloyd Ullman, "Collective Bargaining and Industrial Efficiency" in Richard E. Caves et al., Britain's Economic Prospects (London, George Allen & Unwin, 1968), p. 357.

³ See L.C. Hunter, "Cyclical Variations in the Labour Supply: British Experience, 1951-60", Oxford Economic Papers N.S. XV (July 1963), pp. 140-153; T. Dernburg and K. Strand "Cyclical Variations in Civilian Labor Force Participation", Review of Economics and Statistics, vol. XLVI (Nov. 1964), pp. 378-92; and idem "Hidden Unemployment 1953-62: A Quantitative Analysis by Age and Sex", American Economic Review, vol. LVI (March, 1966), pp. 71-95.

Increases in the secondary labour supply can make a considerable contribution to expanding employment demands. Godley and Shepherd, for example, found that the United Kingdom employment rise of 860,000 between 1952 and 1957 was due entirely to an increase in the participation rate. The contribution of demographic factors was negative.¹ The authors of the 1965 National Plan no doubt had these past increases in mind when they called for further policy measures to encourage married women to seek employment.²

Limitations

The major limitations of the macro approach is that it fails to analyze how the labour supply is allocated between competing demands. This problem is always present, but in a full employment economy it becomes acute. Although recruitment of secondary workers can sometimes alleviate manpower shortages, the British secondary labour supply is limited in size and is comprised mostly of married women who are often not substituteable for primary workers. Moreover, even in the absence of full employment firms attract a high proportion of their recruitment from others who in turn replace losses by recruiting from a third group. Thus the creation of a vacancy suitable for an unemployed person or a labour force entrant may result from several job changes by persons already in employment. Analysis of such movements is beyond the scope

¹W.A.H. Godley and J.R. Shepherd, "Long Term Growth and Short Term Policy", National Institute Economic Review, No.26 (August, 1964), p. 27.

²Department of Economic Affairs, The National Plan, Cmd.2764, (London, H.M.S.O., 1965), pp. 36-38.

of the macro approach.

The Plant's Labour Supply

Empirical inquiries into the labour supply problems facing the individual employer and the methods he uses to cope with them have only recently become a subject of academic research. The traditional local labour market study has focused on the behaviour of the employee and his reasons for moving.¹ These investigations provide considerable insight into the motives of job changers and the ease with which they can cross industrial, occupational, and geographical boundaries. But in the absence of information on the employment policies adopted by firms in different labour markets, they do not contribute a great deal to an understanding of the allocatory process at local labour market level.

Fortunately, two studies of the local labour market behaviour of employers have recently appeared. The first, by D. Robinson,² is an impressionistic survey of the techniques employers use to attract and retain labour. The second, by a research team at the University of Glasgow,³ is a detailed investigation of the employment policies adopted by sixty six engineering plants in varying employment conditions. The

¹ See, for example, Margot Jeffreys, Mobility in the Labour Market (London, Routledge & Kegan Paul, 1954); Hilda R. Kahn, Repercussions of Redundancy (London, George Allen and Unwin, 1964); Lloyd G. Reynolds, The Structure of Labor Markets (New York, Harper & Brothers, 1951); H.L. Sheppard & A.H. Belitsky, The Job Hunt (Baltimore, The Johns Hopkins Press, 1966); and Wedderburn, op.cit.

² Derek Robinson, Wage Drift, Fringe Benefits and Manpower Distribution: A Study of Employer Practices in a Full Employment Labour Market (Paris, O.E.C.D., 1968).

³ D.I. MacKay et.al., Labour Markets Under Different Employment Conditions (London, George Allen & Unwin Ltd., 1971) hereafter referred to as The Glasgow Study.

Glasgow study is probably the most comprehensive inquiry into local labour markets ever undertaken in this country and it is particularly relevant here because the period of investigation parallels the present study's time span. The following discussion draws heavily on the results of both these inquiries.

Labour Market Imperfections

The wage employment relationship enshrined in conventional positive sloping labour supply curves is only a useful tool for analyzing the environment in which the firm operates given the following assumptions. First, the employer never offers a package of net advantages (that is, wages plus fringe benefits and other compensations minus an allowance for unusually strenuous or dangerous work or any other features of a job which make it especially distasteful) greater than that which is required to recruit and retain the labour he needs. Second, the man he employs always chooses a job offering the best package of net advantages.

A necessary condition for both these assumptions to hold is that the employer and employee are aware of the alternative packages open to each of them should either terminate the relationship. Both the buyer and the seller of labour services must be well informed about demand and supply conditions in local labour markets if each is to negotiate arrangements maximizing his own net advantages. If either party lacks knowledge of all the available options, its negotiating position is weakened. The ill-informed buyer or seller is then in danger of accepting a second best arrangement even though his intention is to maximize his own interests. Thus the absence of perfect knowledge can prevent the actions of self-

seeking individuals from equalizing the net advantages desired from employment in different occupations. Instead firms operating in the same labour market pay different wages for the same skill and these variations are generally not offset by the existence of non-pecuniary advantages in low wage plants.¹

In fact, empirical investigations into local labour markets have uncovered a wide range of wage payments for particular skills. The dispersion of earnings is frequently so great that commentators often question the possibility of discovering a market rate for a given job.² Thus either assumption one or two must be rejected.

But it does not follow that the reason for the rejection of either assumption is imperfect knowledge alone. The Glasgow study found that interplant wage differentials exhibit considerable stability over time and that managers "had a fairly clear notion" of the locations of their plants in the wage structure. The authors concluded that imperfect knowledge could not account for these observations and that interplant variations in profitability and union bargaining power combined with the possibility that some employers have a non-economic desire "to be thought of as 'a fair employer'" were the main reasons why some of them pay their employees wages in excess of levels required to retain them individually.³

Consequently high wage establishments do not wish to attract

¹ Ibid., p. 12

² Ibid., p. 73. See also Robinson, op.cit., pp. 88-9.

³ The Glasgow Study, p. 95.

abnormally large numbers of recruits. The relatively high quit rates in low wage plants suggest that employees in these establishments are less satisfied than those in high wage factories. But most of this turnover was shown to be fruitless, because vacancies in high wage plants are limited. Persons from low wage plants may well not discover them, and even if they do "attach to known routines" and fear of the unknown may prevent them from moving.¹ Robinson reports that detailed study of one plant revealed that a high rate of labour turnover was due to new recruits not being given the opportunity to earn high wages through overtime.² In other words people accepted jobs in this plant because they misunderstood the package of net advantages they were offered.

The existence of imperfect knowledge is, therefore, the main reason for rejecting the second assumption about labour market behaviour; the principle that employees always choose a job offering the best package of net advantages. Research into the techniques firms use to recruit labour invariably reveals that most vacancies are filled through either an informal "grapevine" or direct application at the factory gate.³ The news media, the employment exchange and the private employment agencies all play a secondary role as channels of recruitment. Thus a person who wanted to make a careful choice between a range of opportunities would have to be prepared to devote considerable time to collection of the required inform-

¹ Ibid., p. 87.

² Robinson, op.cit., pp. 74-5.

³ All the surveys quoted in footnote 2, p. 6, reported that most workers find jobs through friends and relatives or direct application at the factory gate. See also the Glasgow Study, p. 357.

ation, and even then fluctuations in supply and demand could rapidly make his findings obsolete.¹

Moreover, lack of adequate knowledge does not result simply from the failure of employers to advertise a high proportion of their vacancies before filling them. It is also caused by the difficulty of providing an accurate description of the wages and conditions of employment attached to a job. The complexity of many of the wage systems presently in use makes accurate forecasting of the potential earnings of a new worker a hazardous exercise. Much will depend on his own skills and also on factors beyond his control; such as the allocation of work within the plant which determines his piecework and overtime earnings. Conditions of employment are even more difficult to describe. On this point Robinson has written that

Knowledge of actual working conditions, "the atmosphere of the firm", cannot really be obtained from outside the plant. No matter how reliable the source of information, attitudes to working conditions are essentially subjective, so that accurate reporting and therefore the ability to assess are very different or impossible.²

Given these obstacles to informed job choice it is hardly surprising that most workers having once settled into an acceptable job are reluctant to change. A recent government survey on labour mobility found that of persons in continuous employment over the ten-year period analyzed, 56 per cent of

¹ See G.J. Stigler "The Economics of Information", Journal of Political Economy vol.69 (June, 1961), pp. 213-25; idem., "Information in The Labour Market" Journal of Political Economy vol. 70, part 2 Supplement, (Oct. 1962), pp. 94-105; and E.S. Phelps, et.al., Microeconomic Foundations of Employment and Inflation Theory (New York, W.W. Norton & Co.Inc., 1970).

² Robinson, op.cit., p. 86.

the men and 62 per cent of the women had held only one job. Another 18 per cent of the men and 23 per cent of the women had held only two jobs.¹ Another survey of women in employment discovered only one woman in ten seriously considering changing her job and "less than half of these had done anything about it".² In an earlier study of the labour market in a New England city, Reynolds found that 88 per cent of the workers in a sample of the working population wanted to stay with their present employer.³ Purists could, of course, argue that it is potential mobility not actual movement which ensures that the wage structure reflects variations in the marginal disutility of employment. But it is doubtful if a man who has not changed his job for a considerable length of time will be even dimly aware or interested in alternative employment opportunities.⁴

The extent to which imperfect knowledge inhibits labour mobility can, however, be exaggerated. Reynolds maintained that the core of effective labour supply facing the firm were the unemployed with little hope of getting back to their old firms and a few dissatisfied workers who have either left their old jobs voluntarily or are still in employment.

¹ A.I. Harris, Labour Mobility in Great Britain 1953-63: An Enquiry Undertaken for the Ministry of Labour and National Service in 1963 (London, Government Social Survey, 1966), p.56.

² Hunt, op.cit., p.52.

³ Reynolds, op.cit., p.3.

⁴ Persons higher up the occupational ladder are probably more aware of fluctuations in relative demand for and supply of their services. The propensity to advertise a vacancy generally increases with the general skill level required and this leads to greater dissemination of information about market conditions. The Glasgow Study reported that skilled workers were more likely to find their jobs through newspaper advertising than were semi-skilled and unskilled persons. See The Glasgow Study, p.357.

But it is well known that considerable changes occur in the industrial structure of employment over time.¹ Thus, Reynolds's statement can only be correct if these changes in employment patterns can be attributed to variations in the industrial distribution of new entrants or to involuntary mobility. There is no reason, however, to credit new entrants with more informed job choice than their elders who will have had more experience of labour markets. Reynolds himself found that over 90 per cent of the members of a sample of the working population accepted their first job offer after leaving school without considering an alternative.²

Nor can changes in the distribution of manpower be attributed entirely to redundant workers finding new jobs with firms in other industries. This would imply that the rate at which these changes occur increases during recessions. Yet the figures in Table 1.1 demonstrate that this is not the case. These compare male employees (employed plus unemployed by last industry of employment) in manufacturing and services as a percentage of total male employees with a cyclical indicator; the rate of change of the gross domestic product. The manufacturing share of employees can be seen to have risen by 1.23 percentage points between 1959 and 1961 and 1.32 points from 1964 to 1966 as against a fall of 1.02 points between 1961 and 1963 and 0.05 points between 1966 and 1967. The service sector share rose steadily in both upswings and down-

¹See P. De Wolff, et al., Wages and Labour Mobility (Paris, O.E.C.D., 1965), p.41; hereafter referred to as The O.E.C.D. Study, and Salter, op.cit., p.114 et passim.

²Reynolds, op.cit., p.130.

TABLE 1.1

Manufacturing and Service Sector Shares of Total Male Employees*
1959-1968 (per cent)

	Rate of growth of Expenditure on G.D.P.	Manufactur- ing.	Service Sector
1959	1.7	39.9	28.3
1960	5.3	40.9	28.2
1961	3.7	41.2	28.3
1962	2.1	40.7	28.9
1963	4.2	40.1	29.6
1964	5.8	40.4	29.7
1965	3.4	40.8	29.9
1966	2.4	41.5	29.9
1967	1.9	41.4	30.2
1968	1.5	41.5	30.7

*Employees = employed plus unemployed whose last industry of employment was in that sector.

Source: Employees: See Appendix B. Expenditure Growth Rates calculated from quarterly series in Central Statistical Office, Economic Trends, No.192 (October, 1969), Table A, p.XVI.

swings during the nine-year period. Hence voluntary mobility must account for a considerable amount of the changes in the employment structure.

Non Wage Competitive Techniques

Labour mobility cannot, therefore, be regarded as entirely non-purposive. The implications of the imperfections that are known to exist in labour markets are not that firms have little opportunity to recruit the labour they require. Rather, poor communications and other obstacles to mobility diminish the importance of wages and cause other variables to play an important role in determining a firm's labour supply. Thus both high and low wage plants may experience recruitment and retention difficulties unless managers take these non wage factors into consideration. The complement to the argument that people's job choice is determined by non wage considerations and the amount of information at their disposal is that a number of options are available to employers who wish to increase employment levels. One of these will be to raise wages, and plants paying above average rates, regardless of their reasons for doing so, will certainly enjoy a head start in the competition for scarce labour. But it will be seen below that they too may experience manpower shortages if they rely entirely on this method of attracting and retaining labour and fail to adopt any of the non wage competitive techniques.

Essentially the techniques firms adopt to widen the labour supply they face at a given wage fall into five categories: improving communications, promoting internally, reducing the

the barriers to entry that often surround a job, improving conditions of employment and fringe benefits, hiring the services of workers through employment agencies or labour-only sub-contractors, and taking steps to reduce labour turnover and retain labour. This section will consider briefly the effectiveness of each of these techniques.

Improved communications. The first involves improved utilization of the various techniques available to firms wishing to communicate vacancies. Since labour markets are characterized by imperfect knowledge, the firm which succeeds in increasing the spread of knowledge about its job openings gains an advantage over its competitors and widens its labour supply. Vacancies can be publicised in several ways ranging from the posting of a notice outside the factory gate to a well-placed advertisement in the national press or on commercial television.¹ The posting of vacancies would seem a useful technique in view of the results of many studies reporting that most jobs are found through friends and relatives.² But the relative importance of advertising may not be fully reflected by the interviews on which these studies are based. The "tip off" which is supposed to be a primary source of job information may well have come from an acquaintance who saw an advertisement in the newspaper.³ Moreover,

¹ See, for example, Robinson, op.cit., pp.112-113 and 130.

² See above, p. 9. See in particular The Glasgow Study, p.347.

³ This possibility is suggested by the considerable use firms make of advertising. Sheppard and Belitsky, for example, report that although only 4 per cent of persons they interviewed found jobs through the newspapers, 41 per cent of the firms said they made use of local newspapers advertising to recruit labour. See Sheppard and Belitsky, op.cit., pp.89-90 and 182.

the Glasgow research team reported that a significant number of vacancies for skilled workers in engineering plants were filled through newspaper advertisements.

The importance of the employment exchange may also be under-estimated. D.E. data on placements and unfilled vacancies show that in the average month employment exchanges fill about 50 per cent of the vacancies they receive and the Glasgow team's figures on recruitment channels show that engineering plants in Birmingham and Glasgow recruited 20 per cent and 40 per cent of their respective unskilled workers from this source. The extent to which use is made of employment exchanges varies with the size of the plant and the community. The Glasgow team reported that small plants tend to rely more heavily on the exchange's facilities than large units which "seek labour through other channels particularly relatives and friends and casual callers" but that plants in small communities "rely relatively little on the exchanges".¹

The effectiveness of other recruitment channels also varies between localities. Carr and Dufty, for example, showed that there were considerable variations in the use made of different hiring channels between Australia and California.² Thus, the appropriate method for improving communications of vacancies will be determined by the type of job opening and the location of the plant.

¹The Glasgow Study, pp.356-359. Also see below Chapter VI, pp. 202 and 203.

²C.E. Carr and W.F. Dufty, "Recruitment In An Australian Labor Market", Industrial Labor Relations Review, X (1956-57), pp. 578-587.

Internal promotion. The second tactic available to firms wishing to recruit more labour without raising wages is internal promotion and transfer. Recruitment from within the firm introduces the possibility of shifting external labour demand into markets where supplies are more plentiful. Internal promotion was found to be "severely restricted in volume" in engineering, but was a more important source of recruitment in chemicals and steel production.¹ It is difficult to establish how much promotion is due to labour shortages because other factors, notably the desire of the firm to provide attractive career prospects for its employees and seniority rights derived from formal agreements with unions or custom and practice, will often be the major cause. Nevertheless, this option is likely to be exercised on many occasions when the external labour supply is restricted and institutional pressures, such as job demarcation lines do not prevent it.

Reduction of Barriers. A third tactic firms can employ is reduction of the geographic, occupational, or social barriers surrounding a job. Geographic barriers preventing dissemination of job information can be reduced through advertising in areas outside the firm's locality. Personnel officers can be sent into the area to recruit on behalf of the firm. Provision of transport facilities by the firm can alleviate travel barriers, and assistance in finding accommodation plus reimbursement for removal costs can persuade persons living beyond commuting distance to work for the firm.² Reduction

¹ The Glasgow Study, pp. 90 and 323.

² The U.K. social survey on labour mobility found, however, that only 17 per cent of persons moving house did so for work reasons. It reported that "Generally speaking the higher the qualification the more likely it is that the person holding it has moved for a work purpose." Harris, op.cit., pp.14 and 19.

of occupational barriers is possible through provision of training on the job or at local technical colleges.¹ Social barriers resulting from discrimination against certain groups of job applicants on grounds of class, sex, age, or race can also be lowered.²

Conditions of employment and fringe benefits. A fourth option open to firms is improvement of conditions of employment and provision of fringe benefits. The physical conditions surrounding the job can be improved by ensuring that the workplace is clean, well lit, and generally pleasant. Social conditions are made better by improvements in status through the introduction of common dining facilities for workers and management. Hours of employment can be made convenient for part-timers. Housing and travel facilities and medical insurance, sick benefits, holidays with pay and pension schemes can also be provided.

But this particular tactic is generally thought more important for retaining than recruiting labour. The only fringe benefit likely to attract a person into a job is housing, but firms rarely provide it, and with the exception of working hours the potential employee cannot usually determine whether or not he likes the conditions of employment until he has

¹ See Michael Oatley, "The Economics of Training with Respect to the Firm", British Journal of Industrial Relations, VIII (March 1970), pp.1-22 and Brinley Thomas, John Moxham and J.A. G. Jones "A Cost-Benefit Analysis of Industrial Training", British Journal of Industrial Relations, VII (June, 1969), pp. 231-64.

² A report on racial discrimination states that "discrimination in employment is the biggest single criticism by immigrants of life in Britain and it is the area in which the greatest number of individual claims of discrimination were made." But the report also states that discriminatory barriers tend to be lowered when labour shortages become acute. See Political and Economic Planning, A Report on Racial Discrimination (London, PEP, 1968), p.8. For a similar argument on the relationship between racial barriers and the demand for labour based on American experience see Lester C. Thurow, Poverty and Discrimination (Washington, The Brookings Institution, 1969).

taken the job.

Sub-contracting. The fifth possibility is for firms to engage the services of an employment agency which hires out workers or employs labour-only sub-contractors. Although this usually entails paying a higher rate, the firm saves on national insurance contributions, Selective Employment Tax, and fringe benefits. Even if the savings do not offset the higher costs the firm still avoids increasing the general rate for the job.¹

Retention. A firm can widen its labour supply by taking steps to increase the number of recruits it retains. Absence of perfect knowledge about the job he accepts is probably the major reason why a new recruit is more likely to quit than a long service employee. Consequently increased recruitment effort through each of the five techniques listed above will be of little use if the firm cannot retain its labour. This means that recruitment officers must themselves be highly skilled. They must provide an accurate description of a job to an applicant. Misrepresentation can lead to discontent and wastage. They must also choose the right man for the job especially if the firm is seeking to increase its labour supply by reaching across geographical or occupational barriers. Mistakes will again result in wastage. Finally the firm can promote internally and improve conditions of employment and fringe benefits in order to retain labour.

The longer a new employee can be persuaded to remain in a job the easier it is to retain him. In the early days of his employment he may feel insecure and frustrated owing to the

¹ See Robinson, op.cit., pp.102-3.

failure of the job to live up to his expectations. Once he has settled into his work expectations adjust to reality and the increasingly familiar conditions of employment rise in attractiveness relative to the uncertainty attached to further movement. In other words as the period of employment lengthens the effect of imperfect knowledge on the probability of a new recruit leaving changes from positive to negative. Initially imperfect knowledge of the job he has accepted increases the likelihood that he will be dissatisfied and quit. But the longer he remains the more this effect diminishes and the more uncertainty surrounding alternative jobs adds to the probability that he will stay.

Conclusion . From an economic viewpoint the labour-hungry firm can employ any one of the above mentioned options in addition to raising wages. Its choice will be governed by marginal principles. It will adopt that combination of techniques which is expected, after allowance for risk, to yield the largest increase in job applicants for each additional pound spent. But institutional constraints must also be taken into account and these will cause considerable variations in the strategies firms pursue. One firm may be forced by custom and practice to fill a post through promotion, while another may be prevented by craft demarcation lines from upgrading and forced to recruit externally. Male workers may not be willing to allow women to do their jobs, and whites may not accept blacks in the factory. Unions may completely control hiring channels as in the American construction and dock industries. They can prevent firms from lowering occupational barriers and reject any form of labour-only sub-contracting. The number of

institutional factors that can restrict an employer's recruitment activities is so large that few are likely to have the power to adopt a least cost policy without modification.

Quantitative studies of the relative importance of non wage recruitment and retention techniques have yet to be performed. But it is clear that their existence enables firms to overcome many of the obstacles to movement in labour markets. Consequently significant changes in the distribution of employment can be brought about through voluntary as well as involuntary mobility. The high elasticity of the firm's labour supply relative to that which faces the economy in aggregate is thus due not to a high degree of wage competition but to the numerous non wage techniques firms use to compete for labour.

Implementation of these techniques to attract more labour will hereafter be referred to as variations in recruitment effort. Since employers may raise wages to attract more labour, this tactic is also included in the general term, recruitment effort. But it is recognized that this method will be used infrequently owing to the likelihood that it will upset wage structures and generate comparability claims, and adoption of one of the non wage tactics is usually more expedient.

The effectiveness of these non wage tactics in increasing labour recruitment has been shown to follow from the high degree of imperfect knowledge in local labour markets, and the assumption that firms can increase the attractiveness of the jobs that they have to offer through implementation of these tactics will be seen to play an important role in the analysis in Chapter 6. The existence of imperfect knowledge does, however, make retention of labour easier than recruitment once

the new employees have survived the induction crisis. The implications of this point are important to the argument in Chapters 7 and 8.

The Industry's Labour Supply

Macro studies of labour supply are useful for providing a broad picture of trends and cyclical fluctuations in the economy as a whole. Their limitations lie in their failure to allow for the effect of job changing between competing industrial demands. In contrast, micro studies provide a wealth of information and insight into the job changing process at the most disaggregated level. But from an economic policy making point of view a fully comprehensive set of statistics on manpower flows between industrial aggregates is frequently of more interest than a partial account of movements between particular plants. The insights gained from research into local labour markets are not on their own sufficient to provide the basis for more effective management of manpower resources at the macro level. The development of policies designed to achieve what is regarded as a more socially desirable allocation of labour requires application of this knowledge to the study of trends and cyclical fluctuations in labour supply to specific industries. This is the purpose of this study.

Since the barriers which distinguish labour markets from each other are mostly geographic and occupational, a word in defense of the concept of an industrial labour supply is in order. Although the industry in which a man chooses to work is of less consequence to him than the nature of the job and

the place where it is located, changes in regional and occupational structures are mostly caused by fluctuations in industrial performance reflecting the vagaries of consumer taste and the forces of technical change. The supply function facing each industry comprises a skill-location matrix whose elements represent the responsiveness of each skill in each locality to changes in the package of net advantages offered. But estimation of these elasticities requires detailed information on inter-industry mobility which is simply not available. As a result it is necessary to lump the labour of each occupation and region within an industry into one aggregate figure.

An industry's labour supply is comprised of persons with the capabilities it requires who are either unemployed and seeking employment or working in another industry. At any point in time manpower will be flowing into the industry from these sources, partly to satisfy the rising employment needs of expanding firms, and partly to replace persons lost to other industries for which it is itself a supplier. Every industry supplies every other, but manpower flows between certain pairs of industries are greater than movements between others. Several factors govern the number of transfers between industries.

One of these is the degree of similarity in their regional and occupational structures. For example, the U.K. social survey on labour mobility found that 25 per cent of the men in the sample whose previous job had been in Vehicles had moved into engineering while only 19 per cent had remained in the same industry and only another 25 per cent had found jobs

in all the rest of manufacturing.¹ Similarly, a survey of persons made redundant from the British Motor Corporation's Longbridge plant in 1956 reported that 49 per cent of those who did not return to BMC eventually took jobs in engineering, metal goods, metal manufacturing, or other motor vehicles plants and only 13 per cent were employed in all of the rest of manufacturing. The effect of skill and location on these job changes is demonstrated by the fact that prior to redundancy over 80 per cent of the sample were classified to one of the metal, engineering or allied trades and over 30 per cent of total and 60 per cent of manufacturing employment in the region was concentrated in engineering, metal goods, or metal manufacturing industries.²

A second factor affecting the volume of manpower flows between pairs of industries is sheer size. The larger the two industries the greater the number of persons moving between them. Research has also shown that an industry's relative size plays an important role in determining the number of job changers who enter from other industries.³ These results are attributable to two causes: first, occupational and regional boundaries cut across most industries, and secondly, since job changers have imperfect knowledge of alternative employment opportunities they are more likely to find a

¹Harris, op.cit., p. 79.

²Kahn, op.cit., pp. 154-59. The degree of concentration of employment in engineering, metal goods and metal manufacturing was calculated from DE regional employment figures. See Appendix B.

³See G. Thomas, Labour Mobility in Great Britain 1945-1949: An Inquiry Carried Out For The Ministry of Labour and National Service (London, H.M.S.O., n.d.) p. 8.

suitable vacancy in a large industry. But the importance of size can be exaggerated by a high level of data aggregation. Broadly defined, industries are likely to range widely across skill and locational structures concealing the strength of these variables. Unfortunately, most mobility studies are forced by data limitations to employ broad industrial definitions.

Third, variations in industrial age and earnings structures affect mobility between industries. Galloway's study of continuous work history data derived from a 1 per cent sample of the U.S. working population reported variations by age in correlations between an industry's average wages and its net inflows of manpower from other industries. Net movements of men under 25 were directed towards higher wages while those of men over this age tended to be in the opposite direction. Galloway concluded that voluntary mobility in search of higher pay is concentrated among the young, while older persons rely on seniority and promotion to increase their earnings. He attributed most of the observed mobility of older persons to redundancy.¹ In Britain the Second Labour Mobility Survey reported that 72 per cent of the men aged 25-30 in the sample had held at least three jobs in the last ten years of their work history; whereas job changing among older persons was much less frequent.² The survey does not provide the inform-

¹ See Lowell E. Galloway, Inter-Industry Labor Mobility in the United States 1957-1960 U.S. Dept. of Health Education and Welfare Social Security Administration Office of Research and Statistics, Research Report No.18 (Washington, U.S. Government Printing Office, 1967), p. 40.

² Harris, op.cit., p. 57.

ation required to determine whether or not this movement was towards higher paying jobs, but there is evidence from other sources of a tendency for some industries to recruit new labour force entrants at low wages on the tacit understanding that they will leave after a year or so.¹ The implications of such policies is that low wage industries may act as a labour reserve for higher paying ones.

Labour Supply and Labour Mobility

Identification and analysis of an industry's sources of recruitment and loss of manpower is essential for analysis of the factors affecting its labour supply. Information on the gross flows of manpower between industries is, therefore, required. But most labour supply studies are prevented through lack of data from taking this approach. The most comprehensive of all, the O.E.C.D. study, was forced to rely on comparisons of the distribution of manpower stocks between two points in time. As a result the authors were not even in a position to test their major hypothesis: the sensitivity of labour movement to wages. Their conclusion that "changes in wages have not in practice played an important role in the allocation of labour" had to be qualified, because, given the similarity of average wage changes across industries, considerable mobility could be explained by worker movements from low to high wage industries.²

¹The O.E.C.D. Study, pp. 78-9, and R.D. Sleeper "Manpower Redeployment and the Selective Employment Tax" in Bulletin of The Oxford University Institute of Economics and Statistics, vol. 32, number 4, (1970), pp. 273-99.

²The O.E.C.D. Study, pp. 17-20.

This study focuses attention on manpower flows in the British economy over the past decade. The data are found in transfer matrices provided annually by the Department of Employment (D.E.) since 1960. Separate matrices are provided for men and women. They are constructed from a one per cent sample of members of the working population holding national insurance cards and show the industry of employment of all industry changers in the sample in the present and previous June. Hence multiplication of the figure in each cell by 100 provides an estimate of manpower flows between industries from one mid-year to the next.

Aside from normal sampling error the data are subject to several limitations, details of which are found in Appendix A. Only the major points are given here. First, the figures exclude individuals who do not hold national insurance cards. The largest group in this category are the employers and the self-employed. Second, they do not record multi-industry changes by one individual during the year, nor do they convey any information on the length of unemployment, if any, between employment in each industry. But they do record persons moving from one industry to another and then into unemployment between successive Junes as a flow from the first industry to the second. Third, the DE does not correct the figures for changes in the industrial classification of establishments although occasionally adjustments do occur on a significant scale. Such a change occurred in 1966-67 after the introduction of the Selective Employment Tax (SET). The data for this year have, therefore, been adjusted and the method that was used is described in Appendix A.

In addition to these problems associated with the reliability of the data the information they provide is also very limited. The figures are not broken down by either age, earnings, location, or occupation. Nor are they disaggregated below the two digit level.¹ Nevertheless, considerable insight into mobility patterns can be gained from analyzing them, especially when they are examined in the light of the evidence on the forces affecting labour mobility at the micro level.

Research workers often castigate Government departments for failing to provide the data they require. But the case for devoting limited resources to the development of mobility data has yet to be argued. Only Galloway has analyzed the available U.S. data and his work is hardly known in Europe. The 1965 National Plan included no statement of the underlying manpower flows required to achieve its envisaged changes in industrial employment structure, and the O.E.C.D. Study failed to call for an improvement in flow statistics despite the fact that the fundamental question it raised could not be answered in the absence of this information. One objective of this study is to demonstrate the contribution manpower flow data can make to an understanding of labour supply problems.

¹See Central Statistical Office, The Standard Industrial Classification (London, H.M.S.O., 1958).

CHAPTER II

NET MANPOWER FLOWS

Manpower is constantly moving in both directions between any two industries. The large number of variables affecting individual job changing and the diverse manpower requirements of firms sharing a common industrial classification both ensure that at any point in time some workers in Industry A will prefer to work in Industry B, while others in B will find employment in A more attractive. This raises the question of whether manpower mobility studies should focus on the gross flows between two industries, or the difference between them, the net flow, which measures the effect of the mobility process on an industry's employment levels. The procedure followed here is to devote this chapter to an examination of the extent to which individual industries rely on net flows to increase employment. The underlying gross movements between industries will be considered in later chapters.

Net movements ~~of~~ manpower between industries are likely to change considerably with cyclical fluctuations in economic activity. The increase in labour demand during an upswing causes manpower to flow more heavily into industries whose plants compete most effectively. In a downswing the volume of such flows is reduced and counter-flows into lower paying industries where jobs are more plentiful are likely to occur. The present chapter eliminates cyclical factors and concentrates on underlying mobility patterns which occur regardless of the direction of short run changes in the economy. This objective has been achieved by aggregating net flows between

industries over a seven year period. The effect of cyclical fluctuations on mobility patterns is considered in chapters V to VII.

Analysis of the importance of inter-industry mobility to changes in industrial employment requires some measure of the net effect of the other factors affecting employment changes; net movements in and out of employment and between employment and self employment must be considered. But data on these flows are not available. The only other gross mobility data by industry are the statistics on young persons entering employment, and these exclude the over eighteens and persons entering full employment after a spell of holiday or part-time work. In addition, they measure the number of entrants in a calendar year whereas the inter-industry mobility data run from June to June. Nothing is known about the volume of flows by industry into retirement. Nor is there any information on the movements in and out of employment of students, married women and other members of the secondary labour force. Finally, movements between neither employment and self-employment nor employment and registered unemployment are recorded.

The approach taken here is to estimate the net effect of manpower movements from all these sources on an industry's employment level by subtracting net flows between that industry and all other industries from its change in employment during a given period. Changes in industrial employment are, therefore, comprised of two kinds of net movements: net flows, the difference between inflows from and outflows to other industries, and net entrants, a residual taking into account

the net effect of movements between a given industry and self employment, unemployment, and economic inactivity. The term, net exits is used in the text to refer to negative net entrants.¹

AGGREGATED MALE NET FLOWS

The Manpower Balance Sheet

The composition of employment changes varies between industries. Some expanding industries gain labour primarily through net inflows while others do so largely through net entrants. Some contracting industries lose labour primarily through net outflows while others do so largely through net exits. One industry experiences net outflows and still increases employment by achieving a higher volume of net entrants.

Analysis of these differences in industrial net recruitment patterns can be accomplished by arranging the data on net flows, net entrants, and employment changes in the form of a manpower balance sheet. The objective is to highlight the distinction between gainers and losers from the inter-industry mobility process. Table 2.1 presents a manpower balance sheet for men for the seven year period, June 1959 to June 1966. This particular period was chosen because June 1959 marked the start of a new industrial classification and after June 1966 structural changes occurred both in the classification and in the economy itself.²

¹The estimates provided by the net flow and net entrant figures of the contribution of each type of movement to industrial employment changes are slightly distorted by the fact that gross flows include movements from one industry to another and then into unemployment and also transfers from unemployment into an industry differing from the previous industry of employment. See above Chapter I, p.27 and below Appendix A. Such movements are, however, unlikely to have occurred on a sufficiently large scale to upset the following analysis. In any case most of this distortion will cancel out in the net flow figures over a seven year period.

²See Appendix A and also J.K. Bowers and P.C. Cheshire, "The Change in The Relationship Between Unemployment and Earnings Increases: A review of Some Possible Explanations", National Institute Economic Review, LIV (Nov. 1970), pp.42-63; and Sleeper, op.cit., p.277.

Manpower Balance Sheet - Men: 1959-1966 (Thousands)

Industry	Net flow	Net entrants (3-1)	Employ- ment change	Av. annual employment change (%)	Av. employed (%)	Av. Y.P.'s entry (%)
<u>Net Gainers</u>						
Manufacturing	165.6	250.5	415.6	1.0	40.8	37.2
Construction	101.1	147.4	248.5	2.5	10.1	13.0
Gas, Electricity and Water	35.6	0.8	36.4	1.5	2.4	1.1
Insurance, Banking and Finance	29.4	10.7	40.1	1.8	2.2	2.3
Professional and Scientific Services	87.7	99.9	187.6	3.7	5.1	2.4
Miscellaneous Services	17.2	149.4	166.6	2.8	6.0	9.6
Public Administration	144.5	-89.5	55.0	0.8	6.4	4.4
Totals	581.1	568.7	1149.8	1.6	73.0	70.0
<u>Net Losers</u>						
Agriculture, Forestry and Fishing	-181.2	41.2	-140.0	-3.6	3.2	6.6
Mining and Quarrying	-139.7	-113.5	-253.2	-5.3	4.6	2.3
Transport and Communica- tion	-28.1	-32.9	-61.0	-0.7	9.8	3.6
Distribution	-232.1	277.6	45.5	0.6	9.4	17.5
Totals	-581.1	172.4	-408.7	-1.5	27.0	30.0
GRAND TOTALS	0.0	741.1	741.1	0.7	100.0	100.0

Sources

The flow and employment figures are calculated from sources described in Appendices A and B. The proportion of young persons entering each industry was calculated from figures extracted from the MoL Gazette (May, 1967), p.382 back to MoL Gazette (June, 1960), p.237.

Industries are shown above the line if they achieved net inflows and below the line if they experienced net outflows. An industry need not, of course, increase its employment if it is above the line nor need it lose labour if it is below the line. Net inflows could be more than offset by net exits causing an industry above the line to lose labour. If this were the case, the industry could be expected to employ large numbers of older persons and to attract a relatively low share of the young persons entry. Similarly, an industry below the line could experience net entrants greater than net outflows and add to its manpower stocks. It would then be expected to attract a relatively high proportion of the young persons entry.

Eight industries appear above the line and although all can be seen to have raised employment levels, considerable variations can be observed in the sources of this expansion. Manufacturing, construction, and professional and scientific services all achieved about 40-45 per cent of their manpower increases from net flows; miscellaneous services relied almost entirely upon net entrants; gas, electricity and water, and insurance and banking had larger net flows than net entrants; and public administration experienced net exits.

Four industries appear below the line. Together they supplied 581 thousand persons net to the rest of the economy. This figure can be seen to represent about 50 per cent of the employment increase of the expanding industries above the line and provides an indication of the importance of the inter-industry mobility process to growing industries. But not all industries below the line were themselves declining.

One of them, distribution, can be seen to have itself increased employment by 3.4 per cent in spite of net outflows of 232 thousand to other industries.

The remaining three industries all experienced employment declines but again significant differences can be observed in the composition of these changes. Agriculture, forestry, and fishing experienced large net outflows and net entrants; mining and quarrying had net outflows in excess of net exits; transport and communications experienced net exits slightly greater than net outflows.

These differences between industries in the composition of their employment increases are reflected in variations in the propensities of each to recruit young persons. An industry's size is clearly the most important factor determining the number of young persons it recruits. But if it were the only factor, its share of total employment would equal its share of the young persons entry. Yet, the data in columns 5 and 6 of Table 2.1 reveal that these two figures frequently diverge from each other. Industries with small net entrants or with net exits recruit relatively small numbers of young persons. Mining and quarrying; transport and communications; public administration; and gas, electricity and water all attracted a percentage of the young persons entry smaller than their average annual employment shares. Conversely, industries with high net entrants recruit relatively large numbers of young persons. The percentage of young persons taking their first jobs in agriculture, forestry and fishing, and distribution was twice the size of each industry's average annual employment

share. In miscellaneous services the young persons entry was one and one-half times as great as its employment share.

Industries relying heavily on both net flows and net entrants could be expected to recruit a share of the young persons entry about equal to their employment shares. The figures for manufacturing and construction are consistent with this expectation, although construction's share in the young persons entry is somewhat inflated by the large number of apprenticeships it offers. Professional and scientific services also experienced equal numbers of net flows and net entrants. This industry's dependence on net flows may seem unduly high given the training its entrants require. But net entrants are lower than might be expected because a high retirement rate offsets the large recruitment of labour force entrants into the professions. The industry's low share in the young persons entry occurs because most professional persons do not enter employment until after eighteen and so are not included in the figures.

The Manpower Flow Matrix

The manpower balance sheet analyzes each industry's relative dependence on net flows. This section examines net manpower movements between industries for the 1959-66 period. The matrix in Table 2.2 presents the data. Each industry is assigned a row and its net flows from each of the other industries appear in the cells of each row. Each industry is also assigned a column and its net outflows to each of the others are found in the cells of each column. The volume of net flows from distribution into manufacturing, for example, is found in the cell in the distribution column and the

Table 2.2 - Net Manpower Movements between Industries: Men 1959-1966 (thousands)

Industry	(1) Ag. For. Fish	(2) Min- ing etc.	(3) Distr. Trades Serv.	(4) Misc. Serv.	(5) Trans. Comm.	(6) Mfg.	(7) Con- str.	(8) Gas Elec. Water Fin.	(9) Ins. Bank. Fin.	(10) Pub. admin.	(11) Total Net In- flows	(12) Total Net Out- flows	(13) Net Flows (11 - 12)	(14) Av. (%) Employment growth due to net flows	(15) Av. (£) Wages (manual workers only)
Ag. For., Fish.											0.0	181.2	-181.2	-5.8	18.08
Mining etc.	4.7										4.7	144.4	-139.7	-2.8	23.35
Distribution	15.8	6.2									22.0	254.1	-232.1	-2.8	20.08
Misc. Serv.	12.2	8.9	27.6								48.7	31.5	17.2	0.3	19.53
Trans. & Comm.	12.9	5.8	17.0	6.1							41.8	69.9	-28.1	-0.3	24.84
Manufacturing	48.2	71.1	126.1	6.3	26.4						278.1	112.5	165.6	0.4	24.97
Construction	45.2	28.6	23.8	7.4	7.5	31.7					144.2	43.1	101.1	1.1	24.59
Gas. Elec., Water	4.5	3.5	7.9	2.1	3.7	11.2	3.4			2.0	38.3	2.7	35.6	0.2	21.89
Ins., Bank., Fin.	4.1	1.7	9.1	1.6	3.7	6.2	2.7	2.2			31.3	1.9	29.4	1.4	19.30
Pub. Admin.	23.9	12.1	23.3	6.8	18.1	38.8	26.3		1.9		151.2	6.7	144.5	2.1	20.54
Profess. & Scien. Serv.	9.7	6.5	19.3	1.2	10.5	24.6	10.7	0.5	0.0	4.7	87.7	0.0	87.7	1.8	18.77
Totals	181.2	144.4	254.1	31.5	69.9	112.5	43.1	2.7	1.9	6.7	848.0	848.0	0.0	0.0	23.56

Source: Figures calculated from sources described in Appendix A.

manufacturing row. If there is no net flow from one industry to another because the net flow is in the opposite direction, the cell is left blank.

Table 2.2 represents an attempt to arrange the order in which industries appear so that the direction of net movements is consistently downwards. If such an arrangement can be achieved, all the cells in the lower left half of the matrix would be occupied and all those in the upper right would be blank. But suppose there are net movements from A to B, B to C and C back to A. Some cells in the right half of the matrix will then be occupied and the downward movement of net flows would be upset by cross currents.

One instance of triangularity can be observed in the Table. Net flows can be seen to move from gas, electricity and water into insurance, banking and finance; from insurance, banking and finance into public administration; and from public administration back into gas, electricity and water. Consequently, the ordering of these three industries is purely arbitrary. Any one could be assigned the top row and there would always be one instance of 'doubling back'. But this is the only exception to the general pattern which reveals a consistent net movement of manpower from industries at the top of the Table to those at the bottom.

Column 13 presents each industry's average annual employment growth rate attributable solely to net flows.¹ The

¹ These were calculated by the following formula

$$g_i = 100 \left(\sqrt[n]{\frac{X+NF}{X}} - 1 \right)$$

where

g = annual net flow growth rate in industry i
 X = employment in industry i in 1959
 NF = net flows into industry i between 1959 and 1966.

ordering of the industries as net suppliers and net receivers of manpower can be seen to follow very closely the ranks of these growth rates. Industries at the top of the table experienced the highest net outflows relative to employment size while those at the bottom had the highest net inflows relative to their manpower levels.

It is clear that the ranking of industries as net exporters and net importers is hardly disturbed at all by reverse movements. This steady downward net movement of manpower from those experiencing the highest net outflow rates to those with the highest net inflow rates is a remarkable phenomenon. The next four sections will attempt an explanation.

Wages and Mobility

The net flows of labour from the top to the bottom of Table 2.2 could reflect movements from low to high wage industries. This possibility was mentioned in the O.E.C.D. Study as a major qualification of its conclusions. It is also consistent with the findings of Galloway, Hill, and the Glasgow Study.¹

A simple test of this hypothesis is to observe whether or not average earnings increase with movements down the rows of Table 2.2. But there are two difficulties. First average earnings data are not available for all two digit industries for the 1959-66 period. The figures for that period exclude

¹See above, Chapter I, p.26. T.P. Hill, "Wages and Labour Turnover", The Bulletin of the Oxford University Institute of Economics and Statistics, XXIV.2 (May 1962), pp.185-233; and The Glasgow Study, p.146 et passim.

several of the largest non-manufacturing industries such as distribution and miscellaneous services. The Department of Employment did not launch its first fully comprehensive earnings survey, the New Earnings Survey (NES), until 1968.

One way to overcome this problem is to calculate average earnings from the 1968 NES and treat these figures as a measure of relative earnings on the assumption that the inter-industry earnings structure is stable over time.¹ The results of most research justify this assumption and further evidence supporting it will be given below.²

The second problem is that variation in average earnings between industries are small relative to the dispersions of individual earnings around each industrial mean. Table 2.3 presents average earnings for male and female manual workers in each of the 24 two digit industries. The figures were calculated from the 1968 NES. In addition, the Table presents each industry's mean earnings as a percentage of the all industry average. With two exceptions - agriculture, forestry and fishing, and professional and scientific services, where figures on manual employees do not represent the incomes of most employees - no industry's mean earnings are more or less than 20 per cent of the all industry average. Yet Table 19 of the NES shows that in most industries 50 per cent of the individual pay packets differ from the industry mean by 20 per cent or more. The intra-industry distribution

¹Department of Employment, New Earnings Survey 1968 (NES) (London, H.M.S.O., 1970), pp.69-74.

²See The O.E.C.D. Study, pp. 21-31; Salter, op.cit. pp.107 and 197; A. Dicks Mireaux and J.R. Shepherd, "The Wages Structure and Some Implications For Incomes Policy", National Institute Economic Review, 22 (Nov. 1962), p.39; and Table 2.8 below.

TABLE 2.3

Average Wages in Each Industry as a Percentage of Average Wages in All Industries

INDUSTRY	MEN		WOMEN	
	Av. Wages £	% of Mean	Av. Wages £	% of Mean
Agriculture, forestry, fishing	18.08	76.7	n.a.	n.a.
Mining and quarrying	23.35	99.1	n.a.	n.a.
Food, drink and tobacco	23.71	100.6	11.40	100.0
Chemicals & allied industries	24.94	105.9	11.94	104.7
Metal manufacture	25.49	108.2	n.a.	n.a.
Engineering and electrical goods	24.83	105.4	12.51	109.7
Shipbuilding and marine engineering	25.47	108.1	n.a.	n.a.
Vehicles	27.07	114.9	n.a.	n.a.
Metals goods n.e.s.	24.29	103.1	11.86	104.0
Textiles	23.06	97.9	12.22	107.2
Leather, leather goods, and fur	n.a.	n.a.	n.a.	n.a.
Clothing and footwear	21.96	93.2	12.07	105.9
Bricks, pottery, glass, cement, etc.	24.43	103.7	n.a.	n.a.
Timber, furniture, etc.	23.34	99.1	n.a.	n.a.
Paper, printing & publishing	27.61	117.2	12.16	106.7
Other manufacturing industries	25.85	109.7	11.99	105.2
Construction	24.59	104.4	n.a.	n.a.
Gas, electricity and water	21.89	92.9	n.a.	n.a.
Transport & communication	24.84	105.4	16.59	145.5
Distributive trades	20.08	85.2	9.94	87.2
Insurance, banking & finance	19.30	81.9	n.a.	n.a.
Professional & scientific services	18.77	79.7	10.71	93.9
Miscellaneous services	19.53	82.9	9.96	87.4
Public administration & defense	20.54	87.2	12.30	107.9
Manufacturing	24.97	106.0	12.14	106.5
Non-Manufacturing	22.34	94.8	10.64	93.3
All Industries	23.56	100.0	11.40	100.0

Source: Figures calculated from Tables 45 and 46 in D.E., New Earnings Survey 1968 (London, H.M.S.O., 1970), pp.69-73

of earnings is much greater than the inter-industry distribution. Female average industrial earnings are even less widely dispersed although the NES indicates that variations around each industrial mean are also lower. Given these difficulties any attempt to treat inter-industry wage differences as a factor affecting mobility must proceed cautiously.

Nevertheless the figures in Table 2.3 show that there are significant inter-industry earnings differentials. Certainly these are large enough to account for the net movements of manpower observed in Table 2.2. The earnings data are, therefore, presented in the last column of that Table for comparison with the ordering of the industries. If average earnings rise with movement down the Table, the theory that net manpower flows are from low to high wage industries receives empirical support. But the figures can be seen not to move in this way. The three highest paying industries - transport and communications; manufacturing; and construction - are found in the middle of the Table; the fourth highest - mining and quarrying - is found at the top; and two of the three lowest paying industries - insurance, banking, and finance, and professional and scientific services - are at the bottom.

But three qualifications must be added. First, projection of the 1968 figures back to the 1959-66 period probably overstates relative wages in transport and communications, because productivity bargaining is likely to have improved this industry's position in the earnings structure between 1965 and 1968.¹ Second, since the earnings data are restricted to

¹ See National Board For Prices And Incomes (NBPI) Reports Nos. 1, 8, 14, 48, 50, 63 and 94 (London, H.M.S.O., 1965-68).

manual workers, the figures for insurance, banking and finance, and professional and scientific services are not meaningful. Third, mining and quarrying might also be excluded because the relative wages hypothesis can hardly require that net flows into a declining industry be positive even if it does pay above average wages.

Taking these three factors into account the earnings data may not be so inconsistent with the relative wages hypothesis. If mining and quarrying and transport and communications are excluded, the direction of net flows in Table 2.2 would suggest that net movements of labour are from low to high wage industries. The positive net flows into the three white collar industries at the bottom of the Table might seem to imply an unrealistic degree of social and occupational mobility. But in fact they give no indication of the volume of such movements relative to total flows and may only suggest that the numbers moving up the social hierarchy exceed the numbers going down. An alternative explanation is that these net movements reflect transfers from manual work into lower grade administrative and clerical employment where little training is required and wages are below average levels in manufacturing and construction. Such movements do not contradict the relative wages hypothesis. The correct specification of that theory requires that relative wages be defined to include both the pecuniary and the non-pecuniary advantages of employment. It is likely that persons who move into white collar industries are prepared to sacrifice high wages for better job security and working conditions.

In summary relative wages do not provide an adequate explanation of the ordering industries in Table 2.2. But the possibility that they are one of the factors influencing net flows

cannot be ruled out. The next two sections will introduce a further dimension into the argument.

Age and Mobility

Research into labour mobility invariably reveals a tendency for persons to change jobs less frequently as they grow older. But the relationship between age and mobility is not simply inverse. The propensity of males to change jobs has been found by most investigators to increase up to the late twenties and then decline progressively until the years immediately preceding retirement when it again rises.¹

The explanation for this phenomenon is less easy to establish. The factors affecting mobility include income requirements, promotion prospects, job security, physical ability and stamina, occupational training and its transferability to other firms, family commitments, housing requirements, pension arrangements, and the psychological costs associated with job changing. Since all of these change over a person's lifetime assessment of the relative importance of each one to the age-mobility relationship is difficult.

The tendency for new labour force entrants to enter low wage employment is well documented. The income expectations of teenagers are lower than those of adults, and their job choice is limited geographically because they continue to live at home.² Moreover, restricted entry into apprenticeships,³

¹The O.E.C.D. Study, pp.55-56; L.C. Hunter and G.L. Reid, Urban Worker Mobility (Paris, O.E.C.D., 1968), p.48; and H.S. Parnes, Research on Labor Mobility; An Appraisal of Research Findings in the United States, Bulletin 65 (New York, Social Science Research Council, 1954), p.102.

²The O.E.C.D. Study, p.78.

³Hunter and Reid, op.cit., p.139.

imperfect knowledge of employment opportunities, and a tendency for employers in high wage plants to discriminate against young persons who they regard as unstable,¹ frequently leads to their entry into low wage employment.

But as the young person matures his job horizons widen and his movements increase. First, the breaking of parental ties is often followed by a rise in geographic mobility and a search for jobs providing occupational training with good career prospects. Second, taking on the role of family breadwinner increases current income expectations and leads the worker now in his twenties to seek employment in high wage industries. Third, employers seem to realize that young persons all go through this maturation process. They adjust their hiring policies accordingly and in so doing contribute to the rise in mobility rates for persons in their twenties. The Glasgow Study found that engineering employers hiring highly paid semi-skilled worker had

...a tendency to discriminate against young and old applicants in favour of those² aged 25-40 especially if they are married.

In other words, people in their twenties find more opportunities for improving income and career prospects through mobility than teenagers simply because they are older.

The decline in mobility rates for persons over thirty is due to several factors. First, the longer a person remains in a firm the more job security he enjoys. This is especially true in the United States, where the seniority system is

¹ The Glasgow Study, p.361

² Ibid.

"more or less rigidly adhered to in sizeable sectors of the labour force."¹ In Britain long service also offers some protection against redundancy, but the system is less well-established. The Glasgow Study found that

The great bulk of the case-study plants applied the seniority principle on a departmental or even on a job basis rather than across the plant. This means that, where the incidence of redundancy was uneven across the range of jobs in a plant, the redundant employees were likely to contain a higher proportion of long-service employees than would have been the case if seniority had been applied on a plant wide basis with attendant 'bumping'.²

The implication is that although seniority is taken into account in determining redundancies it is often not the deciding factor.

Second, persons over thirty often find that mobility is no longer a vehicle for improving income and career prospects. Such persons are more likely to have acquired skills not easily transferred to other plants. Movement to another firm could well involve retraining and loss of income during the learning process. Conversely, the employer will be reluctant to lose labour trained to satisfy his specific requirements. He will try to retain persons who have acquired experience by offering more attractive income and conditions of employment in order to avoid the costs of training replacements.³ The Glasgow Study found evidence to support this point. The authors reported that in a 'tight' labour market voluntary quit rates among engineering workers were highest for those

¹ Parnes, op.cit., p.39.

² The Glasgow Study, p.383.

³ G.S. Becker, Human Capital (New York, National Bureau of Economic Research, 1964), pp.21-22.

with less skill and suggested as an explanation "that skilled males are likely to possess attributes which are in greater or lesser degree not directly transferable."¹

But the role of training in reducing mobility must not be exaggerated. The Study's evidence shows that it is mainly skilled workers who are affected. About 40 per cent of the labour force was classified as semi-skilled or unskilled in 1961² and it seems safe to assume that movement within the lower skill categories requires little or no retraining.³ Moreover, there are cases, especially in white collar occupations, where training and job experience widen an individual's range of employment opportunities. Frequently promotion depends on job changing up to the early forties.⁴ In the United States it is common for seniority rules to require persons entering a firm to start at the bottom of a pay structure based on years of service. The economics of job-specific training might be thought to justify such practices. But the fact that American unions have negotiated these agreements suggests that in their absence people can and frequently do move between firms at any level of the job hierarchy. In Britain seniority rules are much less rigid and probably contribute little to the decline in mobility rates of persons over thirty.

Third, there are numerous personal and psychological costs associated with mobility all of which increase with age.

¹The Glasgow Study, pp.172-73.

²Ministry of Labour, Manpower Studies. No.6, Occupational Changes, 1951-61 (London, H.M.S.O., 1967), pp.22-23

³The Glasgow Study, p.286.

⁴Hunter and Reid, pp.76-77.

Family commitments and housing requirements reduce the geographic mobility of a man over thirty. Pension arrangements may tie him to a specific firm, although British evidence suggests that the immobilizing effects of pension schemes are not very great.¹ The psychological costs of movement are assigned a major role by all writers on the subject. Uprooting oneself from a job becomes increasingly difficult with advancing age. It usually involves a loss of prestige associated with length of service, a break from existing work habits, which become more firmly engrained with age, and adjustment to a new and unfamiliar environment. Thus, it seems likely that the psychological costs are a major factor explaining the decline in mobility rates of persons over thirty.

The rise in mobility rates for persons approaching retirement is a phenomenon which has only recently been mentioned in the literature. A decline in physical ability, impairment or obsolescence of a particular skill, or a lowering of income requirements due to reduced family commitments often leads to movement into less demanding jobs in the service sector. The Glasgow Study's evidence on the frequent failure of the seniority principle to protect older persons from redundancy suggests that this rise in mobility before retirement is often involuntary. But many of the workers who find they are physically unable to sustain their former productivity rates on a job may move voluntarily into lighter work.²

The notion that income can be sacrificed for easier work

¹Ibid., p.134.

²Ibid., p.150.

may appear to contradict the evidence cited above¹ that wage differentials are generally not offset by non-pecuniary considerations. This, however, would only be correct if that evidence excluded any possibility of a trade-off between income and effort. Clearly this is not the case. Although earnings variations generally reflect differences in net advantages there are still many opportunities for older persons to trade lighter work for less income.

But the terms of trade they face are not always the same. Some older persons may be lucky and find less arduous work at only slightly lower wages in the same plant. Others will be less fortunate and have to move into the lower paying service sector where easier jobs are more plentiful. Market imperfections do not eliminate choice. They simply lead to variations in the options open to different individuals with the same abilities.

The Life Cycle and Mobility: Hypothesis

The implication of the research findings summarized above is that several modifications should be added to the relative wages hypothesis to allow for the age-mobility relationships. First, the tendency for high wage firms to restrict recruitment of teenagers to those entering apprenticeships combined with the low income expectations and haphazard methods of job search of this age group explains the tendency for large numbers to enter agriculture, forestry and fishing, and the two largest service industries. Second, the large net flow of manpower into manufacturing reflects the movements of

¹See above, Chapter I, p.8.

persons in their twenties whose income expectations rise as they marry and start families. Unfortunately British mobility data is not disaggregated by age so that it is impossible to observe this inflow directly. But Galloway found evidence for such movements from American data and the Glasgow Study's finding that engineering employers prefer to recruit persons aged 25-40 suggests a similar phenomenon occurs in this country.

Finally, the net flow of manpower into gas, electricity and water; insurance, banking and finance; and professional and scientific services reflects a reverse flow of older persons from high wage manufacturing employment into less strenuous and lower paying service sector jobs. Galloway observed this "reverse" flow of older employees into low wage industries in American data and attributed it to a decline in voluntary relative to involuntary movements, the latter of which he thought were constant across all age groups. The fact that in Britain seniority principles are applied with less rigidity in the determination of redundancies suggests that in this country the reverse flow phenomenon is even stronger.

The implication is that the entire service sector experiences a net inflow of older employees from manufacturing and construction. Distribution and miscellaneous services appear at the top of the table because their net losses of younger persons to manufacturing exceed their net intake of older persons, while gas, electricity and water; insurance, banking and finance; public administration; and professional and scientific services are found at the bottom because they recruit smaller numbers of labour force entrants into manual jobs and hence lose fewer young persons to manufacturing. These

industries rely mostly on recruitment of older persons seeking lighter work to fill vacancies in manual and low level clerical posts and their positions in the Table are explained by job changing of this type.

In summary the picture of the mobility process emerging from the above analysis is of a tendency for many male employees to spend the prime of their working lives in the high paying manufacturing and construction industries, but to enter and leave the labour force through low wage industries outside the manufacturing sector. Distribution; miscellaneous services; and agriculture, forestry and fishing all intercept large numbers of teenagers flowing into employment and the entire non-manufacturing sector provides jobs for older persons leaving manufacturing who are not yet ready to retire. The absence of inter-industry mobility data disaggregated by age prevents direct confirmation of the life cycle hypothesis. But evidence supporting it can be found from an examination of industrial employment structures by age groups. The next section presents the results of this analysis.

The Life Cycle and Mobility: The Evidence

An age analysis of employment in each industry is provided annually by the Department of Employment. The data are derived from the same source as those on inter-industry mobility; the one per cent sample of the working population. The figures for each industry include both the employed and the unemployed whose last job was in the given industry.¹ Consequently, they exhibit no significant cyclical variation.

¹The D.E. defines the term employees as the sum of the employed and the registered unemployed. The term is used in this way in the text whenever reference is made to data on employment shares by age groups.

Table 2.4 presents each industry's employed and unemployed as a percentage of total employed and unemployed in each age group. Average earnings for each industry are shown in the bottom row.

The employment shares of agriculture, forestry, and fishing; distribution; and miscellaneous services all start at peak levels with the under eighteens, fall steadily up to the 40-44 age bracket; and then rise with movement into older cohorts. Similar behaviour can be observed in insurance, banking, and finance, except that in this case the initial peak is in the 18-19 age group, presumably reflecting higher educational requirements for entry into this industry. This saucer shaped pattern can be contrasted with the hump in the manufacturing employment shares in the 25 to 44 age groups.

The implication is that manpower flows into manufacturing are comprised primarily of younger members of the labour force moving from the low wage primary and tertiary industries they entered initially into the higher paying skilled and semi-skilled jobs which manufacturing has to offer. Conversely, manpower flows out of manufacturing include mostly older persons who are either redundant or moving voluntarily into lighter work before retirement. The figures for these industries are, therefore, consistent with the life cycle hypothesis.

With the exception of construction where employment data are less reliable due to the large number of self-employed,¹ the remaining industries all experienced a rise in employment

¹ See Report of the Committee of Inquiry under Professor E.H. Phelps Brown into Certain Matters Concerning Labour in Building and Civil Engineering, Cmnd.3714. (London, H.M.S.O., 1968), pp. 14-15.

TABLE 2.4

Each Industry's Average Percentage of Male Employees* in each age group: 1961-1963

Age Group	Ag. for. fish.	Min- ing etc.	Mfg.	Con- str.	Gas elec. water	Trans. comm.	Distr.	Ins. bank. fin.	Prof. & sc. serv.	Misc. serv.	Pub. admin.
Under 18	5.7	3.4	38.9	12.8	1.0	4.5	18.6	1.5	2.2	9.4	2.0
18-19	4.8	3.0	39.0	14.0	1.6	6.3	13.0	2.5	3.7	8.9	4.0
20-24	4.0	3.8	39.8	14.0	1.8	8.3	10.0	2.3	4.8	6.6	4.7
25-29	3.2	4.1	42.1	12.0	2.0	9.0	8.9	2.2	5.7	5.8	4.9
30-34	3.2	4.1	41.7	11.6	2.5	9.7	8.8	2.2	5.4	5.4	5.3
35-39	3.0	5.3	43.6	10.1	2.4	10.0	8.4	2.2	4.6	4.9	5.7
40-44	2.6	5.2	43.3	9.4	2.8	10.1	8.1	2.0	5.1	4.8	6.7
45-49	2.8	5.5	41.4	8.9	2.8	9.8	8.6	2.1	5.5	5.2	7.7
50-54	2.8	5.6	39.9	8.2	2.7	10.3	8.9	2.6	5.4	5.3	8.3
55-59	3.3	5.9	39.3	7.7	3.0	11.3	8.1	2.6	4.8	5.4	8.8
60-64	3.1	6.4	38.7	6.5	3.0	12.2	7.4	2.6	4.8	6.0	9.9
65 & over	4.8	0.9	34.5	6.1	0.8	8.3	12.5	2.6	6.6	12.3	9.3
Av. earnings (£s)	18.08	23.35	24.97	24.59	21.89	24.84	20.08	19.30	18.77	19.53	20.54

*Employees = employed plus registered unemployed.

Source: MoI. Gazette, (June 1962) pp 219-221 and (June 1964) pp 239-241.

shares with movement into older age groups. In transport and communications this is due to a low inflow of young persons and a high rate of retirement while in mining and quarrying it reflects the fact that many young persons have first entered and then left this industry. Table 2.1 shows that most of the employment decline in transport and communications was due to negative net entrants, whereas in mining and quarrying over 50 per cent of the fall in manpower was due to net outflows to other sectors.

The employment shares of both professional and scientific services and insurance, banking and finance can also be seen to increase with advancing age. But in these two cases the rise is less smooth. The figures for professional and scientific services increased sharply up to the 25-29 cohort and then drop abruptly for persons in their thirties. The increase in employment shares up to the 25-29 cohort is undoubtedly due to the large intake of graduates. The decline for persons in their thirties and early forties could be due to increased movements of professional people into other industries or self-employment. But a more likely possibility is that twenty years earlier the war interrupted the education of members of these age groups and a significant number failed to complete their professional training. Hence the share of professional and scientific services in these age groups is abnormally low.

It is equally possible that past history has affected the employment shares of all the industries. The data in Table 2.4 may not then reflect a tendency for individuals to move between industries during their working careers. Rather these differences in each industry's proportion of total employees

may result from past variations in employment growth rates. Average annual employment growth rates were, therefore, calculated over five year intervals comparable to labour force entry dates for several of the cohorts shown in Table 2.4. The figures appear in Table 2.5. It can be seen from the table that there is a tendency for growth rates in manufacturing and distribution to move inversely with each other. Manufacturing experienced its highest rate of employment growth in 1933-1937 and its second highest increase between 1938 and 1948. This could explain the large manufacturing share of total persons employed in the 30-44 age group. Similarly the high growth rates experienced by distribution in the 1920s and 1950s and its low rate of expansion in the 1930s and 1940s could account for its large share of both young and old labour force members in 1961-1963 and its low percentage of persons in the middle age groups.

If, however, each industry's share of total manpower in each age group is determined primarily by its past history of employment growth and not by the inter-industry mobility process, similar employment shares for an earlier period should behave differently. The percentage of persons in each age group employed by each industry was, therefore calculated for the 1951-53 period. The figures are shown in Table 2.6. They are not entirely comparable with those in Table 2.4 because they are based on the 1948 S.I.C. Nevertheless, they provide the basis for a rough comparison sufficient for present purposes.

The Table shows that data for this earlier period behave in a manner fairly similar to the figures for 1961-63. Agriculture, forestry and fishing; distribution; and miscellaneous

TABLE 2.5

Average Annual Percentage Employment Growth Rates By Industry: 1923-1957

Dates of Entry:	1923-27	1928-32	1933-37	1938-48	1948-52	1953-57
Age of Cohort in 1962:	50-54	45-49	40-44	30-39	25-29	20-24
<u>Industry</u>						
Agriculture, forestry & fishing	-0.8	-1.7	-1.8	-0.6	-1.5	-1.2
Mining and quarrying	-3.6	-4.0	0.7	-0.3	0.0	-0.4
Manufacturing	1.5	-3.8	4.4	1.8	1.2	1.3
Construction	5.0	-2.4	3.8	1.6	0.0	1.5
Gas, electricity & water	2.5	2.9	6.4	1.1	3.8	0.4
Transport & communication	1.0	-1.0	0.3	0.9	-0.5	-0.4
Distributive trades	3.3	2.4	1.5	-1.6	1.5	2.3
Insurance, banking & finance	2.4	1.0	2.2	-0.6	1.0	2.5
Professional and scientific services	1.2	1.5	2.2	3.0	3.3	2.9
Miscellaneous services	2.4	1.9	2.4	2.7	-1.5	-0.5
Public administration & defense	0.5	1.5	3.0	6.7	-1.2	-2.4

Source: Figures calculated from Table 59 in C.H. Feinstein, National Income, Expenditure and Output of the United Kingdom, 1855-1965 (Cambridge, Cambridge University Press, 1972), forthcoming.

TABLE 2.6

Each Industry's Average Percentage of Male Employees* in each age group: 1951-1953

Age Group	Ag. for fish.	Min-ing etc.	Mfg.	Con-str.	Gas elec. water	Trans. comm.	Distr.	Ins. bank. fin.	Prof. & sc. serv.	Misc. serv.	Pub. admin.
Under 18	7.8	5.6	46.3	11.6	1.0	6.9	12.2	1.3	2.2	3.4	1.7
18-19	6.6	8.2	40.5	16.7	1.7	8.8	6.1	1.0	3.3	2.5	2.2
20-24	6.5	5.2	40.6	12.8	2.1	10.4	9.0	1.9	3.7	2.7	4.8
25-29	4.9	6.0	43.4	10.8	2.2	10.5	8.1	1.9	4.1	2.6	5.6
30-34	4.2	5.9	43.8	10.2	2.5	10.6	7.9	1.7	4.3	2.7	6.4
35-39	4.3	6.2	42.6	9.5	2.5	10.4	8.1	2.1	4.4	2.9	7.1
40-44	4.2	6.3	41.5	9.1	2.7	10.8	8.6	2.4	4.1	3.1	7.4
45-49	4.6	6.8	40.5	8.4	2.8	11.4	7.8	2.5	4.0	3.3	7.8
50-54	4.1	6.9	39.7	6.7	3.1	12.9	6.9	2.3	3.7	3.6	9.9
55-59	3.8	6.7	39.7	6.0	2.7	13.6	6.9	2.0	3.5	4.0	11.2
60-64	4.8	6.6	39.6	6.6	2.7	11.0	7.2	1.5	3.8	4.6	11.0
65 & over	7.6	5.2	42.0	8.3	1.3	6.6	8.7	1.8	4.3	6.6	7.8

*Employees = employed plus registered unemployed.

Source: Mol. Gazette, (June 1952), pp.197-199 and (June 1954), pp.187-189.

services all exhibit the familiar saucer shaped pattern and manufacturing employment shares are humped as the life cycle hypothesis would predict. But manufacturing had its largest employment share in the under 18 cohort and its percentage of persons over 65 is also greater than expected. These observations reflect greater recruitment through the apprenticeship system and a tendency for the number of persons over 65 and remaining in manufacturing to decline over the ten year period. They do not, therefore, contradict the life cycle hypothesis.

It is more disconcerting to discover that manufacturing employment shares peak in the 25-35 age groups, ten years earlier than in the 1961-63 data, and gas, electricity and water, and insurance, banking and finance have lower shares in the older age groups in the 1951-53 figures than they have in the data for the later years. This suggests that the role of past history cannot be neglected in the determination of the industrial employment shares of cohorts.

Nevertheless, this is at most a qualification to the conclusion that the age-employment data support the life cycle hypothesis. The data for 1951-53 reveal the same tendency for manufacturing to employ a high percentage of persons aged 25-45 and this cannot be explained entirely by past history. Persons aged 35-44 entered the labour force in the 1920s when the manufacturing sector was declining. Moreover, agriculture, forestry and fishing, distribution, and miscellaneous services all exhibit high shares for young and old age groups and three of the remaining non-manufacturing industries - mining and quarrying; transport and communications, and public administration - increased their employment shares with advancing age as in 1961-63.

The manpower balance sheet in Table 2.1 shows that inter-industry mobility contributes to differences in industrial employment growth rates and hence to variations in industrial employment shares. It is, therefore, not empirically justifiable to assume that each industry's percentage of employees in a given cohort is solely determined by the number of labour force entrants it recruits. Although past variations in employment growth have some effect, the main element determining the behaviour of these figures is variations in inter-industry net mobility pattern across age groups. Consequently the life cycle hypothesis gains empirical support from the data on industrial employment shares by age group, and it can be concluded that this theory provides the best explanation for the remarkably consistent net movement of manpower from the industries at the top of Table 2.2 to those at the bottom.

DISAGGREGATED MANUFACTURING MALE NET FLOWS

This chapter has so far considered manpower flows between manufacturing and each two digit level non-manufacturing industry. But manufacturing is itself an aggregate of many industries whose recruitment and loss patterns have differed considerably during the period under analysis. Investigation of this diversity is made possible by the availability of manpower flow data at two digit level.

The Manpower Balance Sheet

Table 2.7 is a manpower balance sheet for the two digit manufacturing industries for the period 1959-66. Industries gaining manpower from the inter-industry mobility process are listed above the line. The losing industries are found below the line.

Table 2.7

Manpower Balance Sheet for Two Digit Manufacturing Industries - Men: 1959-66

INDUSTRY	Net flows			Net ent- rants (5-3) (4)	Employ- ment change (5)	Average percentage		
	from Mfg. (1)	from Non- Mfg. (2)	Total (1+2) (3)			ann. empl. change (6)	empl- oyed (7)	Y.P. entry (8)
<u>Net Gainers</u>								
Food, drink & tobacco	-14.3	23.5	9.2	12.6	21.8	0.7	3.2	2.5
Chemicals & allied industries	12.1	12.9	25.0	-21.4	3.6	0.0	2.3	1.1
Metal manufacture	-5.6	29.9	24.3	15.3	39.6	1.1	3.7	2.5
Engineering & elec- trical goods	80.6	67.8	148.4	112.7	261.1	2.5	10.8	10.7
Metals goods n.e.s	4.9	11.0	15.9	47.3	63.2	2.5	2.5	3.8
Bricks, pottery, glass cement, etc.	-0.3	14.9	14.6	7.2	21.8	1.2	1.8	1.5
Paper, printing & publishing	6.2	21.3	27.5	24.6	52.1	1.9	2.8	2.9
Other manufacturing industries	5.1	17.4	22.5	14.0	36.5	2.9	1.3	1.0
TOTALS	88.7	198.7	287.4	212.3	499.7	1.8	28.4	26.0
<u>Net Losers</u>								
Shipbuilding & marine engineering	-27.6	-24.4	-52.0	-12.8	-64.8	-4.3	1.5	1.4
Vehicles	-20.0	16.9	-3.1	-3.5	-6.6	0.0	5.2	2.8
Textiles	-16.6	3.1	-13.5	3.6	-9.9	0.0	2.5	2.2
Leather, leather goods & fur	-5.9	-3.3	-9.2	6.0	-3.2	-1.2	0.2	0.4
Clothing & footwear	-10.3	-6.1	-16.4	7.5	-8.9	0.0	1.0	1.4
Timber, furniture, etc.	-8.3	-19.3	-27.6	37.2	9.6	0.6	1.6	3.0
TOTALS	-88.7	-33.1	-121.8	38.0	-83.8	-4.8	12.0	11.2
GRAND TOTALS	0.0	165.6	165.6	250.3	415.9	1.0	40.4	37.2

Sources: The flow and employment figures are calculated from sources described in Appendices A and B. The proportion of young persons entering each industry was calculated from figures extracted from the MoL Gazette (May, 1967), p.382 back to MoL Gazette (June, 1960), p.237.

Since industries within manufacturing can recruit from each other as well as from non-manufacturing, two additional columns are included in this table. The first, column 1, shows net flows between each industry and the other manufacturing industries combined. The second, column 2, shows net flows between each industry and non-manufacturing. The remaining columns have the same meaning as their complements in Tables 2.1 and 2.4.

The data in Table 2.7 demonstrate the importance of recruitment from non-manufacturing to employment growth in two digit manufacturing industries. All industries above the line increased employment, and all achieved positive net flows from non-manufacturing. But variations can be observed in their degrees of dependence on the non-manufacturing sector. Three industries - food, drink and tobacco; metals; and bricks, pottery and cement - experienced net outflows to the rest of manufacturing and relied entirely on net recruitment from non-manufacturing to achieve positive net flows. Three others - metals n.e.s.; paper, printing and publishing; and other manufacturing - achieved much larger net flows from non-manufacturing than from manufacturing. Chemicals experienced equal net inflows from both sources, and engineering relied more heavily on manufacturing.

Two industries, below the line - vehicles and textiles - also achieved positive net flows from non-manufacturing. The 16.9 thousand net flow into vehicles reflects the growth of the motor vehicles sub-sector. This three digit industry's full impact on mobility patterns is unfortunately disguised at two digit level by the decline in aircraft and railway equipment

manufacturing. Timber and furniture was the only industry below the line to increase employment. Its failure to achieve net inflows from non-manufacturing reflects net outflows to construction and the existence of occupational entry barriers which limit recruitment from other industries.

Differences between each industry's percentage of total employment, column 6, and young persons, column 7, are consistent with the behaviour of the net mobility figures. All the industries above the line, except metals n.e.s., had employment shares equal to or greater than their shares in the young persons entry. The behaviour of metals n.e.s. suggests substitution of young persons for net losses to other industries within manufacturing even though total net flows from manufacturing are positive.¹ Among industries below the line, vehicles recruited a share of the young persons entry only one-half the size of its percentage of total employment. This reflects a low intake in the declining sectors and the primary dependence of motor vehicles manufacturing on net recruitment from other industries. Timber and furniture attracted a share of the young persons entry in excess of its percentage of total employment due to the large number of apprenticeships in the industry.

Wages and Mobility

Before examining the behaviour of each industry's share of employees in each age group for further evidence to support the life cycle hypothesis, its place in the earnings structure must be established. Table 2.8 presents this information annually between 1959 and 1966. The ranks were determined by averaging semi-annual earnings data for men over 21 as recorded in D.E.

¹ See below Chapter VII, p.245, Table 7.3.

TABLE 2.8

Rankings of Manufacturing Industries by Level of Average Weekly Earnings, men
21 and over; 1959-1966

INDUSTRY	1959 -60	1960 -61	1961 -62	1962 -63	1963 -64	1964 -65	1965 -66	1959 -66
Food, drink and tobacco	11	11	10	11	11	11	10	11
Chemicals & allied industries	7	5	5	4	4	5	4	4
Metal manufacture	3	3	3	3	3	4	3	3
Engineering & electrical goods	4	4	4	6	8	7	8	5
Shipbuilding & marine engineering	9	9	9	9	9	9	5	9
Vehicles	1	1	1	1	1	1	2	1
Metals goods n.e.s.	5	6	8	8	7	8	9	8
Textiles	12	12	12	12	12	13	12	12
Leather, leather goods & fur	13	13	13	13	13	12	13	13
Clothing & footwear	14	14	14	14	14	14	14	14
Bricks, pottery, glass, cement, etc.	8	8	7	7	5	3	6	7
Timber, furniture, etc.	10	10	11	10	10	10	11	10
Paper, printing & publishing	2	2	2	2	2	2	1	2
Other manufacturing industries	6	7	6	5	6	6	7	6

Source: Ranks calculated from MoL Gazette (August, 1966)
p.464 back to MoL Gazette (Feb., 1960), p.45.

earnings surveys.¹ The final column of the table gives each industry's rank for the seven year period taken as a whole. These were determined by summing each industry's rank over seven years and assigning the highest position to the industry with the lowest sum, second highest to the industry with next to the lowest, and so forth.

The Table shows that the position of most industries changed very little over the seven-year period. The ranks of the top three - vehicles; paper, printing and publishing; and metals - did not change at all until 1964-65 when bricks, pottery and cement replaced metals in third position. In the following year paper, printing and publishing took over the leadership from vehicles. The positions of the bottom six industries - shipbuilding; timber and furniture; food, drink and tobacco; textiles; leather and leather goods; and clothing and footwear - were all highly stable. The only exception is shipbuilding's jump from ninth to fifth place in 1965-66 due to the effects of productivity bargaining.² Industries in the middle ranks had a greater tendency to switch positions. Between 1959-60 and 1965-66 engineering dropped from fourth to eighth, and metals n.e.s. fell from fifth to ninth. Chemicals rose from seventh to fourth; bricks, pottery, and cement climbed from eighth to sixth; and other manufacturing fluctuated between seventh and fifth. But these changes do not greatly disrupt the overall pattern of stability in the inter-industry earnings structure.

The Life Cycle and Mobility

Table 2.9 provides data on each manufacturing industry's share of total employees by age averaged between 1961 and 1963.

¹ See "Earnings and Hours", MoL Gazette (Sept. 1966), back to MoL Gazette (Feb. 1960).

² See O.E.C.D. Reviews of Manpower and Social Policies, Report Number 7, Manpower Policy in the United Kingdom (Paris, O.E.C.D., 1970), p.52.

TABLE 2,9

Each Two Digit Manufacturing Industry's Average Percentage of Male Employees* in each age group: 1961-1963

Age Group	Food Drink Tobac.	Chemicals	Metal mfg.	Eng. etc.	Ship-bldg. M.E.	Vehicles	Metals n.e.s. tiles	Leath. Fur	Cloth-ing P'wear	Bricks etc.	Timber Furn. etc.	Paper Print Pub.	Other mfg.
Under 18	3.2	1.1	2.6	10.3	1.6	3.2	3.2	2.7	0.4	1.7	1.8	2.9	1.1
18-19	2.5	1.7	3.0	11.1	1.9	3.5	2.8	2.4	0.2	1.4	2.0	2.3	1.2
20-24	3.1	2.2	3.2	11.7	1.7	4.3	2.6	2.1	0.2	0.9	1.7	3.0	1.3
25-29	3.4	2.7	3.8	11.4	1.2	5.5	2.6	2.2	0.2	0.9	1.8	3.3	1.4
30-34	3.4	3.1	3.7	11.5	1.2	5.7	2.7	2.0	0.1	0.7	1.8	2.8	1.4
35-39	3.4	3.2	4.0	12.3	1.3	6.5	2.5	2.4	0.2	0.9	2.0	2.5	1.2
40-44	3.1	2.9	4.4	11.8	1.5	6.2	2.6	2.3	0.2	1.0	1.9	2.7	1.4
45-49	3.2	3.0	4.2	10.3	1.6	5.8	2.6	2.5	0.2	0.9	1.8	2.6	1.3
50-54	3.2	2.9	3.8	9.2	1.7	5.3	2.3	2.7	0.4	1.0	1.9	2.8	1.2
55-59	3.1	2.5	4.1	9.5	1.9	5.1	2.1	3.2	0.3	1.1	1.6	2.3	1.2
60-64	3.1	2.5	3.5	9.3	2.0	5.1	2.2	3.6	0.3	1.2	1.5	2.2	1.2
65 and over	2.7	1.4	2.8	8.0	1.6	2.8	2.4	3.8	0.4	1.8	1.8	3.4	1.4

Ranks In													
Mf. Earn- ing Struc- ture.	11	4	3	5	9	1	8	12	13	14	7	10	6

*Employees = employed plus registered unemployed.
Source: M.C.L. Gazette (June 1962), pp. 219-221 and (June 1964), pp. 239-241.

The bottom row presents each industry's rank in the manufacturing earnings structure between 1959 and 1966.

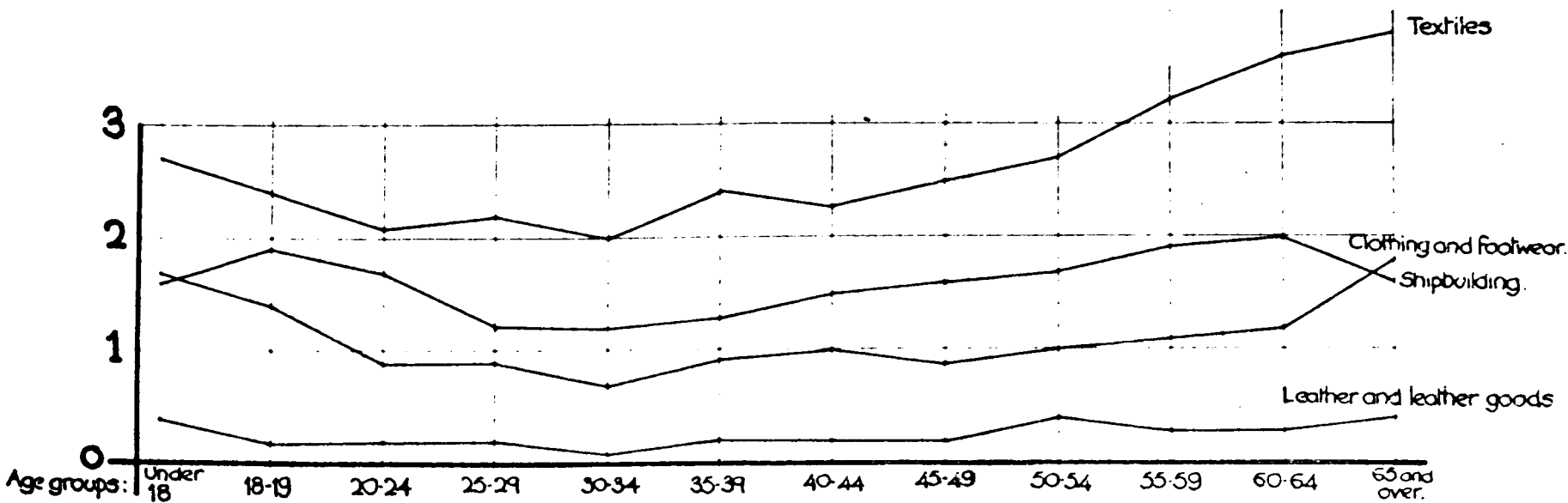
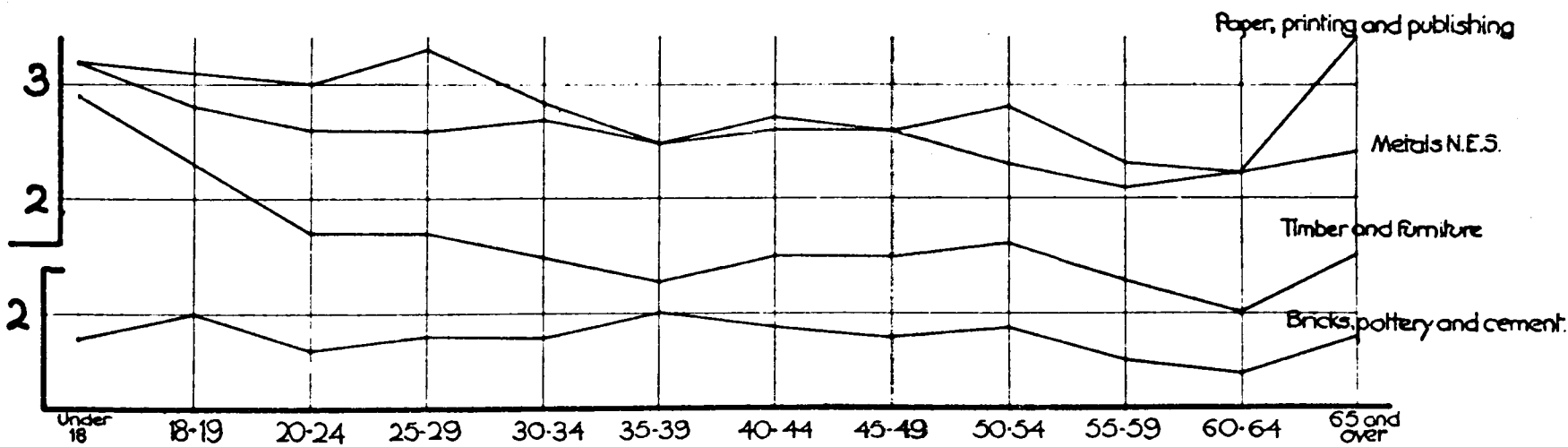
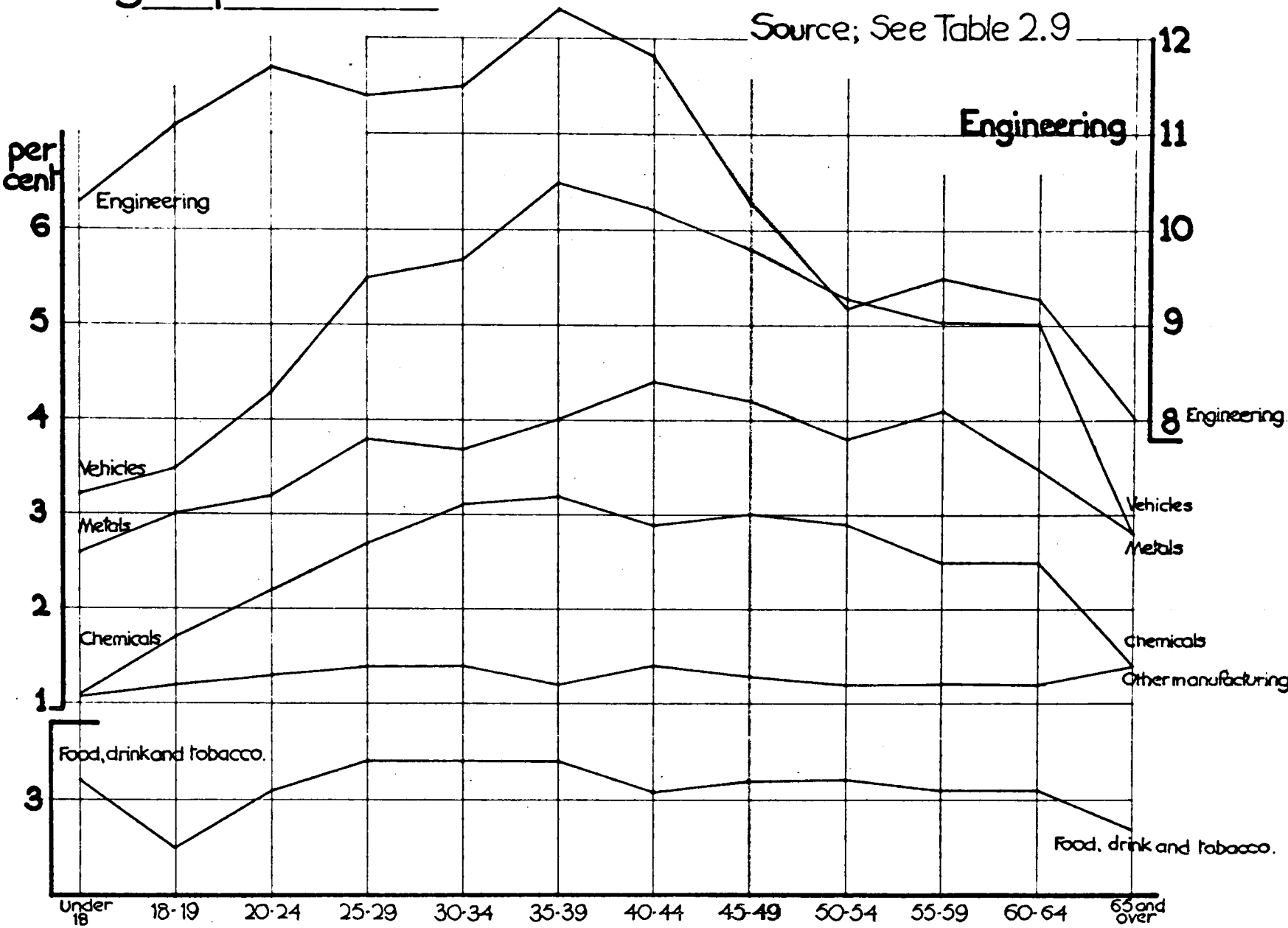
Variations in the patterns formed by the movement of employment shares across age groups are illustrated in Chart 2.1. Industries included in the upper panel all exhibit a bulge in employment shares in the 20-40 age groups, while those with an unclear pattern are shown in the middle panel. The saucer shaped industries appear at the bottom.

The difference in the earnings ranks of industries with saucer shaped employment shares and those with inverted saucer-shaped shares is very striking. Shipbuilding, textiles, leather, and clothing and footwear all exhibit a saucer shaped pattern and all are found at or near the bottom of the earnings structure. In contrast, chemicals, metals, engineering, vehicles and other manufacturing have inverted saucer shapes and occupy five of the top six earnings ranks.

The one anomaly is food, drink and tobacco, which has an inverted saucer shape and occupies eleventh position in the earnings structure. Given its low earnings rank this industry could be expected to have experienced declining employment shares in the 25-40 age groups. Another peculiar feature of its behaviour is the high share of the under eighteens despite the disproportionately low percentage of the young persons entry. This suggests that food, drink and tobacco attracted large numbers of under eighteens from non-manufacturing and lost these same persons within two years to the higher paying manufacturing industries. But it is not at all clear why similar outflows of older employees did not cause a further decline in shares in the 25-40 age groups, and in the absence of mobility data by

Chart 2.1: Each Two Digit Manufacturing Industry's Average Percentage of Male Employees* in each age group: 1961-63

Source; See Table 2.9



age the puzzle remains unsolved.

The remaining industries in the upper panel can be seen from Table 2.7 to have relied heavily on net flows to increase employment. Metals, engineering, and other manufacturing had greater net flows than net entrants; chemicals achieved all its employment increase through net flows; and vehicles experienced a net intake from non-manufacturing despite its employment decline. Conversely industries in the lower panel were all net losers of manpower to non-manufacturing. These industries are all declining and the rise in their shares of the oldest employees is due to the frequently observed unwillingness of older people to leave declining industries.¹

Industries occupying the middle panel of the chart are generally found in the middle of the earnings structure. An exception is paper, printing and publishing, but the absence of a humped pattern in this industry's employment shares is clearly due to the occupational barriers surrounding it. Two of the remaining three industries, metals n.e.s. and timber and furniture can be seen from Table 2.7 to behave rather like service sector industries in that they increased employment mostly through net entrants.

In summary, four of the five highest paying industries achieved peak employment shares of employees in the prime of their working lives, while those further down the earnings structure recruited younger persons either from outside employment or from non-manufacturing to compensate for net outflows to the rest of manufacturing. The decline in the employment shares of most manufacturing industries in older age groups suggests that older persons have a tendency to move into non-

¹See, for example, Wedderburn, op.cit., pp.46-47.

manufacturing jobs before retirement. Thus, on the whole, the behaviour of the two digit employment share data provide further support for the life cycle hypothesis.

FEMALE NET FLOWS

Data are also available on the inter-industry mobility patterns of women, but the absence of information on flows in and out of employment limits their usefulness considerably more than in the case of men. Most men remain in employment, with possible brief spells of unemployment, for their entire working lives. It is thus reasonable to treat male net entrant figures as roughly indicative of the difference between young persons and unemployed entering an industry and old persons and redundant workers entering retirement and unemployment. But no such assumption is tenable for women who move in and out of the labour force several times during their working careers. Female net entrant figures represent the net effect of these flows as well as the movements of young persons, the unemployed and those entering permanent retirement. Nevertheless, some insight into female mobility patterns can still be gained from examining the data.

The Manpower Balance Sheet

Table 2.10 is a manpower balance sheet for women. Comparison with the balance sheet for men in Table 2.1 suggests considerable differences between the mobility patterns of the sexes. Both manufacturing and professional and scientific services relied more heavily on female than male net flows. Conversely, net flows of women into insurance, banking and finance constitute about 30 per cent of the female employment change, whereas net flows of

TABLE 2.10
Manpower Balance Sheet. Women: 1959-1966
(Thousands)

INDUSTRY	Net Flows	Net Entr- ants	Employ- ment Change	Av. % Emplcy. Change p.a.	Av. % Employ- ed	Av. % Y.P.'s Entry
<u>NET GAINERS</u>						
Manufacturing	99.5	39.5	139.0	0.7	34.7	35.9
Construction	14.7	13.4	28.1	5.2	1.0	1.0
Gas. elec. & water	13.4	-0.9	12.5	3.8	0.6	0.5
Trans. & comm.	27.8	-8.8	19.0	1.1	3.2	2.1
Ins., bank. & fi- nance	19.1	52.3	71.4	4.1	3.2	6.3
Prof. & scien. services	223.0	188.5	411.5	4.3	18.0	6.3
Pub. admin.	48.4	18.4	66.8	2.5	4.6	2.7
Mining & quarry- ing.	0.2	-1.6	-1.4	-0.3	0.3	0.2
TOTALS	446.1	300.8	746.9	2.0	65.6	55.0
<u>NET LOSERS</u>						
Agric. For. & Fish.	-13.9	3.2	-10.7	-1.7	1.1	0.9
Distribution	-341.2	572.5	231.3	2.3	18.5	32.1
Misc. Serv.	-91.0	171.8	80.8	1.0	14.8	12.0
TOTALS	-446.1	747.5	301.4	1.5	34.4	45.0
GRAND TOTAL	-	1048.3	1048.3	1.9	100.0	100.0

Source: as Table 2.1

men accounted for 75 per cent of the male employment change. Miscellaneous services achieved net inflows of men and suffered net outflows of women, while transport and communications experienced net outflows of men and net inflows of women. Public administration had male net exits and female net entrants. Finally mining and quarrying appears above the line although in this case the size of the net inflow is negligible. Yet despite these significant variations certain underlying common features between male and female industrial recruitment and loss patterns can still be identified. Agriculture, forestry and fishing; distribution, and miscellaneous services all increased employment primarily through net entrants. Net exits for both sexes from transport and communications and gas, electricity and water imply that each industry replaces a large number of men and women retiring from the labour force with recruits from other industries. A similar pattern is likely in public administration. Although this industry achieved female net entrants the number is small relative to net flows.

Table 2.10 also contrasts average industrial employment shares of women with each industry's percentage of the young persons entry. The manufacturing young persons entry is roughly equal to its percentage of total employed, while distribution and insurance, banking and finance can be seen to have recruited disproportionately large numbers of young persons. Given that both industries relied heavily on net entrants to increase employment the young persons entry data behave as expected for these two industries. But miscellaneous services had a low young persons entry relative to its employment share even though it too relied heavily on net entrants. This suggests that the

different service industries have varying propensities to recruit economically inactive women from different age groups. Distribution and insurance, banking and finance tend to attract young women while miscellaneous services are more likely to recruit older persons. This complicates the problem of testing the life cycle hypothesis as will be seen below.

The Manpower Flow Matrix

The manpower flow matrix for women appears in Table 2.11. Earnings data calculated from the 1968 earnings survey appear in column 15. Comparison with the flow matrix for men in Table 2.2 reveals that industries had to be re-arranged in an attempt to get the direction of net flows from the top and left of the matrix to the bottom and right. Even so it has not been possible to prevent net flows into five industries from appearing in the upper right half of the matrix. Given that women are often employed in clerical occupations, whose boundaries cut across industrial definition, at wages which can be seen from column 15 not to vary a great deal between industries, this lack of regularity is not surprising.

Nevertheless, the direction of net flows is broadly similar for both sexes and the ordering of female employment growth rates attributable to net flows alone can be seen to follow the ranking of industries as net exporters and net importers fairly closely. In the case of both men and women, agriculture, forestry and fishing; distribution; and miscellaneous services are net suppliers of manpower to the rest of the economy. Manufacturing appears in the middle achieving large net inflows from these sectors and simultaneously experiencing net outflows to the public sector, construction, and the professions. In the case of women, however,

Table 2.11 - Net Manpower Movements between Industries: Women 1959-1966 (thousands)

	(1) Ag For. Fish	(2) Distr. Trades	(3) Misc. Serv.	(4) Ins. Bank. Fin. etc.	(5) Min- ing	(6) Mfg.	(7) Trans. Comm.	(8) Pub. admin.	(9) Gas Elec. Water	(10) Con- str.	(11) Total Net In- flows	(12) Total Net Out- flows	(13) Net Flows (11 - 12)	(14) Av. (%) Employment growth due to net flows	(15) Av. (£) Wages (manual workers only)
Ag. For., Fish.			0.4						0.1		0.5	14.4	-13.9	-2.2	n.a.
Distribution	1.8										1.8	343.0	-341.2	-3.7	9.94
Misc. Serv.		16.5					1.0				17.5	108.5	-91.0	-1.1	9.96
Ins., Bank., Fin.	0.6	31.6	1.4								33.6	14.5	19.1	1.1	n.a.
Mining etc.	0.2	1.8	0.2	0.4						0.1	2.7	2.5	0.2	0.1	n.a.
Manufacturing	7.1	175.0	15.5	1.2	0.9						199.7	100.2	99.5	0.6	12.14
Trans. & Comm.	0.7	17.7		2.1	0.0	12.0					32.5	4.7	27.8	1.6	16.59
Pub. Admin.	0.7	22.3	6.7	4.8	0.2	25.2	0.3			0.9	61.1	12.7	48.4	1.9	12.30
Gas, Elec., Water		5.2	1.6	0.7	0.3	5.6	0.9	0.6			14.9	1.5	13.4	4.0	n.a.
Construction	0.1	9.5	0.0	1.2		5.6	1.7		0.3		18.4	3.7	14.7	2.9	n.a.
Profess. & Scien. Serv.	3.2	63.4	82.7	4.1	1.1	51.8	0.8	12.1	1.1	2.7	223.0	0.0	223.0	2.3	9.96
Totals	14.4	343.0	108.5	14.5	2.5	100.2	4.7	12.7	1.5	3.7	605.7	605.7	0.0	0.0	11.40

Source: Figures calculated from sources described in Appendix A.

insurance, banking and finance joins the ranks of exporting industries while transport and communications changes positions with manufacturing. Construction can also be seen to have moved further down the diagram as compared with its position for males but like mining and quarrying the volume of female flows in and out of this industry is so small that it is insignificant.

The matrix shows that manufacturing's large positive net inflow was due almost entirely to net gains of 175 thousand from distribution. Manufacturing recruited only another 24 thousand net from all other industries above it in the Table. Miscellaneous services was a much smaller supplier of labour to manufacturing. Its net outflow into professional and scientific services was over five times greater. Thus, manufacturing seems to rely almost entirely on net inflows from distribution to replace its net losses of married women who leave the labour force. The professional and public sector industries, on the other hand depend about equally upon recruitment from manufacturing and the rest of the service sector to achieve net inflows.

The Life Cycle and Mobility

Since the direction of net female flows between industries is broadly similar to male movements, the life cycle hypothesis may also be applicable to women. Girls under eighteen entering the labour force have a tendency to enter distribution, probably because working conditions are more pleasant and greater social prestige is attached to the job. As they mature and marry, however, rising income expectations are likely to lead to movements into manufacturing where average wages are higher. Similarly, older women seeking lighter work could well move back into the service sector, although this expectation must be qualified by

the fact that a higher proportion of female industry changes are administrative and clerical workers moving between jobs in which conditions of employment do not vary a great deal.

In an attempt to confirm the life cycle hypothesis female industrial employment shares were calculated for five year cohorts. The figures are shown in Table 2.12. They behave very differently from the male data and reflect the much greater role recruitment from outside employment plays in increasing female employment. The decline in employment shares across age groups for distribution and insurance, banking and finance is due to the attractiveness of these industries for younger women while the rise with advancing age in the shares of the rest of the service sector, especially miscellaneous services, reflects greater recruitment of older women returning to work after rearing a family. This tendency for different service sector industries recruiting from outside employment to rely on different age groups means that data on female industrial employment shares by age group do not provide as good a test of the life cycle hypothesis as the male figures.

The manufacturing employment shares can also be seen to decline with advancing age. No evidence of a peak in the 25-40 age group can be seen here. However, despite reservations regarding the usefulness of these figures in testing the life cycle hypothesis it was decided to continue the analysis at two digit level.

This required calculation of each industry's position in the female earnings structure. Annual ranks were determined by first taking a weighted average of the earnings of full and part time women over eighteen as recorded in D.E. semi-annual earnings

TABLE 2.12

Each Industry's Average Percentage of Female Employees* in each age group: 1961-1963

Age Group	Ag. for fish.	Min-ing etc.	Mfg.	Con-str.	Gas elec. water	Trans. comm.	Distr.	Ins. bank. fin.	Prof. & sc. serv.	Misc. serv.	Pub. admin.
Under 18	1.0	0.2	39.7	1.1	1.1	2.7	31.2	4.8	5.4	10.9	2.0
18-19	1.0	0.2	39.2	1.3	1.3	3.2	20.2	6.8	11.6	11.4	3.8
20-24	1.0	0.4	38.6	1.2	1.3	3.6	17.5	5.0	17.0	11.1	4.1
25-29	1.1	0.5	37.5	1.2	1.2	4.4	16.7	3.5	19.1	11.9	4.1
30-34	1.4	0.3	35.3	1.1	1.3	3.6	18.0	2.6	19.3	14.1	4.4
35-39	1.5	0.2	35.4	0.8	0.9	3.7	18.1	2.1	18.3	14.4	4.8
40-44	1.5	0.2	34.6	0.9	0.9	3.4	17.4	2.1	19.1	14.4	5.4
45-49	1.0	0.2	33.0	0.8	0.8	2.9	17.4	2.1	20.6	16.1	5.6
50-54	1.0	0.2	32.4	0.6	0.7	2.5	16.5	2.0	21.5	16.6	5.6
55-59	1.1	0.3	30.5	0.6	0.6	2.9	15.7	2.0	21.9	18.6	5.5
60-64	1.1	0.3	27.5	0.7	0.6	2.6	15.3	2.0	20.9	23.0	6.3
65 & over	1.1	—	22.9	0.6	0.8	2.8	13.6	3.2	18.2	32.5	4.7
Average earnings (£s)	n.a	n.a	12.14	n.a	n.a	16.59	9.94	n.a	10.71	9.96	12.30

*Employees = employed plus registered unemployed.
Source: Mol. Gazette, (June 1962), pp.219-221 and (June 1964), pp.239-241.

surveys. The resulting figures were then averaged to provide annual data to determine the ranks. These are presented in Table 2.13. Ranks for the seven year period are shown in the last column. They were calculated by the same technique as that used for men.¹

The Table shows that the female inter-industry earnings structure is as stable as its male counterpart, although this point must be qualified because the earnings of administrative, technical and clerical workers are not included in the figures. Industries with a small percentage of female workers such as vehicles and timber and furniture can be seen to have the highest ranks, while those employed in industries relying more heavily on women such as food, drink and tobacco; textiles; metals n.e.s., and other manufacturing have lower positions. Clothing and footwear is an exception. It occupied the middle of the earnings structure and moved into sixth place for the last two years.

Table 2.14 presents each two digit manufacturing industry's share of total female employees in each age group with each industry's position in the female earnings structure shown in the bottom row. The familiar bulge in the 20-45 age group appears once again for several industries. A major peak can be observed in the engineering employment share of the 20-30 age group. A minor peak is found in the 35-39 cohort. In food, drink and tobacco, a major peak occurs in the 35-39 bracket and in metal goods n.e.s. a plateau appears for persons aged 25-49. Shares for textiles, leather and leather goods, and clothing and footwear can be seen to move in the opposite direction, but this

¹See above, p. 63.

TABLE 2.13

Rankings of Manufacturing Industries by Level of Average Annual Weekly Earnings

	Women 18 and Over: 1959-1966						
	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1959-66
Food, Drink Tobac.	13	13	13	13	13	13	13
Chemicals	5	5	5	5	5	4	5
Metal mfg.	6	6	6	6	8	8	6
Eng. etc.	3	2	3	4	3	3	3
Shipbldg. M.E.	12	11	12	11	11	11	11
Vehicles	1	1	1	1	1	1	1
Metals n.e.s.	11	12	11	12	12	12	12
Textiles	7	7	8	7	6	7	7
Leath. Fur	10	10	10	10	10	10	10
Clothing F'wear.	8	8	7	8	7	6	7
Bricks etc.	14	14	14	14	14	14	14
Timber Furn. etc.	2	3	2	2	2	2	2
Paper, Print. & Pub.	4	4	4	3	4	5	4
Other mfg.	9	9	9	9	9	9	10

Source: Ranks based on a weighted average of full and part time female earnings extracted from MoL Gazette (Aug.1966), p.464 back to MoL Gazette (Feb.1960), p.45.

TABLE 2.14

Each Two Digit Manufacturing Industry's Average Percentage of Female Employees* in each age group: 1961-1963

Age Group	Food Drink Tobac.	Chemicals	Metal mfg.	Eng. etc.	Ship-bldg. M.E.	Vehicles	Metals n.e.s.	Textiles	Leath. Fur	Clothing F'wear	Bricks etc.	Timber Furn. etc.	Paper Print Pub.	Other mfg.
Under 18	4.4	1.8	1.0	6.6	0.1	1.3	2.1	6.2	0.4	8.4	1.0	0.7	4.1	1.6
18-19	4.5	2.4	1.1	8.1	0.3	1.6	2.4	5.4	0.3	6.6	0.8	0.8	3.6	1.6
20-24	4.5	2.5	1.1	8.9	0.2	1.8	2.2	5.2	0.3	5.4	0.9	0.8	3.3	1.6
25-29	4.7	1.9	1.2	8.9	0.1	1.7	2.5	4.7	0.4	4.7	1.1	0.7	3.2	1.8
30-34	4.7	1.5	0.9	7.7	0.1	1.4	2.6	5.1	0.5	5.0	1.1	0.7	2.7	1.5
35-39	4.9	1.7	1.0	8.1	0.1	1.9	2.5	5.0	0.3	4.4	1.3	0.8	2.1	1.4
40-44	4.6	1.7	0.8	7.6	0.1	1.5	2.7	5.3	0.4	4.3	1.2	0.8	2.0	1.6
45-49	4.4	1.9	0.8	6.4	0.1	1.4	2.6	5.0	0.3	4.4	1.0	0.8	2.2	1.7
50-54	4.2	1.8	1.0	5.9	0.2	1.4	2.3	6.2	0.3	4.0	0.9	0.6	2.1	1.5
55-59	4.1	1.4	0.7	5.1	0.1	1.2	2.2	6.6	0.3	4.2	0.8	0.5	2.0	1.3
60-64	3.0	0.9	0.6	3.8	0.3	0.9	2.5	5.5	0.5	4.6	0.9	0.6	2.0	1.3
65 and over	1.9	0.6	0.6	2.8	---	0.6	1.9	6.1	0.3	4.1	0.6	0.6	2.2	0.8
Ranks In Mf. Earning Structure.	13	5	6	3	11	1	12	7	10	7	14	2	4	9

*Employees = employed plus registered unemployed.

Source: MoL Gazette, (June 1962), pp.219-221 and (June 1964), pp.239-241.

behaviour can be expected from declining industries. A more worrisome problem is that only one of the three industries exhibiting the bulge in the middle age groups - engineering - has a high rank in the earnings structure. The remaining two - metal goods n.e.s. and food, drink and tobacco - rank twelfth and thirteenth respectively. Average wages in these industries do, however, exceed levels in distribution and miscellaneous services so that behaviour of their employment shares can be regarded as supporting the life cycle hypothesis.

The past history of employment growth is likely to have little effect on these shares, because women enter and leave the labour force several times during their working careers. Consequently the bulge in manufacturing employment shares for middle age groups suggests that the inter-industry movements of young women are similar to those of men and consistent with the life cycle hypothesis. But the likelihood that service sector industries vary in their propensities to recruit female labour force entrants from different age groups prevents testing that part of the hypothesis which predicts a net flow of older women from manufacturing into services. Consequently the life cycle hypothesis receives less support from the female data on industrial employment shares than was provided by the comparable male figures.

CONCLUSION

This chapter has been devoted to an examination of net manpower flows between non-manufacturing and manufacturing industries aggre-

gated over a seven year period to eliminate the effects of cyclical fluctuations in economic activity. It has been shown that industries vary considerably in the extent to which they rely on net flows from other industries as opposed to net recruitment from outside employment. Manpower is constantly moving between industries and, at the same time, all industries recruit at least some of their employees from outside employment. But it is the net movements both between industries and in and out of employment which determines the distribution of employment.

The behaviour of these net movements - in so far as they can be identified from the imperfect data available - suggests that manufacturing relies heavily on recruitment of young men in their 20s from the primary and tertiary sectors both to increase employment and to replace losses of older persons who often re-enter these sectors in search of lighter work. Conversely other industries seem to balance their losses of younger employees to manufacturing by recruiting relatively large numbers of boys entering employment and older men leaving manufacturing. Some evidence is available to suggest that net female movements behave in a similar manner, but analysis of the inter-industry mobility behaviour of women is complicated by the frequency with which they tend to move in and out of employment. The absence of data on these movements limits the reliability of the net flow data that is available and qualifies to a considerable degree any conclusions drawn from the figures.

CHAPTER III

Gross Manpower Flows:

Mobility Rates and Neighbourhood Relationships

The analysis has so far focused on net manpower flows between industries. Examination of net manpower movements between industries has shown that younger members of the labour force are most likely to transfer from low to high wage industries while older persons tend to move in the opposite direction. But there are other characteristics of manpower flows between industries. This chapter and the next will uncover two additional types of mobility through an investigation of the gross movements of manpower underlying net flows.

This chapter introduces the gross flow data. It is divided into two parts. The first examines the volume of movements in and out of industries in relation to their employment levels. It applies theories explaining inter-plant variations in labour turnover to variations between industries in inflow and outflow rates. The second examines relative sizes of manpower flows between industries in an attempt to determine whether or not manpower leaving one industry distributes itself across the remaining industries in a random fashion. This provides a basis for identification of two more types of mobility.

INTER-INDUSTRY JOB CHANGING RATES

The size of an industry is an obvious determinant of the number of persons it recruits and loses each year. A large expanding industry requires a greater volume of inflows both to achieve a given percentage rise in employment and to replace a larger number voluntary outflows. A large contracting

industry requires a greater volume of outflows to achieve a given percentage decline in employment. These elementary facts account for a good deal of the variations between industries in the volume of inflows and outflows they experience. But they do not explain why some industries recruit and lose a greater proportion of their manpower than others.

This chapter begins with an examination of the causes of these variations. Comparisons between industrial inflow and outflow rates must allow for variations in industrial size. Assuming no variations between industries in regional and occupational requirements, the larger the industry in relation to total employment the smaller the number of persons available for recruitment from other industries. Assuming further no inter-industry variations in labour demand, the larger the industry the fewer the number of vacancies open to its leavers. These points are particularly relevant to comparisons of inflow and outflow rates between manufacturing and non-manufacturing.

Standardized inflow and outflow rates were, therefore, calculated for each industry using the following formula.

$$R_i = \frac{F_i}{N_i(1 - P_i)}$$

where R_i = Industry i 's inflow (outflow) rate;

F_i = Industry i 's average annual inflows (outflows) between June, 1959 and June, 1966;

N_i = Industry i 's average employment between June, 1959 and June, 1966;

P_i = Industry i 's average employment as a percentage of average total employment between June, 1959 and June, 1966.

The next two sections examine the determinants of these in-

flow and outflow rates for men and women.

Male Inflow and Outflow Rates

Table 3.1 compares each industry's inflow and outflow rates with its average annual percentage growth in employment and its position in the earnings structure. The Table demonstrates that on average persons moving between two digit industries in the 1959-66 period constituted 10 per cent of total employment. This figure is partly determined by the size of industries as defined by the SIC. Adjustments in definitions could cause a change in the number of industry movers. But definitional changes may not be all that significant. The 10 per cent figure is identical to an estimate based on the 1948 SIC of the average proportion of men changing industry annually between 1945 and 1949.¹

Inflow and outflow rates for the manufacturing and non-manufacturing sectors as a whole appear in rows 2 and 3 of Table 3.1. The manufacturing inflow rate is 10 per cent, slightly greater than the comparable figure of 9.3 per cent for non-manufacturing. The manufacturing outflow rate, 9.3 per cent, is slightly less than the non-manufacturing figure.

Examination of the outflow rates for two digit industries shows that the highest was 16.6 per cent in distribution, and the sixth highest was 14.7 per cent in miscellaneous services. Although the outflow rate for the non-manufacturing sector as a whole is not a weighted average of the individual industry figures (because flows within non-manufacturing are excluded)

¹ Thomas, op.cit., p. 9.

TABLE 3.1

Adjusted Inflow and Outflow Rates, Annual Average Growth Rates, and Earnings Ranks for Men Employed in each Two Digit Industry 1959-1966

INDUSTRY	Adjusted Rates (%)		% Employ. Growth	Ranks in Earnings Structure	
	Inflow	Outflow		1968	1959-66
Total	10.1	10.1	0.7		
Manufacturing	10.0	9.3	1.0		
Non Manufacturing	9.3	9.8	0.4		
Agriculture, forestry, fishing	5.8	11.7	-5.0	21	n.a.
Mining and quarrying	3.4	6.7	-5.3	13	n.a.
Food, drink & tobacco	14.6	14.4	0.7	12	11
Chemicals & allied industries	10.7	9.8	0.0	6	4
Metal manufacture	10.6	9.8	1.1	4	3
Engineering & electrical goods	12.2	10.6	2.5	8	5
Shipbuilding & marine engineer- ing	9.3	12.9	-4.3	5	9
Vehicles	9.5	9.6	0.0	2	1
Metals goods n.e.s.	16.4	15.8	2.5	11	8
Textiles	9.2	9.7	0.0	15	12
Leather, leather goods, and fur	11.2	15.0	-1.2	n.a.	13
Clothing & footwear	8.1	9.6	0.0	17	14
Bricks, pottery, glass, cement, etc.	14.4	13.6	1.2	10	7
Timber, furniture, etc.	14.6	16.4	0.6	14	10
Paper, printing & publishing	7.6	6.7	1.9	1	2
Other manufacturing industries	17.1	15.4	2.9	3	6
Construction	14.7	13.6	2.5	9	n.a.
Gas, electricity & water	7.7	6.3	1.5	16	n.a.
Transport & communication	7.6	7.9	-1.1	7	n.a.
Distributive trades	13.7	16.6	0.6	19	n.a.
Insurance, banking & finance	7.0	5.6	1.8	n.a.	n.a.
Professional & scientific ser- vices	8.2	6.5	3.7	n.a.	n.a.
Miscellaneous services	14.9	14.7	2.8	20	n.a.
Public administration & defense	9.3	7.0	1.0	18	n.a.

Rank Correlation Coefficients

	All Industries		Manufacturing	
	Outflow Rates	Earnings Ranks	Outflow Rates	Earnings Ranks
Inflow Rates	.82	.08	.89	-.06
Outflow Rates		-.14		-.34

Sources: Same as in Tables 2.1, 2.3 and 2.8

high outflow rates from these two industries are clearly the main cause of the high figure for the sector as a whole. The excess of the non-manufacturing over the manufacturing outflow rate is thus due to the role of the two largest service industries as suppliers of manpower to manufacturing.

Five manufacturing industries also experienced high outflow rates. These are timber and furniture (16.4 per cent); metals n.e.s. (15.8 per cent); other manufacturing (15.4 per cent); leather and leather goods (15 per cent); and food, drink and tobacco (14.4 per cent). Three of these five experienced net outflows to the rest of manufacturing¹ and the remaining two achieved only small net inflows. Thus high outflow rates amongst two digit manufacturing industries can be seen to occur in those industries tending, like distribution and miscellaneous services, to act as suppliers of labour to the rest of manufacturing.

Turning to adjusted inflow rates the highest figure was in other manufacturing (17.1 per cent) followed by metal n.e.s. (16.4 per cent); miscellaneous services (14.9 per cent); construction (14.7 per cent); timber and furniture (14.6 per cent); food, drink and tobacco (14.6 per cent); and bricks, pottery and cement (14.4 per cent). Given that five of these industries were among the seven with the highest outflow rates these figures might seem surprising. But a high correlation between inflow and outflow rates can be observed across all industries. The rank correlation coefficient between inflow and outflow rates is .82.

¹See below, p. 59, Table 2.7.

This seems to suggest that industries losing a high proportion of their labour to others must recruit most actively from others to replace their losses. In other words, an industry's inflow rate is determined by its outflow rate. But there is a simultaneity problem here because the more persons an industry recruits the greater the number of leavers; since quits are inversely related to job tenure.¹

One way to cut through the circularity is to establish a relationship between one of these variables and an exogenous factor. The most common variable employed for this purpose is earnings differentials. Most labour mobility studies have found an inverse relationship between earnings levels and job separation rates,² but there is little evidence of a positive relationship between earnings levels and recruitment rates.³

¹ This phenomenon may not be fully reflected in the inter-industry mobility data because these do not record multiple job changes occurring within an annual period. Thus, if an industry's turnover rate is subject to seasonal fluctuations recorded in-flows and outflows may well understate the true size of recruitment and wastage rates experienced by the industry.

² See, The OECD Study, pp. 52-53; V. Stoikov and R.L. Raimon, "Determinants of Differences In the Quit Rate Among Industries", The American Economic Review vol. LVIII no. 5, part 1 (December, 1968) pp. 1283-98; T.J. Wales, "Quits Rates in Manufacturing Industries in the United States", Canadian Journal of Economics and Political Science vol. III (February to November, 1970), pp. 123-39; Hill, op.cit., pp. 185-233; and The Glasgow Study, p. 146.

³ Both Hill, op.cit., and the Glasgow Study found no evidence of a positive relationship between earnings levels and recruitment rates from simple correlation coefficients estimated from plant level data. See Hill, op.cit., p. 197, and The Glasgow Study, p. 149. But Hill whose study was restricted to coal mining reported that regressing recruitment rates on quit rates, earnings levels, and profits, a proxy for the growth of manpower requirements, yielded a positive and statistically significant regression coefficient for the earnings variable (p. 203). The validity of these results assumes, however, that "most recruitment was to replace wastage" and that although there was some possibility of feedback this was not "sufficiently serious to have a deleterious effect on the analysis" (p. 207). From his knowledge of the industry Hill felt confident that these assumptions were realistic for coal mining. But it would clearly be dangerous to apply them elsewhere, especially in expanding industries (see below, pp. 88-89).

Quit rates in low wage industries are higher because the effects of low pay on net advantages are not usually offset by non-pecuniary considerations.¹

These same differentials would also reduce the industry's attractiveness to new recruits were it not for the existence of imperfect knowledge in the labour market. In the words of T.P. Hill

An employee is well informed about the wages and general working conditions of his present job but is likely to have only hazy ideas about his prospective remuneration in alternative employment. Dissatisfaction with his present job may cause him to move elsewhere even though he may subsequently regard the change of jobs as no improvement, especially if through ignorance, he does not select the most suitable job out of those available.²

Thus if industries with high outflow rates pay below average wages, it can be argued, that the direction of causation is initially from outflows to inflows. This does not, of course, exclude the possibility of subsequent feedback from inflows to outflows since new entrants, unlike persons with longer job tenure, tend to express their dissatisfaction with the net advantages offered by quitting. A high rate of labour turnover is clearly self-aggravating,³ but the problem is to determine the forces that initiate this circularity.

Unfortunately it was not possible to establish the existence of an inverse relationship between inter-industry variations in outflow rates and earnings. The rank correlation

¹See above, Chapter I p.8 and Chapter II p.48.

²Hill, op.cit., p. 190.

³Considerable insight into the institutional forces that accelerate a degenerating labour turnover situation is provided in Economic Development Committee for Food Manufacturing, A Study of Labour Turnover (London, Natural Economic Development Office, n.d.), p. 13.

coefficient between adjusted outflow rates and earnings was only $-.14$.¹ It is true that the earnings figures used in this test come from the 1968 earnings survey. Perhaps if data for the 1959-66 period were available the correlation would improve. Yet this seems unlikely, since the rank of transport and communications in the 1968 earnings structure is one of the main reasons why the negative correlation is so high and during 1959-66 transport and communications probably occupied an even lower position in the structure.²

A major factor accounting for the weakness of the relationship is the low outflow rates from declining industries in the primary sector and also for gas, electricity and water; and public administration, industries where it has been shown that people tend to remain for reasons of job security until retirement. It was therefore decided to repeat this exercise for manufacturing alone using earnings data for the 1959-66 period. The rank correlation coefficient between inflow and outflow rates was $.89$ and the value for outflow rates and earnings levels was $-.34$, a considerable improvement on the all industry figure.

Nevertheless, the relationship is still weak. This is partly due to low outflow rates from textiles; and clothing and footwear, both of which are declining industries, but it is also a result of the behaviour of other manufacturing. This industry had the third highest outflow rate even though it

¹Leather and leather goods; insurance, banking and finance; and professional and scientific services were all excluded from this calculation owing to the absence of comparable earnings data.

²See above, chapter II p.41.

ranked sixth in the earnings structure. In this case, however, a high rate of recruitment due to expanding labour demand could have initiated an increase in wastage. Table 3.1 shows that other manufacturing had the highest inflow rate of all and that employment in this industry grew at an average annual rate of 2.9 per cent, faster than any other industry.

The behaviour of other manufacturing might be regarded as exceptional were it not for the fact that the Glasgow Study found similar evidence at plant level in the Birmingham labour market for the 1959-66 period. They concluded that in 'tight' labour markets neither high nor low wage plants are immune from high turnover because both are forced to lower standards, and recruit persons who change jobs frequently irrespective of earnings differentials.¹ Thus a high rate of labour turnover is not limited to industries where wages are low. An industry paying relatively high wages and wishing to expand employment at an above average rate is prone to similar difficulties.

Female Inflow And Outflow Rates

Table 3.2 compares each industry's female inflow and outflow rates calculated in accordance with the above formula with its average annual rate of employment growth. The position of each manufacturing industry in the 1959-66 female earnings structure is also shown.

It can be seen that the total number of women recorded as industry changers was 11 per cent of employment compared with 10 per cent for men. Since this is undoubtedly an underestimate of the actual amount of industry changing between

¹The Glasgow Study, p. 161.

TABLE 3.2

Female Inflow and Outflow Rates, Annual Average Employment Growth Rates, and Earnings Ranks: 1959-66

INDUSTRY	Inflow Rates %	Outflow Rates %	Av. % annual employ. growth	Earnings Ranks
Total	11.0	11.0	1.9	
Manufacturing	11.2	10.4	0.7	
Non-Manufacturing	10.4	11.0	2.5	
Agriculture, forestry & fishing	9.1	11.4	-1.7	
Mining & quarrying	10.0	10.0	-0.3	
Food, drink & tobacco	15.4	16.4	0.3	13
Chemicals & allied industries	15.8	15.4	0.6	5
Metal manufacture	15.0	13.4	1.1	6
Engineering & electrical goods	16.9	13.2	3.6	3
Shipbuilding & marine engineering	15.8	15.0	-1.4	11
Vehicles	15.6	14.7	0.0	1
Metals goods n.e.s.	16.1	15.1	1.8	12
Textiles	8.6	10.3	-2.5	7
Leather, leather goods, and fur	15.7	17.6	-3.7	10
Clothing & footwear	9.5	10.6	-5.5	7
Bricks, pottery, glass, cement, etc.	11.5	11.1	0.6	14
Timber, furniture, etc.	18.0	16.9	0.3	2
Paper, printing & publishing	13.2	12.6	1.4	4
Other manufacturing industries	18.5	16.1	2.8	9
Construction	21.3	18.5	5.2	
Gas, electricity & water	11.2	7.1	3.8	
Transport & communication	10.0	8.5	1.1	
Distributive trades	13.4	15.2	2.3	
Insurance, banking & finance	11.5	10.4	4.1	
Profession & scientific services	8.5	6.2	4.3	
Miscellaneous services	13.6	14.9	1.0	
Public administration & defense	10.8	8.8	2.5	
Rank Correlation Coefficients:	Outflow Rates		Ranks in Earnings structure	
Inflow Rates	.70		.15	
Outflow Rates			- .11	

Source: Same as Tables 2.10, 2.3 and 2.13.

1959 and 1966 - due to the tendency for many women to have long spells of economic inactivity - the implication is that women have a higher propensity to change industries than men. Given that they are less likely to be tied occupationally to an industry and that inter-industry female wage differentials are lower in absolute terms than those for men, this conclusion is consistent with a priori expectations.

Examination of the two digit data amplifies this point. Industries employing small numbers of women such as construction; other manufacturing; and timber and furniture; have the largest inflow and outflow rates even after these have been scaled up for differences in industry size. This reflects movements of clerical workers in and out of these industries. Consequently, industries such as food, drink and tobacco; engineering; distribution; and miscellaneous services, which relied more heavily on recruitment of women to satisfy their labour requirements have relatively lower inflow and outflow rates. This does not however, reduce the strength of the relationship between inflow and outflow rates. The rank correlation between them is .85.

The absence of earnings data for all industries prevented calculation of a rank correlation coefficients between inflow and outflow rates and earnings levels for all industries. Rank correlation coefficients between inflow and outflow rates and between each of these variables and earnings levels for manufacturing alone appear at the bottom of the Table.

The rank correlation coefficient between inflow and outflow rates is .7. This figure is lower than that which was calculated for all industries. The negative association

between outflow rates and earnings levels is only $-.11$ compared with $-.34$ for men, and there is also a slight positive association, $(.15)$ between inflow rates and earnings levels. Although restriction of the earnings data to manual workers reduces the meaningfulness of these correlations, they do indicate that women are more mobile between industries than men, and that high female turnover rates are even less likely than those for men to be restricted to low wage industries.

Conclusion

This completes the analysis of inter-industry variations in inflow and outflow rates. The high correlation between inflow and outflow rates at industry level reflects the simultaneous relationship between recruitment and wastage in the plant. In low wage industries whose manpower requirements are not declining, an increase in the rate of turnover is caused initially by a high rate of voluntary separations leading to a rise in recruitment to replace losses. But in both high and low wage industries an attempt to expand employment at a rate above the average for all industries - especially if it occurs in 'tight' labour markets - is likely to initiate this self reinforcing process. Thus an industry is likely to experience high inflow and outflow rates if it is expanding rapidly, or if it is paying below average wages and growing at an average rate. Exceptions to this generalization are public administration; and gas, electricity and water, where exceptionally good job security offsets the effects of low average wages. The implications of this proposition for labour flows between particular industries, or groups of industries, will be seen

at the conclusion of Chapter IV.

THE INTENSITY OF INTER-INDUSTRY MANPOWER MOVEMENTS

Introduction

The remainder of this chapter examines the volume of manpower flows between industries in an attempt to establish whether or not people move with above average frequency between certain pairs. The first post war labour mobility study carried out for the DE concluded its examination of inter-industry mobility with the following observation.

The most striking thing about industrial change as a whole is the extent to which those persons who leave one industry [MLH] do not enter other industries in the same group [2 digit industry] but spread themselves out among the rest roughly in accordance with the numbers employed in each group of industries.¹

This statement implies that differences in earnings and conditions of employment and variations in locational and occupational structures have little effect on inter-industry mobility. It does not mean that these factors have no influence on other kinds of mobility such as movement between firms for it may well be that industrial definitions are sufficiently broad to encompass wide and similar variations in each determining variable. If this were the case, the multitude of factors affecting the propensity of an individual job changer to enter a particular industry would cancel each other out in the aggregated figures. Thus inter-industry mobility could be viewed as a random process with each industry's propensity to recruit and lose labour to another roughly equal

¹Thomas, op.cit., p. 8.

to the latter's employment share.

But evidence from other studies contradicts this theory. Results reported in the Second Labour Mobility Survey and in Hilda Kahn's study of the 1956 redundancies from the British Motor Corporation suggest persons leaving jobs in the engineering and metals sectors tend to find alternative employment within these same industries.¹ Reynolds provides an interesting theory in an attempt to reconcile these two hypotheses. He concluded from a study of the work histories of persons in the New Haven labour market,

...When a worker leaves a firm the probability that he will go into another firm in the same industry is considerably greater than one would expect on a random basis... If he moves outside the industry he is more likely to go to certain industries than to others... [But] even though these things are true of single moves when one aggregates the entire past careers of workers in particular industries their movements will have been so numerous and varied that neighbourhood relationships between industries become blurred and indistinguishable. If a worker moves often enough he will eventually run the gamut of industries, yet each one of these moves may have been influenced considerably by the industry of last employment.²

But the figures used here do not trace work histories. They record total movements between industries during annual periods. Thus, if Reynolds is correct, it should be possible to identify neighbourhood relationships from such data because a year is a relatively brief segment of a person's working career.

The Intensity of Flows

The Concepts It is necessary to begin by introducing two concepts of which considerable use will be made in this and subsequent chapters. The first, the recruitment propensity,

¹Kahn, op.cit., pp. 154-9.

²Reynolds, op.cit., p. 36.

refers to the number of persons recruited from Industry (or Sector) B into Industry (or Sector) A as a percentage of the total number of persons recruited by A from all industries combined. The second, the flow propensity, is defined as the number of persons moving from A into B as a percentage of total outflows from firms in A.

A question arises as to whether or not manpower flows within a given industry should be included in the denominators of flow and recruitment propensities. For example, when calculating the propensity of the engineering industry to recruit from distribution, should manpower movements between engineering firms be included in the total number of engineering recruits. The answer depends on the objectives of the enquiry. The earlier chapters of this thesis focused on the contribution of inter-industry manpower movements to changes in industrial employment levels. Such terms of reference imply exclusion of intra-industry mobility because these movements do not affect the total numbers each industry employs.

But flows within an industry are an important source of recruitment to member firms especially if the industry in question is large as is the case with engineering. If this type of job change is excluded from the denominators of flow and recruitment propensities, firms in larger industries will appear to rely more heavily on recruitment from non-manufacturing than those classified to smaller ones. The figures on intra-industry mobility were, therefore, included in the calculations. Unfortunately the data available do not include all intra-industry transfers. Only movements between 3 digit industries classified to each two digit industry have been

recorded, and there is no information on the numerous persons who will have moved between establishments classified to the same minimum list heading. Recruitment and flow propensities are, therefore, percentages of total industry changers, not job changers, entering or leaving a particular industry.

Between Manufacturing And Non-Manufacturing

Aggregated: Table 3.3 presents the propensity of each manufacturing industry to recruit and lose labour to the non-manufacturing sector between 1959 and 1966. These percentages have been calculated by summing annual movements between industries during this seven year period. Industries have been ranked according to the size of the male recruitment propensity. The ranks for male flow propensities and female recruitment and flow propensities appear in parentheses.

The male non-manufacturing employment share is 59.2 per cent. For women it is 65.3 per cent. If inter-industry mobility is to be viewed as a random process, recruitment and flow propensities should be approximately equal to these shares. But Table 3.3 shows that in most industries they clearly are not. In only three cases - food, drink and tobacco; timber and furniture; and bricks, pottery and cement - were male recruitment and flow propensities greater than 54 per cent. The rest range between 49 per cent for leather and leather goods to 34 per cent for metal goods n.e.s. The female propensities provide even less support for the random flow hypothesis. Food, drink and tobacco has the highest recruitment propensity (55.7 per cent) as well as the highest flow propensity (53.9 per cent). Paper, printing and publishing has the lowest recruitment propensity (34.7 per cent) while metals n.e.s. has

TABLE 2.4

Each Industry's Average Percentage of Male Employees* in each age group: 1961-1963

Age Group	Ag. for. fish.	Min-ing etc.	Mfg.	Con-str.	Gas elec. water	Trans. comm.	Distr.	Ins. bank. fin.	Prof. & sc. serv.	Misc. serv.	Pub. admin.
Under 18	5.7	3.4	38.9	12.8	1.0	4.5	18.6	1.5	2.2	9.4	2.0
18-19	4.8	3.0	39.0	14.0	1.6	6.3	13.0	2.5	3.7	8.9	4.0
20-24	4.0	3.8	39.8	14.0	1.8	8.3	10.0	2.3	4.8	6.6	4.7
25-29	3.2	4.1	42.1	12.0	2.0	9.0	8.9	2.2	5.7	5.8	4.9
30-34	3.2	4.1	41.7	11.6	2.5	9.7	8.8	2.2	5.4	5.4	5.3
35-39	3.0	5.3	43.6	10.1	2.4	10.0	8.4	2.2	4.6	4.9	5.7
40-44	2.6	5.2	43.3	9.4	2.8	10.1	8.1	2.0	5.1	4.8	6.7
45-49	2.8	5.5	41.4	8.9	2.8	9.8	8.6	2.1	5.5	5.2	7.7
50-54	2.8	5.6	39.9	8.2	2.7	10.3	8.9	2.6	5.4	5.3	8.3
55-59	3.3	5.9	39.3	7.7	3.0	11.3	8.1	2.6	4.8	5.4	8.8
60-64	3.1	6.4	38.7	6.5	3.0	12.2	7.4	2.6	4.8	6.0	9.9
65 & over	4.8	0.9	34.5	6.1	0.8	8.3	12.5	2.6	6.6	12.3	9.3
Av. earnings (£s)	18.08	23.35	24.97	24.59	21.89	24.84	20.08	19.30	18.77	19.53	20.54

*Employees = employed plus registered unemployed.

Source: MoI. Gazette, (June 1962) pp 219-221 and (June 1964) pp 239-241

the lowest flow propensity (39.3 per cent).

For many industries, particularly the expanding ones, recruitment propensities can be seen to exceed flow propensities. This is undoubtedly due to the fact that total employment increased between 1959 and 1966. It has already been argued that people have a tendency to enter and leave employment through the non-manufacturing sector. Since total employment was growing during this period, this tendency would clearly cause non-manufacturing recruitment propensities to exceed flow propensities for individual manufacturing industries.

But comparison of each industry's rank by size of recruitment propensity with its rank by size of flow propensity reveals hardly any variation in the ordering. The rank correlation between male recruitment and flow propensities is .99. For women it is .77. In other words, industries recruiting most heavily from non-manufacturing also experience the greatest proportion of their outflows to that sector. The implications of this statement will be explored more fully in the next chapter. Here there is only space to note that one good reason for the occurrence of a relatively high volume of manpower flows in both directions between two industries is similarities in their locational and occupational requirements. The lower rank correlation for women indicates lower occupational barriers to female inter-industry mobility.

Between Manufacturing And Non-Manufacturing

Disaggregated: The analysis has so far focused on the propensity of individual manufacturing industries to recruit

and lose labour to the non-manufacturing sector as a whole. When the relative size of manpower flows between individual manufacturing and non-manufacturing industries are considered, a further blow is dealt to the random flow hypothesis. Table 3.4 presents recruitment and flow propensities with each non-manufacturing industry for the three manufacturing industries experiencing the most intensive exchanges of manpower with the non-manufacturing sector as a whole.

The Table shows that these three industries - food, drink and tobacco; timber and furniture; and bricks, pottery and cement, each have special links with particular non-manufacturing industries. Food, drink and tobacco firms recruit and lose considerable numbers of employees to distribution. Of the total male industry changers recruited by firms in this industry, 24.4 per cent came from distribution. At the same time 20.1 per cent of the male industry changers leaving jobs in food, drink and tobacco entered distribution. Yet the distribution employment share of men is only 9.4 per cent. Slightly intensive movements can also be observed between food, drink and tobacco and miscellaneous services, where recruitment and flow propensities are about 8 per cent and the miscellaneous services male employment share is only 6 per cent.

Timber and furniture can be seen to have close connections with construction and, to a lesser extent, distribution. Firms in this industry recruit 20 per cent and lose 24 per cent of their male industry changers to construction even though the construction employment share is only 10 per cent. They also recruit 16.5 per cent and lose 13.2 per cent to

TABLE 3.4

The Propensity of Three Manufacturing Industries to Recruit and Lose Labour to each Non-Manufacturing Industry 1959-66
(percentages)

INDUSTRY	MALE						FEMALE							
	Food, drink, tobacco		Timber & furniture etc		Bricks, pottery, etc.		Food, drink, tobacco		Timber & furniture etc		Bricks, pottery, etc.			
	R.P.	F.P.	R.P.	F.P.	R.P.	F.P.	R.P.	F.P.	R.P.	F.P.	R.P.	F.P.		
Agriculture, forestry & fishing	3.3	2.1	3.5	1.9	3.2	1.9	6.6	1.7	0.9	1.0	0.4	0.9	0.6	1.1
Mining & quarrying	1.9	1.0	1.3	0.8	7.2	4.9	2.4	0.2	0.1	0.1	0.1	1.0	1.6	0.3
Construction	9.0	9.7	19.9	23.9	20.4	23.1	10.1	0.8	1.1	2.6	2.5	2.6	2.8	1.0
Gas, electricity & water	1.0	1.2	0.7	1.2	0.8	1.4	2.4	0.1	0.2	0.0	0.1	0.0	0.5	0.6
Transport & Communication	7.8	8.1	5.5	6.0	6.3	6.4	9.8	1.6	2.0	1.8	3.2	2.0	2.8	3.2
Distributive trades	24.4	20.1	16.5	13.2	10.0	7.3	9.4	25.9	20.3	22.0	17.9	23.4	13.0	18.5
Insurance, banking & finance	1.0	0.9	0.5	0.7	0.6	0.6	2.3	1.2	1.3	2.1	1.8	2.4	1.7	3.2
Professional & Scientific services	1.7	2.3	1.6	2.1	1.7	2.0	5.1	6.6	9.5	6.7	7.8	6.4	8.4	18.0
Miscellaneous services	8.0	8.4	5.3	5.4	4.5	3.7	6.0	15.8	16.5	12.5	13.5	11.6	12.8	14.8
Public administration & defense	2.6	3.2	2.6	3.3	2.3	3.3	6.4	1.7	2.2	1.0	2.3	1.4	3.1	4.6

Sources: Figures calculated from sources described in Appendix A

distribution although the distribution employment share is only 9.4 per cent. Bricks, pottery and cement also have close links with construction, and mining and quarrying. Recruitment and flow propensities with construction are 20.4 per cent and 23.1 per cent respectively; with mining and quarrying they are 7.2 per cent and 4.9 per cent, although the mining and quarrying male employment share is only 2.4 per cent. Finally, the table shows that all three manufacturing industries tend to recruit and lose disproportionately small numbers of men from the remaining non-manufacturing industries.

The Table also compares female recruitment and flow propensities with employment shares. But the only evidence of special female links is between food, drink and tobacco and distribution. Moreover, intensive movements between these two industries seem to be uni-directional. For the recruitment propensity is 26 per cent, considerably greater than the 18.5 per cent female employment share, while the flow propensity is only 20 per cent. This variation between recruitment and flow propensities is, however, consistent with the fact that distribution female employment shares are highest in the youngest age groups.¹ Similar variations can be observed in the recruitment and flow propensities for movements between timber and furniture; bricks, pottery and cement; and distribution. In all three instances the excess of recruitment propensities over flow propensities provides further support for the view that persons moving from distribution into manufacturing are mostly the younger members of the labour force.

¹ See above, Chapter II, p.75 , Table 2.12.

Within Manufacturing It can be seen from Table 3.3 that the remaining eleven manufacturing industries are not closely linked to non-manufacturing. This section will demonstrate the extent to which they are close neighbours of each other.

Recruitment and flow propensities for the 576 pairs of two digit industries were calculated. Examination of these revealed intensive flows between two groups of industries. The first, the engineering and metals sector, includes metals; engineering and electrical goods; vehicles; and metals n.e.s. The second, Textiles and Clothing, is comprised of textiles; leather and leather goods; and clothing and footwear. The remaining industries, chemicals; shipbuilding; paper, printing and publishing; and other manufacturing are probably not closely linked to any others.

Within Each Industry Before examining the evidence on recruitment and flow propensities between industries, it should first be noted that plants in each industry have a disproportionately high tendency to recruit and lose labour to other plants classified to the same industry. Table 3.5 gives each industry's propensity to recruit and lose labour to itself. Since movements between production units within each three digit industry are not recorded these figures could underestimate quite substantially the propensities of all job changers to remain within their two digit industries. Yet it can be seen from the Table that in every industry except distribution (where a high propensity to leave has already been noted) both recruitment and flow propensities are well in excess of employment shares. Moreover, in each industry where employment levels increased between 1959 and 1966, flow propensities

TABLE 3.5

The Propensity of Each Manufacturing Industry to Recruit and Lose Labour to itself:
1959-66 (Percentages)

INDUSTRY	MALE			FEMALE		
	R.P.	F.P.	% employed	R.P.	F.P.	% employed
Agriculture, forestry & fishing	4.9	2.5	6.6	1.1	0.9	1.1
Mining & quarrying	4.4	2.4	2.4	2.5	2.5	0.3
Food, drink & tobacco	10.4	10.6	3.2	11.6	11.0	4.3
Chemicals & allied industries	14.9	16.2	2.3	10.9	11.3	1.8
Metal manufacture	10.9	11.5	3.7	14.4	18.8	0.9
Engineering & electrical goods	28.5	31.2	10.8	19.0	23.0	7.1
Shipbuilding & marine engineering	20.2	15.6	1.5	11.8	12.2	0.2
Vehicles	12.6	12.5	4.2	7.0	7.4	1.5
Metals goods n.e.s.	6.5	7.0	2.5	9.2	9.8	2.4
Textiles	23.4	22.5	2.5	25.3	22.1	5.4
Leather, leather goods, & fur	4.1	3.1	0.2	2.1	1.9	0.3
Clothing & footwear	22.9	19.8	1.0	28.7	26.3	5.0
Bricks, pottery, glass, cement etc.	7.4	7.8	1.8	4.4	4.5	1.0
Timber, furniture, etc.	11.2	10.1	1.6	5.3	5.6	0.7
Paper, printing & publishing	24.8	27.5	2.8	13.4	13.9	2.3
Other manufacturing industries	4.7	5.2	1.3	4.8	5.4	1.5
Construction*	-	-	10.1	-	-	1.0
Gas, electricity & water	2.7	3.4	2.4	2.9	4.5	0.6
Transport & communication	13.6	12.9	9.8	6.9	8.1	3.2
Distributive trades	18.3	15.5	9.4	16.2	12.5	18.5
Insurance, banking & finance	1.6	2.0	2.3	0.8	1.0	3.2
Professional & scientific services	9.0	11.1	5.1	10.5	13.6	18.0
Miscellaneous services	11.5	11.7	6.0	20.1	18.7	14.8
Public administration & defense	3.8	5.0	6.4	2.4	2.9	4.6

* The Construction industry is not disaggregated to three digit level in the 1958 SIC.

Source: Figures calculated from sources described in Appendix A.

exceeded recruitment propensities suggesting that once workers enter an industry they have a tendency to remain employed in it even though they may change their jobs.

Engineering And Metals: Males Table 3.6 presents the propensities of the industries in the Engineering And Metals Sector to recruit and lose men to each of the 24 industries in the SIC. Employment shares for each industry are given in the final column. The Table shows that most of the intensive movement within this sector is between each industry and engineering. The engineering employment share of men is 10.8 per cent, but the other three industries have much larger propensities to recruit and lose labour from it. In metals the figures are 16.6 per cent and 20 per cent respectively; in vehicles, they are 20.6 per cent and 25.9 per cent, and in metal goods n.e.s. they are 21.1 per cent and 23.6 per cent. Engineering workers themselves can be seen to have a high tendency to remain within the industry. Nearly one out of three industry changers leaving an engineering firm finds a job in another three digit engineering industry. Moreover, engineering flow propensities can be seen to exceed recruitment propensities for each industry in the group. This shows the relative attractiveness of employment in the engineering industry and the tendency for persons who once enter to continue to work in the industry even though they may change their jobs.

Engineering itself seems to have a disproportionate tendency to recruit and lose labour to vehicles and metal goods n.e.s., but not to metals. Engineering recruitment and flow propensities with vehicles were 8.8 per cent and 7.6 per cent

TABLE 3.6

The Propensity of each Engineering and Metals Industry to Recruit and Lose Men to Every Other Industry 1959-66: (percentages)

INDUSTRY	METALS		ENGINEER- ING		VEHICLES		METALS n.e.s.		% empl- oyed
	R.P.	F.P.	R.P.	F.P.	R.P.	F.P.	R.P.	F.P.	
Agriculture, forestry & fishing	1.3	0.6	1.2	0.7	1.3	0.5	1.0	0.4	6.6
Mining & quarrying	4.8	2.0	1.6	0.6	2.0	0.8	1.7	0.8	2.4
Food, drink & tobacco	3.2	3.0	2.5	2.4	2.8	2.3	2.4	2.9	3.2
Chemicals & allied industries	2.9	3.4	1.8	2.1	1.7	1.5	2.0	1.8	2.3
Metal manufacture	10.9	11.5	4.9	4.7	3.9	3.3	8.7	9.5	3.7
Engineering & electrical goods	16.6	20.0	28.5	31.2	20.6	25.9	21.1	23.6	10.8
Shipbuilding & marine engineering	1.7	1.5	2.4	1.4	1.2	1.3	1.3	1.0	1.5
Vehicles	4.3	5.4	8.8	7.6	12.6	12.5	7.3	7.8	4.2
Metals n.e.s.	9.1	9.6	5.9	6.3	5.8	5.9	6.5	7.0	2.5
Textiles	2.3	2.1	1.9	1.9	2.2	1.4	2.4	2.4	2.5
Leather, leather goods & fur	0.3	0.2	0.3	0.2	0.1	0.1	0.4	0.2	0.2
Clothing & footwear	0.7	0.4	0.6	0.4	0.6	0.4	0.4	0.6	1.0
Bricks, pottery, glass, cement etc.	3.2	3.3	1.5	1.7	1.7	1.4	1.9	1.9	1.8
Timber, furniture etc.	1.2	0.8	1.2	1.1	1.5	1.3	2.4	2.4	1.6
Paper, printing & publishing	1.1	1.1	1.4	1.5	1.2	1.3	1.4	2.1	2.8
Other manufacturing ind.	1.7	1.8	2.1	2.1	1.7	2.1	2.9	2.4	1.3
Construction	11.9	13.5	9.8	10.7	8.6	7.8	9.0	10.1	10.1
Gas, electricity & water	1.5	1.6	1.1	1.2	1.1	1.0	1.2	1.1	2.4
Transport & communication	5.5	4.8	4.3	3.7	9.5	8.9	8.0	4.0	9.8
Distributive trades	7.7	5.5	8.5	7.1	8.1	6.1	9.7	8.2	9.4
Insurance, banking & finance	0.5	0.5	0.6	0.7	0.4	0.5	0.4	0.5	2.3
Prof. & scientific services	1.7	1.7	2.0	2.7	1.5	2.5	1.2	2.0	5.1
Misc. services	3.8	3.4	5.2	5.4	8.1	7.5	4.7	5.3	6.0
Public admin & defense	2.3	2.3	2.1	2.6	1.7	3.5	2.0	2.1	6.4

Source: Figures calculated from sources described in Appendix A.

respectively against a vehicles employment share of 4.2 per cent. With metal goods n.e.s. the figures were 5.9 per cent and 6.3 per cent compared with a 2.5 per cent employment share. But in metals they were only 4.9 per cent and 4.7 per cent against an employment share of 3.7 per cent.

There is also evidence of neighbourliness between the other three industries. Metals had recruitment and flow propensities of 9.1 per cent and 9.6 per cent with metal goods n.e.s., while metal goods n.e.s. recruited 8.7 per cent and lost 9.5 per cent of its industry changers to metals. Vehicles had recruitment and flow propensities of about 6 per cent with metal goods n.e.s., and the comparable propensities for metal goods n.e.s. with vehicles were 7.3 per cent and 7.8 per cent respectively. But there is no evidence of intensive movement between metals and vehicles. Both industries have close links with the other two, but not with each other.

There are a few instances of intensive movement between each engineering and metals industry and other industries outside the sector. The metals recruitment propensity from mining is twice the mining employment share, presumably reflecting the movement of coal miners from Wales and the North East into steel factories, and there is some indication of disproportionately large flows between each industry and other manufacturing. On the whole, however, the industries in the Engineering and Metals Sector tend to recruit and lose relatively small numbers from the rest.

Engineering and Metals: Females Recruitment and flow propensities for women must be treated more cautiously than those for men because the number of women moving between two

digit industries who are recorded in a 1 per cent sample of the working population is often very small. Nevertheless, female recruitment and flow propensities for the Engineering and Metals Sector indicate neighbourhood relationships between industries that are remarkably similar to those for men, (see Table 3.7). Each industry can be seen to recruit and lose disproportionately large numbers from engineering. Vehicles and metals n.e.s. exchange relatively large numbers with each other and metals and metals n.e.s. are also closely linked. Finally, engineering has high recruitment and flow propensities with both vehicles and metals n.e.s. The Glasgow Study also observed strong female linkages between plants in this sector. The authors found that a smaller proportion of females than males leave engineering employment when changing employees and described this as a 'frankly mystifying result'.¹ Although the metals industry was excluded from their investigation, this unexpected finding is confirmed by the evidence reported here.

Textiles and Clothing: Males The male recruitment and flow propensities for the Textiles and Clothing Sector shown in Table 3.8 provide some evidence of neighbourliness between clothing and footwear, and leather and leather goods. Leather had recruitment and flow propensities with clothing of 6 per cent and 6.5 per cent compared with an employment share for clothing of only 1 per cent. Conversely clothing's propensity to recruit and lose to leather was 2.3 per cent and 1.5 per

¹The Glasgow Study, p. 260.

TABLE 3.7

The Propensity of Each Engineering and Metals Industry to Recruit and Lose Women to Every Other Industry 1959-66: (Percentages)

INDUSTRY	METALS		ENGINEER- ING		VEHICLES		METALS n.e.s.		% empl- oyed
	R.P.	F.P.	R.P.	F.P.	R.P.	F.P.	R.P.	F.P.	
Agriculture, forestry & fishing	0.6	0.5	0.5	0.4	0.4	0.4	0.5	0.2	1.1
Mining & quarrying	0.1	0.5	0.2	0.1	0.0	0.2	0.0	0.0	0.3
Food, drink & tobacco	5.3	3.4	5.6	5.0	5.4	3.4	7.5	6.2	4.3
Chemicals & allied industries	3.2	1.7	2.6	2.2	2.3	3.0	2.1	2.3	1.8
Metal manufacture	6.1	6.7	1.8	1.8	1.4	1.3	4.0	4.5	0.9
Engineering & electrical goods	14.4	18.8	19.0	23.0	13.6	22.1	15.5	18.0	7.1
Shipbuilding & marine engineering	0.5	0.3	0.2	0.2	0.4	0.3	0.1	0.1	0.2
Vehicles	2.1	2.6	3.6	2.9	7.0	7.4	4.2	4.9	1.5
Metals n.e.s.	12.1	12.6	5.1	5.6	7.8	7.6	9.2	9.8	2.4
Textiles	1.8	2.6	4.6	3.3	4.2	2.0	3.5	3.1	5.4
Leather, leather goods & fur	1.1	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.3
Clothing & footwear	2.9	2.1	4.3	2.7	3.2	2.3	3.2	2.8	5.0
Bricks, pottery, glass, cement etc.	1.7	1.9	1.0	1.2	1.1	0.4	1.4	1.2	1.0
Timber, furniture etc.	1.1	4.0	0.1	1.2	0.9	1.0	1.7	1.5	0.7
Paper, printing & publishing	2.3	2.0	3.1	3.2	1.7	1.6	3.5	2.8	2.3
Other manufacturing ind.	1.9	1.6	2.6	3.0	3.1	2.7	3.4	3.0	1.5
Construction	2.1	2.8	1.4	1.9	1.1	1.6	1.2	1.8	1.0
Gas, electricity & water	0.1	0.6	0.3	0.6	0.5	0.9	0.4	0.5	0.6
Transport & communication	1.9	2.3	1.5	2.2	3.2	4.1	1.4	1.3	3.2
Distributive trades	17.1	12.3	20.4	14.3	20.0	11.5	16.8	13.7	18.5
Insurance, banking & finance	1.3	2.0	1.8	2.0	2.6	2.4	1.3	1.1	1.3
Prof. & scientific services	6.4	8.7	5.5	7.4	5.4	7.6	5.3	6.4	6.4
Misc. services	12.7	10.1	12.0	12.8	11.7	11.5	12.6	12.5	12.7
Public admin. & defense	1.1	3.0	1.4	2.4	2.5	4.1	0.7	1.8	1.1

Source: Figures calculated from sources described in Appendix A.

TABLE 3.8

The Propensity of Each Textile and Clothing Industry to Recruit and Lose Men to every Other Industry 1959-66: (Percentages)

	TEXTILES		LEATHER & " GOODS		CLOTHING & FOOTWEAR		% empl- oyed
	R.P.	F.P.	R.P.	F.P.	R.P.	F.P.	
Agriculture, forestry & fishing	1.8	0.7	2.7	1.0	2.3	0.7	6.6
Mining & quarrying	3.0	1.1	3.4	0.5	1.0	0.6	2.4
Food, drink & tobacco	3.4	3.8	4.1	2.8	2.6	4.5	3.2
Chemicals & allied industries	2.2	2.2	3.1	3.6	1.7	1.7	2.3
Metal Manufacture	2.7	3.1	2.7	3.6	1.5	2.4	3.7
Engineering & electrical goods	9.4	10.0	12.2	11.4	5.3	8.8	10.8
Shipbuilding & marine engineering	0.6	0.3	1.4	0.5	0.8	0.2	1.5
Vehicles	2.6	3.8	1.7	1.3	2.0	2.8	5.2
Metals n.e.s.	3.2	3.3	3.4	4.9	2.3	1.6	2.5
Textiles	23.4	22.5	4.1	4.1	6.7	7.0	2.5
Leather, leather goods & fur	0.5	0.4	4.1	3.1	2.3	1.5	0.2
Clothing & footwear	2.8	2.2	6.1	6.5	22.9	19.8	1.0
Bricks, pottery, glass, cement etc.	2.2	2.0	0.0	1.6	1.6	0.8	1.8
Timber, furniture etc.	2.0	2.0	4.1	2.1	1.7	1.6	1.6
Paper, printing & publishing	2.0	2.5	1.7	4.1	2.4	2.0	2.8
Other manufacturing industries	2.6	3.6	2.7	4.7	2.0	2.0	1.3
Construction	7.9	7.8	12.2	11.9	4.2	6.1	10.1
Gas, electricity & water	1.0	1.8	1.7	1.3	0.5	0.9	2.4
Transport & communication	5.9	4.9	5.4	7.5	3.3	4.5	9.8
Distributive trades	11.4	9.5	13.9	11.4	21.3	18.1	9.4
Insurance, banking & finance	0.7	0.8	0.7	0.8	0.8	1.4	2.3
Professional & scientific services	1.6	2.3	1.0	2.1	1.2	1.3	5.1
Miscellaneous services	5.3	5.8	5.8	5.4	8.1	6.9	6.0
Public administration & defense	1.9	3.4	1.7	3.6	1.6	2.9	6.4

Source: Figures calculated from sources described in Appendix A.

cent against leather's employment share of 0.2 per cent.

Both industries can also be seen to have experienced intensive exchange of manpower with textiles.

It will be noticed, however, that the links between the Textiles and Clothing Sector are weaker than those found in engineering and metals. In Textiles and Clothing the intensity of movement within textiles and clothing is extremely high compared with the relative size of flows between industries, whereas in engineering and metals, engineering itself is so large that the other three recruit and lose one-fifth of their industry changers to the enormous number of firms this one industry contains. The Textiles and Clothing Sector is also less self-contained. Leather and clothing both experienced disproportionately high recruitment and flow propensities with distribution, while none of the engineering and metals industries relied excessively on recruitment from any industry outside the group.

Textiles and Clothing: Females The percentage of women employed in the Textile and Clothing Sector is considerably greater than the proportion of men. Consequently Table 3.9 shows that the propensity of each of these industries to recruit and lose women to the other members of the group was much larger than for men. Furthermore, the degree of insularity of two of the three industries in the Group is much greater.

Both textiles and clothing can be seen to exchange about 35 per cent of their industry changers with each other, and although recruitment and flow propensities with distribution are high they are not disproportionately greater than the distribution share of female employment. Leather and leather

TABLE 3.9

The Propensity of Each Textile and Clothing Industry to Recruit and Lose Women to Every Other Industry: 1959-1966 (percentages)

INDUSTRY	TEXTILES		LEATHER & " GOODS		CLOTHING & FOOTWEAR		% empl- oyed
	R.P.	F.P.	R.P.	F.P.	R.P.	F.P.	
Agriculture, forestry & fishing	0.5	0.5	0.7	0.3	0.6	0.6	1.1
Mining & quarrying	0.3	0.2	0.0	0.0	0.2	0.1	0.3
Food, drink & tobacco	5.5	5.4	3.8	4.3	3.4	4.7	4.3
Chemicals & allied industries	1.6	1.7	2.1	1.6	1.1	1.2	1.8
Metal Manufacture	0.6	0.4	1.0	2.8	0.5	0.6	0.9
Engineering & electrical goods	6.5	9.5	8.7	9.6	4.9	8.8	7.1
Shipbuilding & marine engineering	0.1	0.1	0.0	0.0	0.0	0.0	0.2
Vehicles	0.8	1.5	2.1	2.2	0.8	1.1	1.5
Metals n.e.s.	2.1	2.2	4.9	4.7	1.7	2.0	2.4
Textiles	25.3	22.1	8.3	7.5	9.3	8.7	5.4
Leather, leather goods & fur	0.7	0.6	2.1	1.9	1.1	1.1	0.3
Clothing & footwear	10.2	8.7	14.2	12.4	28.7	26.3	5.0
Bricks, pottery, glass, cement etc.	0.5	0.8	0.7	0.3	0.8	0.7	1.0
Timber, furniture etc.	1.1	1.2	0.7	1.2	1.3	1.2	0.7
Paper, printing & publishing	2.6	2.6	5.6	5.0	2.6	2.9	2.3
Other manufacturing industries	2.2	2.4	6.9	5.0	2.3	2.9	1.5
Construction	0.5	0.7	2.1	0.6	0.5	0.5	1.0
Gas, electricity & water	0.1	0.3	3.5	0.0	0.1	0.2	0.6
Transport & communication	1.2	1.6	2.1	0.6	1.0	1.5	3.2
Distributive trades	18.1	14.9	17.4	18.9	22.3	17.3	18.5
Insurance, banking & finance	1.0	0.9	1.7	2.2	0.8	1.0	3.2
Professional & scientific services	5.8	7.9	3.1	5.9	4.2	5.7	18.0
Miscellaneous services	11.8	12.4	10.4	12.1	11.5	9.7	14.8
Public administration & defense	0.9	1.5	1.0	0.1	4.5	1.3	4.6

Source: Figures calculated from sources described in Appendix A.

goods, on the other hand, exhibits less intensive exchanges with the other members of the group. Although its recruitment and flow propensities with textiles and clothing exceed the employment shares of these industries, leather firms recruit and lose only 20-25 per cent of their industry changers from inside the Sector. Recruitment and flow propensities between this industry and paper, printing and publishing, and other manufacturing are also disproportionately high.

CONCLUSION

The first part of the chapter showed that industries expanding rapidly or paying below average wages tend to have the highest inflow and outflow rates. The second part demonstrated the existence of neighbourhood relationships between various groups of two digit industries. Manpower flows between certain groups of industries are above levels to be expected if manpower recruitment and flow propensities were randomly determined. Certain industries - food, drink and tobacco; bricks, pottery and cement; and timber and furniture are linked to specific non-manufacturing industries, while industries in the engineering and metals sector and in textiles; leather and leather goods; and clothing and footwear have close links with each other and a degree of insularity from the rest. The next chapter will examine the reasons for these neighbourhood relationships and conclude by showing how they are affected by fluctuations in inflow and outflow rates.

CHAPTER IV

Factors Underlying Gross Manpower Flows

The second half of the previous chapter established that industries vary in their propensity to recruit and lose labour from each other even after allowing for size variations. Some two digit manufacturing industries experience intensive exchanges of manpower with individual non-manufacturing industries, while others compete more vigorously among themselves for labour. Among the industries whose links with non-manufacturing are weak, two groups can be identified. The first is comprised of industries in the metals and engineering sector. The second includes the textiles and clothing industries. The fact that manpower flows within these groups tend to be intensive in both directions suggests that the causes of close links lie in factors that are common to group members, namely occupational and locational similarities, and not differences between them namely variations in earnings and conditions of employment. This chapter begins, therefore, with an investigation of occupational and locational similarities between closely linked industries. The second half is then devoted to an examination of the effect of pay and conditions of employment on these neighbourhood relationships.

THE IMPACT OF LOCATIONAL AND OCCUPATIONAL FACTORS

Inter-industry variations in regional and skill structures must be quantified if their effects on the intensity of movement between industry pairs is to be assessed. Ideally this requires data on the occupational structure of each industry in each

region, The availability of such information would enable variations in the occupational structure of each industry by region to be taken into account. These variations could arise from regional differences in the age, structure, training and adaptability of the labour supply. Although such differences are generally thought to cause structural unemployment, they could in periods of excess demand lead to changes in production methods involving substitution of semi-skilled and unskilled jobs for skilled employment. In this way the occupational structure of a given industry in a particular region could become different from that industry's occupational structure in other parts of the country.

Unfortunately, however, the data necessary to determine whether or not such variations are significant is not available. Instead the DE provide an industry-regional cross classification and an industry-occupational matrix. From this data a measure of the separate effects of occupational and locational similarities can be constructed. The difficulty is that each measure assumes that the other factor has no effect on inter-industry mobility. It will, therefore, be necessary to construct a third measure to allow for the influence of both factors simultaneously, but this has to be based on a restrictive assumption due to the data limitations mentioned above.

The Measures

A Locational Measure. Suppose a man employed in Industry i decides to change his job. The structure of industry in Locality r where he lives and works clearly affects the probability of his finding a new job in Industry i . Assume he is unwilling to move and that he cannot commute outside the area. Assume

also inter-industry variations in earnings, conditions of employment and occupational requirements are negligible. Then, the probability of his finding a new job in Industry j depends on that industry's share of total vacancies in the locality. Over a seven year period (that is, leaving out the effects of cyclical fluctuations in labour demand) Industry j 's vacancy share will be closely associated with its share of total employment in the area. Thus in the absence of any variations in earnings, conditions of employment and occupational requirements, the random flow hypothesis must hold within a given locality. The propensity of a man leaving a job in Industry i to enter j will be determined by Industry j 's share of total employment in the locality.

Unfortunately, the locality in which the man leaving Industry i lives is unknown because manpower flow data are not available on a regional basis. Thus the likelihood of his living (and working) in Locality r as opposed to some other area must be taken into account in calculating the chances of his moving from i to j . Given no variations between localities in (a) the degree of prosperity and (b) wages and working conditions within Industry i , the probability of his working in Locality r would equal that locality's share of total employment in i . Such an assumption is, of course, not justified and will have to be relaxed later. But if it is maintained for the moment the probability that a man leaving a firm in Industry i (a) lives in Locality r and (b) finds a new job in Industry j , is equal to Locality r 's share of total employment in Industry i multiplied by Industry j 's share of total employment in the locality.

A man need not, however, reside in Locality r in order to move from Industry i to Industry j . He could live in any other part of the country provided establishments classified to both industries existed in the same area. In each locality, the probability of a man who leaves a firm in Industry i entering Industry j is calculated by the same formula. Thus the probability in the country as a whole of persons who leave Industry i entering Industry j is simply the sum of the probabilities for each locality.

All of this assumes, of course, no variations in the prosperity of Industry i between localities, no movement between localities, and no other factors such as pay and conditions of employment affecting labour mobility. Since these assumptions do not, in fact, hold the above formula is simply a measure of the influence of locational structure as distinct from other forces on the propensity of manpower leaving Industry i to enter Industry j . It can be briefly stated in the following equation.

$$(1) \quad L_{ij} = \sum_r \left(\frac{X_{ir}}{\sum_r X_{ir}} \cdot \frac{X_{jr}}{\sum_r X_{jr}} \right)$$

Where X_{ir} = employment in industry i in locality r

X_{jr} = employment in industry j in locality r

L_{ij} = the influence of locational structure on the propensity of manpower leaving Industry i to enter Industry j .

So far the discussion has concentrated on the effects of location on flow propensities. But similar reasoning can be applied to the relationship between locational factors and

recruitment propensities. In the absence of the other variables affecting labour mobility, the propensity of a firm in Industry i to recruit labour from Industry j is determined by: (a) Industry i 's locational employment structure, and (b) the structure of industry within each region in which it is located. Thus equation 4.1 also gives the formula for measuring the effect of location structure on recruitment propensities.

Equation 4.1 is effectively a weighted average of Industry j 's employment share in each region with the weights equal to each region's share of total employment in Industry i . It is based on the assumption that the proportion of industry changers leaving Industry i , who work in a particular region, is equal to that industry's share of total employment in i . This would be true if there were no significant inter-locational variations in wages and working conditions within i and in the general prosperity of each region. But such differences clearly do exist and it is important to consider whether or not they could bias the L_{ij} 's.

The effect of inter-regional variations in prosperity on the weights used in equation 4.1 is not entirely clear. Redundancy rates from Industry i plants in depressed areas may exceed the industry's national average because plants are less competitive in these regions. But it has also been shown that high separation rates tend to occur in plants whose manpower requirements are expanding at above average rates, especially in conditions where labour markets are relatively tight. Moreover, redundant employees living in prosperous regions are more likely than those in depressed areas to find alternative employment. On balance, therefore, it seems reasonable to assume that the

proportion of persons leaving Industry i who are located in a prosperous region will exceed that region's share of total Industry i employment, whereas in depressed areas the converse proposition will be true.

A second measure of locational effects was, therefore, constructed to boost the weights assigned to the prosperous regions relative to those of the depressed areas. Regional unemployment rates were used to measure the effect of variations in prosperity on the demand for male labour. The formula was

$$(2) \quad L_{ijm} = \sum_r \left(\frac{\frac{X_{ri}}{U_r}}{\sum_r \frac{X_{ri}}{U_r}} \cdot \frac{X_{jr}}{\sum_j X_{jr}} \right)$$

where U_r is the rate of unemployment in Locality r .

This equation is also a weighted average of Industry j 's employment share. But the regional shares of total employment in Industry i , the weights in equation 4.1, have been adjusted to allow for inter-regional variations in unemployment.

Unemployment rates are probably a less reliable indicator of aggregate demand for women than men, since many leave the labour force when demand is slack. Regional participation rates were therefore introduced into the formula used to calculate similar L_{ij} 's for women. It took the following form.

$$(3) \quad L_{ij} = \sum_r \left(\frac{\frac{P_r X_{ri}}{\sum_r P_r X_{ri}}}{\sum_r \frac{P_r X_{ri}}{\sum_r P_r X_{ri}}} \cdot \frac{X_{jr}}{\sum_j X_{jr}} \right)$$

where P_r is the female participation rate in locality r .

The difficulty in calculating the L_{ij} 's in these equations lies in the identification of localities. Specification of

local labour markets is always a problem and in the end some degree of arbitrariness must creep in. The most accurate procedure would be to calculate probabilities for the 576 industry pairs for the employment exchanges in the country and sum them. As this project was obviously not feasible, probabilities were instead calculated for each of the ten planning regions in the country and these were summed across regions. The results are analysed below.

An Occupational Measure The above analysis can also be applied to the construction of a variable to measure the effect of occupational factors on flow and recruitment propensities. If inter-industry variations in location, earnings, and conditions of employment are eliminated and movement between skills is not allowed, labour markets will be defined by occupations and within each occupation inter-industry mobility will be a random process. The effect of occupational factors on labour mobility can, therefore, be quantified by the same method employed for location. In this case the rate of growth of total employment (male and female combined) in each occupation was introduced to allow for the effects of variations in the demand for labour on industry separation rates. The exact way in which U, P and g are introduced in an attempt to allow for demand variations may seem somewhat arbitrary. In fact they had little effect on the values of the locational and occupational variables.

The formula used to calculate occupational similarities between industries was

$$(4) \quad o_{ij} = \sum_o \left(\frac{g_o X_{io}}{\sum_o g_o X_{io}} \cdot \frac{X_{jo}}{\sum_j X_{jo}} \right)$$

where

X_{io} is employment in Industry i and Occupation O

X_{jo} is employment in Industry j and Occupation O

g_o is employment in Occupation O in 1961 divided by employment in the same occupation in 1951.

The O_{ij} 's were calculated from the Occupation by Industry matrix published by the DE Manpower Research Unit. This particular breakdown provides a fairly good distinction between engineering, textile, and service occupations but it lumps together people whose skills are highly diverse such as coal-miners, printers, carpenters, brick layers and crane drivers.¹ This creates some problems in applying the measure to certain industries but fortunately these difficulties do not arise in the case of the industries in either the Engineering and Metals or Textile and Clothing sectors.

A Combined Measure. If inter-industry variations in locational structure were the only factors affecting the relative intensity of movement between industries and if locational boundaries were properly identified by the regional definitions used to measure these variations, the propensity of one industry to recruit and lose labour to another would equal L_{ij} , where the i subscript refers to the given industry and j refers to the industry with which it exchanges labour. Similarly, if inter-industry variations in occupational structure were the only factors preventing inter-industry mobility from being a purely random process and if these variations were measured accurately Industry i 's recruitment and flow propensities with Industry j would equal O_{ij} . But, in fact, both factors simultaneously affect the intensity of movement

¹ See Ministry of Labour, Manpower Studies No.6, op.cit., pp.24-25. The published figures do not give a full breakdown of the figures at two digit level. These were supplied privately by the Manpower Research Unit.

between industry pairs. It is, therefore, desirable to have a measure of the probability that a man leaving Industry i enters Industry j when both locational and occupational variations in employment structure are allowed to affect mobility.

The following formula provides such a measure

$$(5) \quad C_{ij} = \sum_o \left[\frac{\frac{X_{r,i}}{U_r}}{\sum_r \frac{X_{r,i}}{U_r}} \sum_o \left(\frac{g_{r,o} X_{r,o,i}}{\sum_o g_{r,o} X_{r,o,i}} \frac{X_{r,o,j}}{\sum_j X_{r,o,j}} \right) \right]$$

where

$X_{r,o,j}$ = employment in Occupation o , Location r and Industry j

$X_{r,o,i}$ = employment in Occupation o , Location r and Industry i

$g_{r,o}$ = the rate of growth of Occupation o within Locality r .

It can be seen that the expression inside the round brackets is simply the formula for O_{ij} for each locality. These indices of the degree of occupational similarity between two industries within a given locality, O_{rij} 's, are then multiplied by the locational weights and the results for each of the twelve regions are summed. Equation 4.5 is a formula for calculating a combined measure for men. In the formula for women, unemployment is dropped and the $X_{r,i}$ are multiplied by the female participation rate in each locality as in equation 4.3. When summed over j , the C_{ij} , like the L_{ij} and the O_{ij} , are constrained to equal 1. Thus the C_{ij} provide a set of expected propensities for industry changers who enter or leave a firm in Industry i to have come from or gone to each of the 24 two-digit industries.

The difficulty with equation 4.5 is that, in the absence of a three way cross-classification of employment by industry, occupa-

tion, and location, the $X_{r,o,j}$ can only be estimated by assuming that the occupational structure of each industry is the same in all regions. Such an assumption although subject to the qualifications mentioned above¹ seems reasonable given the data limitations. It enables the $X_{r,o,j}$ to be calculated by applying the occupational structure in each industry in the country as a whole to the employment level of each industry in each region. The $X_{r,o,i}$ need not be calculated at all since by assumption the share of each occupation in employment in Industry i is the same in all regions. If the $g_{r,o}$'s are also assumed equal in all regions, the formula becomes

$$(6) \quad C_{ij} = \sum_r \left[\frac{\frac{X_{r,i}}{U_r}}{\sum_r \frac{X_{r,i}}{U_r}} \sum_o \left(\frac{g_o X_{o,i}}{\sum_o g_o X_{o,i}} \cdot \frac{X_{r,o,j}}{\sum_j X_{r,o,j}} \right) \right]$$

where

$$\frac{X_{r,o,j}}{\sum_j X_{r,o,j}} = \frac{\frac{X_{o,j}}{\sum_o X_{o,j}} \cdot X_{r,j}}{\sum_j \left(\frac{X_{o,j}}{\sum_o X_{o,j}} \cdot X_{r,j} \right)}$$

The resulting C_{ij} 's can be regarded as the recruitment and flow propensities that would occur if inter-industry mobility were affected only by locational and occupational variations in industrial employment structures. The next part of this chapter compares these expected values with recorded recruitment and flow propensities.

¹See Appendix A.

Application of the Measures

Industry B can be said to be a close neighbour of A if A's recruitment or flow propensity with B is significantly greater than B's employment share. Although the occurrence of disproportionately large labour flows from A to B does not entail that a similar number of persons move from B to A, in practice it turns out that intensive movements between industry pairs tend to occur in both directions at the same time. The fact that the inter-industry mobility data behave in this way suggests that neighbourhood relationships between industries result from their being linked through common elements in their occupational and locational manpower requirements. The objective of this part of the chapter is to determine the extent to which these measures of locational and occupational similarities between industry pairs can account for the intensity of movement between them.

Non-Manufacturing Aggregated

Table 4.1 presents L_{ij} 's, O_{ij} 's and C_{ij} 's and recruitment and flow propensities for each manufacturing industry with non-manufacturing. Taking the figures for men first, the L_{ij} 's can be seen to exhibit the least amount of variation across the industries. All values can be seen to fall between 50 per cent and 60 per cent. This reflects the locational dispersion of the non-manufacturing industries and the fact that regionally concentrated manufacturing industries such as shipbuilding, textiles, leather, and clothing and footwear are located in areas where there is relatively less alternative employment in manufacturing. It will be noticed, however, that L_{ij} 's for metals, vehicles, and metal goods n.e.s., are about 5 percentage points less than the average for the rest. This is due to the concentration of these industries in regions where engineering is also concentrated.

O_{ij} 's, on the other hand, exhibit considerable variation. The

TABLE 4.1

The Estimated and Actual Propensities of Each Manufacturing Industry to Recruit and Lose Labour to Non-Manufacturing

INDUSTRY	MALE					FEMALE				
	R.P.	F.P.	L _{ij}	O _{ij}	C _{ij}	R.P.	F.P.	L _{ij}	O _{ij}	C _{ij}
Food, drink & tobacco	60.7	57.1	58.4	62.5	59.2	55.7	53.9	65.9	40.5	40.7
Timber, furniture etc.	57.3	58.5	59.6	59.5	57.2	49.9	49.6	66.6	45.3	46.8
Bricks, pottery, glass, cement etc.	56.9	54.4	55.5	59.2	54.0	51.7	47.3	60.6	40.4	36.3
Leather, leather goods & fur	48.6	45.5	59.3	35.5	34.9	38.8	41.6	65.1	30.2	32.1
Shipbuilding & marine engineering	47.8	47.6	60.4	43.8	43.4	56.5	52.3	68.9	63.7	66.6
Chemicals & allied industries	45.4	44.9	58.5	56.1	53.1	52.7	49.0	66.5	56.1	57.0
Clothing & footwear	44.2	43.3	59.7	36.6	35.8	41.5	37.8	64.9	19.8	21.4
Other manufacturing industries	43.3	39.6	57.0	56.3	51.4	45.7	42.7	66.6	41.0	41.3
Paper, printing & publishing	42.5	38.7	61.0	61.1	58.8	34.7	46.7	67.3	45.7	46.8
Vehicles	42.3	39.0	54.3	45.2	39.6	47.4	44.4	62.7	53.6	50.8
Metal manufacture	40.8	35.9	53.3	49.2	42.4	43.5	42.9	61.6	54.8	51.4
Textiles	40.4	38.0	55.3	40.3	35.7	40.1	40.6	61.1	26.4	25.0
Engineering & electrical goods	36.1	35.2	57.5	45.2	42.6	45.1	44.4	66.1	43.0	43.1
Metals n.e.s.	34.3	34.5	52.4	43.0	36.1	40.1	39.3	60.5	34.6	31.6

Source: See text and Appendix A.

three closely linked manufacturing industries have O_{ij} 's with non-manufacturing of about 60 per cent while the values for the rest run from 56 per cent in chemicals down to 35 per cent for leather. The 61 per cent O_{ij} for paper, printing, publishing can be disregarded. It occurs because the Manpower Research Unit's industry-occupation matrix lumps skilled paper workers, printers, and building tradesmen into one occupational category. O_{ij} 's for chemicals and other manufacturing also seem excessive and reflect the failure of the compilers of this matrix to distinguish the professional, technical and skilled manual occupations that are specific to these industries. The lower O_{ij} 's for industries in the engineering and metals, and textiles and clothing sectors can, however, be taken as an indication of the occupational barriers surrounding these industries.

The C_{ij} 's reflecting the combined effects of both locational and occupational similarities in employment structure can be seen to provide remarkably accurate estimates of recorded recruitment and flow propensities for food, drink and tobacco; timber and furniture; and bricks, pottery and cement. They also provide close approximations of recorded values in vehicles and metals n.e.s. But C_{ij} 's for the remaining members of the engineering and metals sector tend to exceed recorded figures while those for the textiles and clothing sector understate quite significantly the propensity of labour to enter from and go to non-manufacturing. C_{ij} 's for the three industries where O_{ij} 's are poor measures of similarities with non-manufacturing in employment structures can also be seen to exceed comparable recruitment flow propensities as expected.

Female L_{ij} 's like their male counterparts, are not very highly

dispersed across industries. They range between 60 and 70 per cent. The excess of female over male L_{ij} 's is clearly due to the fact that the non-manufacturing employment share of women is greater than its proportion of total male employees.

Female O_{ij} 's can also be expected to exceed the male figures. Since women tend to be employed either in clerical jobs whose skill requirements are the same in all industries or in semi-skilled manual occupations, occupational barriers between manufacturing and non-manufacturing should be much lower than for men. It can be seen from the table, however, that female O_{ij} 's do not exceed the comparable male figures in many industries. They tend, in fact, to be lowest in industries that employ the greatest number of women: all the engineering and metals sector and food, drink and tobacco; bricks, pottery and cement; and metals n.e.s. These industries are traditional employers of female labour where well-defined female occupations have existed for many years. But most women working in them are found in semi-skilled manual jobs¹ where the degree of training required is not very great.

Thus the importance of occupational barriers may have been overstated by the O_{ij} 's since the formula used to calculate these probabilities assumes that each occupation is surrounded by a barrier of the same height.

The highest O_{ij} 's are found in shipbuilding, metals and vehicles; industries employing very little female labour. Since most of the women they do employ are office workers, the occupational barriers between them and non-manufacturing tends to be low. Hence the O_{ij} 's are high relative to flow propensities. The

¹ An exception is in bricks, pottery and cement where one-third of the women are classified to skilled occupations.

O_{ij} 's for chemicals, paper, printing and publishing and other manufacturing are too high owing to the way in which occupations in these industries are defined. But the degree of exaggeration in chemicals is probably not as great for women as for men because nearly one half of the women are employed in clerical and allied occupations.

Female C_{ij} 's on the whole provide less accurate estimates of recruitment and flow propensities than do male C_{ij} 's. High values can be seen to exaggerate recorded recruitment and flow propensities while low values understate considerably the true figures. The failure of the female C_{ij} 's to perform adequately in shipbuilding, metals and textiles is not significant because the comparable recruitment and flow propensities are themselves not reliable. They are based on a very small number of recorded industry changes over the seven-year period under analysis and are, therefore, subject to very wide error margins.¹ But the understatement of recorded recruitment and flow propensities in the industries that employ large numbers of women does indicate that occupational barriers between them and non-manufacturing are not as high as the O_{ij} 's imply. On the other hand, since recruitment and flow propensities are considerably less than the L_{ij} 's these occupational differences between industries cannot be entirely ignored. It seems, in fact, that other variables are required to give a full account of the factors affecting the propensity of manufacturing industries to recruit and lose labour from non-manufacturing. These factors will be considered later after the effect of locational and occupational variations in employment structure on manpower flows between individual manu-

¹See Appendix A.

facturing and non-manufacturing industries have been considered.

Non-Manufacturing Disaggregated. It will be recalled that intensive manpower movements between food, drink and tobacco; bricks, pottery and cement; and timber and furniture on the one hand and the non-manufacturing sector on the other resulted from each of these industries having high recruitment and flow propensities with specific non-manufacturing industries. Food, drink and tobacco was shown to experience disproportionately large exchanges of both male and female labour with distribution. Timber and furniture recruited and lost relatively large numbers of men to construction and distribution, while bricks, pottery and cement had high male recruitment and flow propensities with construction and mining and quarrying. The objective of this section is to determine whether or not these intensive manpower movements between industry pairs can be explained by similarities in locational and occupational employment structures.

Table 4.2 compares L_{ij} 's, O_{ij} 's and C_{ij} 's for each of these three industries with their recorded propensities to recruit and lose labour to each non-manufacturing industry. The table shows that the high propensity of timber and furniture to lose labour to construction is very closely approximated by the C_{ij} figure. This is almost entirely due to the similarity of skill structures between these two industries and is reflected in the very high O_{ij} , 22.8 per cent. The C_{ij} for bricks, pottery and cement, and mining and quarrying also provides a good approximation of the recorded figures and it can be seen that here again the intensive movements between these two industries are due primarily to occupational similarities between them. But in the remaining cases the relevant C_{ij} 's understate the intensity of movement between each of the

TABLE 4.2

The Estimated and Actual Propensities of Three Manufacturing Industries to recruit and lose Labour to each Non-Manufacturing Industry: 1959-1966

INDUSTRY	1. Food, Drink and Tobacco (Male)						2. Food, Drink and Tobacco (Female)					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Agriculture etc.	3.3	2.1	6.6	2.6	4.0	1.9	1.7	0.9	1.1	0.9	1.2	0.8
Mining etc.	1.9	1.0	2.4	3.2	5.9	4.0	0.2	0.1	0.3	0.3	0.3	0.3
Construction	9.0	9.7	10.1	10.4	10.3	11.1	0.8	1.1	1.0	1.0	1.0	1.2
Gas etc.	1.0	1.2	2.4	2.4	2.3	2.3	0.1	0.2	0.6	0.6	0.6	0.6
Transport etc.	7.8	8.1	9.8	9.3	10.4	10.3	1.6	2.0	3.2	3.1	2.9	2.9
Distribution	24.4	20.1	9.4	9.7	10.7	9.6	25.9	20.3	18.5	18.9	11.1	10.6
Insurance etc.	1.0	0.9	2.3	2.5	3.6	4.0	1.2	1.3	3.2	3.4	3.3	3.5
Prof. Services etc.	1.7	2.3	5.1	5.6	2.8	2.8	6.6	9.5	18.0	18.9	7.8	8.6
Misc. Services etc.	8.0	8.4	6.0	6.6	5.2	5.4	15.8	16.5	14.8	14.5	8.1	7.5
Public Admin.	2.6	3.2	6.4	6.2	7.3	7.5	1.7	2.2	4.6	4.4	4.2	4.6

- Column (1) = Recruitment Propensity (%)
- (2) = Flow Propensity (%)
- (3) = Per cent of total employed
- (4) = Location Variable (L_{ij})
- (5) = Occupation Variable (O_{ij})
- (6) = Estimated recruitment and flow propensity (C_{ij})

INDUSTRY	3. Timber and Furniture (Male)						4. Bricks, Pottery & Cement (Male)					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Agriculture etc.	3.5	1.9	6.6	2.7	2.3	1.1	3.2	1.9	6.6	2.8	4.6	2.4
Mining etc.	1.3	0.8	2.4	2.9	9.3	5.4	7.2	4.9	2.4	3.8	7.3	5.8
Construction	19.9	23.9	10.1	10.5	22.8	24.5	20.4	23.1	10.1	10.4	14.4	15.2
Gas etc.	0.7	1.2	2.4	2.4	1.7	1.9	0.8	1.4	2.4	2.4	2.4	2.7
Transport etc.	5.5	6.0	9.3	9.4	5.0	5.0	6.3	6.4	9.3	8.3	7.2	6.5
Distribution	16.5	13.2	9.7	9.8	5.8	5.3	10.0	7.3	9.7	8.8	7.2	6.1
Insurance etc.	0.5	0.7	2.5	2.7	2.0	2.4	0.6	0.6	2.5	2.0	2.3	2.1
Prof. Services etc.	1.6	2.1	5.6	5.8	2.2	2.2	1.7	2.0	5.6	5.3	2.9	2.8
Misc. Services	5.3	5.4	6.6	7.0	3.7	4.2	4.5	3.7	6.6	5.9	4.7	4.4
Public Admin.	2.6	3.3	6.2	6.4	4.4	5.1	2.3	3.3	6.2	5.8	6.1	6.0

Source: See Text and Appendix A.

three manufacturing industries and their non-manufacturing neighbours.

In two of these, the value of C_{ij} is very large. Bricks, pottery and cement can be seen to have a much greater C_{ij} with construction, 15.2 per cent, than with any other industry and food, drink and tobacco's expected propensity to recruit and lose women to distribution, 10.6 per cent, is higher than the comparable figure for the other non-manufacturing industries. It is clear that the observed intensity of movement between each of these pairs of industries is at least partially explained by locational and occupational similarities in their manpower requirements. But the fact that recorded recruitment and flow propensities exceed expected values suggests that a large number of persons cross occupational boundaries. A similar observation can be made for miscellaneous services even though food, drink and tobacco does not seem to have recruited or lost disproportionate numbers with this industry. It is interesting, however, that in both cases, particularly in miscellaneous services, the L_{ij} 's are very close to recorded propensities suggesting that locational barriers are a constraint on female labour flows between each industry and food, drink and tobacco.

In the remaining two cases the C_{ij} 's indicate that locational and occupational similarities have very little to do with recorded recruitment and flow propensities. The C_{ij} for food, drink and tobacco with distribution is only 9.6 per cent, one-half the size of actual recruitment and flow propensities. The C_{ij} for timber and furniture with distribution is only 5 per cent while recorded recruitment and flow propensities are three times this size.

In summary, locational and occupational similarities in

employment structure as measured by the O_{ij} 's give a full account of only two of the observed neighbourhood relationships between specific manufacturing and non-manufacturing industries; timber and furniture, and construction; and bricks, pottery and cement, and mining and quarrying. In the remaining instances where close links can be observed, the C_{ij} 's underestimate recorded intensities of movement. All but one of these cases occur where distribution is the non-manufacturing partner in the paired relationship. Clearly, other factors affect the relative volume of movement between this particular part of the service sector and these manufacturing industries. These will be considered later in the chapter.

The Engineering and Metals Sector. The relationship between recruitment and flow propensities, C_{ij} 's, L_{ij} 's and O_{ij} 's was examined for industries in the Engineering and Metals and Textiles and Clothing sectors. Presentation of the worksheets used in this analysis is rather cumbersome. Consequently they have not been included, although the discussion below makes frequent reference to them. Scatter diagrams are shown in their place. These provide a more vivid illustration of the performance of the C_{ij} 's. Each diagram has C_{ij} 's on the vertical axis and an average of comparable recruitment and flow propensities on the horizontal axis. The latter two values are very close to each other in most cases, so that this procedure is justifiable to save space. Where space is available each dot has a number referring to the industry it represents. The numbers refer to industries listed in 'Key to Abbreviations'. The closeness of the observations in each diagram to the 45° line indicates the accuracy of the C_{ij} 's as predictors of recorded propensities. Thus, although the discussion below makes frequent reference to the worksheets,

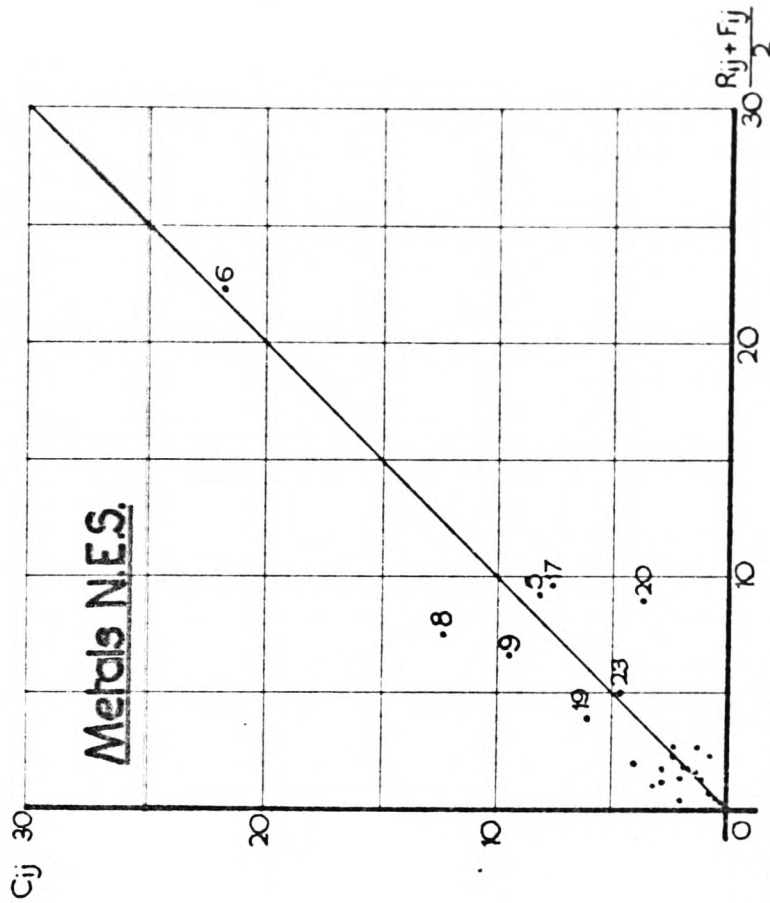
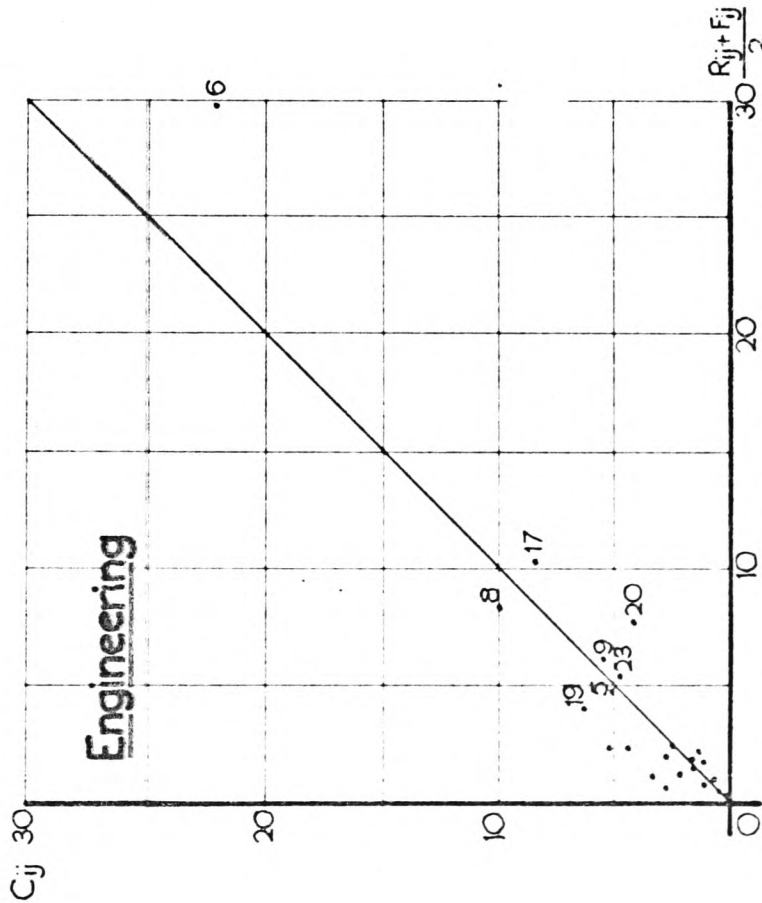
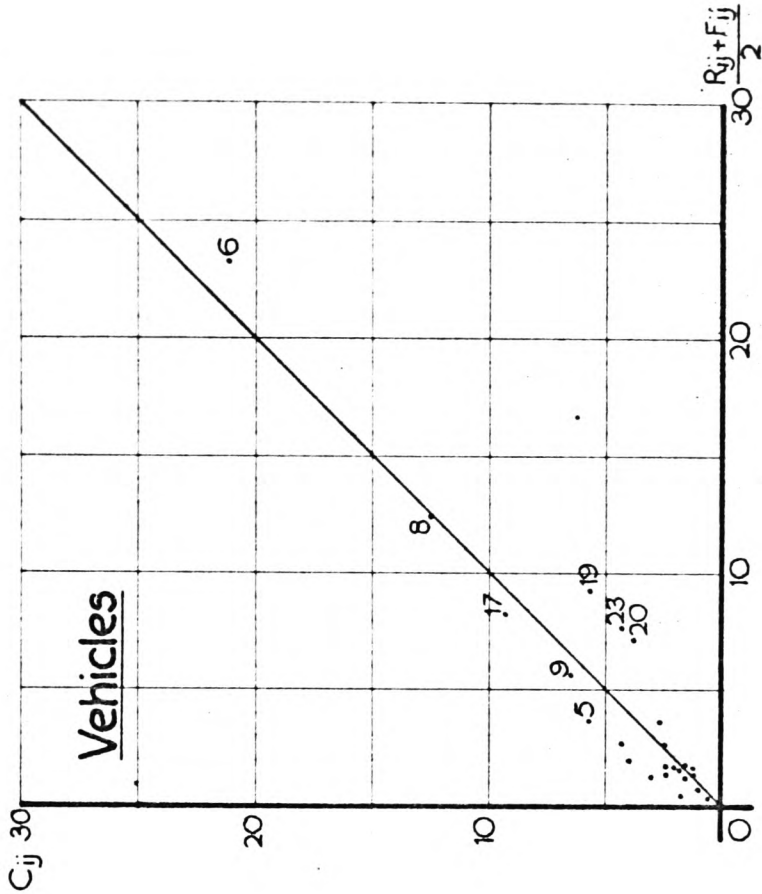
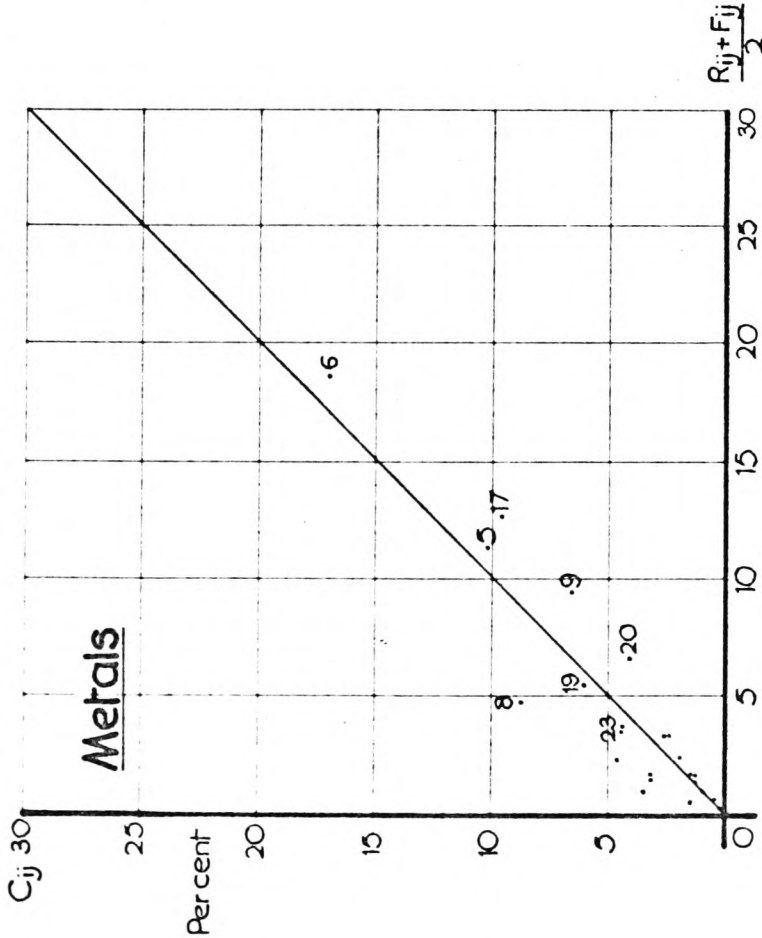
it can be followed by observation of the diagrams. The work sheets are available on request from the author.

MEN. The C_{ij} 's provide remarkably good approximations of the recorded propensities of engineering and metals industries to recruit and lose male labour to each other. For example, engineering has a C_{ij} with metals of 5.1 per cent; its recorded propensity to recruit and lose labour from this industry is 4.9 per cent and 4.8 per cent. Its C_{ij} with vehicles is 10 per cent; recruitment and flow propensities are 8.8 per cent and 7.6 per cent. With metals n.e.s. its C_{ij} is 5.5 per cent while recruitment and flow propensities are 5.9 per cent and 6.3 per cent. The only estimate slightly out of line is the propensity of engineering plants to recruit and lose labour to each other. It is 22.1 per cent, a significant understatement of the recorded values, 28.5 per cent and 31.2 per cent respectively. In metals and metals n.e.s. the degree of accuracy is rather less satisfactory. Metals C_{ij} 's overstate recruitment and flow propensities with vehicles and understate them for metals n.e.s., while the metals n.e.s. C_{ij} with both vehicles and itself can be seen to overstate the recorded figures. But in vehicles the C_{ij} for all four industries provide very close approximations to the true propensities.

The C_{ij} 's for each of the members of the engineering and metals sector outside the group can also be seen to perform well. They provide quite accurate estimates of recruitment and flow propensities with the remaining manufacturing industries and with the primary sector. Their behaviour in the rest of non-manufacturing is particularly interesting. C_{ij} 's with insurance, banking and finance; professional and scientific services; and

Chart 4.1

Estimated and Actual Recruitment and Flow Propensities for Engineering and Metals Sector: Men.



Industries are labelled where space is available. See Key to Abbreviations for reference numbers.
Source: See text p. 131

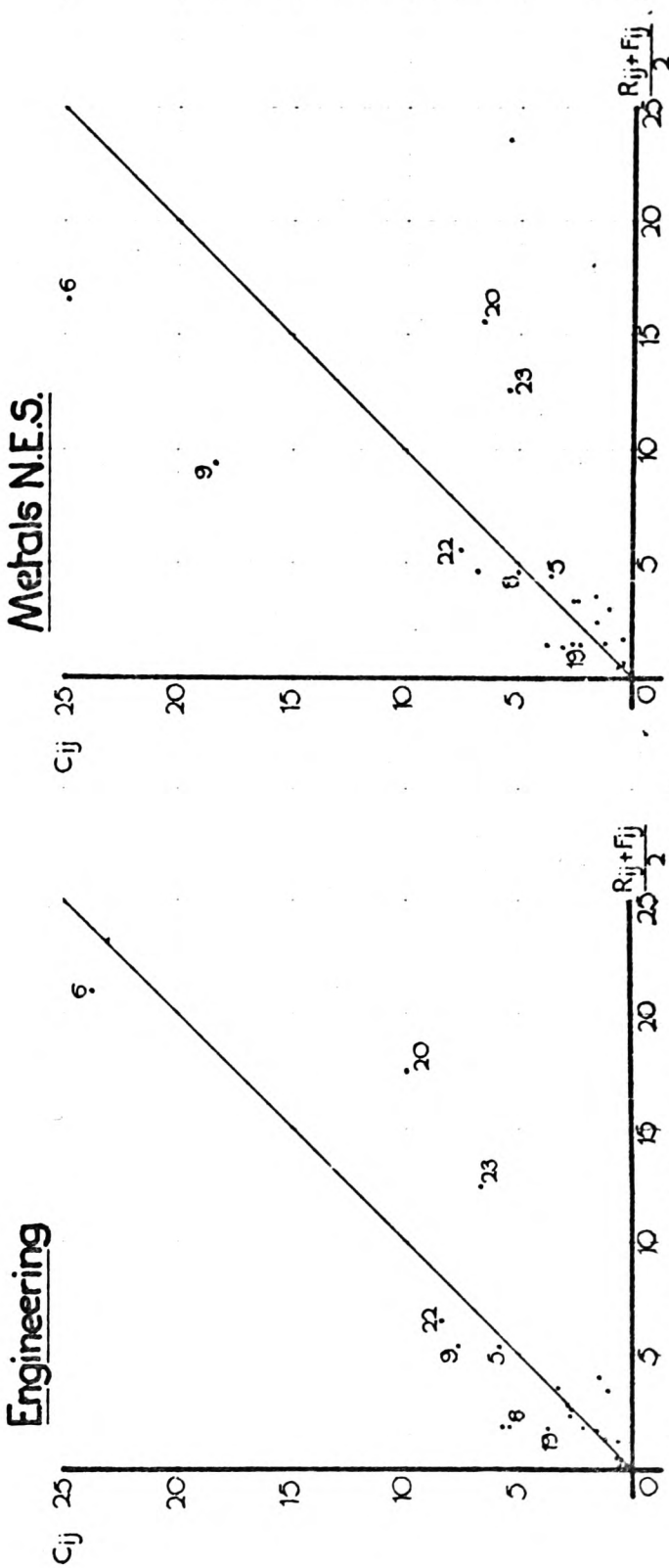
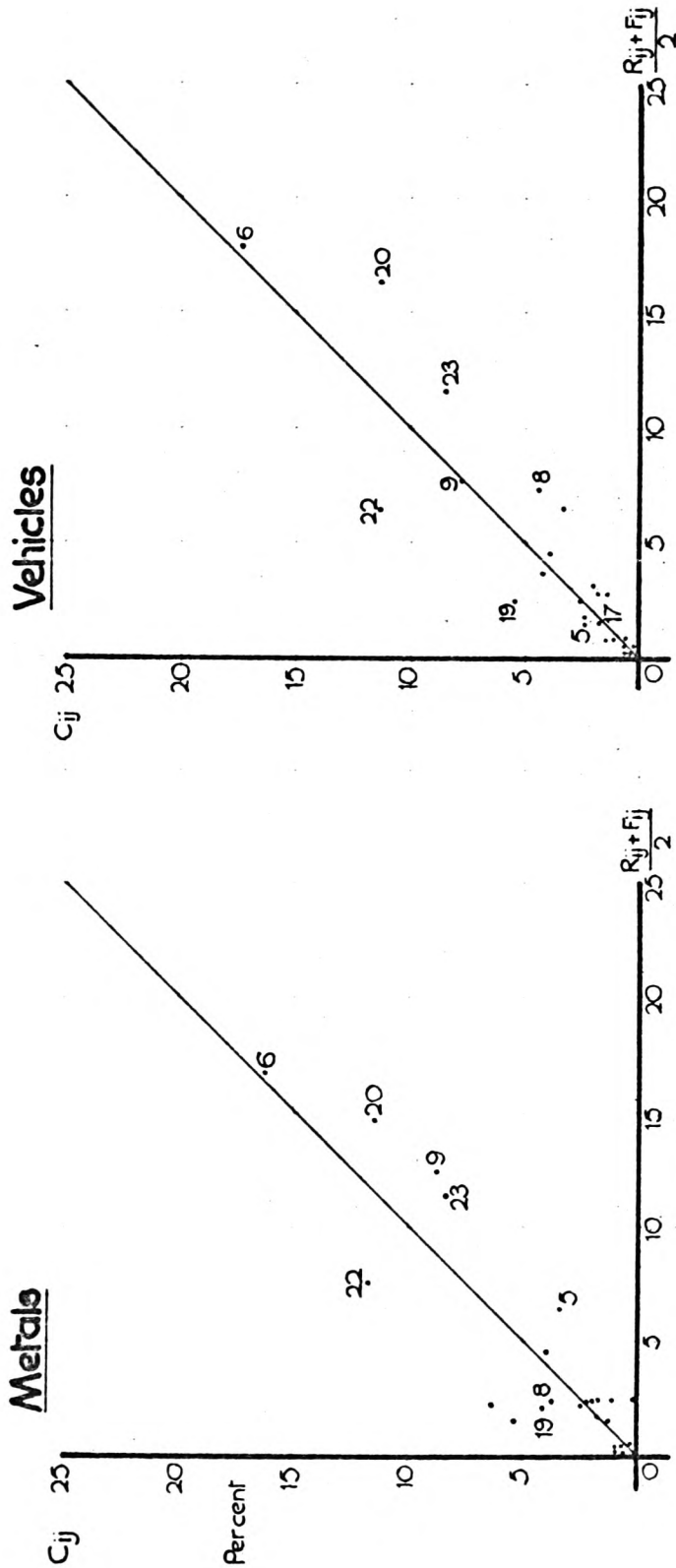
public administration exceed recruitment and flow propensities, while those for construction; transport and communications; distribution; and miscellaneous services either equal or understate the true values. Note that in distribution the discrepancy between estimated and recorded figures is greater than in other industries. In addition L_{ij} 's for all these industries are invariably greater than recruitment and flow propensities. The implication is that manpower mobility between these industries and non-manufacturing involves movements across occupational but not locational boundaries.

FEMALES. Chart 4.2 shows that female C_{ij} 's provide good approximations of recorded recruitment and flow propensities. There are four exceptions. Plants in both metals and vehicles recruited and lost more labour to other plants in the same industry than the C_{ij} 's predicted. In addition, the metals C_{ij} with metals n.e.s. understates recorded propensities, while the metals n.e.s. C_{ij} with itself and engineering overstate them. But in all other cases estimated recruitment and flow propensities give very good estimates of the actual figures.

Female C_{ij} 's with industries outside the engineering and metals sector behave similarly to the male figures. They are about equal to recorded propensities in the remaining manufacturing industries and in the primary sector. They exceed observed figures in insurance, banking and finance; professional and scientific services; and public administration. And they are equal to or less than the actual propensities in the remaining non-manufacturing industries. C_{ij} 's with distribution and miscellaneous services are considerably less than the true figures. But L_{ij} 's are about equal to the actual values. Thus, although

Chart 4.2

Estimated and Actual Recruitment and Flow Propensities for Engineering and Metals Sector: Women.



Industries are labelled where space is available. See Key to Abbreviations for reference numbers.
Source: See text p.131.

women leaving engineering and metals plants tend to remain in the sector,¹ occupational barriers do not seem to prevent them from moving in and out of the two largest service industries.

The Textiles and Clothing Sector.

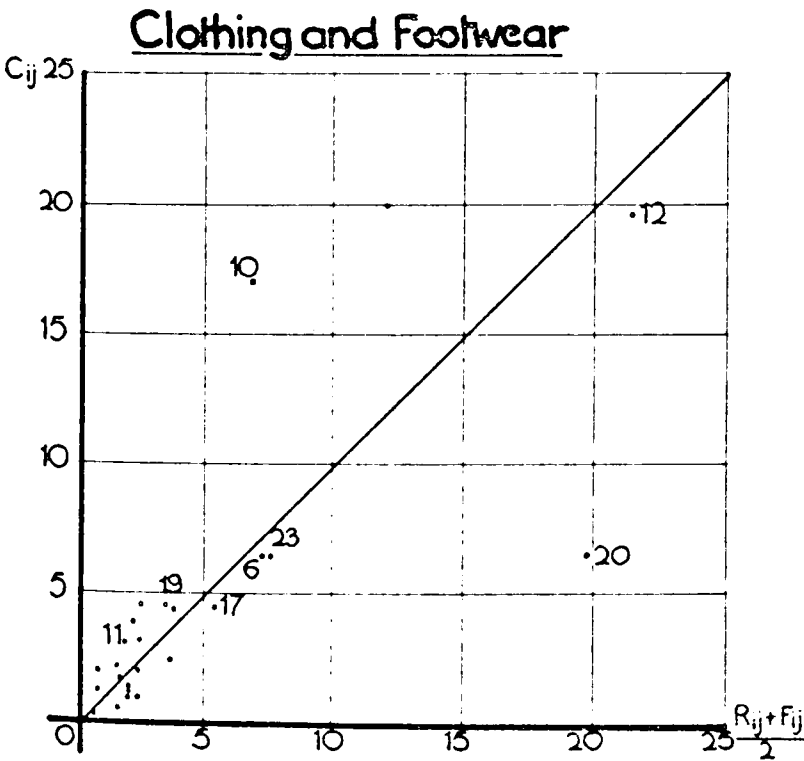
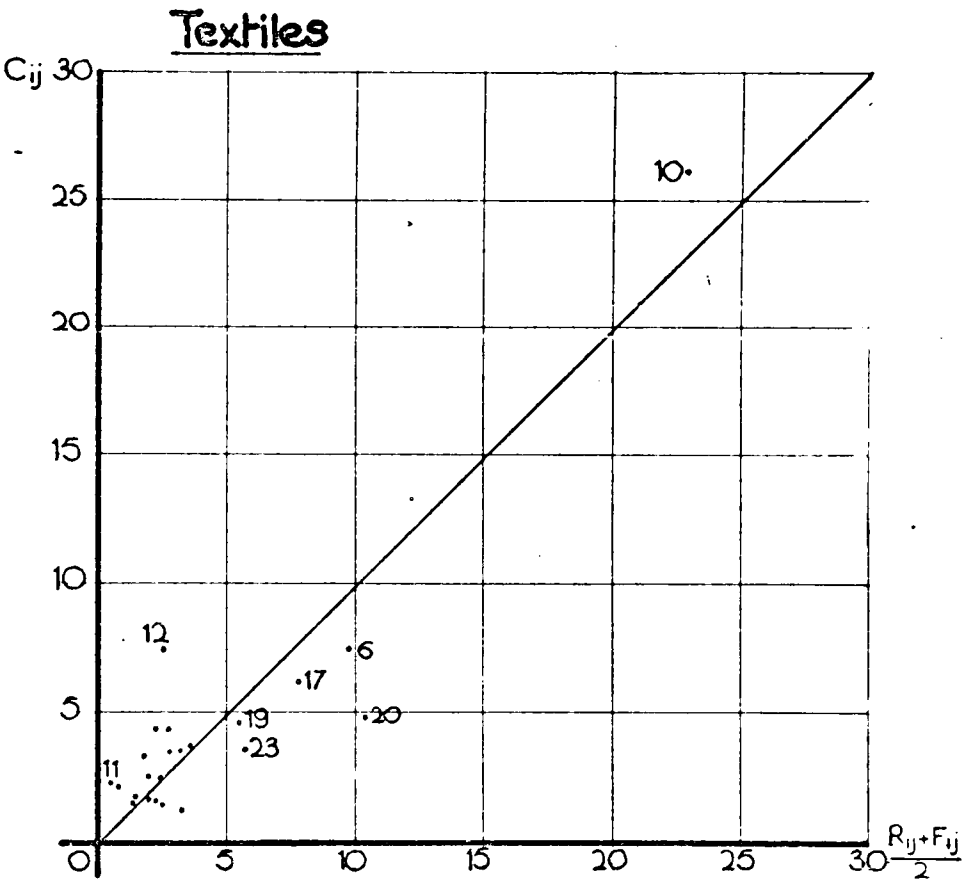
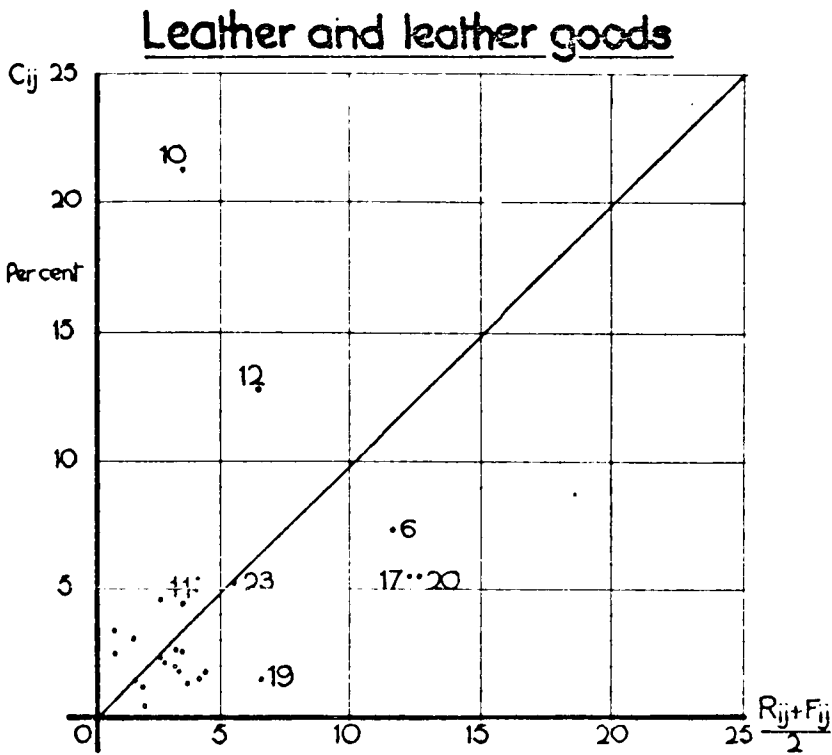
MALES. Male C_{ij} 's in the textiles and clothing sector can be seen from Chart 4.3 to perform rather less satisfactorily. Although each industry's C_{ij} with itself gives a good approximation of the recorded figures, the estimates of intensity of movement within the textile and clothing sector overstate the recorded figures. In one case the leather and leather goods C_{ij} with textiles is 21.4 per cent while comparable recruitment and flow propensities are only 4 and 3 per cent respectively. Even after allowance is made for larger error margins due to the small number of observed flows in and out of leather and leather goods, this approximation of the effect of locational and occupational factors seems well out of line with the evidence on inter-industry mobility.

The converse of overestimation of manpower movements within textiles and clothing is underestimation of the intensity of movement between each member and the industries outside the sector. Each of the industries in the sector can be seen to have C_{ij} 's with distribution which understate considerably the comparable recruitment and flow propensities. C_{ij} 's with engineering are also noticeably lower than recorded figures. But in all other cases the discrepancies between expected and actual values is not significantly large.

The failure of the C_{ij} 's to perform more satisfactorily is

¹See Chapter III, p. 107.

Chart 4.3
Estimated and Actual Recruitment and Flow Propensities for
Textiles and Clothing Sector: Men.



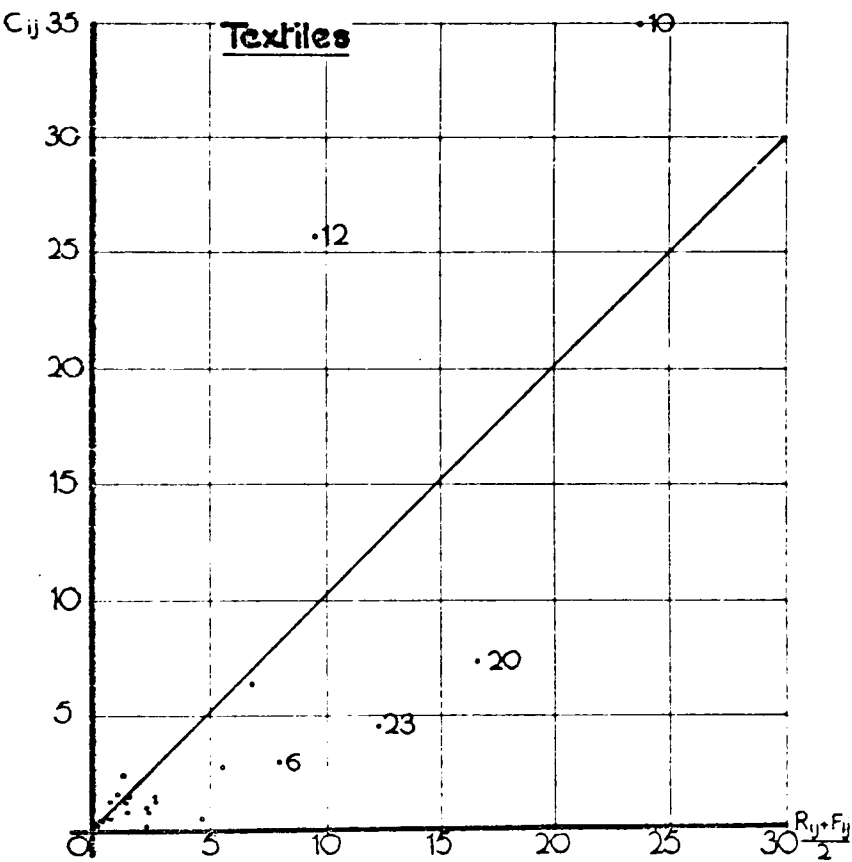
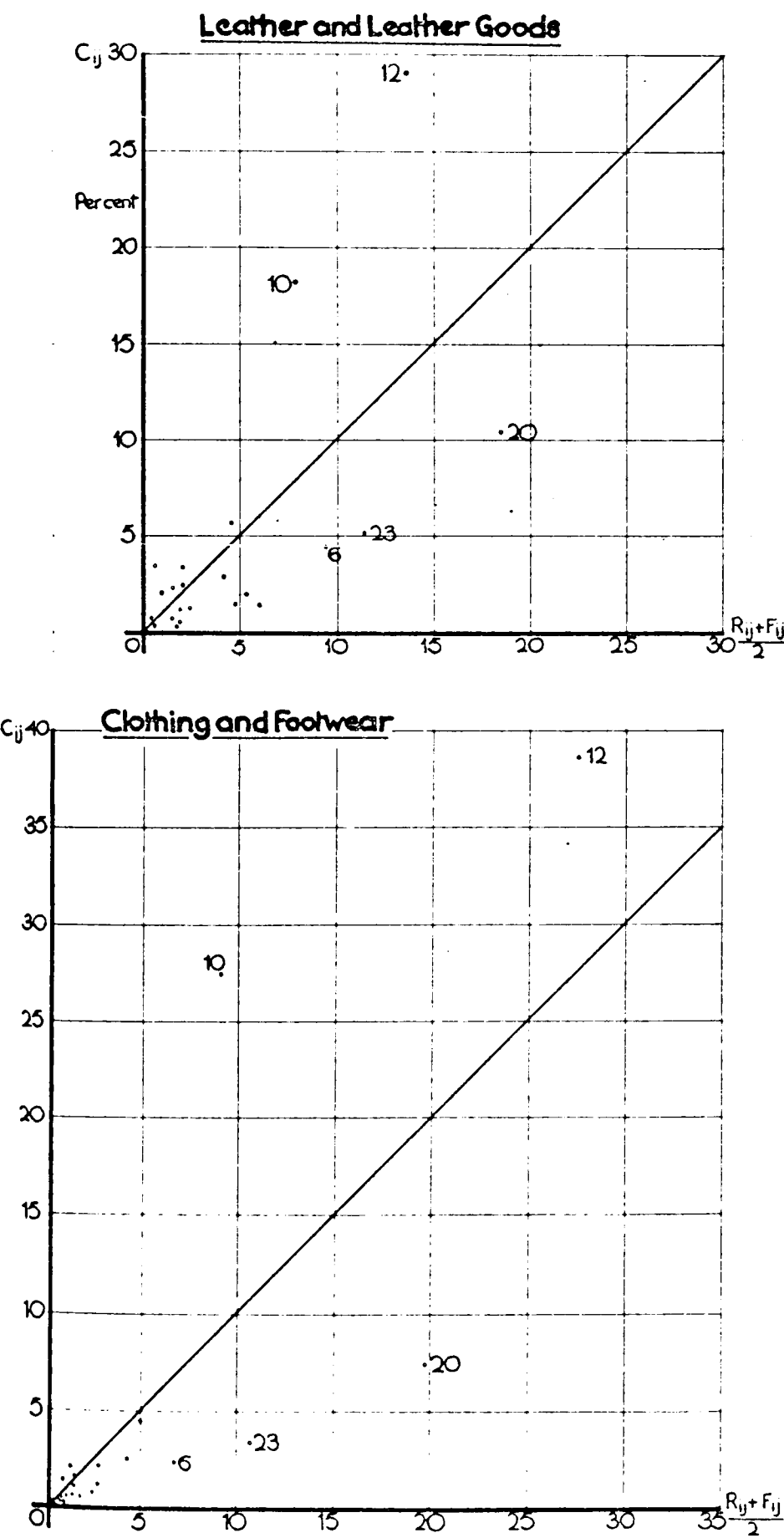
Industries are labelled where space is available.
See Key to Abbreviations for reference numbers.
Source: See text p.131.

entirely due to the high O_{ij} 's between industries in the sector. These, of course, result from the fact that textiles and clothing occupations are specific to these industries. Yet these occupational barriers have not prevented recruitment and flow propensities between group members from being considerably less than their expected values. It has already been noted that the linkages between textiles and clothing members are relatively weak. Given that these industries have been contracting it is hardly surprising that persons leaving them have had a greater propensity to move outside the entire sector than those leaving engineering and metals industries. But the textiles and clothing industries have had equally high propensities to recruit from outside the group.

This suggests an entirely different explanation for the failure of the C_{ij} 's to provide more accurate estimates. The problem is not that the O_{ij} 's over-estimate the size of the occupational barriers between textile industries and the rest. Rather they underestimate the size of the occupational barriers. The O_{ij} 's and the C_{ij} 's predict with good accuracy each industry's recruitment and flow propensity with itself. But the considerable degree of overstatement that occurs when C_{ij} 's are used to estimate the intensity of movement between industries arises because the data used to calculate the O_{ij} 's lumped all textile occupations together into one group. In fact these occupations are probably no more substitutable for each other than is any one of them with engineering.

FEMALES. Chart 4.4 shows that female C_{ij} 's and recruitment and flow propensities behave similarly to those for men. The one difference is that each industry's C_{ij} with miscellaneous

Chart 4.4
Estimated and Actual Recruitment and Flow Propensities for
Textiles and Clothing Sector: Women.



services understates quite considerably its recorded recruitment and flow propensities. It will be recalled that the female C_{ij} 's for the engineering and metals sector behaved similarly. This demonstrates that the occupational barriers facing women are lower than those confronting men.

Conclusion

Estimates of each manufacturing industry's propensity to recruit and lose labour to other industries on the assumption that inter-industry mobility is a random process within each occupation within each region have been shown to provide remarkably close approximations to the actual figures for most industry pairs within the engineering and metals sector. The C_{ij} 's also performed well in estimating the propensities of three digit industries within each of the textiles and clothing industries to recruit and lose labour to each other. But they overstated recruitment and flow propensities between the textiles and clothing industries and understated the propensities of all industries to recruit and lose female labour to miscellaneous services and male and female labour to distribution and miscellaneous services.

Overestimation of the textiles and clothing industries' propensities was probably due to the failure of the occupational data to discriminate between the textiles occupations. Underestimation of each member's propensity to recruit and lose labour to services could have occurred for the same reason since the C_{ij} 's were constrained to sum to 1. But the intensity of manpower flows between four non-manufacturing industries and engineering and metals was also underestimated even though the good

estimates of the links between industries in this sector were provided. In other words, there is some evidence here of manufacturing firms having reached across occupational boundaries to recruit persons from non-manufacturing. The implications of this point will be considered below.

THE IMPACT OF RELATIVE WAGES

Construction of the C_{ij} 's was based on the assumption that persons do not cross the locational and occupational categories specified in the DE matrices from which the measure was calculated. Yet people do move across these boundaries and the underestimation by the C_{ij} 's of each manufacturing industry's male and female recruitment and flow propensities with distribution and its female propensities with miscellaneous services indicate that such movement occurs on a considerable scale. Even in the engineering and metals sector, where the C_{ij} 's provided good estimates of the intensity of movement between industries and where only about 30 per cent of the labour force is classified as unskilled, there is evidence to suggest that considerable mobility occurs across occupational barriers; especially in labour markets where supply is limited.¹ It is therefore necessary to consider other reasons for the neighbourhood relationships between certain groups of industries.

One possibility is relative wages. The role of wages has been neglected so far because intensive movements have been observed in both directions between two industries. It can hardly be argued, for example, that the engineering industry recruits excessive numbers from distribution, because it pays higher wages, when in fact it also loses excessive numbers to this same

¹ See W. Brown, "Piecework Wage Determination in Coventry", Scottish Journal of Political Economy, XVIII (Feb. 1971), pp.5-6. But the Glasgow Study found that movements from semi-skilled into skilled occupations were limited even in the Birmingham labour market. See below, Chapter VII, p.71.

industry. A more subtle hypothesis is required to explain the data.

One of the interesting aspects of the neighbourhood relationships identified above is the similarity in wages between industries that are closely linked to each other. Returning to Table 2.3¹ which shows mean wages in all two digit industries in 1968 it can be seen that each of the engineering and metals industries paid above the all industry average, while textiles and clothing industries for which data is shown had mean wages below it. The two lowest paid manufacturing industries - food, drink and tobacco, and timber and furniture - have both been shown to be closely linked to distribution where mean wages were even lower. This suggests that similarity in wage levels not wage differentials accounts for the intensity of movement between two industries. The next section offers an explanation of why this could be the case.

The Job Selection Process

Recognition of the notorious imperfections that exist in labour markets² has led in recent years to increased research work into the search activities and decision-making processes of job changers under conditions of uncertainty. Most of this work has concentrated on the behaviour of the involuntarily mobile, that is, persons either unemployed or facing unemployment due to redundancy. At any point in time such a person will have several job options open to him. His problem is to decide whether or not to accept an offer or forego the income and devote more time

¹See above, Chapter II, p.40.

²See above, Chapter I, p.10.

and money searching for a better one. The amount of search an individual is prepared to undertake depends on the wages and conditions of employment he thinks his services can command and on the opportunity cost of the search. In other words, each unemployed person has a job acceptance level which is determined by his assessment of the value of his services and the cost of searching. He will reject job offers below this acceptance level and accept the first one above it.

There has been no published empirical work on the factors determining the value a worker places on his labour. Nor have attempts been made to estimate the costs of searching. It seems likely, however, that a person who is involuntarily mobile will expect wages and conditions of employment about equal to what he received in his last job. He will be most reluctant to accept anything less, although he could be forced to do so if the search costs (which include income foregone minus unemployment and welfare benefits) became unacceptably high.

But well over half the total number of persons changing jobs do so voluntarily.¹ For these people search costs are obviously much less because although it is more inconvenient for most persons to search for one job while working in another, such costs are more than outweighed by the fact that income is not foregone. Thus job changers who do not endure a spell of unemployment can be expected to move almost invariably to another job where pay is either greater than or equal to their present wage level. This is not to say that all persons who change jobs do so for monetary reasons. Some may take another job at about the same wage but

¹ See Harris, op.cit., p.63.

with improved conditions of employment, fringe benefits, or some other advantage. and. as has been shown, older persons may accept a lower paying job if the pace of work in the firm of previous employment is too great for them. But it does seem reasonable to assume that on the whole the utility functions of most voluntary job changers do not allow them to accept wage cuts.

Taking voluntary and involuntary job changers together the above analysis suggests that only the unemployed facing high search costs and no alternative employment opportunity at wage levels previously received will accept jobs at lower wages. In the period under analysis there was considerable employment opportunity even during recessions so that the number of persons forced to accept wage cuts on taking new jobs will have been relatively low. This is confirmed by the results of the Second Labour Mobility Survey which showed that over 70 per cent of the men and women interviewed had either increased their wages after the last job change or received the same wages as in their previous job.¹

If this reasoning is correct it implies that intensive movements will occur between industries where wages and conditions of employment are similar. The job acceptance level of persons in high wage industries will exceed that of persons in lower paid sectors. Consequently industry changers in high wage industries will have a lower propensity to accept jobs in low wage sectors than will similar persons already employed in those sectors. Conversely, persons in low paid sectors will be less willing to endure the costs of search in order to find jobs in the higher paying industries.

Some might argue that the above description of job searcher

¹Ibid., p.67.

behaviour exaggerates the degree of imperfect knowledge in labour markets. The Glasgow Study concluded that imperfect knowledge, although important, was not the major factor explaining the persistence of inter-plant wage differentials in engineering. The most important single cause was that high wage plants did not offer a disproportionately large number of vacancies, because their above average wages reflected institutional forces and not attempts to recruit more labour.¹

But, if the Glasgow Study is correct on this point and if its conclusion can be applied at industry level, the argument that intensive labour flows are likely to occur between industries paying similar wages is reinforced. For, if the number of vacancies in industries paying above average wages is not disproportionately high, the persons most likely to find such jobs are those presently or previously employed in these industries. This second proposition holds for three reasons. First, mobile persons accustomed to relatively high wages will search harder for such jobs and will be less willing to accept anything less. Second, information about vacancies is mostly communicated by word of mouth through an informal network of friends and relatives. Persons already working in high wage industries are more likely to find themselves in an environment where greater knowledge is available about other high wage job openings than are persons employed in low wage sectors. Third employers in high wage industries tend to have stricter hiring standards. One criterion they may use as an indication of suitability, apart from occupational experience, is an applicant's

¹The Glasgow Study, pp.94-95.

previous earnings. Although the Glasgow Study reported that Birmingham employers frequently expressed an unwillingness to take on highly paid redundant car workers whom they regarded as quite likely to return to their previous jobs when work became available,¹ the extent to which they practised this policy is a matter of conjecture. In any case the complaint was restricted to only one group of highly paid workers and may not apply elsewhere. If employers do judge an applicant partly by his previous earnings, the tendency for job changers previously employed in high wage industries to remain there will be strengthened.

The question is then whether or not vacancies are unusually high in industries paying above average wages. Galloway found that this was not the case for the United States. He discovered an inverse relationship between the inter-industry wage structure and job opportunities adjusted for industry size. A similar test was carried out for Britain using the DE's vacancy data. These must be treated cautiously for reasons given below.² Each industry's percentage of total vacancies was compared with its position in the earnings structure. Data for 1968 were used to ensure comparability with the 1968 earnings survey. Each industry's vacancy share was divided by its percentage employed to adjust for inter-industry size variations. The resulting figures appear in the first column of Table 4.3.

Some of them seem wildly inaccurate. For example, given its high labour turnover rate the value of .61 for food, drink and tobacco is almost certainly an underestimate of the true figure. The rank correlation coefficient between these standardised vacancy shares and each industry's position in the 1968 earnings structure was $-.19$. When a similar test

TABLE 4.3

Each Industry's Standardised Vacancy Shares and Its Rank in
the Earnings Structure
1968

INDUSTRY	% Vacancies	Rank in Earnings structure
	% Employed	
Agriculture, forestry & fishing	0.88	21
Mining & quarrying	0.91	13
Food, drink & tobacco	0.61	12
Chemicals & allied industries	0.73	6
Metal manufacture	0.75	4
Engineering & electrical goods	1.30	8
Shipbuilding & marine engineer- ing	1.12	5
Vehicles	0.94	2
Metals goods n.e.s.	1.37	11
Textiles	0.83	15
Leather, leather goods, and fur	1.50	n.a.
Clothing & footwear	1.20	17
Bricks, pottery, glass, cement etc.	0.84	10
Timber, furniture, etc.	1.20	14
Paper, printing & publishing	0.57	1
Other manufacturing industries	1.07	3
Construction	1.06	9
Gas, electricity & water	0.36	16
Transport & communication	0.91	7
Distributive trades	1.25	19
Insurance, banking & finance	0.92	n.a.
Professional & scientific services	1.00	n.a.
Miscellaneous services	1.34	20
Public administration & defense	0.78	18

Rank correlation coefficient = -.19

Sources: Vacancies: DEP Gazette (July 1968), p.574
Employment: See Appendix B.
Earnings Ranks: see Table 2.3

was performed on 1959-66 manufacturing earnings data the rank correlation coefficient was .02. Thus there is little evidence in these figures of either a positive or a negative correlation between standardised industrial vacancy shares and relative earnings.

This conclusion need not however, upset the hypothesis that persons presently or previously employed in high wage industries are the most likely recruits to other high paying industries. It is true that vacancy levels do not seem disproportionately low in such industries; but neither are they unusually high. Thus it can still be argued that persons accustomed to lower wages will not be prepared to endure the search costs entailed in finding high paying jobs and that even if they do discover vacancies in high wage industries employers will be less likely to hire them.

But two qualifications must be added to this hypothesis. First, it has been demonstrated that young persons have a tendency to transfer from low to high wage industries while older employees have a similar propensity to move in the opposite direction.¹ Second, it has also been shown that industries trying to expand employment at a rate above the all industry employment growth rate will be forced to reach beyond traditional sources of labour supply in order to satisfy their requirement. In these conditions linkages between neighbouring industries will decline and lower paid workers will find job opportunities opening up in high wage industries. The likelihood of job changers entering industries where wages and conditions of employment are

¹See above, Chapter II.

similar to those in the industries they left is, therefore, reduced in tight labour markets. The greater the volume of excess demand the larger the flow in both directions between low and high wage industries.

The Evidence

The hypothesis advanced above is that two industries are likely to compete intensively for manpower if they are ranked close to each other in the earnings structure. This section attempts to test its validity.

One methodological point should be made clear at the outset. In the analysis of inter-industry mobility each industry plays a dual role. On the one hand, it recruits and loses labour to every other industry (including itself); on the other, it is itself a source of manpower recruitment and loss to every other industry (again including itself). These two roles will now be respectively christened active and passive. Although the notion of an industry actively losing labour to others may not seem entirely appropriate, the clarity of the remainder of this discussion should be improved by adoption of this terminology.

Up to now the analysis of intensive movements between industries has focused on each industry as recruiter and loser to the others; that is, on its active role. But in this section the role of each industry as a source of recruitment to others, its passive role, will be examined. This is due to the absence of earnings data for the service sector and to a desire to focus attention on the role of the earnings structure in determining the relative importance of manufacturing and non-manufacturing as sources of manpower recruitment for each manufacturing industry.

Between Manufacturing and Non-Manufacturing. Table 4.4

analyses the passive role of distribution. It shows the propensity of each manufacturing industry to recruit and lose labour to it. Each industry's rank in the earnings structure over the seven year period and its C_{ij} with distribution is also shown. It can be seen that every manufacturing industry's propensity to recruit and lose labour from distribution exceeded its C_{ij} value with that industry. This indicates considerable movement across occupational boundaries and reflects the operation of the life cycle hypothesis. But it can be seen that the industries relying most heavily on distribution as a source of male recruitment were food, drink and tobacco; clothing and footwear; timber and furniture; and leather and leather goods; all of which are found at the bottom of the earnings structure. The rank correlation coefficients between each industry's propensity to recruit from distribution and its position in the earnings structure and between each industry's propensity to lose labour to distribution and its earnings rank are also shown. It can be seen that the rank correlation between recruitment propensities and earnings ranks was $-.59$. The t value was 2.5 which, with 13 degrees of freedom, is above the critical value of 2.16 at the 5 per cent level. The rank correlation between flow propensities and earnings ranks was slightly less, $-.53$, and the t value was -2.0 just below the critical value of 2.2 . Thus there is good evidence here to support the hypothesis advanced above that when workers in low-paid industries move, they tend to find jobs in other low-paid industries.

The results for women are disappointing. The rank correlation of both recruitment and flow propensities with each industry's

TABLE 4.4

The Estimated and Actual Propensities of Each Manufacturing Industry to Recruit and Lose Labour to Distribution 1959-1966

INDUSTRY	MEN				WOMEN			
	R.P.	F.P.	C _{ij}	Earnings Ranks	R.P.	F.P.	C _{ij}	Earnings Ranks
Food, drink & tobacco	24.4	20.1	9.6	11	25.9	20.3	10.6	13
Chemicals & allied industries	10.0	10.5	6.3	4	23.6	17.2	12.7	5
Metal manufacture	7.7	5.5	4.1	3	17.1	12.3	11.4	6
Engineering & electrical goods	8.5	7.1	4.2	5	20.4	14.3	10.0	3
Shipbuilding & marine engineering	6.4	4.5	3.3	9	15.1	15.6	15.7	11
Vehicles	8.1	6.1	3.9	1	20.0	11.5	11.3	1
Metals n.e.s.	9.7	8.2	3.7	8	16.8	13.7	6.7	12
Textiles	11.4	9.5	4.9	12	18.1	14.9	7.2	7
Leather, leather goods, & fur	13.9	11.4	5.5	13	17.4	18.9	10.4	10
Clothing & footwear	21.3	18.1	6.6	14	22.3	17.3	7.5	7
Bricks, pottery, glass, cement etc.	10.0	7.3	6.1	7	23.4	13.0	9.0	14
Timber, furniture, etc.	16.5	13.3	5.3	10	22.0	17.9	12.2	2
Paper, printing & publishing	13.9	10.9	5.6	2	22.1	16.0	10.9	4
Other manufacturing industries	12.9	10.3	6.0	6	18.5	13.4	9.9	9
Rank Correlation	-.59	-.53			.062	-.132		
r ²	.36	.28			.004	.017		
t	-2.6	-2.0			.214	-.461		

Sources: See text and Appendix A. Earnings Ranks from Tables 2.8 and 2.13

position in the earnings structure is close to zero. This is probably due to the very small amount of variation in the inter-industry female earnings structure and also the exclusion of administrative and clerical workers from the earnings figures. The female earnings structure will, therefore, not be considered further in this analysis.

The above test of the effects of wage differentials on the propensities of manufacturing industries to recruit and lose labour to distribution was applied to the passive role of each of the ten non-manufacturing industries. The tests were restricted to male data and the resulting rank correlation coefficients appear in Table 4.5

TABLE 4.5

Rank Correlation Coefficients Between Each Manufacturing Industry's Average Earnings of Men 21 and over and its Propensity to Recruit and Lose Men to Each Non-Manufacturing Industry: 1959-66.

	Recruitment Propensity	Flow Propensity
Agriculture, forestry & fishing	-.574	-.486
Mining and quarrying	.095	.143
Construction	-.086	-.112
Gas, electricity & water	.279	-.901
Transport & communication	.319	-.086
Distributive trades	-.591	-.530
Insurance, banking & finance	-.297	-.327
Professional and scientific services	-.569	.402
Miscellaneous services	-.037	-.042
Public administration & defense	.196	-.191

Source: Tables 2.8 and 3.6-3.9.

The figures in this Table provide only qualified support for the relative wages hypothesis. Two other industries - agriculture, forestry and fishing; and professional and scientific services - had negative rank correlation coefficients equal to the value for distribution. Since both these industries pay low average wages

to manual workers, their behaviour is consistent with the hypothesis that intensive labour flows tend to occur in industries where average wages are similar. But there is no association between each manufacturing industry's earnings rank and its propensity to recruit and lose labour to miscellaneous services. This implies that significant movements between this low wage industry and the higher paying manufacturing industries did occur. Moreover a positive correlation can be observed between manufacturing earnings ranks and recruitment propensities with transport and communications; and gas, electricity and water. In this case, however, earnings levels were probably closer to those in manufacturing, so that a negative association was not to be expected.¹

Within Manufacturing. The passive role of manufacturing industries as suppliers of manpower to each other was also examined by this technique. Rank correlation coefficients between the earnings rank of each manufacturing industry and its propensity to recruit and lose labour to every other manufacturing industry (including itself) were also calculated. The results which appear in Table 4.6 support the theory that similarities in average wages explain intensive movements between industries. It can be seen that the high wage industries have positive rank correlation coefficients while those for low wage industries are negative. The one exception among high wage industries is paper, printing and publishing which despite its second place position in the earnings structure had a recruitment propensity rank correlation coefficient of $-.178$ and a flow propensity

¹Chapter II, p.41

TABLE 4.6

Rank Correlation Coefficients Between Each Manufacturing Industry's Average Male Earnings and its Propensity to recruit and Lose Men to Every Other Manufacturing Industry.

	R.P.	F.P.	Earnings Ranks (April-October Survey)
	(1)	(2)	(3)
Food, drink and tobacco	-.090	-.288	11
Chemicals & allied industries	.042	.125	4
Metal manufacture	.512	.336	3
Engineering & electrical goods	.499	.451	5
Shipbuilding & marine engineering	.182	.582	9
Vehicles	.468	.407	1
Metals n.e.s.	.407	.371	8
Textiles	-.530	-.490	12
Leather, leather goods & fur	-.371	-.648	13
Clothing & footwear	-.538	-.521	14
Bricks, pottery, glass, cement, etc.	.204	.222	7
Timber & furniture, etc.	-.442	-.446	10
Paper, printing & publishing	-.178	-.200	2
Other manufacturing industries	-.077	-.029	6

Rank correlation between columns (1) and (3) is .7 with accompanying t value of 3.4. Rank correlation between columns 2 and 3 is .63 with accompanying t value of 2.8.

Source: Tables 2.8 and 3.6-3.9.

coefficient of $-.2$. This industry is clearly not an important source of manpower recruitment and loss to other high wage industries. Occupational and locational barriers probably prevent such movement on a large scale. An exception among low wage industries is shipbuilding. Although it is ranked ninth in the earnings structure its flow propensity rank correlation coefficient is higher than any other. In other words, high wage industries have higher flow propensities with shipbuilding than do low wage industries. Again this is possibly due to occupational and locational similarities with high wage industries such as engineering. But in fact the numbers moving in and out of this industry are very small: and the estimates of recorded flows are not very reliable.

The most important point about this table is that all the engineering and metals industries can be seen to have high positive rank correlation coefficients while the coefficients for the textiles and clothing industries are negative. In other words the engineering and metals industries, which pay high average wages, are important sources of manpower recruitment for other high wage industries while textiles and clothing industries which pay low average wages tend to supply manpower to other low paying industries.

The last column of Table 4.6 gives the position of each industry within the manufacturing earnings structure. Rank correlation coefficients were calculated between these ranks and the ordering of the correlation coefficients in columns 1 and 2. If high wage industries are the main source of manpower recruitment and loss for other high wage industries and the converse is true for low wage industries, these rank correlation coefficients

should be positive and significant. The table shows that rank correlation coefficients between recruitment propensity coefficients and positions in the earnings structure was .7. The t value is 3.4 which exceeds the critical value of 3.01 at the 1 per cent level. The rank correlation coefficient between flow propensity correlations and rankings in the earnings structure was .63. The t value was 2.8, significant at the 5 per cent level. Thus there is good evidence in this table to support the view that manpower tends to move between industries paying similar average wages.

THE IMPACT OF LOCATION, OCCUPATION AND WAGES

Manufacturing and Non-Manufacturing

It has been shown that recruitment and flow propensities can be explained by rough measures of occupational and locational similarity between industry pairs. But these measures assume no movement across locational and occupational barriers. Yet such movement clearly does occur, and it is important that a theory purporting to explain inter-industry labour mobility take it into account. The explanation of neighbourhood relationships between industries in terms of similarities in their wage levels offers an alternative hypothesis. It allows people to cross locational and occupational barriers and treats imperfect knowledge and a rigid wage structure as the primary factors affecting mobility. The difficulty with this theory is, however, that it makes no allowance at all for occupational and locational business.

An attempt was made to test the relative importance of both hypotheses by means of multiple regression analysis. The

propensity of each manufacturing industry to recruit labour from distribution was regressed on the comparable C_{ij} estimate and also on the industry's rank in the 1959-1966 earnings structure (See Table 4.8). The resulting equation was

(7)

$$R_{id} = -3.37 + 2.39 C_{id} + 0.40 E_i$$

(0.46)

(0.18)

(5.2)

$\bar{r}^2 = .77$ $F = 22.8$ $DWS = 2.7$

where R_{id} is each manufacturing industry's propensity to recruit from distribution;

C_{id} is each manufacturing industry's estimated recruitment and flow propensity with distribution on the basis of occupational and locational similarities;

E_i is each manufacturing industry's rank in the 1959-66 earnings structure.

A similar equation was tested for flow propensities and the resulting parameter estimates were

(8)

$$F_{id} = -3.6 + 2.1 C_{id} + 3.39 E_i$$

(0.38)

(0.15)

(5.5)

$\bar{r}^2 = .786$ $F = 24.9$ $DWS = 3.0$

where F_{id} is each manufacturing industry's propensity to lose labour to distribution.

The first figure underneath each parameter estimate is its standard error. The second is its t value. Both variables can be seen from these two equations to have been statistically significant. The positive sign on the regression coefficient for earnings ranks implies that the lower an industry's position in the earnings structure the higher its recruitment and flow propensity with distribution. Since wages in distribution are lower than in any manufacturing industry this result is consistent with the hypothesis that closely linked industries pay

similar wages.

Beta coefficients provide a measure of the relative importance of each independent variable in determining the value of the dependent variable. The Beta coefficients for each equation are shown below.

	$\frac{C_{id}}{}$	$\frac{E_i}{}$
Equation 7	$\frac{.73}{}$	$\frac{.32}{}$
Equation 8	$\frac{.75}{}$	$\frac{.31}{}$

In both equations the beta coefficient for the C_{ij} was over twice as large as that for E_i . This implies that about two-thirds of the explained variation in recruitment and flow propensities was due to variations in the C_{ij} 's. Occupational and locational similarities in employment structures are, therefore, the most important variables affecting the propensity of each manufacturing industry to recruit and lose labour to distribution. But the significance of each industry's position in the earnings structure cannot be neglected since this variable does account for one-third of the explained variation in the dependent variable.

Within Manufacturing

The combined effect of C_{ij} 's and relative wages on the intensity of manpower flows within manufacturing was also estimated. Each engineering and metals industry was examined in both its active and passive roles. Taking the active role first, the propensity of each industry to recruit and lose labour to each of the other manufacturing industries was regressed on its comparable C_{ij} and on a variable measuring wage differentials. The equations for recruitment propensities took the following form

$$(9) \quad R_{ij} = \alpha + \beta C_{ij} + \gamma \text{ abs } (E_i - E_j)$$

where $\text{abs } (E_i - E_j)$ is the absolute value of the difference in the earnings rank between Industries i and j.

The equations for flow propensities took the same form. In each regression run the i 's which refer to each engineering and metals industry in their active role were held constant and the j 's were allowed to vary. In other words, the determinants of each industry's active role were analysed separately.

The results of these tests were disappointing. If the hypothesis that closely linked industries have similar wages is correct, the sign of the parameter estimate for the earnings variable should have been negative. In each case, however, the earnings variable had a positive regression coefficient, although the t value accompanying this coefficient did not pass standard significance tests. This implies that engineering and metals industries having similar occupational and locational structures experience more intensive labour flows between each other the greater the wage differences between them. But the real difficulty here is that the C_{ij} 's have themselves so fully accounted for the variations in the propensities of one manufacturing industry to recruit and lose labour to another that there is very little left for the earnings variable to explain.

Table 4.7 presents the simple correlations between recruitment and flow propensities for each engineering and metals industry alone with comparable values of C_{ij} and the earnings variable. In one industry, metals n.e.s., earnings differences performed very badly but this could be due to an abnormally high rate of employment growth.¹ In the remaining three, the earnings variables can be seen to have an inverse relationship with recruitment and flow propensities. But the strength of any effect earnings differences might have had on the dependent variable

¹ See above, pp. 148-49.

is clearly swamped in a multiple regression analysis by the very high correlation between the C_{ij} 's and recruitment and flow propensities.

TABLE 4.7

Simple Correlations between Each Engineering and Metals Industry's Actual Recruitment and Flow Propensities, Its Comparable C_{ij} 's and Its Earnings Differentials with Each Manufacturing Industry.

Industry i	Recruitment Propensities		Flow Propensities	
	C_{ij}	$\text{abs}(E_i - E_j)$	C_{ij}	$\text{abs}(E_i - E_j)$
Metal manufacture	.951	-.482	.966	-.500
Engineering & electrical goods	.987	-.480	.978	-.488
Vehicles	.994	-.433	.987	-.413
Metals n.e.s.	.965	-.030	.964	nil

Source: Tables 2.8, 3.6-3.9, and Worksheets available from author

The behaviour of each engineering and metals industry in its passive role was also examined. The propensity of each manufacturing industry to recruit and lose labour to each industry in this sector was regressed on its comparable C_{ij} and earnings variable. The equations took the same form as Equation 9 above but this time the j 's were held constant in each regression run and the i 's were allowed to vary.

Eight equations were tested and the results were again inconclusive. Parameter estimates of the effects of earnings differences were negative in four instances but accompanying t values were less than one in all eight cases.

Table 4.8 presents the simple correlations. They indicate that in this case the failure of the earnings variable is not

entirely attributable to the explanatory power of the C_{ij} 's. These performed less satisfactorily than in the active role analysis. In only one industry, metals, do the C_{ij} 's explain over 80 per cent of the variations in the dependent variable, and in the remaining three there is ample scope for the earnings variable to add significantly to the explanatory power of the equations.

TABLE 4.8

Simple Correlations Between Each Manufacturing Industry's Actual Recruitment and Flow Propensities, Its Comparable C_{ij} 's and Its Earnings Differential with Each Engineering and Metals Industry.

Industry j	Recruitment Propensities		Flow Propensities	
	C_{ij}	$\text{abs}(E_i - E_j)$	C_{ij}	$\text{abs}(E_i - E_j)$
Metal manufacture	.959	-.500	.916	-.405
Engineering and electrical goods	.841	-.535	.896	-.495
Vehicles	.862	-.569	.834	-.563
Metals n.e.s.	.803	.059	.758	-.048

Source: Same as Table 4.6, and Worksheets available from author.

Its failure to do so most likely reflects the existence of considerable excess demand for labour between 1959 and 1966. It has been suggested that neighbourhood relationships between industries may result from the fact that they offer similar wages and conditions of employment in labour markets characterized by imperfect knowledge and institutionalized factory wage structures. But a rapid expansion in labour demand can reduce the intensity of movement between neighbourhood industries relative to the total volume of flows in and out of industries.

Clearly the demand for labour between 1959 and 1966 was not so great as to remove these linkages. They can still be observed in the data and the ability of the C_{ij} 's to account for them suggests that industrial manpower requirements did not expand fast enough to eliminate the powerful effect of locational and occupational similarities on labour flows between industries. But it has also been shown that labour demand was sufficiently high to cause Engineering and Metals industries to experience recruitment and flow propensities with four non-manufacturing industries - construction; transport and communications; distribution; and miscellaneous services - above the levels predicted by the C_{ij} 's. In other words, plants in this sector appear to have reached across occupational boundaries and into low wage industries to recruit considerable numbers of persons from non-manufacturing. Many of these recruits were probably younger members of the labour force who, it has already been shown, are most responsive to the appearance of job opportunities offering high wages. But the life cycle hypothesis cannot fully account for this movement. Flow propensities also exceed C_{ij} 's. This is partly due to a tendency for older persons to move into non-manufacturing. But it also reflects the role of cyclical factors not yet investigated. This is the purpose of the next chapter.

CONCLUSION

This completes the cross sectional analysis of manpower mobility patterns and at this point it would be well to summarize the conclusions. The technique adopted in the last three chapters has been to eliminate the effects of the trade cycle on the data by aggregating the figures over a seven year period.

This provides the opportunity to identify features of the inter-industry mobility process which are independent of the level of economic activity.

Two types of manpower movements between industries have been identified. The first reflects the influence of age on mobility. It has been found that younger members of the labour force have a tendency to transfer from low to high wage industries while older persons approaching retirement tend to move in the opposite direction. The second is the existence of above average exchanges of manpower between certain groups of industries. These neighbourhood relationships which can be observed in the data result from similarities between industries in their locational and occupational requirements and possibly also from similarities in the wages they offer. There is some evidence however, that expansion of an industry's manpower requirements at above average rates leads to a reduction in relative terms in the intensity of movement between industries that are closely linked to each other. This will provide the basis for specification of a third type of movement in the next chapter.

CHAPTER V

Cyclical Fluctuations In Manpower Flows Between
Manufacturing and Non-Manufacturing.

The analysis has so far been restricted to an investigation of the forces affecting inter-industry labour mobility in the absence of any cyclical fluctuations in the level of economic activity. The effects of variations in the level of aggregate demand on the annual mobility figures have been eliminated by aggregating the data over a seven year period. This has proved a useful device for isolating the role of forces affecting the mobility process whether the economy is buoyant or depressed. But aggregate demand is never stationary, and one of the most interesting, important, and frequently neglected aspects of labour mobility analysis is the relationship between inter-industry labour flows and cyclical fluctuations in the level of economic activity.

As the economy moves through the ups and downs of the trade cycle significant changes occur in individual employment levels as a result of variations in the volume of manpower movements between industries and between each industry and sources outside employment. The purpose of the next three chapters is to examine these fluctuations and try to determine their causes. The present chapter and the one following focuses on manpower movements between manufacturing and non-manufacturing, while Chapter VII analyzes manpower movements within manufacturing.

The investigation covers only a nine year period, 1959-1968, and this makes identification of underlying trends difficult. Moreover, the data are only available on an annual basis thus limiting the extent to which econometric techniques can be

employed. Nevertheless, analysis of cyclical fluctuations in the data provide further insight into the forces affecting inter-industry mobility patterns.

THE FIVE TYPES OF MOBILITY

The evidence presented in earlier chapters led to identification of two types of mobility. The first, the movement of young persons from low to high wage industries and older persons in the opposite direction, will hereafter be called life cycle mobility. The second, flows, between closely linked industries, will be referred to as neighbourhood mobility. It was also shown that when the labour market tightens, there is an intensification of flows across neighbourhood boundaries. This provides the basis for identification of a third mobility type. The purpose of this section is to define this third type of movement, introduce a fourth type, and consider the likely contribution of each one to manpower flows between manufacturing and non-manufacturing over the trade cycle.

Initially a distinction must be made between voluntary and involuntary flows between manufacturing and non-manufacturing. Involuntary flows take place when people suffer redundancies and are forced to move between the two sectors by a lack of employment opportunity in the one which they leave. The remaining inter-sectoral movements are voluntary. Since involuntary flows occur only in recessions when employment opportunity in manufacturing is limited, such movements are invariably from manufacturing into non-manufacturing. Flows from non-manufacturing into manufacturing are, therefore, regarded as entirely voluntary.

Manpower movements between manufacturing and non-manufacturing can be divided into two categories: neighbourhood and non-neighbourhood flows. Although the number of persons moving between neighbouring industries will increase in booms and decrease in slumps, it will be recalled from Chapter III that only three neighbourhood relationships were identified between two digit manufacturing and non-manufacturing industries: distribution and food, drink and tobacco; construction and timber and furniture; and construction and bricks, pottery, and cement. Thus non-neighbourhood movements can be expected to make a greater contribution to total flows between manufacturing and non-manufacturing than neighbourhood movements.

Non-neighbourhood movements can be subdivided into three types. The first is life cycle mobility. Life cycle movements can be expected to make a substantial contribution to employment increases in the manufacturing sector. The number of younger members of the labour force moving from non-manufacturing into manufacturing will rise and fall in response to fluctuations in manufacturing manpower requirements; while flows of older persons in the opposite direction will be less in volume and tend to occur more frequently in recessions. During a boom there will be more opportunity for older persons to move voluntarily into the lighter service sector work, but a greater number of jobs suitable for older persons will also become available within manufacturing. This will limit the number of voluntary life cycle flows from manufacturing into non-manufacturing. Although in a downswing these voluntary movements may drop, this decline will be offset by a rise in involuntary flows as older persons who suffer redundancy are compelled to enter lower paying service sector employment by an absence of suitable vacancies in manufacturing.

Although the volume of neighbourhood and life cycle movements rises and falls with the trade cycle, this kind of movement occurs at all levels of economic activity. There are, however, two further types of non-neighbourhood movements which are purely cyclical phenomena. The first is comprised of persons made redundant from manufacturing plants who cannot find alternative employment elsewhere in that sector and are forced to enter non-manufacturing. Such movements differ from the involuntary flows of older people into non-manufacturing in that a person classified to this type regards his non-manufacturing job as a stop gap; that is, a temporary arrangement until the next upswing when he can transfer back into manufacturing. Hence this type of movement has been called stop gap mobility.

The second includes persons who cross the barriers surrounding neighbouring industries in response to an increase in recruitment effort and/ or lowering of hiring standards by employers who find they cannot satisfy their manpower requirements from traditional sources. This type of flow increases during an upswing as the labour market tightens. Such an increase is reflected in a decline in the recruitment and flow propensities between close neighbours as employers reach across neighbourhood barriers to attract the labour they require. It leads to a rise in manpower flows from non-manufacturing into manufacturing where wages are higher and causes increased movement in the opposite direction as non-manufacturing entrepreneurs faced with a dwindling labour supply from their traditional sources, persons outside employment, are forced to retaliate by making more attractive offers to potential job changers.

This type of movement will be called cross barrier mobility.

The term, cross barrier, is not entirely satisfactory in this context, since life cycle and stop gap movers also cross neighbourhood barriers. But in the absence of a more appropriate expression the remainder of this study will use the term to refer to persons who are neither life cycle, nor stop gap movers, but who cross neighbourhood barriers, when labour markets tighten, in response to an increase in employer recruitment effort. The difference between cross barrier movers and life cycle and stop gap movers is one of age, adaptability, and attachment to a particular skill. Life cycle movers are younger members of the labour force, who once they enter manufacturing remain there for the prime of their working lives. Stop gap movers have a primary attachment to manufacturing and only enter non-manufacturing during recessions as a second best alternative. Cross barrier movers are somewhat similar to life cycle movers in that both types are enticed into manufacturing by higher wages. But cross barrier movers include those persons in their twenties who fail to adjust to manufacturing and older persons who are also less likely to adapt themselves to factory work. Consequently cross barrier movers into manufacturing are subject to much higher wastage than life cycle and stop gap industry changers, especially in the late stages of an upswing when the non-manufacturing demand for labour increases. In fact, many of the cross barrier movers will not be included in the inter-industry mobility figures because they do not remain in manufacturing for a year's time.¹

In summary inter-industry labour flows have been placed into four categories: neighbourhood flows and three types of non-neighbourhood flows; life cycle, stop gap and cross barrier flows.

¹See Appendix A.

This classification is not claimed to be either exhaustive or ideal. There may be individual instances of inter-industry movement which fall into more than one of these categories, and there are undoubtedly numerous cases of job changing to which none of these types apply. But despite these shortcomings, it will be seen that these mobility types are particularly useful for the analysis of manpower flows between manufacturing and non-manufacturing.

Further research based on better data will no doubt lead future investigators to adopt a different set of categories. The subject of inter-industry mobility is in its infancy, and it would indeed be presumptuous to claim at this stage that all persons moving in and out of manufacturing can be placed in one of these four categories. Thus in order to give a full account of labour movements between manufacturing and non-manufacturing it is necessary to introduce a fifth mobility type, which is simply a residual category including all those job changers whose movements cannot be classified to any of the four types defined above.

It has not proved possible to estimate from the data available the volume of manpower flows that can be attributed to each mobility type. The only contention here is that the evidence suggests their existence. Specification of these five types of movement provide an essential theoretical basis for the analysis of cyclical fluctuations in labour flows, which follows. But measurement of the number of persons falling into each category must await further research based on information of the age, earnings, location, and occupation of industry changers.

CYCLICAL FLUCTUATIONS IN NET FLOWS

This section provides a picture of trends and cyclical fluctuations in the net recruitment patterns of both the manufacturing and the non-manufacturing sector. It analyzes annual changes in the volume and direction of net flows, net entrants and employment changes between 1959 and 1968 and attempts to assess the relative importance of demand and supply factors in determining these changes. Such an examination requires an index of cyclical fluctuations in economic activity. This immediately raises problems for the choice of indicator is crucial to the outcome of the analysis

Measures of Cyclical Activity

Post war cycles have been characterized by fluctuations in economic activity around a rising trend. One technique is, therefore, to assume that the trend measures the rate of growth of productive potential. Growth rates below this level result from under-employment of labour and capital due to deficient demand, and those above it occur while these resources are being brought into full productive use. Thus rates of growth above trend levels are not sustainable in the long run.

The difficulty with this method is that the results depend a great deal on the type of trend that is fitted. A second approach is to measure directly the utilization of the factors of production. In practice this boils down to using unemployment and vacancy data as cyclical indicators since there are no measures of plant capacity utilization other than those which rely on business opinion surveys.¹

¹ See Kenneth Hilton and Helen Dolphin, "Capital and Capacity Utilisation in the United Kingdom: Their Measurement and Reconciliation", Bulletin of the Oxford University Institute of Economics and Statistics, XXXII, no.3 (August, 1970), pp.192-4; and below Chapter VII, p. 276.

Table 5.1 presents annual data on three cyclical indicators; the G.D.P. growth rate, the average level of unemployment, and the average level of vacancies. A linear trend measuring the rate of growth of productive potential can be fitted to the G.D.P. growth rates by simply calculating the compound average annual growth rate of G.D.P. between June 1959 and June 1968. This works out at a little under 3 per cent. According to this calculation, the economy was expanding faster than productive potential in 1959-60, 1963-64, and 1964-65. In 1960-61 and 1967-68 actual and potential growth rates were about equal, while in 1965-66 actual growth was rather less than the potential rate of expansion. In the remaining years, 1961-63 and 1966-67, actual growth was considerably less than productive potential indicating a significant decline in the utilization of labour.

TABLE 5.1

Cyclical Indicators.

	G.D.P. Growth Rate %	Average Unemployment (Thousands)	Average Vacancies (Thousands)
1959-60	6.6	392.6	275.1
1960-61	3.0	311.6	330.1
1961-62	1.0	357.0	297.0
1962-63	1.8	519.7	185.0
1963-64	6.3	433.7	257.4
1964-65	3.9	333.2	358.3
1965-66	2.2	303.0	396.6
1966-67	0.7	435.4	293.5
1967-68	3.3	545.9	236.8

Average annual G.D.P. growth rate for the
nine year period is 2.96%.

Sources: Growth rates calculated from Central Statistical Office, Economic Trends, No.180 (October, 1968), Table C, p.XIX. These figures are calculated from quarterly estimates of G.D.P. based on net output data. They differ from expenditure growth rates in Tables 1.1 and 7.5, which were calculated from quarterly G.D.P. expenditure statistics. Unemployment and vacancy figures are averages of the figures for each month between mid-years extracted from the DEP Gazette (July 1968), pp. 658 and 574 back to MoL Gazette (July 1959), pp. 259 and 257.

The unemployment and vacancy figures behave in a slightly different manner. If the unemployment series is inverted, peaks occurred in 1960-61 and 1965-66. Thus both the trend in productive potential and the behaviour of the labour market variables indicate that an upper turning point occurred in 1960-61. During the second upswing the rate of growth of output relative to productive potential seems to have peaked earlier than the peak in unemployment and vacancies. This, however, reflects the unusually large amount of labour hoarding, which occurred in 1965-66.

It is well known that turning points in employment have lagged behind those in output in all the post-war cycles. The length of this lag for earlier cycles was estimated to be about three months. But in 1965-66 it was clearly longer. Labour productivity grew by less than 1 per cent during this period. This could have been caused partly by a decline in working hours.¹ But it is also likely to have reflected the difficulties businessmen experienced in interpreting government policy. By this time they were feeling the effects of the numerous deflationary measures that had been introduced.² Yet in September, 1965 the government accepted the National Plan's long term growth objective, an average annual growth rate of 3.8 per cent, well over the 3 per cent trend rate observed above for the 1959-66 period.³ The effect of announcing almost simultaneously these contradictory objectives was a continued tightening of the labour market and a decline in productivity growth below its trend rate as firms held extra manpower

¹ See Department of Employment, British Labour Statistics Historical Abstract 1886-1968, London, H.M.S.O., 1971), Table 148, p.283.

² A full summary of these measures can be found in Michael Artis, "Fiscal policy for stabilization", Wilfred Beckerman, ed., The Labour Government's Economic Record, 1964-1970 (London, Duckworth, 1972), Table 8.1, pp.268-69.

³ The National Plan, op.cit., pp.1-2.

in anticipation of future rises in requirements. This became clear, after the event, when both productivity and unemployment began to climb at abnormally rapid rates after announcement of the July 1966 deflationary measures and the abandonment of the Plan.¹

Troughs in the labour market indicators also lag the output series. It can be seen from Table 5.1 that unemployment peaked and vacancies troughed in 1962-63, one year after the lower turning point in the G.D.P. growth rate. Since the G.D.P. growth rate in 1962-63 was still below the trend in productive potential it is not surprising that unemployment continued to rise and vacancies declined. In 1967-68, however, the G.D.P. growth rate rose above productive potential; yet unemployment again increased while vacancies fell. This can be attributed to the continued abnormally fast rise in productivity which began in 1966.

In summary, cyclical activity in the economy between 1959 and 1968 was characterized by two sudden upsurges in 1959-60 and 1963-64 followed by reduced rates of growth and tight labour markets in 1960-61 and 1964-66 and recessions in 1961-63 and 1966-67. A third upswing of considerably less magnitude occurred in 1967-68. Upper turning points occurred in 1960-61 and 1965-66 while troughs are located either in 1961-62 or 1962-63, depending on the choice of measure, and in 1966-67. This description of cyclical activity is only a rough guideline of the economy's behaviour. It should however provide sufficient information for the following analysis.

The Behaviour of Net Flows

Table 5.2 presents manufacturing net flows, net entrants and employment changes for each year between 1959 and 1968. The

movements of the figures are plotted in Chart 5.1. Movements in female net flows, net entrants and employment changes are shown together in the bottom panel. Male net entrants and employment changes move together and are shown in the middle panel, while at the top the strong association between male net flows and the G.D.P. growth rate is illustrated.

TABLE 5.2

Manufacturing Net Flows, Net Entrants, and
Employment Changes by Sex

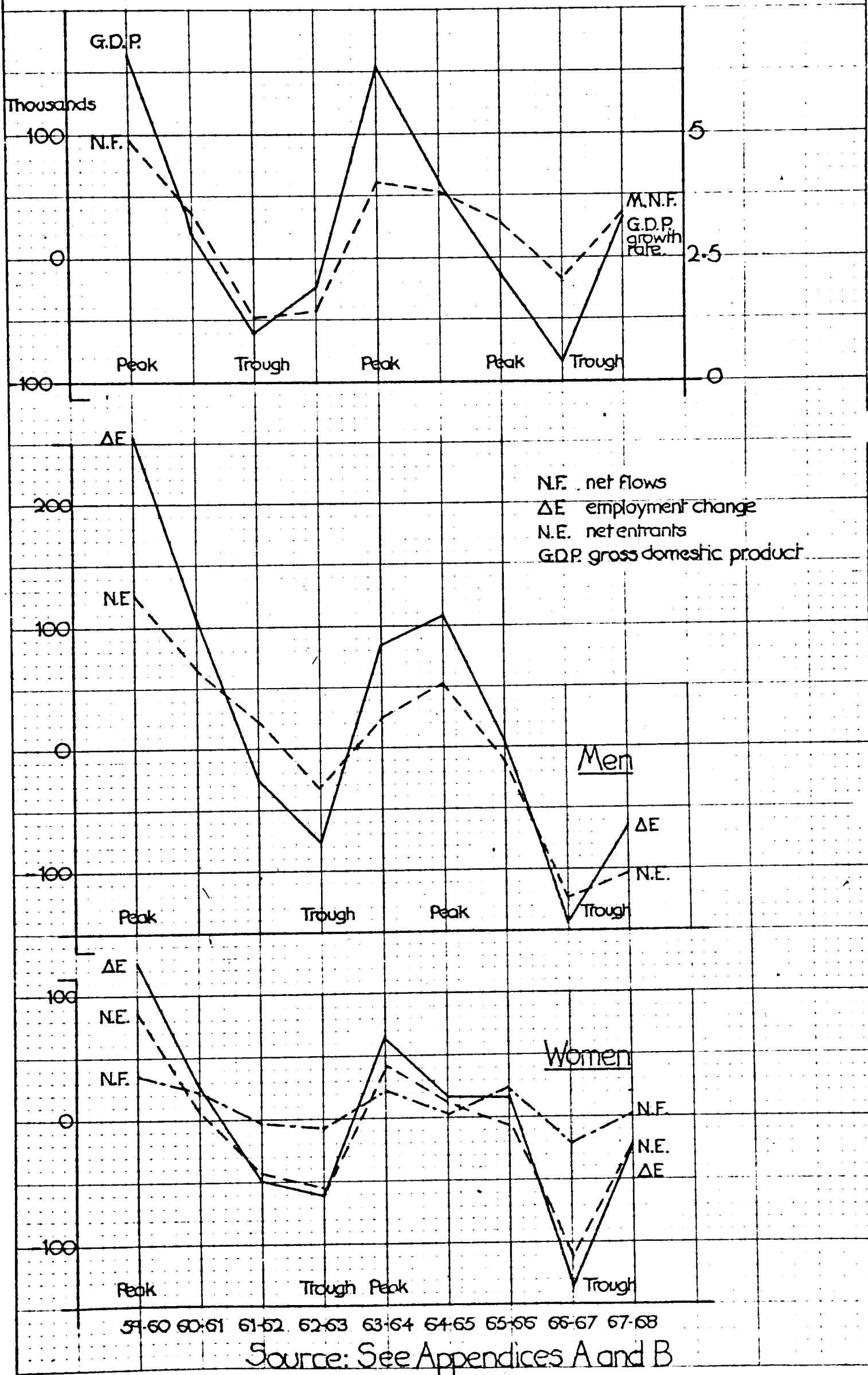
YEAR	MEN			WOMEN		
	Net Flows	Net Entrants	Employ- ment Change	Net Flows	Net Entrants	Employ- ment Change
1959-60	98.0	128.5	226.5	36.2	86.4	122.6
1960-61	36.8	66.2	103.0	23.7	3.9	27.6
1961-62	-49.5	20.6	-28.9	-1.9	-44.3	-46.2
1962-63	-46.3	-31.5	-77.9	-3.8	-55.3	-59.1
1963-64	60.1	25.4	85.5	22.7	41.7	64.4
1964-65	52.7	51.1	103.8	0.3	11.2	11.5
1965-66	13.8	-10.3	3.5	22.3	-4.1	18.2
1966-67	-19.3*	-123.4	-142.7*	-20.0*	-113.2	-133.2*
1967-68	36.3	-100.3	-64.0	0.5	-23.9	-23.4

*Adjusted for reclassifications.

Source: See Appendix A.

Troughs and peaks in male net entrants and employment changes lag the turning points in net flows and the G.D.P. growth rate by one year in 1962-63 and 1964-65. In 1959-60 and 1966-67 all three series peak and trough together, but this is attributable to the very large employment changes that occurred in both these years. What is more significant is that between 1959-60 and 1960-61 net flows declined by almost two-thirds while net entrants fell by only one half. This suggests a tendency for male net flows to lead

Chart 5.1:
Male and Female Net Flows, Net Entrants, and
Employment Changes for Manufacturing: 1959-68.



the cycle and net entrants to follow. During an upswing manufacturing firms first rely more heavily on net recruitment from non-manufacturing firms, while at a later stage having exhausted that supply they turn to net entrants. In a downswing net flows trough before net entrants because initially there are more job openings in non-manufacturing, although this ceased to be the case after the introduction of Selective Employment Tax (SET).¹ It should be noted, however, that in 1963-66 the supply of net entrants was limited and net flows made a greater contribution to employment changes in 1964-66 than in 1960-61.

In the case of women, net entrants and net flows peak and trough together. Peaks occurred in 1959-60 and 1963-64 the years of highest growth, while troughs are located in 1962-63 and 1966-67. The net recruitment pattern for women differs considerably from the male pattern. Manufacturing firms attracted large numbers of net entrants in the years of most rapid growth and turned to net recruitment from other industries in the late stages of each boom. In 1965-66 employer reliance on net movements from non-manufacturing was especially large. Net flows can be seen to have reached a second peak in that year while net entrants were negative. This suggests that in the early stages of an upswing manufacturing firms attract considerable numbers of economically inactive married women. But as the economy approaches full productive potential the supply from outside employment dwindles and employers are forced to rely increasingly on net recruitment from non-manufacturing. The large number of net exits relative to net flows in downswings implies that during these periods

¹Sleeper, "Manpower Redeployment and SET", op.cit., p.293.

many women return to economic inactivity.

The Falling Rate of Growth of Labour Supply

A strong downward trend can be observed in the movement of each employment series displayed in Chart 5.1. This could reflect either a reduction in the relative manufacturing demand for labour during successive upswings or the effects of a fall in the rate of growth of aggregate labour supply. A secular decline in labour demand could have been caused by a fall in the trend rate of growth of manufacturing product demand relative to the rest of the economy. This might in turn reflect a shift in the structure of domestic demand away from manufactured products and towards services such as entertainment, longer holidays, more education, and improved medical services. But as will be seen below there is no evidence of a slackening in the overall growth trend of consumer durables expenditure during the nine year period under analysis.¹ A second possible reason for declining manufacturing product demand is the fall in the competitiveness of exports and import substitutes. There is certainly some strength in this argument, but the amount of weight to be attached to it remains controversial.² Moreover, supply constraints can lead to a decline in competitiveness, since delivery delays cause customers to place orders elsewhere. Calculations reveal an upward trend in the length of time foreigners had to wait for delivery of British goods between 1959 and 1968.³

¹See below, Chapter VII, p.250, Table 7.5.

²See Lawrence B. Krause, "British Trade Performance" in Richard E. Caves, ed., Britain's Economic Prospects (Washington, The Brookings Institution, 1968), p.208 et passim and G.D.W. Worswick, "Trade and Payments" in Sir Alec Cairncross, ed., Britain's Economic Prospects Reconsidered (London, George Allen & Unwin Ltd., 1971), pp.63-72.

³See below, Chapter VII, p.274a.

The decline in manufacturing labour demand could also have been due to an increase in the underlying rate of productivity growth in manufacturing. Both Reddaway and Whitley and Worswick found that engineering productivity growth (defined as output per man) accelerated in 1963¹ despite the decline in average working hours. But this increase was not sufficient to prevent an upward trend in order book lengths. This suggests that manufacturing employers were feeling the effects of a decline in the rate of growth of aggregate labour supply, and the remainder of this section will investigate this possibility.

The behaviour of the unemployment statistics shown in Table 5.1 might suggest that this was not the case. The average level of unemployment at the start of the second boom in 1963-64 was higher than in 1959-60 when the first upswing began. Unemployment is not, however, a good measure of the supply of labour available to the economy as a whole because it does not allow for the effects of changes in the level of aggregate demand on participation and immigration rates.

These factors have, however, been taken into account in estimates of quarterly changes in the labour supply based on a technique developed by Godley and Shepherd. Table 5.3 presents percentage changes in their estimates which assume a constant level of labour demand.² These figures show that the rate of

¹ See Whitley and Worswick, op.cit. and W.B. Reddaway, "The Productivity Effects of Selective Employment Tax: A Reply", N.I.E.R. no.57 (August, 1971), Chart 1, p.65.

² The estimates were supplied by J.R. Shepherd, who has explained the method used to calculate them in J.R. Shepherd, "Productive Potential and the Demand for Labour", Economic Trends, no.178 (August, 1968), pp. XXV-XXVII. The formula in that article is for estimates that assume constant unemployment. These have been replaced with estimates assuming constant vacancies owing to the abnormal rise in unemployment relative to vacancies and other labour market indicators since late 1966.

increase in aggregate labour supply rose up to 1961-62 after which it declined steadily for the rest of the period.

TABLE 5.3

Annual Rate of Increase in Labour Supply

YEAR	% Change in Labour Supply (2nd qtr. to 2nd qtr.)	Young Persons entering employment (thousands)	Net Migration
1959-60	0.5	564	119
1960-61	0.8	560	140
1961-62	1.1	608	149
1962-63	0.6	635	-32
1963-64	0.5	592	-33
1964-65	0.3	594	-11
1965-66	0.0	548	-14
1966-67	-0.1	511	-41
1967-68	0.0	487	48

Source: Per cent change in labour supply calculated from a quarterly series supplied by J.R. Shepherd. Young persons entering employment are from the same source as Table 2.1. Net migration figures are the differences between passenger movements in and out of the United Kingdom. These data were extracted from the Monthly Digest of Statistics (February, 1969), Table 131, p.106 and ibid. (February, 1966), Table 124, p.102.

It is impossible to give a full explanation of the reasons for these changes, but columns 2 and 3 provide an indication of the role of two factors. It shows the number of young persons entering employment each year and net migration into the country. Data on the number of young persons entering employment are recorded on a calendar year basis. This complicates comparisons with employment changes which are calculated in this analysis between successive mid-years. It cannot be assumed that young persons enter employment at a constant rate throughout the year since most school leaving is at the end of summer term. The

figures in Table 5.3 have therefore been derived from published data on the assumption that 70 per cent of the young persons entering employment in any calendar year do so after 1st July

The net migration data is the difference between gross movements of individuals in and out of the country. In this case quarterly figures are available, and these can be summed to provide estimates of annual flows on a mid year basis

Both the number of young persons entering employment and net migration rose in the early years of the nine year period and fell in later years. The young persons entry series reached its peak in 1962-63 after which it dropped as a result of the decline in the birthrate after 1947 and the increasing tendency for people to prolong their education. The net migration series reveals an upper turning point in 1961-62, after which controls on Commonwealth immigration were introduced. The fall in the numbers entering employment from both these sources after 1962 clearly accounts for a considerable proportion of the fall in the labour supply growth rate. The remainder is explained by the trend towards retirement at earlier ages.¹

The falling trend in the growth of aggregate labour supply clearly accounts for the greater dependence of the manufacturing sector on net flows as opposed to net entrants during the second upswing. The fact that net migration started to decline before the young persons entry must have reinforced this tendency because immigrants have a higher propensity to enter manufacturing than young persons.²

¹Activity rates for women over 60 rose slightly from 10 per cent in 1956 to 11.6 per cent in 1966, but those for men over 65 fell from 33 per cent to 23 per cent over this ten year period. See "The fall in the Working Population", DEP Gazette (June, 1970), p.492.

²See David Collard, "Immigration and Discrimination: Some Economic Aspects", Economic Issues for Immigration (London, Institute for Economic Affairs, 1970), pp.72-73

Supply limitations had different effects on male and female net recruitment patterns. At the peak of each cycle net flows for men fell considerably more than those for women. This was particularly true in the second upswing when female net flows rose in 1965-66 to a second peak. Thus both the trend and cyclical declines in labour supply growth rates led to substitution of women for men.

The decline in female net entrants into manufacturing at the peak of the cycle might suggest that even this source of labour is limited. But Table 5.4, showing the behaviour of net entrant figures for non-manufacturing, does not support this view. Male net entrants fell substantially during each plateau period, but female net entrants declined only slightly in 1960-61 and rose considerably between 1963-64 and 1965-66. The indication is that when the labour market tightened non-manufacturing entrepreneurs found it more difficult to recruit men from outside employment to replace net losses to manufacturing. Recruitment of women, whose supply is more elastic, was, therefore, increased.

TABLE 5.4
Non-Manufacturing Net Entrants and Employment Changes

YEAR	Net Entrants			Employment Changes		
	Male	Female	Total	Male	Female	Total
1959-60	109.5	169.6	279.1	-11.5	133.4	121.9
1960-61	40.2	153.1	193.3	77.0	129.4	206.4
1961-62	80.4	143.3	223.7	129.9	145.2	275.1
1962-63	37.6	78.3	115.9	83.9	82.1	166.0
1963-64	99.6	122.7	222.3	39.5	100.0	139.5
1964-65	58.9	132.8	191.7	6.2	132.5	138.7
1965-66	-7.7	176.1	168.4	-21.5	153.8	132.3
1966-67	-223.6	42.6	-181.0	-204.3*	22.6*	-181.7*
1967-68	-105.7	30.9	-74.8	-142.0	31.4	-110.6

* Adjusted for reclassifications.

Source: See Appendix A.

Disaggregation of the net inflow data by industry reveals that this substitution resulted mostly from increased net recruitment of women from distribution. Table 5.5 presents annual data on net inflows from various non-manufacturing industries into manufacturing. It shows that during the years of most rapid growth, 1959-60 and 1963-64, manufacturing achieved net inflows from all sectors except insurance, banking and finance; professional and scientific services; and public administration. In the case of public administration a high volume of life cycle movements-flows of older persons into low grade clerical jobs - probably accounts for the net outflows. But during the late stages of each boom this was not the case. Manufacturing achieved very small net inflows from miscellaneous services in each of these years and experienced net outflows to construction; gas, electricity and water; and transport and communications. Net recruitment from distribution and the primary sector was, however, sustained at high levels. In fact, net movements into manufacturing from these two sources can be seen from the Table to have been positive even during recession years. This clearly reflects the importance of life cycle mobility. It implies that movements of younger members of the labour force from low to high wage industries occurred in every year regardless of the level of economic activity.

Male and female net inflows from each sector tend to move similarly over the cycle. But distribution is an exceptional case. Female net inflows from distribution can be seen to have moved inversely to the male figures in 1960-61 and 1964-66. This is highly significant because the Table shows that distribution is the most important source of net recruitment into manufacturing. Manufacturing firms found it possible to substitute women

TABLE 5.5
Net Flows From Various Non-Manufacturing Sectors Into Manufacturing
(Thousands)

	Primary Sector			Construction, Utilities, Trans. & Commun.			Insurance, Banking & Finance, Prof. Services, Public Admin.			Miscellaneous Services			Distribution			TOTAL		
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
59-60	27.2	3.1	30.3	35.4	0.1	35.5	-4.0	-9.3	-13.3	11.2	14.6	25.8	28.2	27.7	55.9	98.0	36.2	134.2
60-61	20.2	1.2	21.4	-5.7	-5.5	-11.2	-3.5	-5.1	-8.6	2.2	1.5	3.7	23.6	31.6	55.2	36.8	23.7	60.5
61-62	9.0	1.1	10.1	-31.2	-2.3	-33.5	-21.2	-16.1	-37.3	-6.5	-4.5	-11.0	0.4	19.9	20.3	-49.5	-1.9	51.4
62-63	8.3	1.0	9.3	-22.1	-1.6	-23.7	-26.3	-15.0	-41.3	-8.6	-6.1	-14.7	2.4	17.9	20.3	-46.3	-3.8	50.1
63-64	17.1	0.4	17.5	14.2	-1.5	12.7	-1.1	-7.2	-8.3	5.5	3.8	9.3	24.4	27.2	51.6	60.1	22.7	82.8
64-65	17.0	0.9	17.9	3.0	-9.9	-6.9	-5.2	-14.2	-19.4	7.8	-0.2	7.6	30.1	23.7	53.8	52.7	0.3	53.0
65-66*	20.5	0.3	20.8	-10.1	-2.5	-12.6	-8.3	-8.9	-17.2	-5.3	6.4	1.1	17.0	27.0	44.0	13.8	22.3	36.1
66-67	13.8	0.8	14.6	-25.5	-6.4	-31.9	-19.0	-21.7	-40.7	1.9	-5.7	-3.8	9.5	13.0	22.5	-19.3	-20.0	39.3
67-68	13.8	0.6	14.4	17.4	-4.1	13.3	-19.5	-18.4	-37.9	0.1	4.4	4.5	24.5	18.0	42.5	36.3	0.5	36.8

* Figures in this row adjusted for reclassifications

Source: See Appendix A.

for men during these years because they were able to continue to achieve large net flows from distribution despite the tightness of the labour market.

Because distribution is so important as a net supplier to manufacturing the behaviour of its own net recruitment and loss pattern over the cycle is shown in Table 5.6

TABLE 5.6

Net Flows, Net Entrants and Employment Changes for Distribution
(Thousands)

YEAR	Net Flows			Net Entrants			Employment Change		
	Men	Women	Total	Men	Women	Total	Men	Women	Total
1959-60	-33.3	-31.0	-64.3	57.3	84.0	141.3	24.0	53.0	77.0
1960-61	-39.0	-53.3	-92.3	36.1	83.3	119.4	-2.9	30.0	27.1
1961-62	-10.9	-39.9	-50.8	39.1	81.4	120.5	28.2	41.5	69.7
1962-63	-21.1	-43.1	-64.2	37.1	60.2	97.3	16.0	17.1	33.1
1963-64	-50.0	-55.0	-105.0	56.5	82.0	138.5	6.5	27.0	33.5
1964-65	-45.5	-58.1	-103.6	37.8	90.7	128.5	-7.7	32.6	24.9
1965-66	-32.3	-60.8	-93.1	13.7	90.9	104.6	-18.6	30.1	11.5
1966-67	-41.7*	-60.6*	-102.3*	-23.5	-1.4	-24.9	-65.2*	-62.0*	-127.2*
1967-68	-45.9	-43.0	-88.9	27.6	36.7	64.3	-18.3	-6.3	-24.6

*Adjusted for reclassifications

Source: See Appendix A.

The Table reveals distribution as a net importer of labour from outside employment and net exporter to all industries. It has been demonstrated above that distribution firms compensate for manpower lost to other industries by attracting large numbers of young persons. But Table 5.6 shows that such recruitment was insufficient to prevent a high pressure of labour demand from reducing male employment levels during the late stages of each boom. Since this net loss of manpower was on each occasion accompanied by a lower level of male net entrants, it might appear that distribution entrepreneurs lowered their intake of young persons and

other recruits from outside employment in anticipation of the next downswing. It could also be argued that the 18,600 decline in male employment in 1965-66 reflected a fall in labour demand due to the gradual elimination of Resale Price Maintenance (RPM).¹ But this interpretation cannot account for the fact that female net entrants were sustained in 1960-61 at the 1959-60 level and that in 1964-66 they rose ten per cent above the 1963-64 level. This suggests that distribution entrepreneurs were unable to attract sufficient numbers of men from outside employment to substitute for net losses to other sectors and that they reacted by recruiting more women. Thus cyclical fluctuations in the net recruitment and loss pattern of the distributive trades provide further evidence of the recruitment difficulties facing all industries during the plateau years of high employment and low output growth.

Conclusion

This section has examined trends and cyclical fluctuations in manufacturing net recruitment patterns. It has been shown that at the start of cyclical upswings the manufacturing sector increases its net entrants from outside employment, but that in the late stages of a boom both net flows and net entrants decline. During recessions net movements from both sources fall even more and in most cases become negative.

A strong downward trend is apparent in all the manufacturing employment series. This could be due to a decline in manufacturing labour demand or a fall in the growth of aggregate labour supply. A decline in manufacturing labour demand could be due to a shift away from British manufactured products by either domestic or foreign users. But there is little evidence of a fall in

¹This is the view taken by both Whitley and Worswick, op.cit. and Reddaway, "A Reply", op.cit.

the demand for consumer durables and the decline in competitiveness of exports and import substitutes is itself partly due to a trend increase in delivery delays.

The reduction in net entrants and increased reliance by manufacturing entrepreneurs on net recruitment of both men and women from other industries suggest that limitations in supply were the more important factor. Disaggregation of the net flow data by industry shows that distribution was a major contributor to manufacturing employment growth especially when supply was most constrained and examination of the distribution net recruitment pattern demonstrates that employers replaced net outflows to manufacturing by attracting more persons, especially women from outside employment.

The tendency for manufacturing to rely more heavily on net flows than net entrants in tight labour markets does not, however, imply that the supply of manpower outside this sector is unlimited. The decline in the volume of net flows in 1960-61 and 1964-66 suggests that despite a favourable wage differential there are limits to the ability of manufacturing firms to satisfy manpower requirements through the achievement of net recruitment from non-manufacturing. The reasons for the existence of these limits are investigated in the next section.

CYCLICAL FLUCTUATIONS IN GROSS FLOWS

Net movements of manpower into manufacturing reflect the interaction of numerous forces. It is impossible to identify and account for all of them, but examination of the gross mobility data underlying the net flow figures provides the basis for identification of several of the major factors involved. This

section is, therefore, devoted to an investigation of cyclical fluctuations in gross labour flows between manufacturing and non-manufacturing.

Male Flows

Annual data on male labour flows between manufacturing and non-manufacturing from 1959-1968 are shown in Table 5.7. Each sector's average annual vacancies are also presented. The table shows that changes in manufacturing net flows cannot be attributed solely to fluctuations in the volume of gross movements in only one direction. Both the inflow and the outflow series can be seen to vary over time. Thus the cyclical behaviour of the net flow figures is caused by changes in the number of men moving in both directions between the two sectors.

TABLE 5.7

Gross Flows In and Out of Manufacturing and Average Manufacturing and Non-Manufacturing Vacancies 1959-1968: Men (thousands)

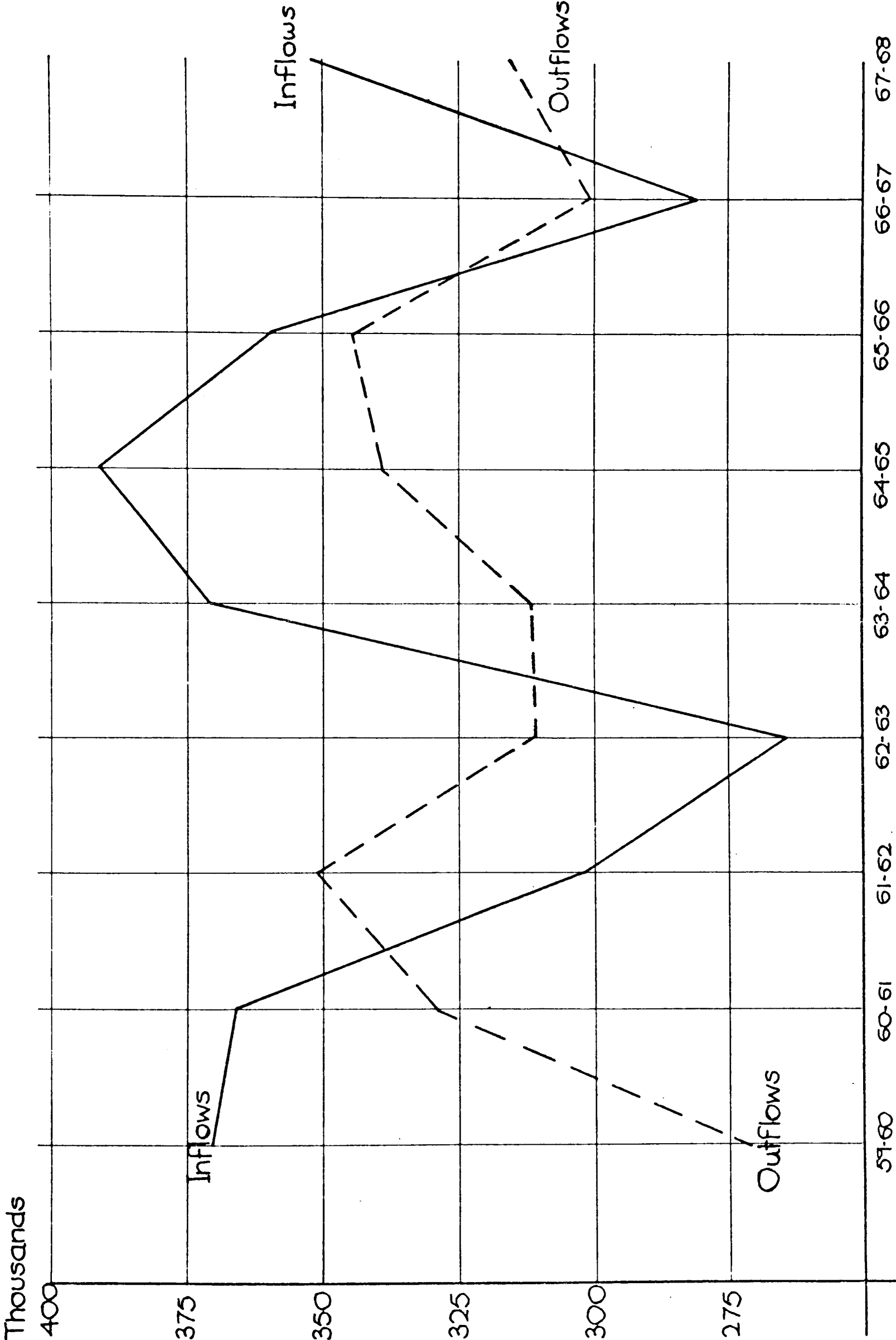
YEAR	Gross		Net Flows	Average Vacancies	
	In Flows	Out Flows		Mfg.	Non-Mfg.
1959-60	370.9	272.9	98.0	36.0	70.6
1960-61	366.6	329.8	36.8	47.3	80.8
1961-62	302.0	351.5	-49.5	36.1	67.6
1962-63	264.1	310.4	-46.3	20.1	44.8
1963-64	371.6	311.5	60.1	34.3	57.8
1964-65	391.2	338.5	52.7	57.2	75.3
1965-66	358.1	344.3	13.8	64.3	83.4
1966-67	282.3	301.6	-19.3	44.6	65.4
1967-68	352.3	316.0	36.3	38.0	51.1

Source: Flows: See Appendix A. Vacancies: See Table 5.1

Chart 5.2 plots movements in the two gross mobility series against time. It shows that the decline in net flows during each

Chart 5.2

Manufacturing Gross Inflows and Outflows: Men 1959-68



Source: See Appendix A

cyclical upswing was due to the fact that initially inflows were high relative to outflows but in the later stage of a boom outflows rose rapidly and reduced the gap between the two series. In 1960-61 gross manufacturing inflows hardly changed from the previous year's level but gross outflows rose by 25 per cent causing net flows to fall. In 1963-64, the start of the second upswing, gross inflows rose by 40 per cent over the previous year's level and accounted for the entire rise in net flows to a second cyclical peak. In the following year inflows rose even further, but outflows also increased so that net flows declined slightly. In 1965-66 the fall in inflows and the rise in outflows was large enough to lead to a 75 per cent drop in net flows.

The Chart also shows that in recessions the initial net outflow from manufacturing was due to both a fall in gross inflows and a rise in outflows. This behaviour can be observed for 1961-62. At a later stage, 1962-63, both inflows and outflows declined reflecting the overall reduction in mobility resulting from the decline in economic activity. It can be seen, however, that the 1961-62 phenomenon did not repeat itself in 1966-67. At the start of the second recession both inflows and outflows fell. This undoubtedly reflects the breakdown of RPM and the introduction of SET.¹

The inability of the manufacturing sector to sustain its volume of net male recruitment from non-manufacturing during upswings is thus reflected in the gross mobility data by a one-year time lag in upper and lower turning points between inflows and outflows. One reason for this lag is the existence of the inter-industry wage differential. Since average earnings in manufacturing exceed levels in non-manufacturing the involuntary

¹ See R.D.Sleeper, "SET and The Shake-Out: A Note on the Productivity Effects of the Selective Employment Tax" Oxford Economic Papers, N.S. XXIV, no.2 (July, 1972), forthcoming.

movements of life cycle and stop gap movers are mostly from manufacturing to non-manufacturing. Consequently, manufacturing inflows are comprised almost entirely of voluntary movers while outflows include both voluntary and involuntary job changers. Since at the start of an upswing the rates of voluntary to involuntary mobility rises, inflows can be expected to rise relative to outflows. Conversely, at the beginning of a downswing the fall in this ratio causes outflows to rise relative to inflows.

It is well known that turning points in industries producing consumer durables tend to lead the cycle.¹ The consequent fall in demand could cause movements into these industries to decline and outflows to rise in the late stages of a boom. If a sufficient number of industries within manufacturing experienced early downturns in demand and declared redundancies, changes in the ratio of voluntary to involuntary mobility could also account for the levelling off of inflows and the rise in outflows before the economy encountered the cyclical peak.

But the difficulty with the argument is that total manufacturing vacancies can be seen from Table 5.7 to have increased continuously up to the peak of each cycle. Vacancy figures must, of course, be treated cautiously owing to the danger of variations over time in the extent to which firms fail to report them to employment exchanges. It will be shown below, however, that these biases are unlikely to have led to an understatement of the true vacancy position in manufacturing.² Thus the fall in labour demand in cycle leading industries must have been more than offset

¹See below, Chapter VII, pp.249-50.

²See below, Chapter VI, p. 202-203.

by increases in cycle lagging industries. The failure of the manufacturing sector to maintain its net male recruitment as the cycle progressed cannot, therefore, be attributed to the early demand peaks experienced by certain manufacturing industries.

Nor can the rise in outflows be explained by increasing involuntary movements into non-manufacturing. Given the high level of manufacturing vacancies, people who lost their jobs in the cycle leading industries could have easily found alternative employment in manufacturing. If such persons did switch into non-manufacturing, their movements must be described as voluntary. Thus the tendency for outflows to catch up with inflows during an upswing must reflect the increasing difficulty experienced by manufacturing entrepreneurs in recruiting and retaining labour from non-manufacturing. Given a favourable wage differential it seems surprising that manufacturing firms should have encountered such problems. The purpose of the next section is to explain why this was the case.

The Impact of Supply Constraints

There are two aspects of the problem. First, the failure of inflows to rise further in response to the increases in manufacturing vacancies must be explained; second, a theory is required to account for the rise in voluntary outflows despite the growth in manufacturing labour demand and the favourable manufacturing wage differential. There are two reasons why inflows could have failed to increase. First, the supply of potential life cycle and stop gap movers working in non-manufacturing may be insufficient to sustain a continuous increase in the movements of such persons into manufacturing. Second, as the labour market tightens the rise in vacancies in the non-manufacturing

may divert potential neighbourhood and cross barrier movers away from manufacturing jobs. Some may be persuaded through improvements in wages and conditions of employment to remain in their present jobs while others may find alternative employment elsewhere in non-manufacturing. Clearly, the relative importance of each of these two factors depends on the contribution of each mobility type to total inflows. The quality of information available at the present time makes estimation of the number of persons falling into each category impossible. But disaggregation of manufacturing inflow data into its two digit components does provide some clues about the nature of this problem. An investigation of this question is attempted in the next chapter. For the moment, however, the analysis simply recognizes the existence of both factors and notes that each reflects the effects of constraints on the supply of labour and not reductions in the growth of manufacturing manpower requirements before the peak of the cycle has been reached.

There are two possible explanations for a rise in voluntary outflows in the late stages of a boom. The first attributes such an increase to delayed recovery in non-manufacturing labour demand. Two kinds of lags could be involved here. First, recovery in non-manufacturing product demand might lag behind an upswing in manufacturing. If output-employment lags have equal lengths in both sectors, recovery in non-manufacturing labour demand will then lag behind the upswing in manufacturing manpower requirements. Thus voluntary movements from manufacturing to non-manufacturing will increase at a later stage of the boom after the effects of the upswing have worked their way through to the rest of the economy.

This argument is based on the generally accepted proposition that economic recovery begins with an upswing in the demand for manufacturing output. The difficulty with this view is that the lag between upturns in manufacturing and non-manufacturing product demands are unlikely to be as long as a year. This might be true of the construction industry where market growth is connected to manufacturing demand through the lagged accelerator. But the multiplier effects of a rise in manufacturing employment income on consumer demand for non-manufacturing goods will work through the system in less than a year's time. Manufacturing's own demand for non-manufacturing services, e.g. power, transport, communications and distribution outlets, will react even more quickly. In short, although there might be some delay in the response of non-manufacturing product demand to an upswing in manufacturing output, the length of the lag is unlikely to be sufficient to account for voluntary outflows in the late stages of the boom. Quarterly output statistics for manufacturing and non-manufacturing between 1958 and 1968 were each plotted against time, and there was, in fact, no evidence of a delayed recovery in non-manufacturing.¹

It is possible, however, that the length of the output employment lag may vary between the two sectors. It will be demonstrated below² that in many non-manufacturing industries this lag reflects the impact of different forces in each sector. Consequently there is no reason to believe a priori that it will have the same length in each sector. If it is longer in non-manufacturing than in manufacturing the recovery in non-manufacturing employment demand will be further delayed and this could possibly account

¹The figures were taken from the same source as Table 5.1. The Chart is available from the author.

²See below Chapter VI, pp.204-5.

for the lagged increase in voluntary outflows during cyclical upswings. The only reason for believing that this was not the case is that male non-manufacturing net entrants were at peak levels at the start of each upswing (see Table 5.4). This suggests that non-manufacturing labour demand does recover within a year of the trough in manufacturing. The combined effects of an output lag between manufacturing and non-manufacturing and output-employment lags in each sector do not, therefore, explain the lagged increase in outflows from manufacturing during each upswing.

The second possible explanation for this phenomenon places less emphasis on demand recovery lags and focuses on inter-sectoral variations in recruitment patterns as the major cause. The argument is that at the beginning of a recovery manpower requirements in both manufacturing and non-manufacturing start to rise within the same year. The lagged rise in outflows is then due to the tendency for manufacturing to rely more heavily on recruitment from non-manufacturing to satisfy its manpower requirements and for non-manufacturing to replace these losses by increasing its intake of young persons and immigrants. Thus during the first year of an upswing the volume of labour flows from non-manufacturing to manufacturing rises, but there is little or no increase in movements in the opposite direction.

As the boom progresses, however, the supply of labour outside employment declines and non-manufacturing entrepreneurs are forced into competition with manufacturing for scarce labour. Despite the wage differential a rise in non-manufacturing vacancies will lead to an increase in voluntary outflows from manufacturing. Life cycle movements will rise as older persons take

advantage of the increase in employment opportunities and transfer into lighter service sector work. Movements of person employed in the manufacturing industries closely linked to non-manufacturing will also increase in response to the rise in vacancies in the latter sector. Finally, at least some non-manufacturing employers will react to a tight labour market by improving wages and conditions of employment. These changes will attract persons employed in the remaining manufacturing industries who are dissatisfied with their present jobs. Persons falling into this category will probably include many who left non-manufacturing employment during the earlier stages of the upswing and are not satisfied with manufacturing work. Consequently cross barrier movements will also increase in the late stages of a boom. Thus the tendency for manufacturing voluntary outflows to rise during cyclical upswings can be ascribed to a rise in competition between manufacturing and non-manufacturing for increasingly scarce labour.

In summary, the failure of manufacturing employers to sustain their net recruitment of men from non-manufacturing as an upswing approaches its peak is due to the effects of a reduction in aggregate labour supply. This reduces the availability of life cycle and stop gap industry changers in non-manufacturing and increases the need for employers outside manufacturing to retain and recruit more labour from manufacturing. Consequently, persons working in non-manufacturing who are potential neighbourhood and cross barrier recruits in manufacturing are persuaded either to remain in their present jobs or fill other non-manufacturing vacancies, while potential life cycle, neighbourhood, and cross barrier movers working in manufacturing transfer voluntarily into non-manufacturing. The effect is a levelling off in manufacturing inflows and

a rise in outflows in the late stages of each boom.

Female Flows

The difficulties manufacturing employers experience in recruiting and retaining men as the economy approaches its cyclical peak has an effect on female net recruitment patterns. Although there are limits to the substitutability of women for men, the analysis of net movements of women into manufacturing has shown that during upswings employers rely increasingly on female net flows to satisfy expanding manpower requirements in tight labour markets. The gross female mobility data in Table 5.8 provide further evidence of this behaviour. Comparison with the figures on men in Table 5.7 suggests that manufacturing firms recruit more women from non-manufacturing when they encounter difficulties in attracting men. Gross inflows of women can be seen to rise above the previous year's level in 1960-61 and 1965-66 when male

TABLE 5.8
Vacancy And Mobility Data For Women
(Thousands)

YEAR	Total Gross Mfg.		Vacancies	
	Inflows	Outflows	Mfg.	Non-Mfg.
1959-60	198.6	162.4	38.059	45.228
1960-61	211.8	188.1	41.824	51.651
1961-62	185.8	187.7	33.021	46.564
1962-63	174.9	178.7	21.086	48.082
1963-64	218.8	196.1	33.056	56.533
1964-65	214.1	213.8	43.268	72.162
1965-66	220.0	197.7	49.201	76.807
1966-67	170.8*	190.8	33.818	59.832
1967-68	196.2	195.7	33.922	53.714

* Adjusted for reclassifications
Source: Same as Table 5.7

inflows declined. Conversely, female inflows fell in 1964-65 when recruitment of men increased. Thus manufacturing inflows of women do not have a tendency to decline in the late stages of a boom when vacancies are at their peak. Rather they tend to rise in response to shortages of male labour.

Gross outflows of women like those of men tend to increase during the late stages of a boom. But at the start of a down-swing the male and female figures behave differently. Outflows of women did not increase in 1961-62/^{as} was the case for men. This suggests that a higher proportion of female outflows are comprised of life cycle, neighbourhood and cross barrier industry changers moving voluntarily between the two sectors and that women made redundant in manufacturing tended to leave the labour force.

The effects of these differences between male and female mobility patterns is that movements of women between manufacturing and non-manufacturing are much more strongly correlated with cyclical fluctuations in labour demand than are the movements of men. The manufacturing intake of women does not decline when the labour market tightens because the rise in female participation rates during the upswing enables both manufacturing and non-manufacturing to recruit more labour from each other without either experiencing the difficulties encountered in trying to attract men. Similarly, outflows do not rise during the down-swing because female participation rates decline as women made redundant from manufacturing leave the labour force.

Regression analysis provides further confirmation of this view. When male manufacturing inflows and outflows were each regressed on manufacturing and non-manufacturing vacancies respectively the resulting equations were:

$$1. \quad F_m = 261.7 + \begin{matrix} 1.86 \\ (.109) \\ (1.72) \end{matrix} V_m \quad \begin{matrix} \bar{r}^2 = .195 \\ F = 2.9 \\ DWS = 1.8 \end{matrix}$$

$$2. \quad F_{nm} = 276.0 + \begin{matrix} .668 \\ (.642) \\ (1.04) \end{matrix} V_{nm} \quad \begin{matrix} \bar{r}^2 = .01 \\ F = 1.1 \\ DWS = 1.3 \end{matrix}$$

Where

F_m = manufacturing inflows
 F_{nm} = non-manufacturing inflows (manufacturing outflows)
 V_m = manufacturing vacancies
 V_{nm} = non-manufacturing vacancies.

In neither case were the relationships statistically significant.

But the results of regressing female gross inflows and outflows on manufacturing and non-manufacturing vacancies for women were:

$$3. \quad F_m = 138.1 + \begin{matrix} 1.68 \\ (.058) \\ (2.89) \end{matrix} V_m \quad \begin{matrix} \bar{r}^2 = .480 \\ F = 8.4 \\ DWS = 1.9 \end{matrix}$$

$$4. \quad F_{nm} = 135.6 + \begin{matrix} .964 \\ (.311) \\ (3.10) \end{matrix} V_{nm} \quad \begin{matrix} \bar{r}^2 = .519 \\ F = 9.6 \\ DWS = 1.83 \end{matrix}$$

Although these equations each explain only about 50 per cent of the variance in the mobility data, both regression coefficients easily pass the t test at the 5 per cent confidence interval, where the critical value with eight degrees of freedom is 2.3.

The contrast between the strong mobility-vacancy relationship for women against the weak correlation for men demonstrates the effects of changes in aggregate labour supply on the inter-industry mobility process. The supply of economically inactive male labour is limited because most men are included in the primary labour supply. Thus as the economy approaches full employment the supply of male labour must become increasingly inelastic with respect to upward changes in the level of aggregate

demand. But approximately half the women in employment are married and can, therefore, be classified as secondary workers having a primary allegiance to the home. This makes the female labour supply more responsive to demand variations and explains the relative ease with which firms can recruit women from each other as well as from outside employment at the peak of each trade cycle.

CONCLUSION

The objective of this chapter has been to analyze the behaviour of manpower movements between manufacturing and non-manufacturing over the trade cycle. The first half examined trends and cyclical fluctuations in manufacturing net flows, net entrants, and employment changes, and demonstrated that all three series experienced a falling trend between 1959 and 1968. This was due in part to an acceleration in the rate of manufacturing productivity growth, and possibly also a fall in the relative demand for manufacturing output. But the main cause was the decline in aggregate labour supply. The evidence is the manufacturing sector's greater dependence on net flows during the second upswing.

The ability of the manufacturing sector to achieve net recruitment of men from non-manufacturing was, however, shown to be limited. Male net flows were observed to decline in the late stages of each boom and manufacturing employers were forced to satisfy their expanding requirements by increasing net recruitment of women.

The second half of the chapter investigated the behaviour of the gross manpower flows underlying the net movements examined

in the first half. It demonstrated that the decline in the manufacturing net intake of men from other sectors in the late stages of each boom was due to a levelling off in the growth of inflows and a delayed increase in voluntary outflows. This was attributed to the rising inelasticity of the male labour supply which led to reductions in potential life cycle and stop gap industry changers in non-manufacturing and increasing competition for scarce labour between manufacturing and non-manufacturing entrepreneurs. Consequently, inflows and outflows of women increased as plants substituted female for male labour.

The behaviour of the manpower mobility figures thus seems to suggest that during cyclical upswings and downswings the inter-industry mobility process is affected considerably by changes in the aggregate labour supply. This affects the ease with which employers can recruit labour from each other as well as from outside employment. One of the objectives of the next chapter is to investigate more systematically the effects of variations in labour market conditions on the ability of manufacturing firms to retain and recruit manpower from the industries outside manufacturing. But sufficient evidence has already been presented to demonstrate that during each upswing before July 1966 manufacturing employers encountered a full employment ceiling in the form of an increasingly tight labour supply which made the satisfaction of manpower requirements increasingly more difficult. The remaining chapters will investigate more fully the nature of this ceiling, and the effect it had on manpower movements in and out of the individual manufacturing industries.

CHAPTER VI

Inter-Industry Mobility and the Full Employment Ceiling.

The previous chapter concluded with the statement that during each cyclical upswing between 1959 and 1966 the economy encountered a full employment ceiling. According to Matthews the existence of such a ceiling does not imply that a rigid barrier stops all employment growth at some point of the expansion process. Rather, it takes the form of gradually increasing shortages of labour as the boom progresses.¹

This tightening of the labour supply can occur uniformly across the economy as a whole or it can vary between industries. The more mobile the labour force, the more responsive are inter-industry labour flows to changes in relative demands and the more variations between them will be eliminated. The decline in aggregate labour supply in relation to demand will then have roughly equal effects on all industries. Conversely the smaller the volume of movements between industries with varying demands the more inter-industry mobility is obstructed by geographical and occupational barriers, poor communications between buyers and sellers of labour services, and the failure of variations in wages and conditions of employment to reflect these demand differences.

MANPOWER SHORTAGES IN MANUFACTURING

One method of determining the degree of uniformity in the effects of declining labour supply on various industries is to examine the behaviour of each industry's proportion of total vacancies over the cycle. If industrial vacancy shares remain

¹R.C.O. Matthews, The Trade Cycle (Cambridge, Cambridge University Press, 1962), pp. 49-50.

constant during upswings and downswings it can be concluded that all industries suffer equally from falling aggregate labour supply. If, on the other hand, they vary over time the effects of a labour shortage will be felt unevenly across industries. Further exploration of this approach does, however, require a thorough understanding of the biases inherent in the vacancy data.

It has always been known that there are limitations attached to the reliability of the vacancy data. The difficulty is that in tight labour markets it is not clear a priori whether firms will overstate or understate their requirements. Some might notify more vacancies to employment exchanges than they actually have in the hope of receiving a greater number of applicants, while others might notify none because they do not believe the exchanges can satisfy their needs. In the absence of further information, it is impossible to know which of these tendencies prevails amongst employers.

Fortunately, the Glasgow Study investigated this problem. The authors reported that the reliability of the vacancy figures were subject to five limitations. First, most employers report only a small proportion of their total vacancies to employment exchanges. Over-stating of vacancies seldom occurs. Second, the proportion of jobs filled through the exchanges was lower in relatively tight labour markets suggesting that a smaller proportion of vacancies will be notified as aggregate labour supply falls. Third, vacancies registered at employment exchanges often fail to match the real requirements of plants. Fourth, employers notify a lower proportion of skilled vacancies to the exchanges; hence the vacancy data are biased towards the semi-

skilled and the unskilled. Fifth, small firms tend to rely more on recruitment from the exchanges than large firms and can, therefore, be expected to report a higher proportion of their vacancies.¹

Bearing these points in mind the behaviour of male vacancy shares in Table 6.1 seems paradoxical. The Table presents the proportion of total vacancies for men 18 and over reported by firms in manufacturing, construction, distribution, miscellaneous services, and non-manufacturing aggregated. Now the average size of plant and degree of skill requirements is higher in manufacturing than in non-manufacturing. Consequently if the Glasgow Study's findings, which are based on evidence from engineering, vehicles, and metals n.e.s. can be applied to the entire economy, the degree of vacancy understatement in manufacturing relative to non-manufacturing can be expected to increase as the labour market tightens. Yet Table 6.1 shows that it is

TABLE 6.1

Vacancy Shares in Manufacturing, Non-Manufacturing and Selected Non-Manufacturing Industries: Men 18 and over.
(per cent)

Year	Mfg.	Non-Mfg.
1959-60	33.8	66.2
1960-61	36.9	63.1
1961-62	34.8	65.2
1962-63	30.9	69.1
1963-64	37.3	62.7
1964-65	43.2	56.8
1965-66	43.5	56.5
1966-67	40.5	59.5
1967-68	42.7	57.3

Source: Same as Table 5.1

the manufacturing sector whose vacancy shares increased at the

¹The Glasgow Study, pp.349-56.

peak of each cycle. In 1960-61 its share rose by 3 percentage points over the previous year's figures and in 1965-66 it was 6.2 points above the 1963-64 figure. Moreover, a rising trend can also be observed in manufacturing vacancy shares suggesting that plants in this sector suffered most from the secular fall in labour supply over the nine year period.

The paradox can only be resolved if it is assumed that the relative increase in manufacturing manpower requirements during each upswing and for the period as a whole was even greater than that which is suggested by the figures. This in turn implies that the effects of a decline in aggregate labour supply were felt unevenly across the economy as a whole and that manufacturing plants encountered the full employment ceiling more frequently than non-manufacturing establishments.

One reason for this is that product demand fluctuates more violently in manufacturing than in non-manufacturing. This alone makes manpower requirements in manufacturing relative to non-manufacturing rise in booms and fall in slumps. But cyclical fluctuations in the ratio of employment demand between the two sectors are further accentuated by the existence in manufacturing of a less flexible short run relationship between the volume of output and labour inputs. This relationship is more likely to be fixed by technical considerations in the manufacturing sector because there is less scope for curtailing the services associated with delivery of the product. Sales revenue per employee in transport, for example, can be raised by overcrowding the buses and trains and increasing the inconveniences associated with travel. Similar labour savings can be achieved in communications by reducing the number of daily postal

deliveries. In distribution reductions in the number of product outlets raises output per man at the expense of a loss in shopping convenience. Variations in product quality can of course also be introduced in manufacturing but such adjustments are associated with changes in product design and usually involve investment decisions. Thus given the volume of capital, a rise in manufacturing production entails an increase in the labour input whereas a similar condition does not necessarily apply in many of the industries outside manufacturing. These inter-sectoral differences in the output-employment relationship contribute to the rise in the ratio of manufacturing to non-manufacturing vacancies during cyclical upswings.

Severe fluctuations in this ratio may, however, be offset by the tendency of manufacturing employers to hoard manpower. It has been argued elsewhere¹ that labour hoarding, that is, employing manpower in excess of current requirements in expectation of future rises in demand, is more likely to occur in manufacturing than in non-manufacturing for four reasons.

First, the skill content of manufacturing jobs is higher and many skills are specific to the firm. Substitution between skills is more difficult and a wider range of complementarity is found between them. Intra- and inter-union demarcation lines reinforce this tendency.

Second, the higher level of wages in manufacturing makes it easier to retain labour and more difficult to reduce employment through natural wastage. Thus lowering manpower levels is more likely to entail redundancies and this reduces the morale of the rest of the work force and worsens relations with the unions

¹Sleeper, "SET and The Shake-Out," op.cit.

whose influence in manufacturing is generally more pervasive than in the privately owned areas of non-manufacturing.

Third, the more severe cyclical fluctuations in manufacturing product demand create a wider divergence between labour's present and expected future value. Fourth there is more opportunity for manufacturing plants to reduce labour costs without actually declaring redundancies. Wage payment systems in manufacturing are more flexible than in non-manufacturing, especially services. If demand falls, labour costs can be cut by reducing hours of employment. If payment by results schemes are operating they may fall automatically.

For these reasons manufacturing employers will be slow to cut employment when output requirements fall. Their initial response is more likely to be a cut in working hours and only at a later stage when they are convinced that the downturn will last for some time will they cut employment as well.¹ In many cases, employers may ride out the entire slump with labour in excess of requirements. Hence the spurt in manufacturing productivity at the start of each upswing.

The tendency for manufacturing plants to employ manpower in excess of current requirements will, however, only reduce cyclical fluctuations in manpower demand if firms restrict their hoarding efforts to the recession years. But there is no reason for them to do so. Of the four reasons given above to justify

¹ See R. R. Neild, Pricing and Employment in the Trade Cycle, National Institute of Economic and Social Research Occasional Papers XXI (Cambridge, Cambridge University Press, 1963); F.P.R. Brechling, "The Relationship between Output and Employment in British Manufacturing Industries", The Review of Economic Studies, XXXII (1965), pp.187-216; and R.J.Ball and E.B.A. St. Cyr, 'Short Term Employment Functions in British Manufacturing Industry', The Review of Economic Studies, XXXIII (1966), pp.179-207.

labour hoarding, the first and the third are just as likely to affect the behaviour of plants in booms as in slumps. In fact, employers are likely to try to hoard more labour during upswings when expectations of further growth in product demand are most buoyant. They are, however, less likely to succeed in tight labour markets especially since they will try hardest to hoard the most scarce labour - skilled persons. Consequently far from reducing cyclical fluctuations in manufacturing manpower demand and easing recruitment problems during the late stages of a boom, the existence of labour hoarding is likely to exacerbate the problem.

This argument explains the rise in manufacturing labour demand relative to non-manufacturing during cyclical upswings. But it does not account for the inability of manufacturing firms to take advantage of the favourable inter-sectoral wage differential and satisfy expanding manpower needs by achieving larger net intakes both from non-manufacturing and from outside employment. One reason for this failure is that employers may not be able to adjust skill requirements to available labour supply. During an upswing the availability of skilled and semi-skilled labour, or persons suitable for training to perform such tasks, falls more rapidly than the total labour supply. The number of similarly qualified persons working in non-manufacturing also becomes depleted.

Most manufacturing industries do not have occupational linkages with non-manufacturing. Thus recruitment of skilled manpower into manufacturing will be restricted to a small number of stop gap movers who acquired manufacturing skills before suffering redundancy and life cycle industry changers who are willing and able to learn them. Life cycle entrants into skilled

jobs include both young persons entering formal apprenticeships who first had a brief spell of employment in non-manufacturing and persons in their twenties who receive less formal training. The size of the entry will vary between industries and regions depending upon the nature of the training required, the attitude of the unions, and the extent to which demand for the skill exceeds available supply.¹ The number of life cycle and stop gap industry changers recruited into semi-skilled occupations will be larger because training periods will be shorter and less formalized and the unions are likely to adopt a less restrictive attitude. For these reasons there is also likely to be a considerable amount of cross barrier movement into semi-skilled occupations.² Consequently, as the boom progresses employers will recruit a greater number of life cycle, neighbourhood, and cross barrier movers into skilled and semi-skilled jobs. This increased intake from non-manufacturing will clearly be accompanied by a reduction in hiring standards as firms try to match their requirements to available supply.³ But there is evidence to show that the scope for such adjustments is limited.⁴ Thus the effects of the full employment ceiling are felt more severely in the manufacturing sector.

A second reason for the inability of manufacturing firms to sustain employment increases during cyclical upswings is the rise in competition for labour from the non-manufacturing sector. This diverts potential neighbourhood and cross barrier industry changers away from manufacturing and increases the flow of such

¹W.Brown, op.cit., p.6.

²The Glasgow Study, p.286.

³See M.W. Reder, "Theory of Occupational Wage Differentials" in The American Economic Review, ILV (December, 1955), pp.833-66.

⁴The Glasgow Study, pp.120-21 and 286.

persons along with life cycle movers from manufacturing into non-manufacturing.

Both the decline in the supply of suitably qualified manpower in non-manufacturing and the rise in competitiveness of non-manufacturing plants have been shown to reduce the manufacturing net intake of men during cyclical upswings.¹ So far, however, no attempt has been made to assess the relative importance of each factor. This is the objective of the remainder of this chapter.

MANPOWER MOBILITY MODELS : MANUFACTURING AGGREGATED

The purpose of this section is to construct and test a model designed to explain the volume of manpower movements in and out of manufacturing in terms of the five mobility types defined above. Given the availability of only nine observations it is not possible to establish econometrically the existence of a lag in the inflow-outflow-relationship. But further insight into the nature of the full employment ceiling encountered by the manufacturing sector is provided by this analysis even though the results must be regarded as highly tentative owing to the small number of observations and the limitations in the reliability of the independent variables.

Inflows

The Model. Consider the following equation

$$1) \quad F_{mt} = \alpha + \beta V_{mt} - \gamma V_{nt}$$

It says that manpower flows into manufacturing (F_{mt}) are a positive function of the average level of manufacturing vacancies (V_{mt}), during a given time period and a negative function of the

¹See above, Chapter V, pp.189-90.

average level of non-manufacturing vacancies (V_{nt}). Estimation of the parameters of this model is beset with difficulties. First vacancies in both manufacturing and non-manufacturing can be seen from Table 5.7 to move closely together over the trade cycle. The correlation between them is .84 and this makes identification of the impact of each variable difficult to achieve.

Second, the model raises a serious simultaneity problem. It says that manpower flows into an industry are likely to rise when that industry's vacancies increase relative to job openings in the rest of the economy. But this very increase must fill the given industry's vacancies and create new job openings in the rest of the economy where employment levels will have been reduced. Thus a rise in the number of persons moving from one industry to another has a negative impact on vacancy levels in the receiving industry and a positive effect on the number of job openings in the losing industry. The feedback in the model cancels the initial effect. It is not surprising, therefore, that when this model was tested using the data in Table 5.7 the results were insignificant.

The strength of the feedback effect depends on changes in the general state of the labour market. Vacancies arise when an industry's desired manpower level exceeds the actual numbers employed. If these openings are filled instantaneously vacancy levels will always be zero. But, in practice finding a suitable applicant for a job takes time,¹ and in the meantime new vacancies will arise if the firm's manpower requirements continue to expand. In other words, variations in the speed with which vacancies are filled will determine the strength of the feedback effect.

¹See M.W. Reder, "The Theory of Frictional Unemployment" in Economica, (February, 1969), p.3 et passim.

This point can be demonstrated quite simply. Let

- H_{mt} = total hirings in manufacturing in time t ;
 S_{mt} = the speed with which vacancies are filled;
 P_{mt} = the proportion of manufacturing hirings
 comprised of gross labour flows from non-
 manufacturing.

Now S_{mt} is defined as the ratio of hirings to vacancies, and manufacturing inflows will be some proportion of the total number of persons hired by manufacturing firms. Formally,

$$(1.1) \quad S_{mt} = \frac{H_{mt}}{V_{mt}} \quad \text{by definition}$$

$$(1.2) \quad F_{mt} = P_t H_{mt} \quad \text{by definition}$$

$$(2) \quad \therefore F_{mt} = S_{mt} P_{mt} V_{mt}$$

P_{mt} can be regarded as some function of non-manufacturing vacancies. The higher the level of vacancies outside manufacturing the greater the chance that persons leaving a non-manufacturing firm will take another job outside manufacturing.

Finding a measure of S_{mt} is more difficult. The speed with which vacancies are filled will depend mainly upon supply conditions in labour markets. But the role of demand cannot be entirely excluded. When demand is high, firms may raise the speed at which they recruit from a given labour supply by increasing recruitment effort and/or reducing hiring standards. In these conditions a rise can be expected in the manufacturing intake of life cycle job changers as employers revise downwards the qualifications they require from younger members of the labour force who wish to move from non-manufacturing into the higher paying manufacturing jobs. Moreover this adjustment in hiring standards will affect cross barrier movers whose rise will also reflect increased recruitment efforts as employers reach beyond tradi-

tional sources of labour supply in an attempt to satisfy expanding manpower requirements. Conversely, when demand slackens recruitment effort will be reduced and hiring standards raised. This leads to a fall in the volume of life cycle and cross barrier movements into manufacturing. In other words, a given level of vacancies and labour supply can sustain varying levels of manufacturing inflows depending upon the effort firms put into recruitment and the hiring standards they adopt. The behaviour of the vacancy data in Table 5.7 demonstrates this point. Both manufacturing and non-manufacturing vacancies were nearly equal in 1959-60, 1961-62, and 1963-64. Yet the second of these three years marked the beginning of a downswing. Clearly recruitment effort was higher in 1959-60 and 1963-64.

Various measures of the level and rate of change of the working population including the Shepherd estimates (See Table 5.4) were tried as proxies for S_{mt} . None provided satisfactory results. Since the time taken to fill vacancies is determined not only by the number of persons available for employment but also by the employer's expenditure on recruitment effort and the hiring standards he adopts, changes in the economy's total employment level seemed a more appropriate indicator of variations in S_{mt} than any of the attempts to measure pure labour supply. During an upswing the change in total employment represents the responsiveness of supply to an increase in employer recruitment effort and a lowering of hiring standards while in the downswing a much lower rise in total employment reflects the fact that employers reduce recruitment effort, raise hiring standards, and declare redundancies. In other words, because the change in total employment reflects the interaction of both supply and

demand in labour markets it is the most suitable proxy for S_{mt} .

Annual changes in male employment are shown in Table 6.2. These can be seen to begin at a peak in 1959-60, trough in 1962-63, peak in the following year, and trough in 1966-67. A downward trend reflecting the decline in aggregate labour supply can be observed in the figures. Positive values for employment changes in the 1961-63 recession reflect the peaks in immigration and the young persons entry that were observed in Table 5.3 above. Negative values in 1966-67 are partly due to the decline in aggregate labour supply. But this is not the entire explanation. There is evidence to indicate that the introduction of SET in 1966-67 led a significant number of persons to switch from employment into self-employment to escape the tax.¹ This change in employment status clearly had no effect on either recruitment effort, hiring standards, or the underlying labour supply position. In an attempt to eliminate these distortions, an instrumental variable was derived by ranking the annual changes in total employment in descending order and regressing the original figures on the ranks. If the distortions in the original data are not too great, the resulting fitted values derived from this regression should provide a more accurate ordinal measure of the speed with which vacancies are filled. These figures are shown in the second column of Table 6.2. They exhibit a downward trend similar to that which appears in the original figures. But the very large negative values in 1966-67 and 1967-68 have been reduced relative to employment changes in other years.

¹ See R.C.O. Matthews, "Trends and Cycles in the British Economy", London and Cambridge Economic Bulletin, p.3.

TABLE 6.2

Annual Changes in Male Employment
(Thousands)

<u>Year</u>	<u>Employment Changes</u>	<u>Changes in Labour Supply*</u>
1959-60	215	272
1960-61	180	208
1961-62	101	18
1962-63	6	-45
1963-64	125	145
1964-65	110	82
1965-66	-18	-108
1966-67	-347	-235
1967-68	-206	-171

*See Text for explanation
Source: See Appendix A.

The Results. It follows from the preceding discussion that Equation (2) can be written as

$$(3) \quad F_{mt} = f(V_{mt}, V_{nt}, S_t)$$

where S_t is an ordinal measure of S_{mt} the speed with which vacancies were filled in manufacturing in time t . The model was tested in both linear and log-linear form. The linear equation provided the best results. These are shown below in Equation (4) where the t subscript has been dropped.

$$(4) \quad F_m = 374.83 + 5.81V_m - 4.27V_n + .283S \quad \begin{array}{l} \bar{r}^2 = .840 \\ F = 15.0 \\ DWS = 1.6 \end{array}$$

The critical F value with two degrees of freedom in the numerator and six in the denominator is 10.9 so the overall relationship is significant at the one per cent confidence level. The first figure underneath each regression coefficient is its standard error; the second is its t value. The critical value at the 5 per

cent confidence interval is 2.45 and each parameter estimate easily passes the test. Thus gross flows into manufacturing are seen to be a positive function of that sector's vacancies and the time taken to fill them and a negative function of vacancies in non-manufacturing.

These results can be used to assess the relative impact on manufacturing inflows of the pull inwards from manufacturing vacancies, the diversionary pull exerted by non-manufacturing vacancies on potential neighbourhood and cross barrier movers, and the effects of changes in recruitment effort, hiring standards and aggregate labour supply on life cycle and cross barrier mobility. Beta coefficients measuring the relative effect of each independent variable are suitable for this purpose. The beta coefficients for Equation (4) were $V_m = 1.73$, $V_n = 1.26$, $S = 1.11$. They are, of course, subject to the same margins of error as the regression coefficients. But taken at face value they imply that the positive effect of a rise in manufacturing vacancies on gross inflows can be completely cancelled by the combined effect of an equi-proportional rise in non-manufacturing vacancies and decline in the speed with which all job openings are filled. The results of the regression analysis, therefore, support the proposition that the fall in aggregate labour supply and rise in non-manufacturing competition for scarce labour explain the failure of manufacturing firms to attract the labour they require during cyclical upswings.

Outflows

The Model. The model introduced in the previous section should be applicable to manpower movements into any industry or

sector provided that two conditions hold. The first is that vacancies in the industry from which manpower leaves do not rise significantly as a result of its losses to the industry whose inflows are being explained. The second is that the S variable is positively related to S_{it} , the speed with which vacancies in the industry under analysis are filled.

Equation (3) was tested in linear form on the data for manpower flows from manufacturing into non-manufacturing. The resulting equation was

$$(5) \quad F_n = 135.7 + .181V_m + .948V_n - .056S \quad \begin{array}{l} \bar{r}^2 = .548 \\ F = 4.2 \\ DWS = 1.9 \end{array}$$

$$\begin{array}{ccc} (.727) & (.442) & (.041) \\ (.249) & (2.15) & (1.37) \end{array}$$

where F_n = manpower movements into non-manufacturing.

The relationship is much weaker than that which was found for movements into manufacturing. The F statistic is less than 5.14, the critical value at the 5 per cent confidence level. Moreover, the signs of the parameter estimates for V_m and S are not consistent with the reasoning underlying the model. This implies that the two conditions required for its application to non-manufacturing do not, in fact, hold. First, even though its standard error is high, the positive coefficient for V_m suggests the possibility of significant feedback from manufacturing outflows to vacancies. Second, the negative coefficient attached to S implies that it is not positively related to S_{mt} , the speed with which non-manufacturing employers fill their vacancies. This provides further evidence of the non-manufacturing sector's propensity to recruit more intensively from manufacturing in the late stages of a boom when its primary source of manpower, persons outside employment, is approaching exhaustion.

The failure of equation (5) to explain manufacturing outflows implies that they are governed by a different mechanism from that which controls inflows. It has been suggested above that the tendency for manpower movements into non-manufacturing to increase as an upswing progresses and to remain high after the start of the downswing can be ascribed to cyclical variations in the composition of the flows. During an upswing the voluntary movements of life cycle, neighbourhood and cross barrier industry changers will rise while at the start of a downswing involuntary transfers by life cycle and stop gap movers will increase. If this theory is correct, manpower movements into non-manufacturing can be explained by two variables: one to allow for changes in the voluntary movements of the first three types of industry changers due to variations in the relative attractiveness of employment in non-manufacturing, a pull variable; the other, a push variable, measuring the effects of redundancies on involuntary movements of life cycle and stop gap industry changers into non-manufacturing.

The best push variable should be the rate of growth of manufacturing production. If the economy were not subject to cyclical fluctuations, the rate of growth of manufacturing production would have to equal the underlying rate of productivity growth to ensure the absence of redundancies. The effect of cycles is to cause changes in manufacturing production growth rates. These cause variations in present and future expected manpower requirements and hence changes in the number of persons forced to transfer into non-manufacturing owing to redundancy and the lack of employment opportunity elsewhere in manufacturing.

Several pull variables were introduced into the model but the

one which performed best was gross labour flows into manufacturing. It has been shown that a rise in labour flows into manufacturing leads at the peak of the cycle to increased movements in the opposite direction as the non-manufacturing sector tries to recoup its losses to manufacturing. Thus it seems reasonable to regard manufacturing outflows as an inverse function of the rate of growth of that sector's production and as positively related to its inflows.

The outflow model therefore took the following form:

$$(6) \quad F_n = f(\dot{P}, F_m)$$

where $\dot{P}$ is the rate of growth of manufacturing production.

It might have been more appropriate to lag the outflow series to allow for variations in turning points between inflows and outflows. But the testing of lagged relationships was not considered feasible given only nine observations, the last two of which were affected by a major structural change, the introduction of SET. Thus no lags were introduced into the analysis.

The Results. The model was tested in two linear forms.¹ The first took no account of SET and the results were not significant. But the two post-SET observations were found well below the regression line. It has been argued elsewhere that the effect of SET was to reduce labour flows from manufacturing to non-manufacturing but not to increase movement in the opposite direction.² A dummy variable taking the value 1 for 1966-67 and 1967-68 and 0 for all other years was, therefore, added into the model and the regression

¹The production series used appears in Annex A.

²Sleeper, "Manpower Redeployment and the SET", op.cit. p.293.

was computed once again. The results were

$$\begin{array}{rclclcl}
 (7) & F_n & = & 192.9 & + & .473F_m & - & 7.96\dot{P} & - & 27.6D & \bar{r}^2 & = & .692 \\
 & & & (.157) & & (1.79) & & (11.59) & & & DWS & = & 2.15 \\
 & & & (3.01) & & (4.45) & & (2.38) & & & F & = & 6.98
 \end{array}$$

This equation is a considerable improvement on Equation (5). F exceeds the critical value, 5.14, at the 5 per cent level. The parameter estimates for F_m and P are also significant at the 5 per cent level. Although the coefficient for the dummy variable just fails to pass the t test, this result can as a whole be described as satisfactory.

Manufacturing and Distribution

Since distribution is the largest supplier of net manpower flows to manufacturing, the models developed in the previous section were tested on the gross flows between these two sectors. The data is presented in Table 6.3. The figures can be seen to behave similarly to those for total movements in and out of manufacturing.

But there are two exceptions. The first is in 1960-61 where manpower flows from distribution into manufacturing were above the previous year's level, whereas total manufacturing inflows declined slightly. The second is in 1965-66 when gross flows from manufacturing into distribution declined although total gross outflows into non-manufacturing increased. Both of these exceptions reflect the fact that differences in average pay between manufacturing and distribution are much greater than those between manufacturing and non-manufacturing as a whole. As a result in 1960-61, distribution entrepreneurs experienced greater difficulty in retaining their labour than employers in the rest of non-manufacturing while in 1965-66 they were unable to

attract a greater number of life cycle, neighbourhood, and cross barrier industry changers out of manufacturing.

TABLE 6.3
Movements of Men between Manufacturing and
Distribution (Thousands)

YEAR	Flows from Distr. into Mfg.	Flows from Mfg. into Distr.	Net flows
1959-60	89.2	61.0	28.2
1960-61	97.0	73.4	23.6
1961-62	79.0	78.6	0.4
1962-63	68.3	65.9	2.4
1963-64	97.9	73.5	24.4
1964-65	106.8	76.7	29.1
1965-66	91.8	74.8	17.0
1966-67	72.8*	63.3	9.5
1967-68	94.7	70.2	24.5

* Adjusted for reclassifications.
Source: See Appendix A.

Nevertheless, the models developed in the previous section to explain manufacturing inflows and outflows performed well when tested on the data for manpower movements between manufacturing and distribution. Gross flows from distribution into manufacturing yielded the following equation.

(3) $F_{dm} = 1064.0 = 18.9V_m - 14.9V_n + 0.817S$ $\bar{r}^2 = .838$
 (3.51)^m (3.70)ⁿ (0.15) DWS = 1.9
 (5.39) (4.03) (5.35) F = 14.8

where F_{dm} is manpower flows from distribution into manufacturing. Each of the individual regression coefficients is significant at the 1 per cent level. The beta coefficients are $V_m = 1.96$, $V_n = -1.53$, $S = 1.12$. They imply that each explanatory variable has approximately the same relative effect on gross flows between

manufacturing and distribution as it has on total manufacturing inflows.

Gross flows from manufacturing into distribution provided the following results.

$$(9) \quad F_{md} = 387.3 + \begin{matrix} .432F_{dm} \\ (0.14) \\ (3.14) \end{matrix} - \begin{matrix} 13.2\dot{P} \\ (4.54) \\ (2.89) \end{matrix} - \begin{matrix} 7.33D \\ (3.45) \\ (2.13) \end{matrix} \quad \begin{matrix} \bar{r}^2 = .587 \\ DWS = 2.8 \\ F = 4.79 \end{matrix}$$

where F_{md} is manpower movements from manufacturing into distribution.

Although Equation 9 has a low F statistic, the coefficient attached to F_{dm} and $\dot{P}$ are significant at the 5 per cent level and the dummy variable just fails to pass the t test, given only six degrees of freedom this can be described as a satisfactory result.

Conclusion

This section has introduced two equations to explain the behaviour of manufacturing inflows and outflows. Inflows are a function of manufacturing vacancies, the speed with which they are filled, and non-manufacturing vacancies. The failure of inflows to continue to rise in the late stages of a boom was shown to be due to a rise in non-manufacturing vacancies and a decline in the speed with which manufacturing vacancies were filled. This supports the previous chapter's conclusion that as the economy approaches its cyclical peak manufacturing inflows are limited by a fall in aggregate labour supply and an increase in non-manufacturing competition for scarce labour. Outflows are a function of inflows, the rate of growth of manufacturing production, and a dummy variable to allow for the effects of SET. The rise in outflows in the late stages of each boom reflects the ability of the non-manufacturing sector to recoup its losses to

manufacturing by attracting more voluntary movers from that sector, while the high level of outflows in the downswing is due to the fall in the growth of manufacturing production and the consequent rise in redundancies.

These models provide some insight into the relative importance of voluntary and involuntary mobility to movements between the two sectors. They also give an indication of the behaviour of each mobility type over the cycle. An upswing is characterized by a rise in the movements of all four types of job changers into manufacturing and an increase in the voluntary flows of life cycle, neighbourhood, and cross barrier movers in the opposite direction. A downswing involves a reduction in voluntary job changing by persons classified to these three types of mobility and an increase in involuntary transfers into non-manufacturing by life cycle and stop gap industry changers.

The analysis of gross movements in and out of the entire manufacturing sector does not, however, enable distinctions to be made between the contribution of each type of mobility to total flows in upswings and downswings. This requires application of the models introduced above to data on labour flows from non-manufacturing into each two digit industry. Such an analysis is carried out in the next section.

MANPOWER MOBILITY MODELS: MANUFACTURING DISAGGREGATED

The evidence presented in Chapters III and IV revealed considerable variations in the intensity with which two digit manufacturing industries exchanged manpower with non-manufacturing. It seems likely therefore, that manpower movements in and out of industries whose recruitment and flow propensities with

non-manufacturing are relatively low, will be comprised mostly of life cycle, cross barrier and stop gap industry changers, while flows between industries that are more closely linked to non-manufacturing will include a greater proportion of neighbourhood movers. The cyclical pattern of inflows and outflows between non-manufacturing and each manufacturing industry will now be examined to determine whether or not this is the case.

Inflows

Inflows and outflows of men between each manufacturing industry and non-manufacturing are given in Annex B at the end of this chapter and their movement over time is illustrated in Chart 6.1. The industries have been grouped according to their links with each other and non-manufacturing. The three industries closely linked to construction and distribution appear at the bottom of the Chart. Next are the industries in the textile and clothing sector. These are followed first by the self-contained industries and then by engineering and metals industries.

Aggregate inflows into manufacturing can be seen from the Chart to rise in the early stages of a cyclical upswing (1959-60 and 1963-65) and decline slightly in the late stages (1960-61 and 1965-66) before falling sharply during recessions (1961-63) and (1966-67). But the figures at two digit level do not always follow this pattern. All industries, except shipbuilding, and timber and furniture, reduced inflows during recessions and achieved increases in 1963-64, the first year of the second upswing. But in the late stages of both upswings the behaviour of the figures varies considerably.

Two of the engineering and metals industries (metals n.e.s.

and engineering), two self-contained industries (paper, printing and publishing; and chemicals) and one textile and clothing industry (clothing and footwear) all increased their recruitment from non-manufacturing in 1960-61. Yet the remainder experienced a decline in inflows during this period. In 1965-66 the behaviour is more uniform with inflows into all industries falling, except in paper, printing and publishing; and clothing and footwear. Even here, however, the rates of decline tend to vary. Recruitment by firms in engineering, textiles and leather goods was only slightly less than in the previous year, while in other industries the fall was much greater.

Inflows can also be seen to have declined in five industries in 1964-65. Two of these, vehicles and textiles, were industries whose employment levels declined between 1959 and 1966 but the remaining three - food, drink and tobacco; timber and furniture; and bricks, pottery and cement - increased employment. These three industries have been shown to be close neighbours of industries outside manufacturing and this decline in inflows during the second upswing is further evidence that they experience the most intensive competition with the non-manufacturing sector.

The behaviour of the data for 1966-67 and 1967-68 deserve special consideration. An attempt has been made to eliminate the effects of reclassifications on the 1966-67 data by subtracting the difference between employment levels in each industry before and after reclassification from the inflow figures.¹ No adjustments have been carried out on the 1967-68 data. The Chart suggests, however, that this method has been only partially successful. Inflows in 1966-67 are well below levels in other

¹See Appendix B.

years, while in 1967-68 they exceed all other values. On the other hand, in chemicals, where the 1966-67 figure was not adjusted because employment remained unchanged after reclassification, inflows actually rose above the 1965-66 level and then declined in the following year. In other industries, such as engineering; and paper, printing and publishing; the 1967-68 figure seems unduly high.

Now abnormally high inflows in 1967-68 could be due to the response of manpower movements to the combined effects of SET and devaluation, both of which may have caused a shift in the structure of labour demand in favour of manufacturing. Or they might have been created spuriously by further reclassifications of establishments into manufacturing as a result of SET. The DE claim that only a small number of reclassifications occurred after 1967. It can be seen from the Chart, however, that inflows rose sharply in 1967-68 not only in export industries such as engineering, but also in food, drink and tobacco; and timber and furniture, suggesting that reclassifications into these industries have been large enough to bias the data.

The inflow model introduced in the previous chapter stated that male manufacturing inflows were a function of vacancies in both the manufacturing and the non-manufacturing sector and a third variable measuring the speed with which vacancies are filled. Table 6.4 presents the results of testing the inflow equation on inflow data for the fourteen manufacturing industries. The equation for manufacturing as a whole is shown at the bottom to provide a basis for comparison with the two digit results. The 1967-68 observations were dropped for the reasons given above. The effect was to increase the explanatory power of the model.

INDUSTRY	Const	
	(1)	
Food,	44.2	(
Drink &		(
Tobacco		(
Timber,	18.9	(
furniture		(
etc.		(
Bricks,	33.5	(
Pottery,		(
etc.		(
Leather &	2.0	(
leather		(
goods & fur		(
Textiles	20.2	(
		(
Clothing &	.943	(
footwear		(
		(
Shipbldg.	5.6	(
& marine		(
eng.		(
Other	11.7	(
mfg.		(
Industries		(
Chemicals	31.5	(
& allied		(
industries	(1)	(
Paper,	8.48	(
printing &		(
publishing		(
Vehicles	36.4	(
		(
Metals	23.6	(
Mfg.		(
		(
Engineer-	59.4	(
ing &		(
elec. gds.		(
Metals	19.4	(
n.e.s.		(
		(
Manufact-	320.7	(
uring		(

1. 1966-67
employment

TABLE 6.4
REGRESSION RESULTS FOR THE INFLOW MODEL

NOTES

The Inflow Model is

$$F_m = \alpha + \beta V_m - \gamma V_n + \delta S$$

where F_m = flows from non-manufacturing into the two digit manufacturing industry

V_m = vacancies in the two digit manufacturing industry

V_n = vacancies in non-manufacturing

S = the speed with which vacancies are filled

Source: Inflows, see Annex B; S, see Table 6.2; non-manufacturing vacancies, see Table 5.7.

Average annual vacancy figures for each manufacturing industry are available from the author.

WITH NON-MANUFACTURING VACANCIES

(Critical t value with 5 degrees of freedom: 2.57)
(Critical F value : 5.41)

INDUSTRY	Const	V _m	V _n	S	r ²	F	DWS	Correlation V _m /V _n	Beta Coefficients V _m V _n S
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9) (10) (11)
Food, Drink & Tobacco	44.2	11.6 (2.5) (4.7)	-0.33 (0.10) (3.43)	0.023 (0.003) (7.000)	.891	20.1	2.7	.89	4.7 3.4 7.0
Timber, furniture etc.	18.9	5.45 (2.31) (2.36)	-0.16 (0.10) (1.63)	0.032 (0.009) (3.470)	.671	5.1	3.4	.81	.99 -.70 .88
Bricks, Pottery, etc.	33.5	13.3 (3.4) (3.9)	-0.45 (0.13) (3.38)	0.008 (0.005) (1.700)	.640	5.1	3.5	.88	2.0 -1.8 .43
Leather & leather goods & fur	2.0	12.0 (3.1) (3.9)	-0.04 (0.01) (2.90)	0.0020 (0.0005) (3.5000)	.772	8.9	2.7	.87	1.4 -1.1 .65
Textiles	20.2	8.41 (4.74) (1.77)	-0.25 (0.22) (1.12)	0.008 (0.006) (1.370)	.376	2.4	2.6	.94	1.6 -.99 .43
Clothing & footwear	.943	0.61 (2.23) (0.27)	0.07 (0.04) (1.73)	0.004 (0.002) (2.190)	.802	10.5	3.2	.83	1.1 .67 .48
Shipbldg. & marine eng.	5.6	-0.43 (0.83) (0.52)	0.10 (0.04) (2.26)	0.002 (0.003) (0.818)	.796	10.1	3.4	.71	-.25 .97 .28
Other mfg. Industries	11.7	6.28 (1.76) (3.58)	-0.10 (0.068) (1.39)	0.020 (0.010) (3.530)	.706	6.6	2.4	.60	1.1 -.41 .89
Chemicals & allied industries	31.5 (1)	17.50 (9.70) (1.80)	-0.692 (0.507) (1.40)	0.049 (0.020) (2.820)	.810	9.7	2.3	.98	2.8 -2.2 .97
Paper, printing & publishing	8.48	7.22 (1.96) (3.68)	-0.01 (0.05) (.070)	0.010 (0.002) (1.940)	.880	18.0	1.5	.80	1.0 -.02 .32
Vehicles	36.4	3.05 (4.47) (.682)	-0.36 (0.03) (0.58)	0.030 (0.010) (3.000)	.500	3.3	1.5	.98	.99 -.84 .86
Metals Mfg.	23.6	4.23 (1.84) (2.29)	-0.20 (0.20) (1.03)	0.040 (0.010) (4.630)	.790	9.6	1.4	.84	.82 -.37 .90
Engineer- ing & elec. gds.	59.4	2.62 (0.77) (3.41)	-0.30 (0.33) (.893)	0.070 (0.010) (5.100)	.930	30.0	3.4	.85	1.1 -.29 .88
Metals n.e.s.	19.4	3.50 (1.16) (3.03)	-0.14 (0.12) (1.21)	0.030 (0.010) (2.950)	.691	6.2	2.3	.77	1.1 -.45 .71
Manufact- uring	320.7	4.75 (0.85) (5.61)	-2.86 (0.94) (3.04)	0.28 (0.03) (8.27)	.943	39.9	2.8	.88	1.4 -0.8 0.9

1. 1966-67 observation excluded. The actual change in employment was used to measure S.

WITHOUT NON-MANUFACTURING VACANCIES

(Critical t value with 6 degrees of freedom: 2.45)
(Critical F value: 5.14)

Const.	V _m	S	r ²	F	DWS	Beta co- efficients V _m S
(12)	(13)	(14)	(15)	(16)	(17)	(18) (19)
36.0	3.72 (1.71) (2.2)	0.017 (0.005) (3.440)	.656	7.7	.999	.48 .76
14.2	2.3 (1.5) (1.5)	0.03 (0.01) (2.59)	.534	4.4	2.5	.42 .72
30.7	11.0 (3.66) (3.00)	-0.35 ⁽¹⁾ (0.14) (2.49)	.502	4.5	2.6	1.7 -1.4
1.0	4.4 (2.37) (1.85)	0.001 (0.0007) (1.9000)	.441	3.8	1.3	.52 .54
11.6	3.43 (1.66) (2.07)	0.01 (0.01) (1.10)	.345	2.8	1.7	.64 .32
2.9	4.06 (1.16) (3.50)	0.006 (0.002) (3.510)	.724	10.2	1.9	.71 .71
9.5	1.27 (0.449) (2.84)	0.007 (0.002) (3.48)	.630	7.0	2.2	.74 .91
7.6	4.54 (1.34) (3.38)	0.012 (0.004) (3.000)	.651	7.5	2.1	.81 .72
10.4	4.3 (1.19) (3.6)	0.285 (0.010) (2.9)	.774	11.3	2.5	.71 .57
8.4	7.10 (.869) (8.17)	0.005 (0.002) (2.6)	.903	33.6	1.4	.99 .32
28.6	0.51 (0.77) (0.66)	0.026 (0.008) (3.2)	.565	5.5	1.3	.16 .80
15.0	2.6 (0.908) (2.83)	0.030 (0.007) (4.6)	.783	13.6	1.7	.44 .67
50.2	2.0 (.245) (8.06)	0.06 (0.01) (7.25)	.928	46.4	2.7	.85 .76
13.6	2.4 (0.69) (3.39)	0.013 (0.005) (2.58)	.662	7.9	1.6	.76 .57
230.3	2.35 (0.50) (4.72)	0.21 (0.04) (5.12)	.850	20.9	1.3	.70 .76

1. Coefficient for V_{nm}, not S.

It can be seen from the table that food, drink and tobacco performed best of all. The model explained 89 per cent of the variation in inflows and each parameter estimate was highly significant. The results for the other two closely linked manufacturing industries were less satisfactory. In bricks, pottery and cement the coefficients for manufacturing and non-manufacturing vacancies were statistically significant. But the t value for S , was only 1.7 and the F statistic was 5.1, slightly below the critical value at the 5 per cent level. The relationship was also weak in timber and furniture, where vacancies in the manufacturing industry failed to pass the t test. One other industry did perform well. This was leather and leather goods where the model explained 77 per cent of the variation in inflows and all the parameter estimates easily passed the t test at the 5 per cent confidence level.

In none of the other industries were all the parameter estimates statistically significant. But F statistics can be seen to exceed the critical value at the 5 per cent level, 5.4, in eight of the remaining ten industries. Thus in most cases the data indicate the existence of a significant relationship. The difficulty is the high correlation between vacancies in each manufacturing industry (V_m) and vacancies in non-manufacturing (V_{nm}). The simple correlation between them can be seen to be above .8 in most industries. This makes discernment of the separate effects of each variable difficult. In fact, given the small number of degrees of freedom it is remarkable that there was sufficient variation in the data to identify the separate effects of each variable. It can be seen that the signs on both vacancy variables were correct in all but three industries: clothing and footwear;

shipbuilding; and vehicles; all of which were in secular decline during the period under analysis.

The second half of table 6.4 shows what happened when non-manufacturing vacancies were dropped and the regressions rerun. Eight of the eleven industries whose results were previously not significant yielded parameter estimates that passed the t test. The model had particularly high explanatory power in expanding industries such as engineering; chemicals; metals; and paper, printing and publishing. It also performed well in metals n.e.s. and other manufacturing, and, even in two declining industries; shipbuilding, and clothing and footwear, the results were statistically significant. In bricks, pottery, and cement non-manufacturing vacancies were retained and changes in total employment were dropped. The resulting parameter estimates can be seen to pass the t test, but the decline in $\bar{r}^2$ and F shows that there was no improvement in the overall relationship.

The three industries where the inflow model failed completely were textiles, vehicles, and timber and furniture. Each of these was in secular decline during the period and is thus unlikely to have experienced a manpower constraint. This explains the failure of the model to account for variations in the data. But the behaviour of the figures in vehicles and timber and furniture requires further comment.

The vehicles industry is a curious hybrid. The motor vehicles section is one of the first industries to be affected by government deflationary policy. It is also one of the first to recover from a recession. Redundancies occurred in the summer of 1960 while the demand for labour continued to rise and recovery occurred in 1962-63 while the rest of the economy was still in a

recession. The rest of the industry, motor cycles, aircraft and railway production began a long term decline in the early 1960s. The combination of these factors caused inflows from non-manufacturing into vehicles to move counter-cyclically in the early 1960s. Unfortunately vehicle vacancies do not move in the same direction because the vacancy levels are determined by the time taken to fill job openings as well as the number arising. The effect was a low inverse correlation between inflows and vacancies. This point will be investigated further in the next chapter. The evidence presented so far, however, provides little indication of the operation of a manpower constraint in this industry.

A similar phenomenon could also be operating in timber and furniture. The furniture industry is very sensitive to changes in economic policy and employment levels fluctuate up and down within the broader swings experienced by the economy as a whole. Timber and furniture is rather different from vehicles, however, in that it is closely linked occupationally with construction whose average earnings exceed its own. Thus the roles of the manufacturing and the non-manufacturing industries could well be reversed in this instance with timber and furniture providing an alternative source of employment for persons who take jobs in construction during cyclical upswings.

The inflow equation does not provide an explicit measure of the importance of the four types of mobility to manufacturing inflows. But variations between industries in the relative impact of each explanatory variable give an indication of the contribution of each type of job changing to the total inward movement. Life cycle mobility, the movement of younger persons into manufacturing, occurs because on the whole manufacturing rates

of pay exceed those in non-manufacturing. When manufacturing vacancies rise the volume of this flow is likely to increase. Non-manufacturing entrepreneurs will be content to allow the process to continue because they can replace manpower losses to manufacturing with young persons just entering the labour market. If, however, the influx of new labour force entrants is for some reason reduced, they will try to slow it down by offering inducements to persuade their younger employees to stay. Thus the volume of life cycle flows is likely to be determined by the level of manufacturing vacancies and changes in the time taken to fill them.

Stop gap mobility, the movement of persons holding temporary jobs in non-manufacturing back into manufacturing is a purely cyclical phenomenon. It will be affected very little by changes in non-manufacturing vacancies and the speed with which manufacturing vacancies are filled. Since its occurrence is due to the role of certain non-manufacturing industries as a residual source of employment during recessions, the return of prosperity will be accompanied by an immediate increase in the movement of stop gap industry changers from non-manufacturing into manufacturing.

Neighbourhood and cross barrier movements will be affected by all three variables. A rise in manufacturing vacancies and an increase in the speed with which they are filled will increase inflows while a rise in non-manufacturing vacancies will deflect potential neighbourhood and cross barrier movers away from manufacturing. Neighbourhood movers will, however, be highly sensitive to changes in the level of non-manufacturing vacancies, since flows between closely linked industries will be affected

considerably by changes in the ratio of vacancies between them. Cross barrier flows into the higher paying manufacturing industries are, however, less likely to be diverted by a rise in non-manufacturing vacancies although this possibility cannot be ruled out on the basis of a priori reasoning alone.

The manufacturing industries that were found to be closely linked to non-manufacturing were food, drink and tobacco; bricks, pottery and cement; and timber and furniture. In addition, one Textile and Clothing industry - leather and leather goods - experienced intensive exchanges of manpower with distribution. In all of these industries, except timber and furniture, non-manufacturing vacancies added significantly to the explanatory power of the regression equation. This provides an indication of the contribution of neighbourhood movements to inflows into these industries from non-manufacturing.

Non-manufacturing vacancies were not statistically significant in any of the remaining industries. Thus the negative effect of rising competition from non-manufacturing seems to be restricted to movements into the industries closely linked to non-manufacturing. There is no evidence to suggest that cross barrier job changers are diverted from the high wage manufacturing industries by a rise in non-manufacturing vacancies.

The major reason for the failure of inflows to rise to higher levels in the remaining manufacturing industries is, therefore, the decline in potential life cycle and stop gap movers in non-manufacturing and the limited scope for increasing cross barrier flows. This reflects the difficulties employers face in adjusting skill requirements to available labour supply.

Outflows

Since manufacturing enjoys a favourable wage differential with the rest of industry its inflows will be mostly voluntary, that is, persons will enter the manufacturing sector not because they cannot find jobs in non-manufacturing but because they prefer the package of net advantages manufacturing has to offer. Outflows from manufacturing will, however, be comprised of both voluntary and involuntary movers. Persons moving voluntarily between manufacturing and non-manufacturing include life cycle, neighbourhood, and cross barrier movers while those moving involuntarily can be classified to either life cycle or stop gap mobility.

The contribution of each type of mobility to total outflows can be expected to vary considerably between two digit manufacturing industries. Involuntary movements can be expected to comprise a higher proportion of total outflows from the high wage than the low wage manufacturing industries. Stop gap mobility is by definition involuntary and thus will occur most frequently where there is a substantial wage differential between the two digit manufacturing industry and non-manufacturing. Moreover, outflows of life cycle movers from high wage manufacturing industries to non-manufacturing will also be comprised mostly of involuntary job changers. Since during an upswing such persons are more likely to find lighter work at higher wages either within the plant of present employment or elsewhere in manufacturing, the number of persons moving voluntarily into non-manufacturing will not be very great. However the existence of cross barrier mobility - the movements of persons dissatisfied with work in manufacturing back into non-manufacturing in response to a rise in non-manufacturing recruitment effort - and

the possibility of a large residual movement implies that voluntary outflows will also be large especially in the late stages of a cyclical upswing. In the manufacturing industries where average wages are relatively low the voluntary movements of neighbourhood and cross barrier industry changers are likely to make the predominant contribution to the outflow figures.

Examination of the outflow data whose movements are plotted on Chart 6.1 provides evidence of varying behaviour at 2 digit level. The most striking deviations occur in 1961-62 when outflows rose in only six industries. These included all the industries in Engineering and Metals industries; paper, printing and publishing; and chemicals. Two other industries - other manufacturing, and clothing and footwear - experienced no change in the numbers lost to non-manufacturing and in the remaining cases outflows fell. These differences in 1961-62 reflect variations between industries in the contribution of each mobility type to outflows. Five of the six industries whose outflows rose the most in this year were the five top wage payers. The sixth, metals n.e.s., was eighth in the league table. It can be seen, however, that in 1966-67 outflows did not rise in any industry. This was clearly due to the progressive breakdown of RPM and the introduction of SET. These structural changes were sufficiently strong to reduce involuntary movements from the high wage industries to a level where their contribution to total outflows was indiscernible.

Outflows can also be seen to rise in both high and low wage industries during cyclical upswings. Between 1959-60 and 1960-61 movements out of each manufacturing industry increased. During the second upswing the behaviour of the data for the

different industries was more mixed. But high wage industries were just as likely to experience rising outflows as low wage sectors. Given the tight labour market which prevailed at the time this may seem surprising. However, it probably reflects increased cross barrier movements of people who enter high wage industries and become dissatisfied with their work. Frequently such people encounter informal rules within the factory which restrict the higher paying jobs to the longer service employees.¹ Most of them leave within a year but those who remain longer before returning to non-manufacturing will be included in the outflow figures.

The outflow equation was tested on the two digit data but in most industries the resulting parameter estimates were not statistically significant, and it was not considered worthwhile to include them here. Nevertheless, the above analysis has given an indication of the importance of each mobility type to total outflows from manufacturing. The contribution of life cycle and stop gap movements from high wage industries can be observed in 1961-62. It has also been shown that voluntary outflows from both high and low wage manufacturing industries rise during cyclical upswings. This indicates that life cycle, neighbourhood, and cross barrier job changing increase together during cyclical upswings although the contribution of each type varies between industries.

CONCLUSION

As a boom progresses the economy encounters a full employment ceiling in the form of gradually increases shortages of labour. This tightening of the labour supply affects all sectors of the

¹ See above, Chapter I, p.10.

economy but some are affected more than others. Despite its favourable wage differential the behaviour of manufacturing vacancies suggests that firms in this sector suffer most severely. The difficulties they encounter are due to three factors. First, product demand fluctuates more violently in manufacturing than in non-manufacturing, and, in the short run, the relationship between labour demand and product demand is more rigid, since the scope for reducing the services accompanying product delivery is limited. Second, the level and range of complementarity of skill requirements in manufacturing is higher than in non-manufacturing, and as the economy approaches full employment the supply of suitably qualified persons both outside employment and working in non-manufacturing falls faster than total labour supply. Employers may respond to this tightening of the labour market by increasing recruitment effort and lowering hiring standards. This leads to a rise in cross barrier movements. But the opportunities for such adjustments are limited, and, when they are exhausted, the effects of the full employment ceiling are felt. Third, the decline in unemployed and economically inactive manpower, the major source of recruitment for firms outside manufacturing, results in rising competition between manufacturing and non-manufacturing for scarce labour. This reduces the volume of neighbourhood and cross barrier manufacturing inflows and increases voluntary outflows by life cycle, neighbourhood, and cross barrier industry changers. Consequently, the manufacturing net intake from non-manufacturing declines.

An attempt was made to establish the relative importance of the second and third factors in limiting net movements of manpower into manufacturing. Regression models explaining the cyclical

fluctuations of inflows and outflows in which the independent variables could be taken as rough indicators of the relative importance of each mobility type were constructed and tested first on manpower flows between the entire manufacturing sector and non-manufacturing, and second on the figures measuring movements between each two digit manufacturing industry and non-manufacturing. The resulting equations for the aggregate data confirmed the importance of both factors in limiting rises in manufacturing gross inflows and increasing voluntary outflows during the late stages of a boom. Application of these models to the disaggregated data provided some insight into the relative importance of each factor. The only manufacturing industries where inflows were restricted by rising competition from non-manufacturing were those closely linked to non-manufacturing. In the remaining industries the decline in aggregate labour supply and the limited scope for adjusting skill requirements downwards explains the failure of inflows to continue to rise in the late stages of a boom. Application of the outflow model at two digit level did not yield significant results. Nevertheless the behaviour of the figures shows that outflows from both high and low wage manufacturing industries rose in the late stages of each boom. This suggests a rise in voluntary transfers by life cycle, neighbourhood, and cross barrier industry changers from low wage industries and by cross barrier movers alone from high wage industries.

The reasons manufacturing firms failed to sustain net inflows of manpower from non-manufacturing during cyclical upswings can thus be seen to vary between two digit industries. Those which are closely linked to non-manufacturing suffered both from a decline in aggregate labour supply and a rise in non-manufacturing

vacancies, while the remainder experienced difficulties because the fall in labour supply led to a shortage of the skills they require and the scope for adjusting skill requirements downwards is limited. The next chapter will consider the effects of the full employment ceiling on this second group of industries.

ANNEX 6.A

The Rate of Growth of Manufacturing Production

(per cent)

1959-60	10.2
1960-61	3.2
1961-62	-0.5
1962-63	0.2
1963-64	9.6
1964-65	4.9
1965-66	2.5
1966-67	-1.0
1967-68	2.3

Source: Same as Table 5.1

ANNEX 6.B.

Inflows and Outflows Between Each Manufacturing Industry and Non-Manufacturing
(Thousands)

INDUSTRY		59-60	60-61	61-62	62-63	63-64	64-65	65-66	66-67	67-68
Food, drink & Tobacco	In	45.1	45.3	40.2	40.5	46.8	47.1	44.7	36.8*	45.8
	Out	39.8	42.4	38.7	38.2	43.8	41.1	42.2	41.3	43.6
Timber, furniture etc.	In	24.9	19.7	20.2	15.9	23.6	22.5	19.3	5.8*	28.6
	Out	21.5	24.4	23.0	24.4	24.4	23.0	24.7	21.5	18.2
Bricks, pottery, glass, cement, etc.	In	20.5	20.6	21.0	19.8	28.1	27.3	23.2	22.4*	27.0
	Out	18.0	23.3	19.3	18.1	18.3	23.7	24.9	21.0	25.2
Leather, leather goods & fur	In	2.1	1.9	1.6	1.8	2.2	2.5	2.2	1.1*	2.1
	Out	2.9	3.1	2.1	2.2	2.9	1.6	2.8	1.6	1.8
Shipbuilding & marine engineering	In	13.0	12.9	12.4	9.2	11.3	12.8	12.0	11.0	6.0
	Out	15.0	18.1	16.6	16.8	13.7	12.6	15.2	4.1*	7.9
Chemicals & allied industries	In	22.8	27.1	17.9	14.6	20.5	25.2	21.3	23.5*	20.0
	Out	15.9	20.8	23.6	18.8	17.2	19.0	21.2	17.5	20.8
Clothing & footwear	In	7.3	8.5	6.6	4.0	6.8	6.5	7.5	5.4*	6.5
	Out	5.8	7.8	8.1	7.7	7.6	9.5	6.8	7.3	7.7
Other manufacturing industries	In	14.5	13.6	11.1	12.1	15.1	19.2	15.5	10.1*	15.7
	Out	7.8	12.4	12.9	10.6	11.7	14.9	13.4	12.2	13.2
Paper, printing & publishing	In	15.2	18.0	15.8	13.4	16.0	19.5	20.3	14.6*	19.9
	Out	9.5	13.2	17.4	11.6	14.9	15.0	15.3	14.7	17.9
Vehicles	In	42.1	34.7	26.7	28.6	37.3	35.6	32.0	27.2	27.2
	Out	30.1	31.0	36.7	31.4	31.3	32.8	26.8	24.5*	25.6
Metals manufacture	In	34.9	26.7	17.3	16.6	26.8	30.1	24.5	16.8*	19.6
	Out	14.6	20.7	26.2	18.8	19.3	21.5	25.9	20.5	20.9
Textiles	In	18.4	18.3	13.8	12.3	21.4	20.0	19.6	16.5*	19.5
	Out	16.0	20.8	19.7	15.0	14.9	16.3	18.0	15.5	16.7
Engineering & electrical goods	In	89.3	95.5	78.8	59.6	89.6	95.9	93.1	72.9*	92.2
	Out	59.1	71.0	83.9	76.1	74.8	85.5	83.6	79.0	77.1
Metals n.e.s.	In	20.8	23.8	18.6	15.7	26.1	27.0	22.9	18.5*	20.6
	Out	16.9	20.8	23.3	20.7	16.7	22.0	23.5	20.9	19.4

*Adjusted for reclassifications

Source: See Appendix A.

CHAPTER VII

The Manpower Constraint and InvestmentMANPOWER SHORTAGES IN THE ENGINEERING AND METALS SECTOR

The industries experiencing the most violent fluctuations in manpower demand are found in the investment sector. It is well known that the demand for investment goods fluctuates more than any other component of final demand. Moreover, most of the manufacturing firms producing or supplying materials for investment goods are found in the Engineering and Metals Sector - metals, engineering, vehicles and metals n.e.s. - and most of the sector's skill requirements are specific to these four industries. In addition, the proportion of persons classified to skilled manual occupations in this sector is higher, with one exception, than anywhere else in manufacturing.¹ The full employment ceiling is, therefore, likely to have its most severe effects in this sector.

It has been shown that despite its favourable wage differential most manufacturing industries were not able to satisfy fully their manpower requirements by recruitment from non-manufacturing. Tables 7.1 and 7.2 show that this is particularly true for the Engineering and Metals industries even though they pay the highest wages of all. Table 7.1 compares cyclical fluctuations in male net flows, net entrants and employment changes for engineering and metals with similar data for the entire manufacturing sector. It can be seen that the movements

¹ This is timber and furniture. See Ministry of Labour, Occupational Changes 1951-61, p.26.

of this sector's figures over the cycle follow closely the behaviour of the aggregate data. Net flows for both Engineering and Metals and manufacturing in total peak at the start of each upswing, decline as the boom progresses, and become negative in the downswing. Net entrants and employment changes behave similarly in both sectors over the nine year period.

TABLE 7.1

Male Net Flows, Net Entrants and Employment Changes for Engineering and Metals Sector contrasted with similar Data for Manufacturing. (Thousands)

YEAR	ENGINEERING AND METALS SECTOR					MANUFACTURING		
	Net Flow			Net Ent- rants	Emp. Change	Net Flow	Net Ent- rants	Emp. Change
	From Non- Mfg	From Rest of Mfg	Totals (1+2)					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
59-60	66.4	19.7	86.1	91.0	177.1	98.0	128.5	226.5
60-61	37.2	14.5	51.7	31.2	82.9	36.8	66.2	103.0
61-62	-28.7	0.7	-28.0	8.5	-19.5	-49.5	20.6	-28.9
62-63	-26.5	3.8	-22.7	-17.0	-39.7	-46.3	-31.5	-77.9
63-64	37.7	5.0	42.7	26.7	69.4	60.1	25.4	85.5
64-65	26.8	15.7	42.5	33.6	76.1	52.7	51.1	103.8
65-66	12.7	0.5	13.2	-2.2	11.0	13.8	-10.3	3.5
66-67	-9.5	3.0	6.5	-20.9	-14.4	-19.3	-123.4	-142.7
67-68	18.6	-2.9	15.7	-74.3	-58.6	36.3	-100.3	-64.0

Source: See Appendices A and B

The Table also shows that net flows from non-manufacturing into Engineering and Metals (col.1) rise as a proportion of total net flows into manufacturing (col.6) in the late stages of each boom. In 1960-61 and 1965-66 the entire net movement into manufacturing was comprised of net flows into these industries. This provides an indication of the extent to which this sector requires labour at the peak of the cycle. Moreover the figures in column 2

show that Engineering and Metals industries added to their total net recruitment from the rest of the economy by achieving net inflows from the remaining manufacturing industries. In other words, these industries relied more heavily on net flows than did the total manufacturing sector. The contribution of the manufacturing industries outside the group to net flows into the group was considerably less than that of the non-manufacturing industries.

Table 7.2 shows that net flows from other industries into the Engineering and Metals Sector were insufficient to satisfy the sector's expanding manpower requirements. It compares average vacancy levels in the Engineering and Metals Sector with those for manufacturing as a whole. The two series can be seen to rise and fall by approximately the same percentage amounts over the cycle. But there are two reasons for believing that the amplitude of variation in the sector's vacancy

TABLE 7.2

Male Vacancies in Engineering and Metals and in Manufacturing
Aggregated
 (Thousands.)

YEAR	Eng. & Metals	% of total male vacancies	Mfg.	% of total male vacancies
1959-60	24.1	22.6	36.0	33.8
1960-61	32.5	25.4	47.3	36.9
1961-62	24.9	24.1	36.1	34.8
1962-63	13.3	20.5	20.1	30.9
1963-64	23.0	25.0	34.3	37.3
1964-65	39.2	29.6	57.2	43.2
1965-66	46.5	31.5	64.3	43.5
1966-67	30.7	29.0	44.6	40.5
1967-68	25.0	28.1	38.0	42.7

Source: See Table 5.1

series understates the actual size of cyclical fluctuations in these industries to a greater extent than the changes in statistical vacancies for the entire manufacturing sector.

First, the level of skill requirements is high in these industries and employers inform employment exchanges of a lower proportion of their skilled job openings. Second, firms in these industries tend to be located in the more prosperous regions, and this further reduces their propensity to notify vacancies. Thus recorded vacancy levels are likely to have understated quite considerably the sector's true manpower requirements.¹

The inability of plants in these industries to satisfy manpower requirements by increasing net recruitment from sources outside the sector must have led to an intensification of competition between them at the peak of each cycle. Table 7.3 analyzes this process by examining the cyclical behaviour of four components of each industry's annual male employment changes: net flows from the remaining industries inside the sector; net flows from the manufacturing industries outside the sector; net flows from non-manufacturing; and net entrants. The most interesting feature of this Table is the behaviour of the engineering net intake figures. At the start of each upswing (1959-60) and (1963-64) engineering can be seen to have relied most heavily on net flows from non-manufacturing and also on net entrants from outside employment. But as the labour market tightened net recruitment from both sources declined. At the same time the engineering net intake from the rest of manufacturing increased with net inflows from the remaining industries in the group making the greatest contribution. During the first upswing the rise in engineering net

¹ See above, Chapter VI, pp.202-03.

TABLE 7.3

Sources of Male Net Flows into the Engineering and Metals Sector

YEAR	METALS					ENGINEERING					VEHICLES					METALS N.E.S.				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
59-60	-0.2	7.7	20.3	10.7	38.5	3.1	7.6	30.2	30.5	71.4	0.4	3.2	12.0	29.2	44.4	-3.3	-1.6	3.9	20.6	22.8
60-61	4.0	0.7	6.0	4.0	14.7	8.7	13.5	24.5	27.1	73.8	-13.3	-13.5	3.7	-8.7	-18.5	0.6	0.5	3.0	8.8	12.9
61-62	-5.8	-5.1	-8.9	-14.4	-34.2	9.7	5.4	-5.1	17.3	27.3	-2.2	-2.4	-10.0	1.1	-11.3	-1.7	0.6	-4.7	4.5	-1.3
62-63	1.3	-0.4	2.2	-2.3	-3.6	1.4	0.6	16.5	-13.3	-27.8	-0.6	1.3	-2.8	-7.2	-8.7	-2.1	1.7	-5.0	5.8	0.4
63-64	0.8	4.5	7.5	14.7	27.5	2.3	-2.9	14.8	14.0	28.2	-6.2	-3.9	6.0	1.1	3.2	3.1	1.1	9.4	-3.1	10.5
64-65	-5.0	1.3	8.6	3.2	9.1	7.6	8.7	10.4	33.2	59.9	-1.9	-1.0	2.8	-9.1	-7.3	-0.7	3.8	5.0	6.3	14.4
65-66	-7.7	-2.7	-1.4	-0.6	-12.4	10.7	4.2	9.5	3.9	28.3	-3.9	-3.7	5.2	-9.9	-8.4	0.9	-1.2	-0.6	4.4	3.5
66-67	1.7	-2.2	-3.7	-22.9	-27.1	5.7	4.2	-6.1	-7.9	-4.1	-4.2	-3.0	2.7	-26.6	-26.9	2.0	-5.4	-2.4	-9.3	-15.1
67-68	-2.8	-0.2	-1.3	-7.2	11.5	2.3	-0.3	17.1	-56.8	-37.7	0.1	-0.4	1.6	-12.0	-10.8	0.4	-1.9	1.2	1.7	1.4

Columns: (1) Net Flows from Sector.
 (2) Net flows from mfg. excluding sector
 (3) Net flows from non-mfg.
 (4) Net entrants
 (5) Employment Change

Source: Appendices A and B.

flows from the sector as a whole was not always at the expense of the same industry. In 1960-61 the increase was balanced by net outflows of over 13,000 from vehicles, reflecting redundancies in the motor vehicles industry in the summer of 1960.¹ Consequently, net flows into metals and metals n.e.s. were also positive in this year. In 1961-62, a recession year, the rise in engineering net inflows was accompanied by net outflows from the three remaining industries. The increase in the engineering net intake in 1964-65 was balanced by net outflows from metals and metals n.e.s. Net outflows from vehicles fell from the previous year's level, which was swollen by redundancies in aircraft manufacturing.² Finally in 1965-66 a further rise in engineering net inflows occurred at the expense of rising net outflows from metals and vehicles. On this occasion net flows from the rest of the sector into metals n.e.s. were positive.

Given its position in the inter-industry wage structure it is surprising that the engineering industry should benefit most from intensified competition with its neighbours for scarce labour. It has been shown that engineering's rank in the earnings league table dropped from fourth to eight between 1959 and 1966. Although metals n.e.s. experienced a drop of similar magnitude (from fifth to ninth) vehicles and metals remained in the top three positions for the entire period.³ Yet, when the labour market tightened, these last two industries did not experience a rise in net inflows from the rest of the sector.

¹ Employment in the motor vehicles industry fell by 32,500 from Aug. 1960 to Feb. 1961 according to DE employment figures. See Appendix B.

² See "Calendar of Economic Events" National Institute Economic Review, no. 23 (Feb. 1963), p. 62.

³ See above Chapter II, p. 62.

Instead, with the exception of metals 1960-61, Table 7.3 shows that they both experienced increasing net outflows as the economy approached its cyclical peak.

This shortage of male labour could have affected each industry's net recruitment of women. The scope for the substitution of female for skilled male labour is, of course, limited, but there will be numerous opportunities for women to replace men on semi-skilled and unskilled jobs. It has already been shown that the female labour supply is more responsive to variations in employer recruitment effort. Engineering and Metals industries could, therefore, be expected to substitute women for men at the peak of each cycle.

Table 7.4 does not, however, provide much evidence to support this view. It compares each industry's annual percentage changes in male and female employment for the nine year period. In 1960-61 the rate of increase in the entire sector's employment of women was less than one quarter of the 1959-60 level; whereas the percentage increase in male employment was one half the previous year's rate. In the late stages of the second boom the number of women employed again failed to rise faster than the number of men; except in engineering in 1965-66.

TABLE 7.4

Rates of Change in Male and Female Employment for Industries in
The Engineering and Metals Sector

YEAR	Metals		Eng.		Vehicles		Metals nes		Total	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
59-60	7.6	6.5	5.1	10.0	6.0	6.2	7.0	9.1	5.9	8.9
60-61	2.7	1.6	5.0	3.2	-2.3	-2.0	3.7	0.3	2.6	1.8
61-62	-6.1	-3.8	1.8	1.4	-1.5	-3.1	-0.3	-3.8	-0.6	-0.7
62-63	-0.7	-0.7	-1.8	-0.5	-1.1	-1.0	0.1	2.0	-1.2	-0.9
63-64	5.3	4.0	1.8	6.0	0.4	2.0	2.9	6.5	2.2	5.4
64-65	1.7	0.1	3.8	2.2	1.0	-2.0	3.9	2.7	2.4	1.7
65-66	-2.2	-0.8	1.7	3.2	-1.1	-0.8	0.9	0.8	0.3	2.0
66-67	-5.0	-5.3	-0.2	-3.8	-0.8	-2.5	-3.9	-7.4	-2.2	-4.4
67-68	-2.2	-0.2	-2.2	-0.1	-1.5	-1.7	-0.4	-0.9	1.8	-0.5

Source: See Appendix B

A second point emerging from Table 7.4 is that percentage rises in both male and female engineering employment are much larger than comparable increases for the other three industries in the late stages of each boom. In 1961-62 they remain positive, even though this was a recession year. This suggests significant variations between industries in the relative demand for both male and female labour at different stages of the cycle.

The well known lag of investment behind consumer durables could explain the ability of engineering to achieve net flows from metals and vehicles at the peak of each cycle despite its lower average wages. It has been assumed up to now that all industries experience simultaneous peaks and troughs in their demand for labour. But post war cycles have been led by the swings in domestic demand for consumer durables and lagged by expenditure fluctuations on private sector capital goods. The effects of these variations have been noted in the behaviour of inflows and outflows in the vehicles industry.¹ But their full implications for labour movements within the Engineering and Metals Sector have yet to be considered.

It is clear that relative changes in product demand facing each two digit industry in the Engineering and Metals Sector will affect manpower movements between them. But what is more difficult to establish is the impact of changes in the composition of final demand on production requirement in industries producing directly or indirectly for more than one final demand category. Moreover, there is also the possibility that the length of the lag itself is affected by the speed with which resources are

¹ See above, Chapter VI, p. 229, Chapter VII, p. 246.

transferred from consumer durables into investment. Although each post-war upswing has been brief the tightness of labour markets up to mid 1966 could have caused the delayed recovery of investment to be extended and restricted in the late stages of an upswing by labour hoarding in consumer durables. The remainder of this chapter investigates both these problems. The next section considers the likely effects of the consumer durables-investment lag on manpower movements within the Engineering and Metals sector and the last section considers the extent to which booms led by growth in consumer durables have reduced the supply of labour to the investment producing industries.

LEADS AND LAGS IN THE DEMAND FOR LABOUR

The Consumer Durables Investment Lag

Evidence of the lagged recovery in fixed investment expenditure behind consumer durables is provided by the data in Table 7.5. It contrasts expenditure growth rates in G.D.P., consumer durables, and private sector investment between 1959-66. Since production of cars and motor cycles, radio and electrical goods, and plant and machinery is concentrated in the Engineering and Metals Sector, growth rates in expenditure on these particular goods are also presented. The table shows that the largest swings occurred in consumer durables and within this sector the sharpest fluctuations are in cars and motor cycles. The swings in private sector investment and plant and machinery are also large in comparison to those of the G.D.P.

The location of turning points varies considerably. Although G.D.P. growth rates were highest in 1959-60 and 1963-64 and

lowest in 1961-62, they were above trend in 1960-61 and 1964-65 and below trend in 1962-63 indicating that peaks and troughs in aggregate economic activity occurred in the latter years.

TABLE 7.5

Annual Percentage Growth Rates in G.D.P. and in Expenditure on Consumer Durables and Fixed Investment Goods

(Revalued at 1963 prices)

YEAR	G.D.P.	Consumer Durables	Radio & electrical g'ds	Cars & motor cycles	FIXED INVESTMENT	
					Total private sector	Plant & machinery
1959-60	5.3	16.9	11.4	33.4	11.7	6.2
1960-61	3.7	-6.9	-7.4	-6.7	12.9	12.0
1961-62	2.1	1.0	2.4	-2.4	5.1	6.7
1962-63	4.2	15.7	9.6	38.0	-5.4	-2.3
1963-64	5.8	16.9	8.1	29.2	9.8	11.4
1964-65	3.4	3.6	0.6	4.5	11.8	9.5
1965-66	2.4	0.0	-0.4	-1.2	-0.6	6.9
1966-67	1.9	-9.1	-1.6	-15.1	0.4	6.5
1967-68	1.5	19.0	11.5	34.4	-0.2	-0.2

Source: Figures calculated from quarterly data extracted from Central Statistical Office, Economic Trends, no.192 (Oct. 1969), Table A, p.XV, and Table K, p.XXXIX.

But growth rates in consumer durables expenditure (which can be seen to exhibit no downward trend) were negative in 1960-61, below trend in 1964-65, and well above trend in 1962-63. Thus turning points in consumer durables expenditure led those for the economy as a whole by one year. Fixed investment, on the other hand grew faster in 1960-61 than in 1959-60; expenditure growth on plant and machinery actually doubled in the second year. In fact, the growth rate did not drop below trend until 1962-63. Hence a one year lag emerges between the peak in G.D.P. and investment expenditure. In the second upswing, total private sector investment can be seen to have turned down after 1964-65.

Expenditure on plant and machinery did not drop below trend until 1967-68.

Impact of

The Consumer Durable Investment Lag

The Composition of Final Demand. Variations in the timing of cycles in expenditure on consumer durables and investment goods must affect the allocation of manpower within the Engineering and Metals Sector. But it is difficult to establish the magnitude of these required changes and the level of aggregation at which they occur. If industries were defined by the final demand sectors for which their products are directly or indirectly destined, the redeployment effects of the consumer durables investment lag could be fully observed in the behaviour of the inter-industry mobility figures. Unfortunately, however, definitions of each of the two digit industries that are members of the Engineering and Metals Sector cut across the categories of final demand. Knowledge of the proportion of each industry's output devoted to each final demand sector is, therefore, required to assess the impact of the consumer durable investment lag on inter-industry manpower movements within the sector. This information is provided in the 1963 Input-Output Tables, and Table 7.6 is taken from this source. It shows the percentage of each Engineering and Metals industry's total production supplied as intermediate products to other industries and the proportion sold to each final demand sector. It can be seen from the table that metals and metals n.e.s. are mostly providers of intermediate goods. Over 80 per cent of metals production and 70 per cent of the output of metals n.e.s. satisfies intermediate demand. In contrast, three quarters of engineering output and nearly 90 per cent of vehicles production is directed

TABLE 7.6

Sources of Demand for Output of Industries in the Engineering and Metals Sector

Per cent of Total Industry output devoted to each sector																
INDUSTRY	SUM COLS 1 to 4				INTER-MEDIATE DEMAND		FINAL DEMAND						SUM COLS 6 to 11			
	Metals	Engin-eering	Vehi-cles	Metals n.e.s.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		(9)	(10)	(11)
Metals	-	27.3	19.4	18.2	64.9	83.4	0.9	0.4	0.4	-0.7	15.5	16.6				
Engineering	2.4	-	6.3	0.8	9.5	24.7	7.0	9.8	30.0	1.4	27.1	75.3				
Vehicles	1.1	1.3	-	0.3	2.8	12.7	14.2	18.3	20.5	2.3	32.0	87.3				
Metals n.e.s.	3.0	15.0	19.8	-	37.8	69.6	10.2	1.3	4.2	0.5	14.2	30.4				

Sources: Figures calculated from Central Statistical Office, Input-Output Tables for the United Kingdom 1963 (London, H.M.S.O. 1970), Table 1, pp.6-7.

towards the satisfaction of final demand.

Table 7.6 also provides information on the inter-relatedness of product demand within the sector. It shows the proportion of total output of each group member sold as intermediate products to each of the other three. This gives an indication of the extent to which product demand is generated within the sector. The metals industry can be seen to supply the largest proportion of its output to the rest of the group. It sells 65 per cent of its goods to the other three members: 27 per cent to engineering, 19 per cent to vehicles and 18 per cent to metals n.e.s. Thirty eight per cent of metals n.e.s. output is devoted to Engineering and Metals industries: 3 per cent to metals, 15 per cent to engineering and 20 per cent to vehicles. But engineering supplies only 9.5 per cent to the remaining sector members, mostly to vehicles, and vehicles itself sells only 3 per cent of its output to the rest of the sector.

The S.I.C. at two digit level does not, however provide the basis for distinguishing between investment, export, and consumer durables producers. Over 50 per cent of the production of engineering and vehicles is comprised of investment and export goods, 26 per cent includes intermediate products, and less than 15 per cent is devoted to consumer durables even though both these two digit industries are the major producers for the last of these three categories of final demand. Disaggregation of the input-output data for engineering and vehicles into their three digit level components gives a better indication of the sources of output for the different sectors of final demand. Table 7.7 presents this information. The data have been taken from the 1963 Input-Output Tables. In some cases, the Tables

TABLE 7.7

Sources of Demand for Output of Three Digit Industries Classified to Engineering and Vehicles

INDUSTRY	% of Total Industry output devoted to each sector.						
	Inter- mediate Demand	FINAL DEMAND					
		Consum- ption	Public Sector	Invest- ment	Stocks	Export	Sum
1. Agric. machinery	13.3	0.8	0.6	56.2	-2.2	31.3	86.7
2. Machine tools	18.1	0.3	1.2	49.0	0.1	31.3	81.7
3. Small tools & gauges	75.6	1.0	1.2	2.4	0.5	19.3	24.4
4. Industrial engines	35.2	3.7	6.6	25.5	-3.4	32.5	64.8
5. Textile machinery	14.4	0.3	0.7	29.1	0.5	54.9	85.6
6. Contractor's plant, quarrying machinery	11.8	1.0	4.1	48.4	-1.6	36.2	88.2
7. Mechanical Handling equipment							
8. Office machinery							
9. Other machinery	22.9	4.4	2.5	37.1	0.8	32.3	77.1
10. Industrial plant & steelwork	23.4	0.9	3.3	57.5	1.0	13.8	76.6
11. Ordin. & small arms	64.2	1.6	11.2	7.5	0.0	15.4	35.8
12. Other mech. eng. n.e.s							
13. Surg. & scien. inst.							
14. Watches & clocks	21.3	11.7	22.6	7.2	2.5	34.7	78.7
15. Electrical machinery	35.3	2.8	4.0	34.3	2.4	21.2	64.8
16. Insul. wires & cables	59.6	2.4	4.7	16.0	1.1	16.2	40.4
17. Telegraph & 'phones	14.3	10.9	27.8	21.4	4.0	21.6	85.7
18. Radio & electronic apparatus							
19. Domestic appliances							
20. Other elect. goods	48.2	25.4	4.5	4.5	1.0	16.3	51.7
<u>Vehicles</u>							
21. Motor Vehicles	9.5	22.0	2.7	24.0	1.8	40.0	90.5
22. Aircraft	4.2	0.2	63.1	4.5	7.2	20.7	95.8
23. Other Vehicles	46.7	11.9	2.3	19.5	-0.1	19.6	53.3

Source: Figures calculated from C.S.O., Input-Output Tables,
op.cit., Table D, pp.52-55.

aggregate several three digit industries into one category. Nevertheless, the figures in Table 7.7 can be seen to improve the quality of information on the proportion of resources the different parts of engineering and vehicles devote to each sector of final demand.

The Table shows that within the vehicles industry group motor vehicles -producers of passenger cars and commercial vehicles -devote 22 per cent of output to consumer durables, 24 per cent to investment and 40 per cent to exports; whereas aircraft manufacturers sell over 60 per cent to the public sector and 21 per cent to exports, and other vehicles supplies nearly one half of its output as intermediate products to other industries.

Within the engineering sector several mechanical engineering industries (agricultural machinery, machine tools, contractors plant and quarrying machinery and mechanical handling equipment, office machinery and industrial plant and steelwork) devote about 50 per cent of resources to the production of investment goods, 30 per cent to exports, and the remainder to intermediate products. Two-thirds of the output of other machinery is equally shared between investment and exports, and one fifth is comprised of intermediate products, while textile machinery exports 55 per cent of its production and devotes the rest to investment and intermediate products. Small tools and gauges and other mechanical engineering n.e.s. concentrate on the production of intermediate goods, while industrial engines produces equal shares of its output for exports and intermediate products and devotes most of the remainder to investment.

Electrical engineering industries devote a larger share of resources to consumption. Twenty five per cent of the output of

other electrical goods and 11 per cent of radio and electronics production is comprised of consumer durables. Radio and electronics also sells 28 per cent of its output to the public sector. But electrical engineering output is most heavily concentrated on production of intermediate goods. Nearly 60 per cent of the output of insulated wires and cables and 50 per cent of production in other electrical goods is comprised of supplies to other industries.

The high proportion of resources that firms in electrical engineering, metals, and metals n.e.s. devote to production of intermediate goods complicates analysis of the effects of the consumer durables investment lag on labour flows within the Engineering and Metals industries. For the data presented so far, provide no indication of that sector of final demand for which these intermediate products are ultimately destined. Fortunately the Input-Output Tables do provide some information on ultimate product destinations. Although the data are not disaggregated to three digit level electrical and mechanical engineering are distinguished from each other. This gives an indication of variations in the structure of final product demands facing industries within engineering.

Table 7.8 presents the share of each industry's net output which ultimately finds its way into each final demand category. The Table shows that the export sector ultimately receives the largest share (27 to 40 per cent) of the production of the Engineering and Metals industries. With the exception of vehicles which supplies about one quarter of its production to the public sector, most of each industry's remaining output is divided between consumption and investment. In metals and electrical

engineering the split is about even. Each final demand sector takes about one quarter of the production of each industry. However, in metals n.e.s. a higher proportion (35 per cent) goes into consumption and only 22 per cent is devoted to investment. In contrast only 13 per cent of mechanical engineering output contributes directly or indirectly to consumption, whereas 40 per cent is ultimately destined for investment.

TABLE 7.8

The Proportion of Each Engineering and Metals Industry's Output Directly or Indirectly Satisfying Each Sector of Final Demand.

(per cent.)

INDUSTRY	Consumption	Government current Expenditure	Gross Domestic Fixed Capital Formation	Exports
Metals	24.4	9.3	27.1	39.0
Mechanical Engineering*	13.0	9.7	40.2	36.6
Electrical Engineering*	23.3	18.2	28.2	27.1
Vehicles	18.6	23.2	21.3	34.2
Metals n.e.s.	35.0	9.6	21.7	32.3

*Mechanical engineering includes the first twelve three digit industries in Table 7.7. Electrical engineering refers to industries 13-20 in that Table.

Source: Figures calculated from C.S.O., Input-Output Tables op.cit., Table 6, p.6.

Thus the information in Table 7.8 gives a rough indication of the proportion of its total resources each industry devotes to the satisfaction of each sector of final demand. But, since no one industry produced entirely for any single final demand sector, changes in the composition of final product demand at the peak of the cycle need not necessarily lead to changes in each

industry's relative demand for labour. It is quite possible, for example, that the effects on manpower requirements of reductions in consumer demand for motor cars in the late stages of a boom were more than offset either by an increase in exports or a rise in expenditure on commercial vehicles, so that the industry's demand for labour relative to other industries would remain the same. In other words, the entire redeployment effects of the consumer durable investment lag could be absorbed at lower levels of aggregation; that is, either through manpower mobility within multi-product plants or between plants classified to the same industry.

But if this were the case each industry's employment level should either go on rising after the downswing in consumer durables expenditure or, if aggregate labour supply is constrained, at least remain stable until the fall in investment expenditure takes place. It is unlikely that employment would decline in absolute terms, while labour demand continued to rise. This seems especially true in motor vehicles, the industry with the highest average earnings, but it probably holds for all the Engineering and Metals industries given the high positions in the earnings structure. Thus if an examination of cyclical fluctuations in employment at three digit level reveals that industries producing consumer durables experience turning points well in advance of those concentrating on production of investment and export goods, it can be concluded that the consumer durables investment lag does affect the movement of labour between the Engineering and Metals industries. This would explain why it is that the engineering industry, where production of fixed investment goods is most highly concentrated achieves increased net inflows of manpower from the remaining three

industries in the sector at the peak of each boom. The next section is therefore devoted to a study of the movements over time in three digit level industrial employment data.

Cyclical Fluctuations in Employment. Matthews has identified four upper and three lower turning points in the level of economic activity in the post-war period. He locates peaks in 1951, 1955, 1960, and 1964 and troughs in 1952, 1958 and 1962.¹ These dates differ slightly from those given in Chapter V because Matthews conducted his study on a calendar year basis. The discrepancy is of no consequence for the following discussion.

The procedure adopted has been to examine the order of occurrence of peaks and troughs in Engineering and Metals three digit industry employment levels for each post-war cycle in an attempt to determine whether or not industries whose output has a high consumer durable content consistently experienced earlier turning points than those producing mainly for the investment sector. To allow for the possibility that at the peak of the cycle firms may substitute women for men, data on male and female employment were aggregated. Industries where employment levels were dominated by a downward trend were excluded. These were textile machinery and accessories and all industries classified to vehicles with the exception of motor vehicle manufacturing. Three other industries; agricultural machinery, ordnance and small arms and scientific, surgical and photographic instruments were eliminated because cyclical fluctuations could not be discerned in the data.

¹R.C.O. Matthews, "Postwar Business Cycles in the United Kingdom", in Martin Bronfenbrenner, ed., Is the Business Cycle Obsolete (New York, John Wiley & Sons, 1969), pp.108, 117.

The analysis has been complicated by the revision of the standard industrial classification in 1958. Few industries escaped without some changes in definition. As a result there are some inconsistencies between industries defined in the earlier (1948) and later (1958) S.I.C.'s. In some cases employment levels for several industries were aggregated to improve comparability. When data for tools and implements, and cutlery in the 1958 S.I.C were summed to make them correspond with the 1948 figures cyclical fluctuations could not be identified. These two industries were then eliminated from the analysis, along with one other industrial plant and steelwork which had no complement in the 1948 S.I.C. Fortunately, these were minor difficulties and did not greatly disrupt the analysis. On the whole the problem of comparability was not serious. The objective was to analyse cyclical fluctuations not trends, and the S.I.C. was changed at a time when no industry was at an employment peak and only a few were experiencing troughs.

Tables 7.9 and 7.10 summarize the results of this analysis. Table 7.9 presents the number of months each industry's employment peak lagged behind the median turning point for all industries at the peak of each post-war boom. The first column shows each industry's average lag for the first three booms. The 1964-66 set of employment peaks was excluded from the calculation of the average because their order of occurrence was quite different. The reasons for this will be considered shortly.

The industries have been ranked in the Table according to the length of the average lag. This presentation brings out the impact of the consumer durables investment expenditure lag on the employment figures. Three consumer durables industries -

¹ See Appendix C for a statement of industrial definitions.

TABLE 7.9
 Monthly Lag of Each Three Digit Industry Employment Peak behind Peak of Median
 Industry: 1950-56
 (months)

INDUSTRY	Average Lag*	(Median (month	50-52 Feb. 1952	55-58 March 1956	60-62 Aug. 1961	64-66 Dec. 1965
1. Jewellery	-10.3		-21	-1	-9	-1
2. Radio & Electronics	-6.7		-3	-6	-11	10
3. Motor Vehicles	-5.7		-1	-4	-12	5
4. Non Ferrous Metals	-3.3		0	-1	-9	8
5. Iron Castings	-2.7		0	-1	-7	-12
6. Other electrical goods	-1.0		0	-1	-2	-12
7. Watches & Clocks	-1.0		-1	-4	2	10
8. Metal Industries	1.0		-1	-4	2	0
9. Industrial Engines	1.7		1	3	1	-7
10. Bolts and Nuts	2.7		9	1	-2	-4
11. Wire and Wire Mfg.	3.3		9	1	0	0
12. Engineering machinery	6.7		0	10	9	10
13. Wires and Cables	7.0		3	0	18	0
14. Steel Tubes	8.0		-1	18	7	0
15. Iron and Steel	8.3		6	23	-4	-3
16. Telegraph & Telephone	12.3		9	22	6	25
17. Machine Tools	12.7		11	10	17	10
18. Electrical machinery	18.3		7	35	13	10

*Average lag does not include 1964-66 upswing

Source: See Appendices B and C.

jewellery, radio and electronics and motor vehicles-are found at the top of the Table leading the cycle, while industries concentrating on investment goods - machine tools and electrical machinery - are located near the bottom. Engineering machinery - the major supplier of investment goods to the private sector - occupies the twelfth position owing to its zero lag in the first recession. The 1951-52 slump was, however, relatively brief and the occurrence of all the turning points was (with the exception of jewellery and electrical machinery) compressed into an eighteen month period. In 1955-58 and 1960-62 turning points were spread over three year periods, and the lag of engineering machinery behind the median was nine and ten months respectively.

The industries whose positions varied most in the rankings were the suppliers of intermediate products. Most of these are classified to metals and metals n.e.s. but some are included in engineering. For example, iron and steel was one of the last industries to encounter peak employment levels in 1951-52 and 1955-58, but in 1960-62 its turning point was sixth in the ranking. Metal industries, on the other hand, had early peaks in the first two downswings and a late turning point in 1960-62. Peaks occurred at increasingly earlier stages of successive downswings in iron castings, wire and wire manufacturing and bolts and nuts while iron and steel tubes after encountering an early peak in the first recession experienced late turning points in the next two. The three digit engineering industries whose positions tended to fluctuate were wires and cables and other electrical goods.

Variations in the positions of intermediate supplier industries

could have occurred for any one of three reasons. First, these industries have been shown to supply both consumer durables and investment producers. Thus variations in the rates of growth of those parts of an industry supplying each final goods sector could have caused the timing of the peak employment level to vary. Second, differences in industrial definition could account for an industry's position in the ordering in 1960-62 differing from earlier years. Finally, variations in export and public sector demand and in the competitiveness of import substitutes at similar stages in each cycle could explain the differences in turning points.

The behaviour of employment troughs in each of the eighteen industries is analyzed in Table 7.10. Only three sets of lower turning points are available for the 1950-66 period. In the first set, 1951-52, investment industry recessions were extremely brief owing to rearmament. This led to a quick recovery in engineering machinery and reduced its average lag so that it is ranked eighth in the Table. In addition, jewellery is ranked seventh owing to a very late recovery in 1960-64. Apart from these difficulties the start of upswings in consumer durables can be seen to lead those in investment by one to two years, while troughs for intermediate suppliers are scattered in between.

The fourth set of employment peaks, 1964-66, are a peculiar group to analyse. The order of occurrence of turning points was much more jumbled in comparison with the previous three cyclical peaks. Peaks in motor vehicles and radio and electronics lagged behind the median industry and occurred almost at the same time as upper turning points in machine tools,

TABLE 7.10

Monthly Lag of Each Three Digit Industry Behind Trough of Median
Industry - 1952-1963

(Months)					
INDUSTRY	Average Lag		52-54	56-59	61-64
		(Median (Month:	July 1953	Aug. 1958	March) 1963)
1. Radio and Electronics	-20.7		-13	-24	-25
2. Motor Vehicles	-12.7		-4	-18	-16
3. Watches and Clocks	-9.0		-12	-14	-1
4. Non Ferrous Metals	-3.7		-1	-1	-9
5. Industrial Engines	-3.0		-9	7	-7
6. Other Electrical Goods	-2.7		-1	-1	-6
7. Jewellery	0.3		-1	-13	15
8. Engineering Machinery	0.3		-12	9	4
9. Metal Industries	1.3		0	-1	5
10. Steel Tubes	2.7		8	0	0
11. Wire and Wire Mfg.	2.7		8	-1	1
12. Wires and Cables	3.3		0	5	5
13. Bolts and Nuts	3.7		2	5	4
14. Telegraph and Telephones	3.7		8	10	-7
15. Electrical Machinery	3.7		0	6	5
16. Iron and Steel	4.3		11	4	-2
17. Machine Tools	5.3		1	10	5
18. Iron Castings	8.0		11	9	4

Source: Same as Table 7.9

engineering machinery, and electrical machinery. This unusual behaviour undoubtedly reflects employer uncertainty regarding the government's intentions during the late stages of the second upswing and suggests that employers engaged in a considerable amount of labour hoarding during this period. This would explain the delayed downturn in many of the consumer durables industries and hence the apparent reduction in the length of the consumer durable-investment lag. This point will be developed further in the last part of this chapter.

Conclusion

Several conclusions can be drawn from the analysis of leads and lags in the demand for labour. First, post war trade cycles have been led by fluctuations in consumer durables demand and lagged by fluctuations in the private sector's demand for capital goods. Second, establishments producing directly and/or indirectly for both these final demand sectors are concentrated in the Engineering and Metals sector. Third, with the exception of the 1963-66 upswing, three digit industries supplying consumer durables tend to experience employment turning points one to two years before those producing for the private investment sector. Turning points in the industries producing intermediate goods are scattered in between those for consumer durables and investment with variations in the growth rates of sub-divisions devoted to satisfaction of different components of final demand accounting for the absence of a clear pattern. Previous chapters have shown that Engineering and Metals industries have a high propensity to recruit and lose labour to each other and that when the labour market tightens the Sector as a whole encounters recruitment difficulties despite the relatively high average wages its

establishments pay.

Taken together these points imply that the existence of the consumer durables investment lag resolves the paradox mentioned above; the rise at the peak of the cycle in net flows of men from the rest of the Engineering and Metals sector into engineering despite the industry's low wages relative to the Sector average.¹ Early downturns increase the ease with which engineering industries producing private sector investment goods can recruit manpower from the rest of the Sector. For example, given the similarities in locational and occupational requirements the decline of 30,000 in motor vehicles employment in the autumn of 1960² must surely have increased the number of persons available for recruitment into the capital producing industries where labour demand was rising rapidly. In fact, Table 7.3 shows that in 1960-61 the vehicles sector as a whole experienced net losses of 13,000 men to the rest of the Sector of which nearly 9,000 entered engineering. But these figures give a poor indication of the true employment gains to the investment sector resulting from redundancies in consumer durables, because engineering itself contains industries whose principal products are consumer durables and both engineering and vehicles include several three digit industries producing public sector investment goods whose demand does not lag the cycle.

No industrial classification can ever provide a perfect set of definitions for categorizing production units according to the ultimate use of their output. As long as establishments produce more than one product, the output of some will invariably

¹ See above, p.246.

² Ibid.

flow into more than one sector of final demand. Nevertheless, the industrial classification does cut across final demand categories less frequently at three than two digit level. It is, therefore regrettable that data on inter-industry movements between three digit industries is not available. In the absence of such information it is impossible to quantify the effects of the consumer durables investment lag on manpower flows between the Engineering and Metals industries. But given the role investment plays in the growth process it is important to gain greater insight into the nature of this effect even though data limitations rule out the possibility of quantification. The next two sections attempt to provide such an analysis.

THE MANPOWER CONSTRAINT

Manpower Flows and Expenditure Lags

Given the fact that both consumer durables and capital goods producing industries require manpower with similar characteristics, variations in the timing of each sector's peaks and troughs in employment demand should alleviate competition between them for scarce labour. Differences in employment demand cycles would lead to offsetting changes in each sector's recruitment effort as measured by the amount of money its member plants spend on recruitment, retraining, higher wages, fringe benefits and so forth.

Taking an extreme case to illustrate the point, suppose that first, manpower having once entered the Engineering and Metals Sector is never allowed to leave and the number of persons entering each year equals the trend rate of growth in employment demand for the group as a whole; second, the production of each

establishment classified to Engineering and Metals is restricted in its ultimate use to satisfaction of domestic demand for either consumer durables or fixed investment goods, never both, so that industrial definitions can be made co-terminous with final demand categories; and third that the employment demand cycles of the two sectors are identical in length and amplitude with peaks in one occurring at precisely the same time as troughs in the other and vice versa.

Manpower would then flow back and forth between the two sectors in response to changes in the relative demand of each for labour. These fluctuations would be determined by variations in the structure of final product demand. The two sectors' total expenditure on recruitment effort would not change over the cycle (assuming the costs of advertising, interviewing, fringe benefits and so forth do not vary). Differences in the resources each sector's employers devote to attracting more labour would be evened out for the sectors as a whole by the lag in demand for private sector capital goods behind consumer durables.

But in practice none of these conditions holds. Cycles in the demand for labour to produce consumer durables, on the one hand, and private sector investment goods, on the other, do not mirror each other. There are occasions when manning requirements for production of outputs to satisfy both sectors of final demand rise rapidly, so that increases in the recruitment effort of plants producing goods of each type occur simultaneously. This intensification of competition will be mitigated by increased recruitment from declining industries inside the sectors such as manufacturers of aircraft, railway equipment and textile machinery, and a rise in life cycle and stop-gap movements from

non-manufacturing. But it may also be exacerbated by rising employment demand in establishments within the sector producing exports and public sector investment goods.

The outcome of a competitive struggle for the labour required to satisfy consumer durables and fixed investment requirements is not easy to predict. Consumer durables will, however, enjoy two advantages. First, wages in plants producing motor cars exceed levels in all other industries. Second, because demand for consumer durables leads the cycle employment will be near to its upper turning point when competition with the investment sector intensifies. Plants can, therefore, sustain production at near peak levels by simply retaining the existing labour force; whereas investment producers having experienced a delayed recovery in employment demand must entice manpower away from their competitors if they are to move towards full capacity output.

It seems likely, therefore, that the difference between desired and actual employment devoted to producing fixed capital goods will widen until consumer durables output reaches its peak level. Once this upper turning point has been passed the rate at which the gap between desired and actual employment narrows will depend on the speed with which employment in consumer durables adjusts to falling output requirements. If employers shed labour rapidly, employment in the investment sector will catch up with its desired level very quickly. But if they are slow to release manpower; if they tend to retain extra labour in anticipation of another upswing, the gap between desired and actual employment in industries¹ producing fixed capital goods will

¹Ball and St. Cyr found that the speed with which actual employment adjusts to desired levels in a two-digit industry is positively related to its unemployment rate. This suggests that supply constraints do affect employment levels. See Ball and St. Cyr, op.cit., p.193.

narrow more slowly.

This raises the possibility of a simultaneous relationship between the consumer durables investment expenditure lag and the movement of manpower within Engineering and Metals. The tendency for consumer durables producers to hoard labour after output has passed its peak could increase the time investment producers require to work through their swollen order books. Consequently, the lag between peaks in consumer durables and private investment expenditure will itself lengthen.

Some evidence to support this possibility is provided in Chart 7.1, where the movements of seasonally adjusted quarterly data on consumption expenditure on cars, motor cycles, and electrical goods are contrasted with the behaviour of comparable figures on investment in plant and machinery. The peak in the fixed capital goods series can be seen to lag upper turning points in consumer durables by seven quarters in the first upswing and ten in the second. Moreover, the chart also shows that consumer durables expenditure was increasingly unstable after the second peak in the first quarter of 1965. A minor peak can be observed in the second quarter of 1966 before expenditure reached its trough two quarters later.

The instability of consumer durables expenditure during the second upswing combined with the occurrence of much later employment peaks provides strong evidence for a rise in the propensity of employers to hoard labour during the period.¹ If such an increase did occur, it could have contributed to a reduction in the supply of labour to industries producing capital goods. The next section examines this possibility by analyzing variations over the cycle in the time those who ordered capital

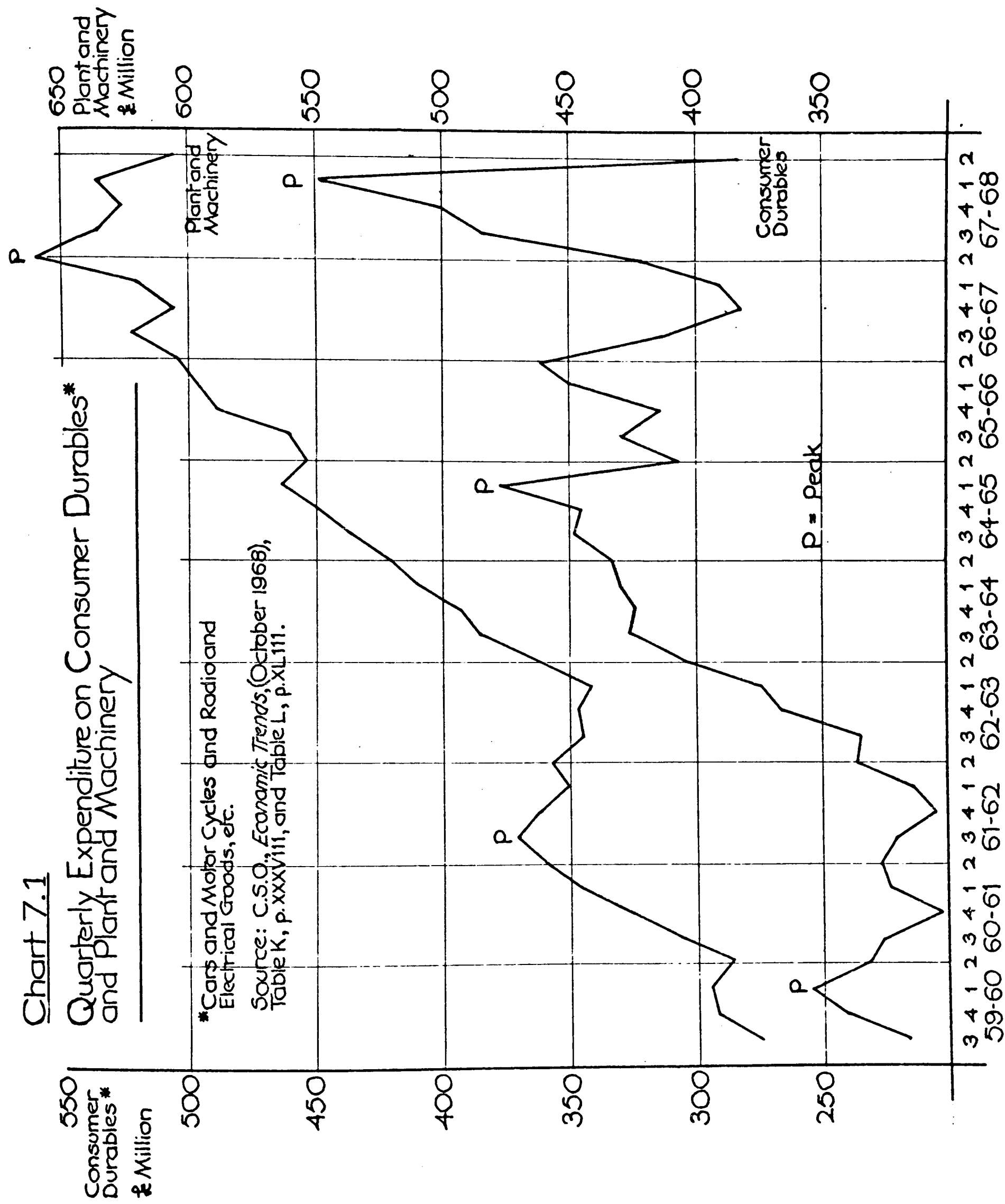
¹See above, Chapter VI, pp.205-7.

Chart 7.1

Quarterly Expenditure on Consumer Durables*
and Plant and Machinery

*Cars and Motor Cycles and Radio and Electrical Goods, etc.

Source: C.S.O., *Economic Trends*, (October 1968), Table K, p. xxxviii, and Table L, p. xl11.



equipment had to wait for deliveries.

The Order-Delivery Lag

One of the technical characteristics of the capital producing industries is that most of the goods are made to order. Consequently delivery dates are a means of rationing sales when demand exceeds supply. This process can be analyzed by examining the time customers have to wait for delivery of their goods.

Waiting times are comprised of two elements; production time, defined as the time required to produce the order; and queueing time, the period the order must wait before work on it begins. Given information on order book lengths and deliveries two kinds of waiting times can be calculated. The first measures the time orders placed in period t will have to wait for delivery. The second measures the time customers receiving deliveries in period t have had to wait for their orders. The first type is a major factor determining future manpower requirements. The second is determined by the existing supply of capital and labour. In this section an attempt will be made to establish whether at the peak of each boom capital goods production was constrained by manpower shortage. Attention will, therefore, be focussed on the second measure, delivery waiting times.

Assuming plants work through the order book on a first-in first-out basis and that orders and deliveries are evenly distributed over each period the time a customer receiving the first delivery in period t has had to wait for his order can be calculated by cumulating orders in periods $t-1$, $t-2$, $t-3$, etc. until the sum exceeds the length of the order book in period t . For example, if a firm receives £100 worth of orders each period and the order book at the start of period t stands at

£200 the first delivery in that period was ordered at the start of period $t-2$. If the order book is at £225, the order was placed three quarters of the way through period $t-3$.

The formula for calculating delivery waiting times at the start of each period is, therefore,

$$W_t = n + x$$

where n equals the number of periods prior to t over which orders have had to be cumulated before the sum exceeds existing orders on hand, and $x = 1 - \frac{\text{Cumulated orders}-\text{orders on hand}}{\text{orders in period } t-n}$

Since the W_t 's are discrete points on a continuous function it is not clear whether observed turning points occurred before or after actual turning points. This question can be answered by averaging waiting times in successive periods ($\frac{W_t + W_{t+1}}{2}$). Although this blunts the sharpness of peaks and troughs, the period with the highest average is clearly the peak since the waiting time at the start of period $t + 1$ is the same as the waiting time at the end of period t . This assumes, of course, that the waiting time function does not contain any bumps between the discrete observations. Quarterly data on orders and deliveries for three digit engineering industries producing a high proportion of private sector capital goods were first aggregated and then used to calculate average delivery waiting times.¹ Separate waiting times were also calculated for exports and the home market. Both series were found to peak and trough in the same quarter as the series based on total orders and deliveries, with the amplitude of fluctuations in the domestic series exceeding the amplitude for exports by about

¹These capital goods producers include machine tools, industrial engines and engineering machinery, all of which are defined in Appendix C, and industrial plant and steelwork.

one-half of a quarter. In addition both series exhibited a rising trend¹. Only the waiting times for total deliveries will be considered here. The cyclical behaviour of this series is contrasted with fluctuations in the aggregate employment level of these industries in Chart 7.2. The movement of employment in four three digit engineering and metals industries producing cars and electrical goods is also illustrated.

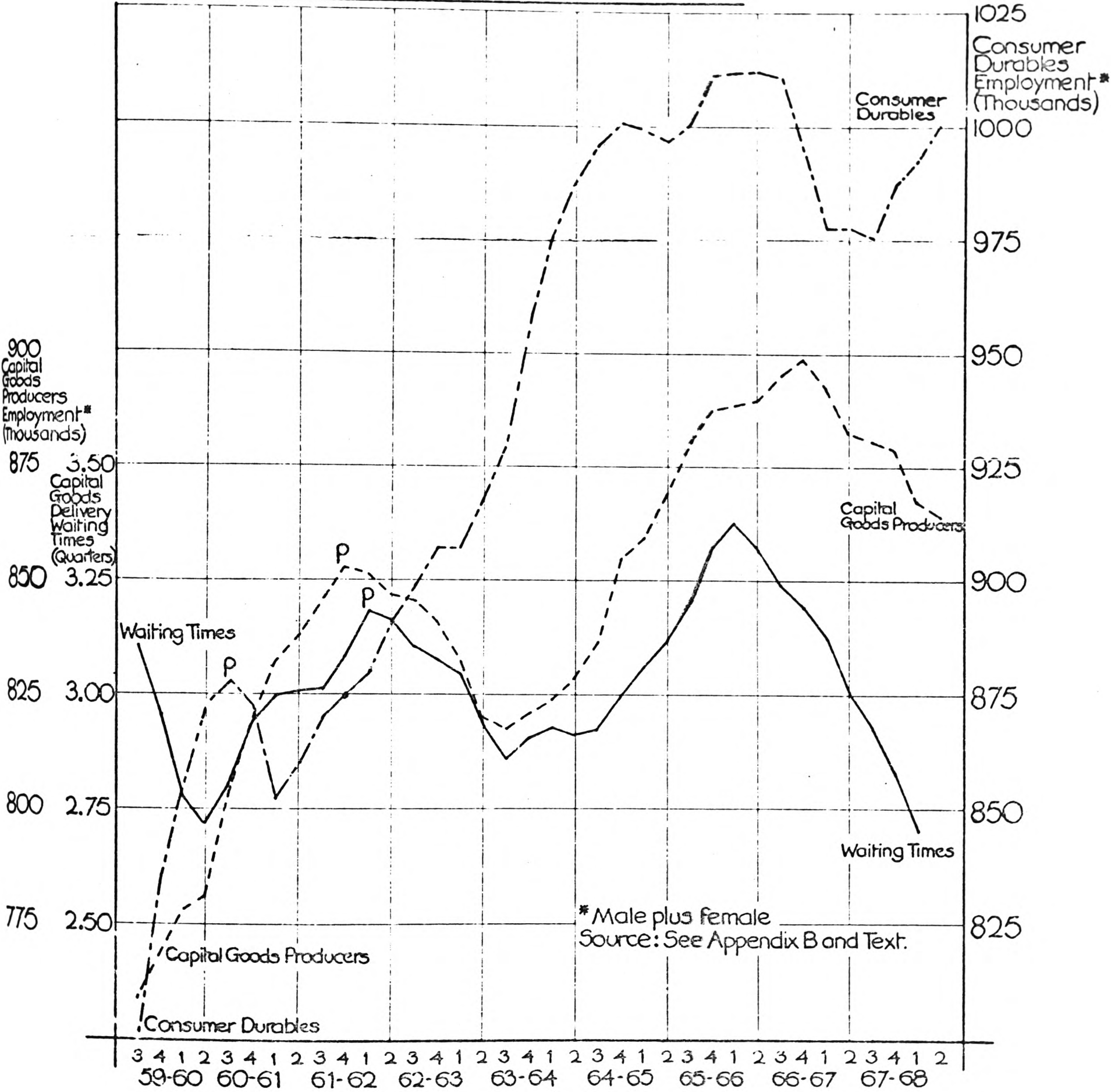
The chart shows that during the first upswing employment in consumer durables industries peaked in the third quarter of 1960. Both employment and delivery waiting times in capital goods producing industries continued to rise for five more quarters. Employment reached an upper turning point in the fourth quarter of 1961, and the longest waiting time, 3.18 periods, occurred in the first quarter of 1962.

During the second upswing, the order of occurrence of peaks was very different. Employment in industries producing consumer durables reached a minor peak in the fourth quarter of 1964, dipped slightly before rising to an even higher level in the fourth quarter of 1965, and remained on this plateau until the third quarter of 1966. The peak in waiting times occurred in the first quarter of 1966 before the downturn in consumer durables employment. The last peak was in capital goods employment in the fourth quarter of 1966.

The behaviour of employment in industries manufacturing consumer durables suggests that labour hoarding did occur unless it can be shown that increases in the production of export and investment goods were large enough to offset the fall in real expenditure on consumer durables after the first

¹ See above, Chapter V, p.177.

Chart 7.2 : Delivery Waiting Times
and Employment* In Consumer Durables and
Capital Goods Producing Industries: 1959-68



quarter of 1965. Statistics on total deliveries for these industries were therefore examined. These seem to follow the employment series more closely than the real expenditure series suggesting less labour hoarding after all, but the data are incomplete and not comparable with the real expenditure series because they are not adjusted for price changes. The evidence is therefore insufficient to determine whether or not consumer durables manufacturers engaged in labour hoarding during the period.

The Chart also shows that waiting times were longer during the second upswing than they were during the first. Between the third quarter of 1965 and the fourth quarter of 1966 customers waited over 3.2 periods for deliveries; in the first quarter of 1966 they waited 3.38 periods; whereas during the first upswing the longest they ever had to wait was 3.18 periods. This could reflect an increase in orders for goods taking longer to produce relative to the total size of the order book. But it is more likely to have been caused by supply constraints in the industries producing capital goods.¹

The Chart shows that the rate of increase of employment in capital goods industries slackened after the fourth quarter of 1964. Yet new orders reached an upper turning point in the first quarter of 1965.² It is conceivable that employers deliberately reduced employment increases in anticipation of this peak, but this assumes more accurate demand forecasting than

¹In a study of foreign order machine tool waiting times for the 1956-1963 period no evidence for changes in product composition was found. See M.D. Steuer, R.J. Ball and J.R. Eaton, "The Effect of Waiting Times on Foreign Orders for Machine Tools", *Economica*, N.S., XXXIII, no. 131 (Nov. 1966), p.392.

²New orders, deliveries and waiting times for mechanical engineering appear in the Annex to this chapter.

they are probably capable of achieving. It seems more likely that a limited labour supply caused this decline in the employment growth rate. The fact that manpower levels continued to rise until waiting times fell back to the peak length in the previous upswing provides considerable support for this view.

The Possibility of A Capital Constraint

The failure of employment to grow more rapidly in the capital goods producing industries is not necessarily the cause of longer waiting times at the peak of each boom. Output growth could have been constrained by limited plant capacity. But the C.B.I. Survey on business opinion shows that in November 1964, the quarter prior to the slackening in the capital goods employment growth rate (see Chart 7.2), 65 per cent of the mechanical engineering respondents expected skilled labour shortages to be a major constraint on output growth; whereas only 7 per cent were worried about plant capacity limitations. In the first quarter of 1966, the period when delivery waiting times reached their peak levels 62 per cent complained of skilled labour shortages and only 14 per cent were concerned about plant capacity.¹

Of course these figures represent subjective opinions and are poor substitutes for detailed econometric investigations. But, unfortunately there is no measure of capital capacity and until one is constructed it will be necessary to continue to rely on information such as the C.B.I. Survey provides. Its evidence clearly supports the view that manpower shortages con-

¹ See Federation of British Industries, Industrial Trends Survey, nos. 21 and 25 (London, Nov. 1964 and Feb. 1966). Mechanical engineering is defined in the Survey to include two industries not included in the definition in Table 7.8; scientific, surgical and photographic instruments and watches and clocks.

strained growth in the capital goods sector between 1964 and 1966.¹

The Consumer Boom and the Manpower Constraint

The question of whether or not this manpower shortage was exacerbated by the prolonged rise in employment in consumer durables manufacturing remains to be answered. The C.B.I. Survey also shows that employers producing motor cars and electrical consumer goods are less likely than those concentrating on capital goods production to name skilled labour shortages as one of the most important constraints on output growth. This undoubtedly reflects lower level skill requirements in the consumer durables industries.

It is generally believed that motor vehicles manufacturers deplete the skilled labour supply by attracting skilled engineering workers into semi-skilled assembly line work. This wastes the resources of the community, since persons employed outside the Engineering and Metals Sector, in services for example, could be recruited into these jobs. But the Glasgow Study found evidence to suggest that manpower shortages in capital goods producing industries cannot be blamed entirely on labour hungry motor car manufacturers. High wage plants in other Engineering and Metals industries are also responsible for this flow down the occupational ladder.

Unfortunately the Study does not provide information on the number of establishments in its sample engaged directly or indirectly on the production of consumer durables. There are, however, two reasons for believing that employers recruiting large numbers of persons from skilled into semi-skilled work

¹ See Hilton, op.cit., pp. 192-94.

tend to concentrate on consumer durables. First, consumer durables production is more likely to be organized on an assembly-line basis; hence there is a greater need for semi-skilled labour. Second, consumer durables producers will find it relatively easy to attract skilled labour from capital goods industries at the start of an upswing before investment demand has begun to rise.

The Glasgow Study concluded that the excess of downward over upward occupational mobility - especially noticeable in the Birmingham labour market, where skilled labour shortages were most acute - reflected both high pay for semi-skilled jobs in many plants and the unwillingness and/or inability of employers to provide sufficient training to bridge the gap between semi-skilled and skilled job requirements.¹

These points are certainly justified, but it is also worth considering the role the trade cycle may play in aggravating the problem. Consumer durables industries are the first to recover from a recession. Consequently employers in this sector enjoy a competitive advantage because they exert maximum recruitment effort at a time when labour supply is slack. Employers producing capital goods face a more difficult recruitment problem. They encounter tight labour markets when their manpower requirements start to rise. Consequently they must persuade persons employed in consumer durables factories to leave at a time when consumer demand is still rising. It is always easier to retain than recruit labour, and the problem is aggravated by the high wages in many semi-skilled jobs. Moreover, on the assumption that relative wages are determined by the prosperity of the plant, workers in consumer durables factories will have high expectations

¹ The Glasgow Study, pp.285-86.

of further wage increases until output stops increasing. Finally, the unwillingness of capital goods plants to invest in the training of semi-skilled recruits is not surprising since experienced employers realize that once their own cycle has passed its peak they will probably not require the manpower whose skills they have developed.

CONCLUSION

This chapter has investigated the effects of the full employment ceiling on the Engineering and Metals industries. The first section examined cyclical fluctuations in net flows within the sector over the cycle and found that at the peak of each cycle engineering gained manpower from the other three industries despite its relatively low position in the Sector's earnings structure. This suggested that labour flows between the industries were mainly determined by the lag of investment demand behind consumer durables over the cycle.

The second section examines the effects of this lag on manpower movements within the Engineering and Metals sector. It turned out that its impact on two digit industries is muted by the way in which the industries are defined. Three digit industries are more easily placed into final demand categories, although even here there are difficulties. But flow statistics are not available at this level of aggregation. Consequently the effects of the lag on manpower flows can only be studied by examining the cyclical behaviour of three digit industry employment levels.

Comparisons of upper and lower turning points show that industries whose plants supply consumer durables (along with

goods for other final demand sectors) experienced peaks and troughs in employment one to two years prior to those whose establishments concentrate on private sector capital goods production, although in 1963-66 the order of turning points did not follow this pattern. Peaks and troughs experienced by industries producing intermediate goods were scattered in between.

This demonstrates that consumer led booms must have had a great impact on manpower movement within the Engineering and Metals sector, and the last section considers whether or not this was strong enough to contribute to a manpower constraint in the plants producing capital goods. It examines the relationship between employment levels and delivery waiting times in the mechanical engineering sector and finds some evidence to suggest that customers had to wait longer for deliveries during the second upswing owing to a shortage of manpower. It is possible that this was due to labour hoarding in consumer durables, although the evidence is insufficient to clarify this point.

Nevertheless, it is certainly clear that the early recovery in consumer durables demand confers an advantage on plants in this sector in the competition for scarce labour. The existence of this lag combined with the favourable wage differential in motor vehicles plants may well be the major cause of the flow from skilled into semi-skilled employment observed in the Glasgow Study. Unfortunately, however, substantiation of this point requires manpower flow data at a lower level of aggregation.

ANNEX 7.A

New Orders, Deliveries and Waiting Times for Capital Goods
And Employment in Consumer Durables and Capital Goods In-
dustries

YEAR	Qtr	New Orders	Deliveries	Waiting Times (quarters)	Employment (1000's)	
		£ million	£ million		Consumer Durables	Capital Goods
1959	3	289.6	297.7	3.17	803.4	757.5
	4	368.2	330.5	3.05	836.4	768.0
1960	1	419.2	327.7	2.81	855.2	778.5
	2	384.9	338.6	2.76	873.4	791.3
	3	380.1	321.2	2.68	878.5	804.8
	4	378.4	363.1	2.92	872.6	821.0
1961	1	450.2	359.7	2.96	852.3	832.2
	2	419.5	385.5	3.02	860.3	839.3
	3	337.9	369.5	3.01	870.3	846.6
	4	365.0	402.4	3.03	874.1	852.9
1962	1	390.2	390.1	3.13	880.5	851.2
	2	361.6	395.2	3.22	890.0	847.2
	3	321.3	365.2	3.10	895.7	845.3
	4	383.7	398.5	3.09	907.6	841.8
1963	1	418.2	382.8	3.06	907.0	832.0
	2	436.9	385.9	3.01	917.3	820.5
	3	403.3	374.4	2.85	930.6	817.4
	4	441.0	407.2	2.88	958.1	820.9
1964	1	485.6	418.1	2.91	975.8	823.5
	2	524.6	430.6	2.95	987.7	827.9
	3	470.9	408.1	2.89	995.1	836.3
	4	515.7	469.0	2.97	1002.4	855.2
1965	1	559.8	470.3	3.00	999.7	859.4
	2	481.4	465.3	3.11	997.0	868.3
	3	434.3	434.3	3.13	1003.1	880.2
	4	503.9	497.2	3.28	1010.9	888.4
1966	1	532.9	498.5	3.37	1011.7	889.7
	2	476.5	508.9	3.39	1011.0	890.0
	3	465.5	505.0	3.26	1010.0	895.2
	4	490.2	555.4	3.22	994.4	898.1
1967	1	454.7	531.6	3.17	978.1	887.8
	2	513.9	532.0	3.07	978.4	882.0
	3	464.0	495.9	2.93	976.1	881.5
	4	474.2	549.4	2.92	987.9	879.8
1968	1	586.2	540.7	2.74	993.8	867.4
	2	527.3	544.8	2.66	1003.6	859.8

Source: New orders and delivery figures were supplied
by the Economic and Statistical Analysis Division
of the Board of Trade.

CHAPTER VIII

CONCLUSION

This chapter summarizes the findings of the study and considers their implications. Data on inter-industry manpower flows have been examined in an attempt to identify the pattern of movements, the forces underlying them, and the contribution they make to changes in industrial employment structure. Previous studies of labour mobility have focused on local labour markets and provided considerable insight into the job changing process in particular areas. But the increase in knowledge resulting from this research can never be utilized in the development of an effective manpower policy as long as macro studies of labour supply are limited to the examination of demographic trends and movements over time in activity rates. Policies designed to influence the distribution of manpower between competing demands require identification of the sources from which each industry recruits labour and the categories into which its leavers tend to move.

Ideally information is required not only on inter-industry flows but also on movements between each industry and unemployment, self-employment, and the various categories of economic inactivity such as education, migration, family raising, and retirement. It would then be possible to confront a given set of industrial manpower demands derived, let us say, from a National Plan with the existing pattern of mobility. If the two were found to be incompatible policy changes would be necessary.

This would require knowledge of the factors underlying the existing flow pattern. An adequate analysis of these forces could be provided if the ages and the occupation, location, and

earnings of movers in their present and previous industries were recorded. Similar data would be needed on the stocks of manpower remaining in each of the economically active and inactive categories listed above. Unfortunately most of this information is not available at the moment. Consequently the present study has had to make do with highly aggregated data on inter-industry flows and no information on the volume of movements in and out of employment or on the characteristics of those persons whose movements are recorded. Nevertheless it can perhaps be viewed as a small step towards achievement of a link up between the results of local labour market research and the development of macro manpower planning models.

The proportion of employment changes accounted for by net flows was shown in Chapter II to vary considerably between industries. All industries gaining manpower from the inter-industry mobility process increased employment between 1959 and 1966, but some relied more heavily on this source of recruitment than others. Moreover, one industry, distribution, experienced large net losses of men and women to the rest of the economy and yet still increased its manpower level. This was made possible by recruitment of a proportion of the young persons entry about twice the size of the industry's share of total employment.

Analysis of net manpower flows between industries revealed a remarkably consistent pattern of movement. An attempt to arrange industries so that the direction of net male movements between them was from the top to the bottom of the ordering proved highly successful and only one instance of "doubling back" could not be eliminated. Female net flows were less amenable to this technique of analysis and five instances of reverse

movements could not be eliminated. Nevertheless the rankings for both sexes were found to be broadly similar to the ordering of industries according to their dependence on net flows for employment increases. Thus, the pattern of inter-industry net flows can be described as one in which certain industries act as suppliers of manpower to the rest of the economy and compensate for their net losses by achieving a large volume of net recruitment from outside employment.

The existence of this pattern is attributable to a phenomenon which has been labelled life cycle mobility. The inter-industry wage structure turns out on inspection to be highly stable at the two digit level of aggregation. Wage differentials are not generally offset by non-pecuniary considerations and are mostly due to the role of institutional forces in determining relativities. Labour mobility is prevented from evening out earnings variations due to non-economic forces by a combination of limited vacancies in the high wage industries and imperfect knowledge among job researchers. Nevertheless the ordering of industries according to the direction of net flows combined with data on each industry's share of employees in each age group suggest that younger members of the labour force tend to move from low wage non-manufacturing industries into the manufacturing sector while older persons are prone to flow in the opposite direction. In other words certain non-manufacturing industries, particularly distribution and miscellaneous services, tend to act as ports of entry and exit for many persons who spend the prime of their working lives in manufacturing.

The tendency for teenagers to have low income expectations and inexperience in searching for employment combined with the

bias against employing them, except in apprenticeships, in high wage plants lead many to accept their first jobs in low wage non-manufacturing industries. But income expectations rise with age and when such persons reach their twenties and gain more experience in the job search process they tend to move on to the higher paying manufacturing jobs which become more readily available to them. Finally the propensity of older persons to return to services before retirement represents involuntary movements by some who are made redundant and cannot find alternative jobs in manufacturing and voluntary transfers by others seeking lighter work in industries where such job openings are more plentiful. Life cycle mobility can be detected amongst both men and women although it is more difficult to substantiate female behaviour owing to the frequency with which women enter and leave employment on several occasions during their working careers.

Analysis of gross manpower flows reveal further characteristics of the inter-industry mobility process. The random flow hypothesis which states that persons leaving one industry tend to spread themselves over the rest roughly in accordance with each industry's employment share is not supported by the data. Neighbourhood relationships can be observed between various pairs of industries. These are identified by comparing the proportion of total inflows Industry A draws from B (A's recruitment propensity with B) with B's employment share. Similar comparisons are also made between the proportion of outflows from A entering B (A's flow propensity with B) with B's employment share. If both recruitment and flow propensities exceed comparable employment shares, the two industries can be described as close neighbours, or closely linked, to each other. It is possible that A

could have abnormally high recruitment and flow propensities with B and B have propensities with A no greater than A's employment share, but in practice this seldom happens.

Neighbourhood relationships were discovered between the engineering and metals industries - metals, engineering, vehicles and metals n.e.s. - and between the textile and clothing industries - textiles, leather and leather goods, and clothing and footwear. The links were stronger in the first sector than in the second and, surprisingly, they were as strong for women as for men in the first group. Linkages were also discovered between distribution and food, drink and tobacco; construction and timber and furniture; and construction and bricks, pottery, and cement.

The major explanation for these neighbourhood relationships was found to be the existence of similar occupational and locational structures. Estimates of recruitment and flow propensities based on a measure of the combined impact of these two factors turned out to be remarkably close to the actual values. It was also noted that industries closely linked to each other tended also to be ranked near to each other in the earnings structure. This suggested that similarities in average wages in conditions of imperfect knowledge might account for some of the intensive movement between industries closely linked to each other. But when the effect of both variables was tested using multiple regression analysis, the explanatory power of the combined measure of locational and occupational factors was so strong that it swamped any impact the earnings variable might have had.

Moreover, in several of the results reported the sign on the earnings variable was perverse suggesting that gross flows

respond to wage differences after allowance is made for locational and occupational factors. Since, however, close neighbours pay similar wages, this probably reflects a tendency for plants in closely linked industries to reach across the boundaries surrounding themselves and their neighbours in response to recruitment difficulties. Such behaviour could be expected in 1959-66 when there was considerable excess demand for labour.

The analysis of manpower flow patterns in the absence of short run changes in the level of economic activity provides the basis for isolation of three types of movement between industries: life cycle, neighbourhood, and cross barrier mobility. A fourth type of mobility associated entirely with cyclical fluctuations in the economy is stop-gap movement resulting from redundancies in manufacturing during cyclical downswings. These four mobility types defined in the introduction to Chapter V provide a basis for analyzing the effects of short run changes in the level of economic activity on inter-industry manpower flows.

Net flows into manufacturing were seen to rise during upswings and fall in downswings. They also increase as a proportion of total manufacturing employment changes during the late stages of each boom, and they were found to account for a greater part of the increase during the second upswing than the first. This behaviour is due to the favourable manufacturing wage differential and the fall in the rate of growth of aggregate labour supply at the peak of each upswing and also over the period as a whole. Manufacturing plants were found to rely especially heavily on net flows from distribution, the lowest paying industry of all, and employers in this industry compensate for their losses by increasing recruitment from outside employment. The net entrants

data show that they rely especially heavily on women whose supply is more responsive to demand increases than that of men.

Analysis of the data on gross movements between manufacturing and non-manufacturing revealed that the decline in male net flows during the late stages of each boom is due to both a levelling off in inflows and a rise in outflows. The failure of inflows to rise faster is due to a relative decline in potential life cycle and stop-gap movers in non-manufacturing and the increase in outflows reflects increasing competition from non-manufacturing. These changes in the composition of labour flows between manufacturing and non-manufacturing are in turn due to the fall in the growth rate of aggregate male labour supply. The female labour supply is more elastic. Consequently movements of women between manufacturing and non-manufacturing are more responsive to increases in each sector's vacancies as plants substituted female for male labour.

The behaviour of the manpower mobility data analyzed in Chapter V suggest that the economy encounters a full employment ceiling at the peak of each boom. This takes the form of gradually increasing shortages of labour in particular sectors. Chapter VI shows that it is the manufacturing sector which seems to suffer most despite the fact that its plants tend to pay the highest wages. This is attributable to three factors. The first is the greater cyclical fluctuations in manufacturing labour demand and the smaller scope for curtailment of services associated with delivery of the product. The tendency for manufacturers to hoard manpower during downswings does not reduce cyclical fluctuations in labour demand. Employers are more likely to try to hold labour in excess of requirements before

they reach the upper turning point. But they are less likely to be successful, and the consequences of failure are a rise in vacancies.

The second factor is generally higher manufacturing skill requirements. As the economy approaches the full employment ceiling, the supply of skilled labour is the first to decline. Employers may respond by lowering hiring standards and reaching across locational and occupational barriers to recruit labour, but the number of cross barrier movers who remain with the plant is probably limited. The third factor is rising competition from non-manufacturing, which increases neighbourhood and cross barrier movements out of manufacturing.

The significance of the second and third factors was tested by means of regression analysis. Both were found to have a significant effect on the behaviour of the aggregate inflow and outflow data. Application of the inflow model to the disaggregated data revealed considerable differences between industries in the relative strength of each factor. It was found that in the late stages of each upswing those closely linked to non-manufacturing experienced a fall in inflows due to rising competition from their close neighbours. Similar declines in the remaining industries were due to a shortage of life cycle and stop-gap movers in non-manufacturing. Unfortunately the outflow model failed to provide significant results at the two digit level, so that it was not possible to establish the extent to which rising competition from non-manufacturing drew manpower away from specific manufacturing industries.

The industries suffering most from manpower shortages at the peak of each boom were found to be those in the Engineering

and Metals Sector. Net manpower movements within this sector reflect the effects of the consumer durables investment lag, although its impact is muted at the two digit level of aggregation by the fact that S.I.C. definitions are not coterminous with final demand categories. Nevertheless, it is clear that net flows into engineering from its three neighbouring industries are due to the delayed recovery of investment demand.

An attempt was made to establish whether or not consumer led booms added to the delay and restricted investment growth by diverting scarce labour resources into consumer durables plants. Comparison of cyclical fluctuations in three digit industries within the Engineering and Metals sector show that industries containing the major producers of consumer durables experienced upper and lower turning points one to two years prior to those concentrating on the production of investment goods for the private sector. The 1963-66 upswing was an exception due possibly to a tendency for consumer durables producers to hoard labour during this period, but there is insufficient evidence to substantiate this point.

The existence of this employment lag suggested that investment may have been "crowded out during the consumer boom".¹ Delivery waiting times in mechanical engineering were observed to lengthen at the peak of each cycle, and the evidence both from the behaviour of employment series and the response of employers to opinion surveys points to a shortage of skilled labour as the major cause. The critical question is whether this is in turn due to a pre-emption of resources for the

¹ Harold Wilson, New Statesman (24th March 1961), P.462 quoted by Roger Opie, "Economic Planning and Growth", Beckerman, ed., op. cit., p.159

satisfaction of consumer demand, but unfortunately manpower flow data are not available at a low enough level of aggregation to provide an answer. However, the Glasgow Study's figures on the size of flows from skilled into semi-skilled jobs in the Birmingham labour market suggest that a certain amount of pre-empting did occur.

Having summarized the major findings of this study the remainder of this chapter will consider their implications. The discussion is divided into three parts. The first is concerned with the function of labour markets and the role of wages in determining labour mobility. The second considers alternative methods of affecting the industrial distribution of employment. The third examines the role of inter-industry mobility in achieving various economic policy objectives.

Among the various techniques employers use to attract more labour, offering higher wages receives low priority. Employers are reluctant to adopt this technique because they realize that raising the wages of one group of workers is quite likely to generate comparability claims from others. Notions of fairness and equity simply cannot be dismissed as criteria for settling wage claims. Hence the wage structure is pretty well determined by institutional forces. Employers who try to alter it in an attempt to attract more of a particular type of labour probably find that the internal dissension they create outweighs any benefits derived from easier recruitment.

But it does not follow from this argument that relative wages do not affect inter-industry labour flows. The evidence presented in this study shows quite clearly that they do. Each of the four

types of mobility identified above is due partly to their effect. Life cycle, cross barrier, and stop gap flows would not occur if relative wages were not higher in manufacturing than in non-manufacturing, and even neighbourhood flows may reflect movements for higher wages between industries closely linked through locational and occupational similarities.

This raises the question of whether or not changes in the inter-industry wage structure should be introduced deliberately, say through the implementation of an incomes policy, in order to achieve a desired change in the industrial employment structure. Given the evidence presented above there seems little doubt that if the changes were sufficiently large, and if they could be sustained against pressures derived from comparability claims, until they were themselves institutionalized, there would be substantial changes in mobility patterns. If, for example, distribution were raised from the bottom of the earnings league table to a position further up the hierarchy, its net outflows to other industries would be reduced. But distribution employers might then become more selective in their choice of applicants, since they were now having to pay higher wages. Consequently the rate of growth of distribution employment might not exceed increases that would occur in the absence of the wage change.

Analysis of the effects of a change in the earnings structure on the pattern of inter-industry mobility would require much more detailed information than it has been possible to present here. Each of the four mobility types would be affected by such a change. But they would not all be influenced in the same way. For example, suppose that in 1959-66 the ranks of food, drink, and tobacco, and engineering had been switched. Food drink and tobacco was raised

from eleventh to fifth and engineering which was in fifth place was dropped into food, drink, and tobacco's position. Suppose further that neighbourhood relationships between industries are due entirely to imperfect knowledge about wages; that is industries are closely linked to each other, not through locational and occupational similarities, but through similar rates of pay. This far fetched assumption allows relative wages to have a maximum impact on inter-industry mobility.

The effects of these changes would be to increase the volume of life cycle, cross barrier and stop gap movements from non-manufacturing into food, drink and tobacco. But outflows comprised of each of these mobility types would also rise. In addition, neighbourhood flows between food, drink and tobacco, and distribution would be replaced by inflows and outflows of the same type with the remainder of the Engineering and Metals Sector. Conversely, engineering would experience a fall in the first three types of movement to and from non-manufacturing; a rise in neighbourhood flows with distribution; and a fall in such movements with the remaining Engineering and Metals industries. In short, plants in food, drink and tobacco and engineering would each find themselves competing for different types of labour in different markets.

Labour turnover would probably fall in food, drink and tobacco, and rise in engineering owing to the inverse relationship between earnings levels and quit rates. But whether in the long run food, drink and tobacco would increase its employment share as a result of this change in the earnings structure is difficult to say. An answer to this question requires specification and estimation of a model relating the effects of earnings changes on

each mobility type. Occupational, locational, and demand variables, all of which were ruled out of the above example, would have to be included. It might turn out in the end that food, drink and tobacco would gain and engineering lose manpower as a result of these earnings changes. But unless such an outcome could be forecast with a fair degree of accuracy it hardly seems worthwhile to upset the existing earnings structure and run the risk of large comparability claims. This is not to say that adjustments in wage differentials should never be used to change the pattern of inter-industry flows. But the implications of the above argument are that relative wage changes are best regarded as a policy of last resort and even then they should be implemented only after their likely impact on flow patterns and comparability claims have been carefully worked out.

Changes in mobility patterns are more easily accomplished by encouraging plants to vary their non-wage competitive techniques. Local labour market research shows that these are the tactics most commonly used by employers to increase the speed at which vacancies are filled. Consequently the industrial employment structure does partially adjust itself to changes in the structure of production requirements in spite of the stability of relative earnings. The cyclical variations in inter-industry manpower flows and employment growth examined above provide sufficient evidence to establish that point.

If total adjustment occurred automatically there would be no need at all for government intervention in labour markets. The development of active manpower policies designed to control and direct the labour supply to industries where the need for labour is greatest would not be necessary. But it has been shown that during the 1959-66 period a relative increase in labour demand

in certain sectors was not always sufficient to satisfy manpower requirements. Manufacturing vacancies continued to rise in the late stages of each boom despite the decline in net inflows. Manpower shortages were experienced in the capital goods producing sector of the Engineering and Metals Sector. The extent to which labour employed elsewhere in the economy might have made a greater contribution to the balance of payments and long term growth prospects had it been transferred into these industries is unfortunately not known. An estimate of this kind would require a much more detailed model of the economy's behaviour than is presently available. But even in the present state of knowledge it is clear that the performance of these industries is crucial to the achievement of these two objectives.

Most government manpower policy has, however, been directed towards evening out regional unemployment disparities and reducing barriers to greater general mobility. Regional policy has involved subsidization of both labour and capital in the depressed areas. There is now some evidence that these policies are beginning to bear fruit, although whether reductions in unemployment variations around the national average are sustained in the next upswing remains to be seen.¹ Measures designed to achieve greater mobility through the reduction of barriers to movement include the Industrial Training Act (1964), The Redundancy Payments Act (1965), and Earnings-related unemployment benefits (1966).² These policies had social, as well as economic objectives,³ but their intended effect on the labour market was to

¹ See Jeremy Hardie, "Regional Policy", Beckerman, op.cit., p.241.

² These are summarized in O.E.C.D., Manpower Policy in the United Kingdom, op.cit.

³ See S.P. Parker, et al., Effects of the Redundancy Payments Act (London, H.M.S.O., 1971), p.4.

encourage mobility in general by reducing the hardships of job changing such as those resulting from occupational mismatch and the costs of searching for a job. The general rise in labour turnover after 1966 in the face of declining employment suggests that they too had an effect.¹

Governments have been more reluctant to adopt measures designed to influence the direction of labour flows between industries. The one exception is the SET; although even here the question of whether this measure was designed to equalize the burden of taxation between goods and services or transfer manpower from the service industries into manufacturing is almost as controversial as its actual effects.² Yet, SET has one great advantage over relative wage adjustments as a means of achieving a change in the distribution of employment. Attempts to institute relative wage changes invariably induce comparability claims from rival work groups who wish to regain their position in the earnings structure. If such groups succeed the effects of the initial wage change is cancelled and each industry returns to its previous position in the earnings league table. SET provides a more convenient method of discriminating against certain industries whose employment growth the authorities may wish to discourage because it does not induce comparability claims. Thus, the future planning of resource allocation may require more discriminatory fiscal measures of this type.

The objectives of post-war economic policy have been full employment, balance of payments equilibrium, stable prices and

¹ See J.K. Bowers and P.C. Cheshire, "The Change in the Relationship Between Unemployment and Earnings Increases: A Review of Some possible Explanations," National Institute Economic Review no. 54 (November, 1970), pp.56-57.

² See Sleeper, "Manpower Redeployment and the SET", op.cit., p.274

a higher growth rate. The last two have rarely been given major priority and have certainly never been achieved. Policies have focused mainly on the first two objectives. But since they have turned out to be incompatible priorities have shifted constantly between them.

Demand management through implementation of fiscal and monetary policies has failed to achieve the objectives of full employment, balance of payments equilibrium, higher growth rates and stable prices. It has led instead to the consumer durables - investment expenditure lags observed in Chapter VII. This has caused the consumption sector to pre-empt resources at the start of a cyclical upswing, so that, when investment demand recovers in the later stages, capital goods producers face a manpower constraint. It has not proved possible to achieve a shift of resources into capital goods industries without at the same time reducing the demand for investment products. Consequently the effects of the lag have been to constrain productivity growth, reduce export competitiveness and in the long term make the full employment objective even less compatible with balance of payments equilibrium than previously.

This has led to calls for expenditure switching policies, which increase demand for domestic output, as opposed to expenditure reducing policies, which reduce domestic expenditure. The best example of an expenditure switching policy is devaluation, and the theory underlying this approach is that by switching expenditure demand from foreign to domestic output induced investment will rise, so that in the long run full employment, higher productivity growth and a stronger balance of payments (through improved export competitiveness) will become more compatible.

But the success of a devaluation, or any other expenditure switching policy, depends in a full employment context on the ease with which resources can be transferred from industries producing consumption goods into the export and capital producing industries.

Achievement of the required transfer of resources probably depends more on the mobility of labour than capital. For one thing, there is more evidence of a labour constraint than a capital constraint within firms; for another one of the major objectives of the policy is to increase the supply of capital by transferring labour into the capital producing industries. Hence, expenditure switching policies will be frustrated if there are impediments to the flow of manpower into export and investment plants.

It is frequently argued that under full employment expenditure reducing policies must accompany measures designed to switch expenditure from foreign to domestic output. Since the economy is operating at full productive potential before the introduction of the switching measure, domestic expenditure must be reduced in order to equate aggregate demand with supply. This poses a dilemma because the improvement in entrepreneurial expectations which is generally regarded as essential to an increase in investment demand will be undermined by imposition of measures restricting domestic demand.

The need for such measures arises on the assumption that labour is fully utilized in the industries where it is employed before the introduction of the switching policies. But given that wage differentials tend to be unrelated to skill differentials this is unlikely to be so especially in a full employment context where

firms try to retain manpower in anticipation of future increases in demand. At the moment estimates of the size of deflation required to match an expenditure switch make no allowance for productivity increases resulting from reductions in labour hoarding which the measures may themselves bring about. Consequently the deflationary policies that have been implemented since 1966 have shaken out more labour engaged on domestic production than has been required to satisfy export demand even after devaluations. The fact that these measures have also severely reduced investment demand has further contributed to the resulting rise in unemployment.

But it is impossible to determine whether or not expenditure switching policies will generate manpower transfers from industries under-utilizing labour into the export and investment sector without knowledge of the flow patterns that underlie industrial employment changes. The Reddaway Report, for example, has shown that a squeeze on labour in distribution through SET and the abolition of resale price maintenance led to productivity increases in that industry, and this study has shown that distribution is an important source of recruitment for manufacturing industries. This would seem to suggest that expenditure switching policies need not be accompanied by such heavy doses of deflation. Taking another example, the Glasgow Study's evidence that skilled labour is frequently employed on semi-skilled assembly line work suggests that given appropriate policies (in this case an adjustment of wage differentials might be required) this downward flow might be reversed and service sector employees might be shifted into these semi-skilled jobs.

In other words the redeployment objectives of expenditure reducing policies may be achieved at a cost of less unemployment if

they are replaced by more direct intervention in the labour market. SET was an initial step along these lines. It failed because it was not accompanied by expenditure switching policies of sufficient size to expand labour demand in the manufacturing sector. In fact the July 1966 measures had precisely the opposite effect. Consequently, the social costs of SET were, if anything, greater than those resulting from conventional deflationary measures. Not surprisingly this led the government to disown the Tax's redeployment objective.

But recent experience with SET by no means suggests that a tax designed to squeeze manpower out of industries where it is under-utilized and into sectors suffering from excess demand could not achieve its objective. Nor is it necessary that such taxes be restricted to the service sector.. A tax on skilled labour in the motor-car industry imposed during a cyclical upswing might well have a useful effect in increasing labour supply for the capital goods sector. But such measures need to be backed by a good deal more research into inter-industry flow patterns than is possible given the data that are presently available.

The formulation of policies designed to influence labour mobility is regarded as a fringe subject by most economists. Analysis focuses mainly on the impact of fiscal and monetary measures on global aggregates; and so called active manpower policies are regarded as measures designed to reduce the social costs of the damages these macro measures can create. Measures designed to influence directly the distribution of employment must be taken off the periphery of policy making, reworked and brought into the centre of the stage, where they can play a major role in the achievement of full employment and a higher rate of economic growth. At present there seems to be little prospect of macro

policy moving in the direction of greater intervention in the labour market. But the failure of traditional policies to achieve their objectives makes such a movement inevitable in the long run.

APPENDIX A
THE FLOW DATA

The DE data on inter-industry manpower flows are based on a one per cent sample of employees who hold national insurance cards. They are for Great Britain only. The information is extracted by the Records Branch of the Department of Health and Social Security from their ledger entries. The figures on total flows between each two digit industry and all other industries combined have been published in the DEP Gazette.¹ The remainder are available at request from Statistics Division, Watford, and the author.

The data show changes in the industrial classification of individuals between one June and the next. They include persons who between two successive years leave a job in one industry and enter unemployment before finding another job in a different industry. They are subject to the following limitations. First, the size of the sampling error relative to the observed flows can be quite large when the flows are small. Standard errors for the 66.6 per cent confidence interval are:

	<u>Estimated Flow</u>	<u>Standard Error</u>
(thousands)	0.1	± 0.1
	1.0	± 0.3
	10.0	± 1.0
	100.0	± 3.2
	1000.0	± 10.0

The observational errors in the net flows are the sum of the errors in the gross flows from which they are calculated.

Second, the figures do not include those individuals who are

¹ See "Approximate Estimates of the Flow of Employees Between Industries", DEP Gazette (April, 1970), pp.303-5 reprinted in Department of Employment, British Labour Statistics Year Book 1969 (London, H.M.S.O., 1971), Appendix A, pp.336-42.

in the one per cent sample whose National Insurance cards were exchanged more than three months after the due date. They also exclude certain civil servants and Post Office workers who are not represented in the sample, because their national insurance contributions are paid without the use of cards. The DE estimate that the ratio in a given year between the numbers in the sample and the size of the population ranged between 102 and 103 for males and between 102 and 105 for females during the years for which data is available. Consequently the size of understatement resulting from grossing up the sample by a factor of 100 can be as much as 5 per cent and it can vary between years. For particular industries both the size and the degree of variation in the understatement could be much larger.

Third, persons moving from one industry to another and then into unemployment will be recorded as moving between the two industries. This causes outflows from the first industry and inflows into the second to be overstated. Similarly persons moving from unemployment into an industry between one year and the next are recorded as a flow from their last industry of employment into the industry they entered. This also causes an overstatement of outflows and inflows. These distortions are not very serious for the measurement of flows over a seven year period. They may, however, have a greater effect on the annual data, although they probably tend to cancel each other out in the net flow figures.

Fourth, changes in the industrial classification of establishments exaggerate the size of flows. Between 1966 and 1967 the industrial classification of many establishments was changed as a result of the introduction of SET. This tax was originally designed to subsidize manufacturing employment at the expense of

construction and services, and it operated in this fashion until the subsidies were withdrawn in November 1967, except in areas designated by the government as depressed. After this date manufacturing paid the tax and received a refund so that it continued to discriminate, although less strongly, against construction and services.

The White Paper¹ introducing SET invited employers to apply for recognition of their establishments as in manufacturing. Many of them did so and were successful. Since in most cases the industrial classification of an establishment is the same as its classification for SET purposes, the result was a significant change in the definition of industries and hence in industrial employment levels

Changes in the industrial classification of establishments generate spurious flows in the inter-industry mobility data. Figures on the number of employees actually reclassified are not available, but the DE have published estimates of the effects of reclassifications on male and female industrial employment levels in 1966. These show that manufacturing gained an extra 87,000 men and 24,000 women mostly at the expense of construction, distribution, and miscellaneous services. The increases were not distributed evenly across two digit industries, chemicals and leather and leather goods lost women and vehicles and shipbuilding lost both men and women. But the size of these losses was small. Changes also occurred in the remaining non-manufacturing industries. Transport and communications where with certain exceptions the tax was refunded gained 7,500 men and others experienced minor losses.

²See The Selective Employment Tax, Cmd. 2981 (London, H.M.S.O., 1966), p.5.

The flow figures for 1966-67 were adjusted for these classification changes by subtracting each two digit manufacturing industry's employment increase from its gross inflows from non-manufacturing on the assumption that these changes reflect reclassifications from industries penalized to those subsidized by SET. In those few cases where employment fell after reclassification the size of the decline was subtracted from outflows into non-manufacturing in order to achieve balance between the two digit data and the aggregate flows between manufacturing and non-manufacturing.

Employment declines in non-manufacturing were subtracted from gross outflows to manufacturing. But the 7,500 increase in men in transport and communications complicated the adjustment process. It was assumed that 4,500 of these persons came from distribution and 3,000 from miscellaneous services. Consequently the estimated sizes of spurious outflows from each of these industries into manufacturing (as measured by the decline in employment before and after reclassification) were reduced by these amounts.¹ The adjustments made to the gross flow data to allow for the effects of reclassifications are shown in Table A.²

No adjustments were made to the 1967-68 data, despite the fact that further reclassifications may have occurred. The male flow from public administration into construction in 1963-64 was,

¹See "Annual and Quarterly Employment Statistics: Revision to June 1966 Estimates of Employees in Employment in Great Britain", DEP Gazette, (Nov., 1968), pp.913-15.

²The adjustment for spurious inflows into transport and communications was not performed on the 1966-67 data used in Sleeper, op. cit. (Manpower Redeployment and the SET). Hence there is a slight discrepancy between the figures in the Appendix to the article and those shown in Table A. But this has no significant effect on the analyses in either study. The figures in Sleeper, op.cit. (SET and the Shake-Out), are the same as in Table A.

however, reduced by 25,000 to allow for the reclassification of 25,000 public administration workers into construction in June, 1964.¹ Consequentlyⁱⁿ Table 2.¹ construction net flow and employment changes have been reduced by 25,000 below values calculated from the official estimates and the comparable figures for public administration have been raised by an equal amount.

¹See "Number of Employees (Employed and Unemployed) June 1964", MoL Gazette (Feb. 1965), p.59.

TABLE A: Adjustments for Spurious Flows in 1966-67 (thousands)

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	<u>Inflows</u>	<u>Spur- ious</u>	<u>Adj. Inflows</u>	<u>Outflows</u>	<u>Spur- ious</u>	<u>Adj. Outflows</u>	<u>Net Flows</u>
MALES							
1.	22.6		22.6	40.9	-1.8	39.1	-16.5
2.	22.4		22.4	39.5	-2.0	37.5	-15.1
3.	70.7	-12.5	58.2	61.5		61.5	-3.3
4.	45.1		45.1	34.8		34.8	10.3
5.	47.0	-3.1	43.9	48.1		48.1	-4.2
6.	192.4	-36.2	156.2	152.4		152.4	3.8
7.	17.0		17.0	11.3	-0.2	11.1	5.9
8.	59.2		59.2	65.5	-6.0	59.5	-0.3
9.	53.4	-1.7	51.7	57.5		57.5	-5.8
10.	33.7	-0.4	33.3	37.1		37.1	-3.8
11.	4.1	-0.6	3.5	4.1		4.1	-0.6
12.	9.8	-0.7	9.1	13.9		13.9	-4.8
13.	48.2	-11.7	36.5	36.9		36.9	-0.4
14.	41.1	-20.9	20.2	35.7		35.7	-15.5
15.	30.2	-2.0	28.2	27.6		27.6	0.6
16.	31.5	-3.2	28.3	29.5		29.5	-1.2
Mfg.							
Total	683.4	-93.0	590.4	615.9	-6.2	609.7	-19.3
17.	174.7		174.7	192.2	-41.6	150.6	24.1
18.	26.4		26.4	20.8	-0.4	20.4	6.0
19.	108.1	-7.5	100.6	88.9		88.9	11.7
20.	138.8		138.8	215.6	-35.1	180.5	-41.7
21.	23.3		23.3	19.0	-0.2	18.8	4.5
22.	65.0		65.0	46.9	-3.9	43.0	22.0
23.	123.4		123.4	126.8	-8.6	118.2	5.2
24.	83.6		83.6	65.2	-0.7	64.5	19.1
FEMALES							
1.	8.5		8.5	7.8	-0.6	7.2	1.3
2.	2.5		2.5	4.3	-0.1	4.2	-1.7
3.	53.4	-8.7	44.7	45.5		45.5	-0.8
4.	21.7		21.7	21.4	-0.2	21.2	0.5
5.	8.4	-0.6	7.8	11.1		11.1	-3.3
6.	85.8	-3.5	82.3	78.1		78.1	4.2
7.	1.4		1.4	1.7	-0.1	1.6	-0.2
8.	16.7		16.7	14.8	-1.3	13.5	3.2
9.	24.5	-1.0	23.5	27.5		27.5	-4.0
10.	29.3	-0.1	29.2	39.8		39.8	-10.6
11.	4.8		4.8	2.9	-0.6	2.3	2.5
12.	28.4	-1.8	26.6	39.8		39.8	-13.2
13.	9.4	-0.9	8.5	8.4		8.4	0.1
14.	10.5	-2.8	7.7	8.6		8.6	-0.9
15.	28.6	-0.7	27.9	24.6		24.6	3.3
16.	23.2	-3.8	19.4	20.2		20.2	-0.8
Mfg.							
Total	346.1	23.9	322.2	344.4	2.2	342.2	-20.0
17.	18.3		18.3	20.1	-3.1	17.0	1.3
18.	6.6		6.6	4.7	-0.1	4.6	2.0
19.	27.0		27.0	21.8	-1.0	20.8	6.2
20.	135.5		135.5	208.9	-12.8	196.1	-60.6
21.	35.7		35.7	31.1		31.1	4.6
22.	122.5		122.5	87.5	-0.3	87.2	35.3
23.	153.3		153.3	150.9	-2.4	148.5	4.8
24.	54.7		54.7	29.2	-1.3	27.9	26.8

Note. Numbers in left hand column refer to Industries listed in Key to Abbreviations.

Source: See text.

APPENDIX B

THE EMPLOYMENT DATA

The figures on male and female employment in Great Britain, which are used in this Study were supplied by DE Statistics Division, Watford. They are not comparable to estimates published in the Ministry of Labour Gazette prior to 1966, because these were found to be inaccurate owing to belated exchanges of National Insurance cards.¹ They have recently been published with minor amendments in Department of Employment, British Labour Statistics Historical Abstract 1886-1968 (London, H.M.S.O., 1971), Tables 136 and 137, pp.250-53. Figures on employed plus unemployed by last industry of employment are in Tables 130 and 131, pp. 336-41. Differences between the published figures and those used in this study are due to the Ministry's attempts to reconcile the industrial estimates with total employment figures obtained by a different method. The adjustments are minor and have no effect on the analyses in this study.

The three digit monthly employment statistics that provide the basis for Tables 7.9 and 7.10 and the quarterly series in Chart 7.2 have not been published. They are available on request from DE Statistics Division, Watford and the author.

¹ See "Revised Employment Estimates: Great Britain 1964 and 1965", MoL Gazette (March, 1966), pp.110-12, and "A New Quarterly Series of Total Employment", MoL Gazette (May, 1966), pp.207-215.

APPENDIX C

CHOICE OF TURNING POINTS AND INDUSTRIAL DEFINITIONS OF THREE DIGIT INDUSTRIES

The turning points identified in Tables 7.9 and 7.10 are the months in which each industry experienced its highest (lowest) employment level in each cycle - the major turning points. Months in which minor turning points occurred were ignored. If two major peaks were observed for an industry its position in the ordering was determined by the date of the second peak. The reasoning here is that only a sharp downswing in employment can be taken as ruling out the possibility that employment growth was restricted by recruitment difficulties.

There is one exception to this rule. In the 1955-58 period an initial recovery in late 1956 - early 1957 was followed by a second recession. This created two peaks in several important industries and in two cases - other electrical goods and non-electrical engineering - the second peak was above the first. Nevertheless the start of the recession has been dated from the first peak, because in these cases the subsequent decline in employment was most likely due to a fall in manpower requirements not a reduction in labour supply.

The following table relates each industry in Tables 7.9 and 7.10 to the industries defined in the 1958 and the 1948 standard industrial classifications. Since the discussion in the text was concerned only with the identification of peaks and troughs no attempt was made to link the data based on each classification. An analysis of the differences in industrial definitions between industries can be found in General Register Office, Census 1961 England and Wales Industry Tables, Part I, Appendix D., pp.XLII - XLVII.

Comparison of Industrial Definitions for Tables 7.9 and 7.10

Industries in Tables 7.9 and 7.10	Industries in 1958 S.I.C.	MLH No.	Industries in 1948 S.I.C.	MLH No.
1. Jewellery	Jewellery	396	Jewellery	102
2. Radio & Electronics	Radio & Electronics	364	Wireless apparatus & Gramophones	73
3. Motor Vehicles	(Motor Vehicles Mfg.; (Motor Cycle, Three Wheel Vehicle (& Pedal Cycle Mfg.	381		
4. Non Ferrous Metals	(Light Metals; (Copper, brass and other base metals	382	Motor Vehicle & Cycle Mfg.	80
5. Iron Castings	Iron Castings	321	Non Ferrous Metals	49
6. Other Elect. goods	Other Elect. goods	322		
7. Watches and Clocks		313	Iron Foundries	42
8. Metal Industries	Watches and Clocks (Metal Industries n.e.s.; (Cans and Metal Boxes	369	(Wireless Valves & Elect. Lamps; (Batteries & Accumulators; (Other Elect. goods.	74 75 79
9. Industrial Engines		351	Mfg. and Repair of Watches & Clocks	101
10. Bolts and Nuts	Industrial Engines	399	(Metal Industries n.e.s.;	99
11. Wire and Wire Mfg.	Bolts and Nuts	395	(Iron and Steel Forgings; (Hollow-ware; (Brass	92 94 95
12. Iron and Steel	Wire and Wire Mfg. Iron and Steel		Stationary Engines	55
13. Mechanical Engineering	(Contractors' Plant & Quarrying (Machinery; (Mechanical Handling equipment; (Office Machinery; (Other Machinery	334 393 394 311	Bolts and Nuts	91
	Insulated Wires and Cables		Wire and Wire Mfg.	93
14. Wires and Cables	Steel Tubes	362	Iron and Steel	41
15. Steel Tubes	Telegraph & Telephone apparatus	363	Non-electrical engineering	69
16. Telegraph and Telephones	(Machine Tools; (Engineer's Small Tools and Gauges	332 333		
17. Machine Tools	Electrical Machinery	361	Wires and Cables	71
18. Electrical Machinery			Iron and Steel Tubes	44
			Telegraph and Telephone Apparatus	72
			Machine Tools	54
			Electrical Machinery	70

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