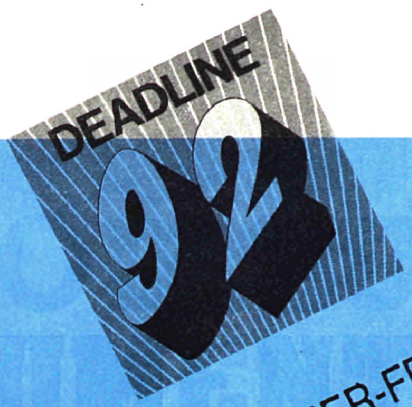
PROGRAMME FOR RESEARCH AND ACTIONS ON THE DEVELOPMENT OF THE LABOUR MARKET

TRENDS IN NON-WAGE LABOUR COSTS AND THEIR EFFECTS ON EMPLOYMENT

FINAL REPORT



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FINAL REPORT

by

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Document

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ABSTRACT

Non-wage labour costs comprise between 30 and 40 per cent of total labour costs in the average firm within the OECD bloc of countries. In many countries, their percentage share of total labour costs in both manufacturing and service industries has grown systematically over several decades. During the 1960s and early 1970s, labour market analysts concentrated their attention on the employment effects of hiring and training costs which comprise a relatively small proportion of all non-wages. In more recent times, and particularly in the 1980s, interest has expanded to embrace the employment and other labour market effects of changes in statutory and/or voluntary pension, health and unemployment contributions as well as in holiday payments and other special cost items.

The early, human capital oriented, studies were principally concerned with explaining the cyclical adjustment of employment and hours of work to unanticipated changes in product demand. In later theoretical and empirical work, it was established that integrating the rôle of non-wages into labour market analyses helped to cast considerable light on such diverse topics as the employment effects of working time reductions, the comparative international variability of workers and hours (especially in relation to the incidence of unemployment), the employment implications of job security policies, the job creation potential of payroll tax reductions and the implications of special tax treatment of employee fringe benefits.

This report is designed to cover these and other policy topics, with a marked emphasis on the most recent international research activity. Attention is concentrated on the Federal Republic of Germany, Japan, the United Kingdom and the United States of America. The breadth of

experience and policy direction encompassed by these countries allows us to provide a comprehensive review of the areas in which non-wage labour costs have an important bearing on employment as well as the wider labour market. In a European Community context, it is probable that a better set of policy perspectives is achieved from a discussion based on a wider comparative international setting. Our emphasis is decidedly on policy questions although we provide reasonable levels of theoretical and empirical background - in acccessible form - where these are deemed to be important to a full understanding of the economic issues involved.

In the course of this work, we present detailed statistical material for each of the four highlighted countries. These include non-wage estimates of fixed and variable components of costs, relative trends in individual cost items and the industrial decomposition of costs together with information on hours of work, labour turnover, employee skill and other labour market variables that relate closely to non-wages. Where possible, the statistics are constructed in such a way as to facilitate cross-country comparison.

CONTENTS

Chapter 1 Objectives, Scope and Definitions

A firm's total labour costs can be separated into remuneration that is directly related to the work performance of its employees and all other costs. The latter embrace a very wide spectrum of possibilities including social security contributions, private fringe benefits, hiring/firing and training costs, payments for days not worked, special types of bonus payments as well as a myriad of smaller cost items. Their collective name is non-wage labour costs (NWLCs). Recent years have witnessed a surge of interest in the labour market effects of changes in NWLCs, especially in relation to employment. Three outstanding factors help to account for this.

In the first place, the share of NWLCs within total labour costs has grown systematically in most OECD countries over the past two decades and now accounts for between 34 and 40 per cent of the total in the average firm. Precise international comparisons are rather difficult to make, depending on definitional choice and somewhat painstaking matching of cost items (e.g. Hart, 1984a). The Swedish Employers' Federation regularly presents a wide international set of comparative data and while the statistics are crude - involving little attempt at standardisation and entailing some interpolation - they at least provide the broadest available picture of international trends and growth rates. A sample of these data, depicting NWLCs as a percentage of total labour costs, are shown in Table 1.1 for the years, 1965, 1975 and 1983 along with an estimate of annual growth rates in the percentage. In all countries, the growth of non-wages has outstripped that of direct wages over this period. In the Federal Republic of Germany (FRG), the United Kingdom (UK) and the United States of America (USA) - three of the four countries on which this report focuses - the annual growth rates of the ratios are between 2.25 (FRG) and 3.74 (UK) per cent. Although

Table 1.1

Non-Wage Labour Costs as a Percentage of Total Labour Costs

	1965	1975	1983	Annual rate of growth[a] 1965-83
Austria	41.0	45.1	47.7	0.84
Belgium	43.5	41.7	44.9	1.82
Canada[b]	-	19.0	21.7	2.20[c]
Denmark	14.1	17.0	22.0	2.53
Finland	21.6	32.7	36.7	2.98
France	40.2	43.8	44.4[d]	0.56
Germany	29.7	39.2	44.4	2.25
Italy	44.9	51.4	46.3	0.17
Japan[e]	-	13.9	15.5	0.44[g]
Netherlands[f]	31.7	42.9	44.0	1.85
Norway	22.2	29.9	33.0	2.22
Sweden	19.0	32.2	40.6	4.32
United Kingdom	13.7	19.6	26.5	3.74
United States[b]	17.1	24.0	26.7	2.51
Average (unweighted)[h]	26.9	31.1	34.7	
Coefficient of variation (%)	39.1	37.7	31.1	

a Growth rate is for the proportion of NWLCs to total labour costs.
b Excluding the costs of vocational training and of welfare services.
c 1967 to 1983.
d Data do not include the extra week of vacation.
e Data refer to all employees. Irregular bonuses and payments for days not worked are included in wages for time worked. NWLCs for Japan are thus significantly underestimated in comparison to other countries (see discussion in the text).
f Data refer to all employees.
g 1970 to 1983
h Average and coefficient of variation are calculated for all countries, excluding Canada and Japan.

Source: Swedish Employers' Confederation, Wages and Total Labour Costs for Workers, International Survey.

our fourth country, Japan, displays far more modest growth (0.44 per cent) we will see elsewhere that certain categories of NWLCs - omitted from Table 1.1 - are increasingly believed to play a vital part in explaining key differences in the performance of the Japanese labour market and those of its main OECD competitors.

In the second place, over the same period covered by Table 1.1, economists have developed a number of labour market theories in which some types of NWLCs are seen to perform in distinctly different ways from the rôles traditionally accredited to direct wages. It has become increasingly recognised that certain earlier theoretical and empirical labour market studies that had included only direct wages as a reflection of labour costs may not only have misrepresented the full part played by total labour costs but also produced seriously misleading policy prescriptions. One central reason for this, as we shall see at several stages throughout the report, is that the structure of NWLCs necessitates the division of the firm's labour input into the number of workers and their rate of utilisation. The latter may include hours of work, shiftworking, work organisation and part-time working. In turn, when this distinction is incorporated into labour market analyses - together with the appropriate allocation of total labour costs - any resulting policy prescription may constitute a major departure from that obtained from equivalent earlier work.

Thirdly, several of the important labour market policy questions that arose in the second half of the 1970s and the 1980s happened to feature NWLCs quite prominently. Attempted answers helped to accelerated the development of relevant theory and empirical testing. Such problems included the topics of the effects of workweek reductions on employment and unemployment, the labour market implications of increased job security

legislation, the employment generating potential of cuts in payroll taxes and the benefits/costs of a long-term growth of specific human capital investments. A particularly stimulating development in some of these areas has been the fact that certain analysts chose to go along the relatively difficult route of carrying out their research in a comparative international perspective and thereby achieved much more general insights.

1.1 Objectives and Scope

The central aim of the report is to convey the importance of NWLCs to current labour market policy questions, particularly those relating to employment. In order to capture as wide a range of policy topics as possible, the work focuses on international aspects of costs in four contrasting major OECD economies - viz. FRG, Japan, UK and USA. While the report is designed to be completely self-contained in that it discusses essential economic arguments wherever necessary, excessive formality and detail in this direction are avoided. For interested readers, a great deal of complementary technical economic analysis is provided in Hart (1984a) while the present study provides a wealth of references that give in depth economic analyses of each specific subject area covered.

The European/North American/Japanese orientation enables us to deal with NWLCs and employment in a number of different dimensions.

First, as we shall see particularly in chapters 2 and 6, there is a sharply contrasting structure of NWLCs among the four countries. The following examples are among those of concern to later discussion.

a The FRG places far greater emphasis on legislatively imposed social security costs than do the other countries.

b The Japanese bonus structure has an importance and rôle not found elsewhere.

c Job security legislation – typically imposing a special type of NWLC on the employer – is far more prevalent in Europe than in the USA.

d Per-employee unemployment insurance contributions in the USA constitute a tax on jobs that applies differently from elsewhere.

Secondly, policy discussion involving NWLCs, while displaying general overlap in one or two areas, has tended to vary among the three geographical regions. A number of examples stand out. In Europe, economic models incorporating NWLCs have proved to be especially helpful in clarifying several of the thorny questions relating to the employment effects of workweek reductions. In contrast, United States economists have devoted considerably more attention to studying the economic reasons for and the implications of the growth of private fringe benefits. One particular fixation in Japan has been the employment implications of the growth of private and statutory pension contributions in the wake of a significant actual and forecasted growth in the retirement cohort as a proportion of the economically active population.

Thirdly, the choice of the four highlighted countries permits a discussion of the most important international comparative work that has focused on NWLCs. An important aspect of the work has involved an evaluation of the relative variability of employment, hours of work and wages in Japan and the USA. In a similar context, differences in job tenure and earnings profiles in these two countries have also been examined. Another area of comparative research has concentrated on the implications for employment adjustment and workers/hours variability of an unequal incidence of job security rules in Europe and the USA. Closely related to this area, economists are beginning to attempt to explain why, during downturns in economic activity, worksharing is more prevalent in Europe while the USA appears to resort more readily to the use of temporary layoffs.

While the main focus of the report is on the analysis of current employment policy as it relates to very recent research findings involving NWLCs, the preparation of parts of the relevant background evidence has enabled us to present new information that extends earlier work. In particular, we provide the most accurate and detailed estimates of fixed and variable NWLCs (for definitions, see next section) so far attempted. Other statistical breakdowns together with some empirical investigation contain much new material.

1.2 Two Key Definitions

1.2.1 NWLC coverage

In very broad terms, NWLCs are defined to include the following cost categories:

statutory social welfare costs

voluntary social welfare costs

payments for days not worked

benefits in kind

other expenses of a social nature

vocational training costs

taxes and subsidies

[bonuses].

These are the general headings adopted in the EC classification of labour costs (see Labour Costs in Industry, EUROSTAT, various volumes). Each heading is subdivided into more narrowly defined cost items, the number of which vary from country to country. Hart (1984a) provides detailed breakdowns under the EC classification for the four countries of main concern here. The report not only deals with the employment issues related

to these costs taken as a whole but also focuses on most of the individual cost headings and attempts to convey their distinctive rôles.

The last cost item, 'bonuses', is bracketed in order to denote its somewhat special position with respect to non-wages. In many countries, bonuses can be regarded more or less in the same way as wage costs since they relate directly to work performance and effort. As we shall see in the next chapter and elsewhere, however, this interpretation may be totally unsatisfactory for certain countries. In our sample of countries in particular, it has been argued that Japanese bonuses may well be comprised largely of fixed NWLCs (as defined in the following sub-section) and should not be treated as direct compensation.

1.2.2 Fixed and variable NWLCs

The distinction between fixed and variable costs is, of course, well known in economics. Typically it applies to short-run production and cost theory where fixed costs are associated with a constant stock of capital and variable costs are wages paid to the variable factor input, labour. In the present context, the distinction - widely adopted in the labour market literature - has a somewhat different connotation. In the NWLC context, fixed and variable labour costs apply to two components of one input factor; these are, respectively, the number (or stock) of workers and their average rate of utilisation, the combination of which defines the labour input. Labour utilisation usually (although not invariably) refers to average working hours per period. Fixed (or more strictly 'quasi-fixed') NWLCs are, therefore, those costs that attach only to the number of workers and that do not vary with the rate of labour utilisation.

The fixed NWLCs that feature most prominently in the literature are specific training costs, especially those non-recurrent, or once-over, costs

that are incurred in the first period of a worker's lifetime in a given firm. If, for example, the worker has to learn to operate a highly specialised machine, then some minimum level of training would be required irrespective of the subsequent per-period length of working time. In the traditional quasi-fixed cost theory (Oi, 1962; Becker, 1964), it would be expected that the firm would pay the full cost of training that pertains exclusively to its own activities. While the training would be expected to enhance marginal product within the firm itself, workers who are laid-off cannot 'sell' this increment to marginal product to other firms because, by definition, the investment in their human capital is firm-specific. They are unlikely to be willing to pay for an investment that resulted in a wage reduction in the event of layoff. (By symmetric argument, workers would be expected to pay the full cost of general training.) It should be added, however, that more modern theory (especially Hashimoto, 1981) has established why it would be in the joint interest of employers and workers to share both the costs and returns of specific investments. Arising from these ideas, firms employing labour with relatively high specific human capital endowments are more likely to encourage long tenure thereby maximising the discount period over which the once-over investments are amortised.

Other types of NWLCs are also fixed, especially certain types of voluntary social welfare payments. Indeed, these are often quantitatively more important than training costs and recent studies have concentrated on their labour market policy implications. The main point to establish here, however, is that several of the important ideas in the subsequent policy discussion hinge on the division of labour costs into fixed and variable components and on the associated division of the labour input into stock and utilisation components. Much related effort has also been devoted to providing detailed estimates of fixed/variable cost ratios for our four countries.

Chapter 2 International Trends in Non-Wage Labour Costs

In the following sections in this chapter, we feature what we believe are the main trends in NWLCs in each of the four featured countries. As far as possible the discussion is designed to concentrate on common cost features in our four countries of interest as well as to provide a useful background on which to focus later policy discussion. On occasion, however, the discussion deals with country-specific information where this is thought to be essential information for later references to that country.

2.1 Federal Republic of Germany

As in all other OECD countries, hourly NWLCs in FRG have grown considerably in recent years. Table 2.1 shows indices of hourly real total NWLCs (including all cost items except for bonuses listed in section 1.2.1) for manual and non-manual (more strictly, blue collar and white collar) workers in FRG for the years 1978, 1981 and 1984 together with an index of hourly productivity. The costs have grown by just under 20 per cent for the period and they are almost exactly in line with productivity growth.

A better appreciation of the importance of NWLCs is gained, however, by expressing them as a proportion of total labour costs. This is carried out in Table 2.2. Not only are non-wages then seen to be significant in absolute terms - comprising 44.4 per cent of total labour costs in manufacturing in 1984 - but it is clear that they have been growing faster than direct compensation. Between 1978 and 1984 they have accounted for over 8 per cent more of total labour costs. This depressed economic period witnessed, on the average, great wage restraint by German unions with real labour costs per employed person (measured as total compensation divided by the GDP price deflator) growing at a modest rate of about 1 per cent per

Table 2.1

Indices of real NWLCs and productivity:
FRG manual and non-manual workers in manufacturing,
1978, 1981 and 1984

(1978=100)

	NWLCs[a]			Productivity[b]
	manual	non-manual	total	
1978	100	100	100	100
1981	114	108	112	108
1984	117	119	119	119

a Average hourly cost deflated by consumer price index.
b Output per person hour in 1978 prices.

Sources: EUROSTAT, Labour Costs in Industry (various issues); Produktionsvolumen und-potential, 'Produktionsfaktoren des Bergbaus und der vararbeitenden Gewerbes in der Bundesrepublik Deutschland' (Berlin: Deutches Institut für Wirtschaftsforschung).

Table 2.2

Non-wage labour costs as a percentage of
total labour costs by type of costs:
FRG manufacturing industry,
1978, 1981 and 1984

	As percentage of total labour cost				
	All non wages	Payments for days not worked	Statutory Social Welfare	Voluntary Social Welfare	Vocational training
1978	36.1	13.1	14.2	0.3	1.7
1981	43.5	15.2	13.9	2.3	1.0
1984	44.4	14.4	14.3	3.1	1.1

Source: Statisches Bundesamt: Fachserie 16 'Arbeitskostenerhebung'

annum. Clearly, labour cost growth would have been even more modest - and on a par with countries like USA, Denmark and Sweden that experienced negative rates of real labour costs at this time (see OECD, 1985) - if NWLCs have grown at the same rate as wage compensation.

Table 2.2 also gives a breakdown of the NWLC percentages by four of the main cost items (see section 1.2.1). A very noticeable feature of FRG NWLCs in general is that statutory social welfare costs (i.e. employer compulsory contributions to pensions, health care, unemployment and short-time insurance) are considerably greater than voluntary social welfare costs (such as private industrial retirement pensions and net payments to private pension funds). Since the Second World War, there has been great cooperation between unions and governments in FRG over the mandatory provision of benefits and the emphasis given to statutory relative to voluntary social welfare is stronger than any other OECD country. (A general discussion of the relative economic merits of these two types of NWLC can be found in Hart, 1985; see also Chapter 5.) Noticeably, however, voluntary social welfare costs have grown appreciably faster than statutory costs in manufacturing, accounting for one-third of the total growth of non-wages as a percentage of total costs between 1978 and 1984.

As indicated in section 1.2.2, the ratio of fixed-to-variable NWLCs are often a vital consideration in economic analyses involving non-wages. Recall that fixed NWLCs are those cost items that are independent of hours worked per period. NWLCs that can be regarded as fixed costs include supplementary retirement and provident schemes, payments to savings schemes, severance pay, etc. (for a complete list, see below). A rigorous measurement of fixity would also divide statutory social security into fixed and variable components but we leave discussion of this point until a little later. Albeit to state that in the estimated fixed/variable cost ratios for

manufacturing industries (1978, 1981 and 1984) shown in Table 2.3, statutory social welfare payments are treated as purely variable costs. Payments for days not worked are also regarded as variable costs despite the fact that there is some ambiguity over the precise allocation of such costs (see the discussion in Hart, 1984a, Ch.2).

On this narrow definition of fixity - referred to as Ratio I in Hart (1984a) and in later sections of this report - it can be seen that the fixed/variable cost ratio has grown from 0.06 to 0.10 over the period. The estimated ratios are somewhat smaller than in the other three countries of interest but their positive growth rate is common to all (see Hart, 1984a and OECD, 1986). As expected, the aggregate figures disguise a wide dispersion of individual industry ratios. For example, a ratio of 0.23 in mineral oil refining contrasts with a ratio of 0.05 in the leather and leather goods industry in 1984. As emphasised in Chapter 6, large capital intensive industries are likely to incur higher degrees of labour fixity than smaller industries with relatively high labour intensity. This does not hold invariably, however, as a closer comparative examination of Table 2.3 will reveal. As far as growth rates are concerned, the ratio grew by 136 per cent in iron and steel in contrast to -33 per cent in the manufacture of tools and finished metal goods.

While the figures in Table 2.3 give a reasonably accurate impression of the relative sizes and growth rates of the fixed/variable cost ratios among the industries, they are not precise estimates. In particular, they almost certainly understate the sizes of the ratios in high wage industries like chemicals and metal manufacture. The principal reason concerns the system governing statutory social welfare contributions. In common with the other three countries featured in this report - and most other countries in the OECD bloc - employers in FRG contribute to each item of social welfare in

Table 2.3

Fixed/variable Cost Ratios (Ratio I):
German Manufacturing Industries
1978, 1981 and 1984

	1978 Ratio I	1981 Ratio I	1984 Ratio I
Mineral oil refining	0.26	0.20	0.23
Iron and steel	0.11	0.13	0.23
Non-ferrous metals	0.08	0.10	0.11
Non-metallic mineral goods	0.08	0.08	0.09
Glass and glassware	0.06	0.08	0.10
Ceramic goods	0.08	0.08	0.10
Chemicals	0.11	0.12	0.16
Foundries	0.08	0.08	0.08
Structural metal products	0.12	0.12	0.14
Tools and finished metal goods	0.06	0.06	0.04
Mechanical engineering	0.09	0.09	0.10
Office and data processing machinery	0.11	0.28	0.15
Electrical engineering	0.09	0.10	0.13
Motor vehicle manufacturing	0.09	0.10	0.11
Shipbuilding	0.09	0.10	0.13
Aerospace	0.11	0.11	0.15
Instrument engineering	0.08	0.08	0.09
Tobacco products	0.15	0.26	0.24
Textiles	0.05	0.05	0.06
Leather and leather goods	0.04	0.05	0.05
Timber and furniture	0.06	0.07	0.07
Pulp, paper and board manufacture	0.09	0.10	0.10
Paper and board processing	0.06	0.06	0.07
Printing	0.06	0.06	0.06
Rubber and plastics processing	0.06	0.07	0.07
Rubber products	0.05	0.06	0.06
TOTAL MANUFACTURING	0.06	0.09	0.10

Sources: Statisches Bundesamt, Fachserie 16 'Arbeitskostenerhebung'

the form of a payroll tax which, for a given period of time, varies directly with wages up to a ceiling cut-off limit. For employees with wages above the ceiling, the contribution per period is calculated simply as the tax rate multiplied by the ceiling wage. Therefore, in these cases, the contributions constitute fixed costs since a change in the wage - due, for example, to longer per-period hours - involves no change in contribution. Currently in FRG, again like many other countries, the wage ceilings are situated towards the upper tails of wage distributions. Firm with predominantly male and highly skilled labour may nonetheless experience high fixed costs given a significant proportion of their workforce may well receive wages above ceiling levels. For most other firms, however, statutory social welfare contributions comprise essentially variable labour costs.

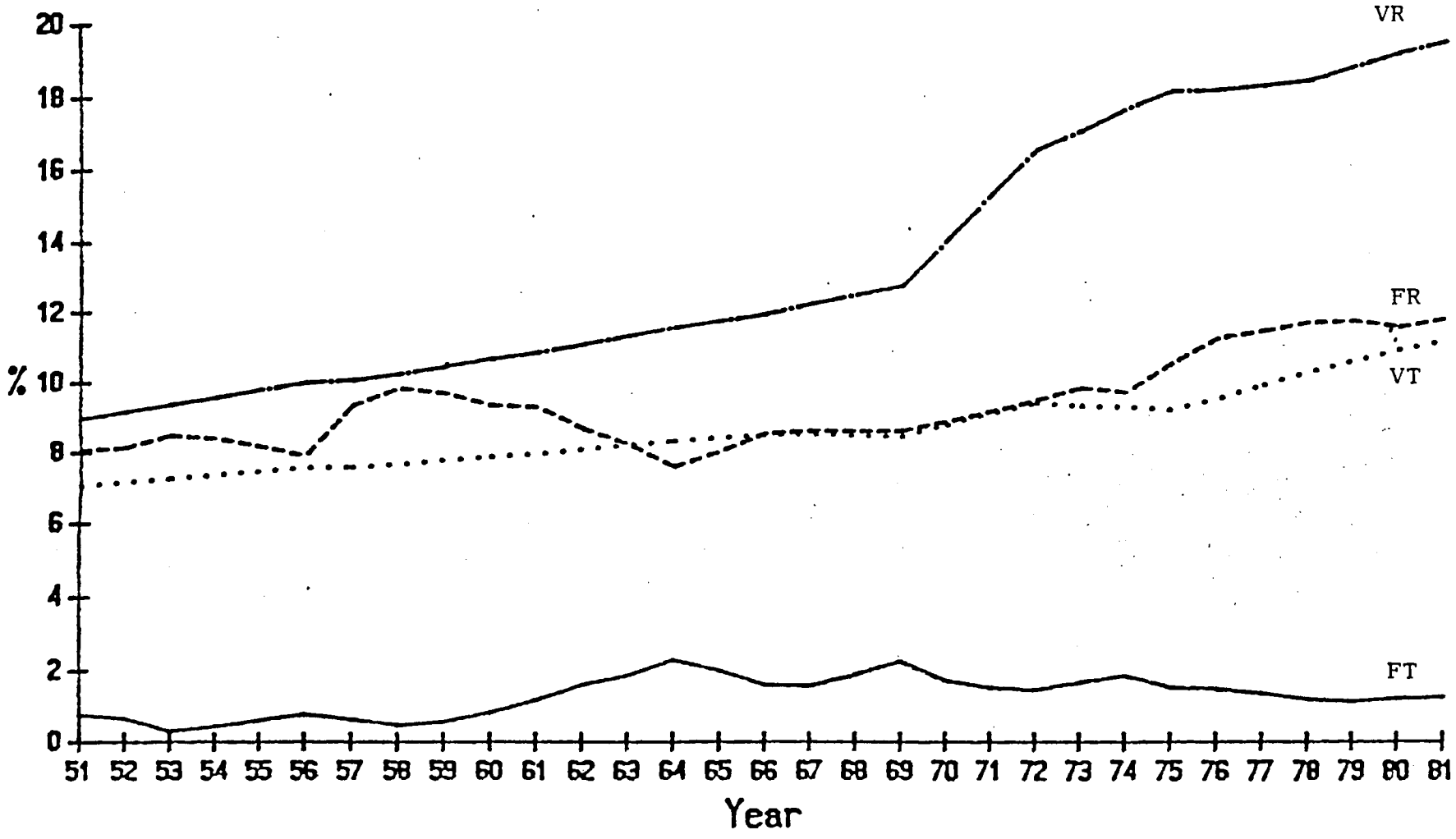
In research into the effects of payroll tax changes on employment and hours of work in FRG - reported on in some detail in section 3.2.2 - Hart and Kawasaki (1987) have produced detailed estimates of aggregate manufacturing fixed and variable NWLCs that include adjustments to take account of social welfare wage ceilings as well as some special features that are FRG specific. Estimates from this study are presented in Figure 2.1 which shows the trend in fixed and variable labour costs between 1951 and 1981. Four categories of non-wages are shown in the figure that, together, account for all FRG NWLCs. These are:

FT: average fixed statutory social welfare contributions (primarily concerning pension, health and unemployment insurance);

VT: average variable statutory social welfare contributions (with the same coverage as FT);

FR: average remaining fixed NWLCs (supplementary retirement and provident schemes, payments to workers' saving schemes, severance pay, vocational training, canteen/recreational and other social

Figure 2.1: Estimates of Average Per-Capita Fixed and Variable Non-Wage Labour Costs as Percentages of Total Labour Costs: FRG Manufacturing Industry, 1951-1981



Source: Constructed from data in Hart and Kawasaki (1987).

expenditures, benefits in kind, housing and housing allowances, family allowances, maternity and disability allowances, other expenditures);

VR: average remaining variable NWLCs (paid holidays and compensation for holidays not taken, sickness pay, holiday bonuses, public holidays, industrial accident insurance).

Estimates of FT and VT involved fitting and interpolating separate wage distributions for female and male workers as well as adjusting wage ceilings in order to compensate for the double monthly Christmas payment (Weihnachtsgeld) received by a high proportion of the total workforce.

The graphs in Figure 2.1 express the above cost categories as percentages of total labour costs. Up until the late 1960s variable 'remaining' non-wages (VR) grew steadily in relation to total costs and then increased from 12.8 per cent to 19.5 per cent of the total between 1970 and 1981. Variable payroll taxes (VT) declined significantly in the late 1950s/early 1960s with fixed taxes (FT) growing somewhat. The principal reason for this was that, during this period, wage ceilings were changed at infrequent intervals and wage growth pushed higher and higher proportions of workers over the ceiling limits. For example, both health insurance and unemployment insurance ceilings were unchanged between 1957 and 1964, at DM.660 and DM.750, respectively. After this time, and particularly in the most recent years, governments have increased the ceilings on an annual basis and, on average, ceiling growth has exceeded wage growth. Accordingly, VT has displayed trend growth and FT trend decline since 1964. By contrast, 'remaining' fixed non-wages have shown more or less steady growth over the entire period, starting at 7.1 per cent of total costs and finishing at 11.2 per cent. It should be emphasised that the statistics represented in Figure 2.1 should not be compared with the industrial data in Table 2.3 given the ability to input much more accurate detail into the former, but at the cost of greater aggregation compared to the latter.

2.2 Japan

This section and section 6.1.1 present extensive estimates of Japanese labour costs. A detailed discussion of sources and background technical work can be found in Appendix 2.1.

In line with virtually every OECD country, Japan's NWLCs have grown relative to total labour costs since the middle of the 1970s (see OECD, 1986 for a comprehensive international comparison). Tables 2.4 and 2.5 provide more detailed cost breakdowns of the trends. They show, respectively, the manufacturing and service industry time-series movements of the main components of wage and non-wage costs - expressed as proportions of total costs - since the mid-1960s. Figures 2.2 and 2.3 give a pictorial display of the same information. The outstanding features of these data are as follows:

(a) The two largest cost items - contract wages and the bonus - have exhibited remarkable stability within the total share over the past decade,

(b) There is a pro-cyclical fluctuation in overtime payments - particularly in manufacturing industry - which is in line with the well known cyclical variation in average hours of work in Japan relative to most other OECD countries (see section 4.2).

(c) Statutory welfare costs have shown the largest and the most persistent growth in the total share over the entire period.

(d) While the growth is not as marked as for statutory costs, voluntary welfare costs have also experienced an increased share over the period.

(e) Training costs have exhibited some cyclical fluctuation around a declining trend.

The constancy of the contract wage and bonus shares may reflect the fact that such compensation represents, primarily, returns to investment in specific human capital rather than outcomes of competitive market forces

Table 2.4

Wage and Non-Wage Labour Costs as a Proportion of Total Labour Costs:

Japanese Manufacturing Industry, 1965-85.

Year	Total Monthly Labour Costs (Yen)	As Percentage of Total Labour Costs								
		Contract Wages	Overtime Payments	Paid Holidays	Bonus	Statutory Welfare Costs	Voluntary Welfare Costs	Training Costs	Benefits in kind	Other NWLCs
1965	41517	59	7.9	2.4	15	4.6	5.6	0.65	3.6	1.3
1968	62104	56	9.0	2.3	17	5.0	5.4	0.81	3.4	1.6
1971	99865	55	7.1	2.4	19	4.9	5.6	0.68	3.3	1.5
1972	115379	55	6.9	2.2	20	4.9	6.0	0.65	3.3	1.4
1973	147005	53	8.8	2.2	20	5.0	5.6	0.74	3.1	1.4
1974	179978	54	6.1	2.4	21	5.2	5.6	0.64	3.0	1.4
1975	194915	56	4.6	2.4	20	5.9	6.1	0.47	3.2	1.3
1976	219109	55	5.9	2.3	19	6.0	6.7	0.40	3.2	1.3
1977	240802	54	6.2	2.4	19	6.5	6.9	0.38	3.2	1.5
1978	255866	54	6.4	2.3	18	6.6	7.7	0.39	3.3	1.5
1979	273855	53	6.9	2.1	19	6.7	7.4	0.40	3.1	1.7
1980	293689	53	7.4	2.3	19	6.7	6.6	0.48	3.0	1.8
1981	311649	53	7.0	2.3	19	7.2	6.7	0.47	3.4	1.7
1982	325262	53	6.8	2.3	19	7.4	6.8	0.47	3.2	1.8
1983	334014	53	7.0	2.4	18	7.4	6.8	0.43	2.9	1.8
1984	348921	53	7.7	2.2	18	7.3	7.0	0.45	2.3	1.2
1985	372903	52	7.7	2.1	20	7.3	7.0	0.45	2.3	1.0

Sources: 'Basic Survey on Wage Structure', Ministry of Labour;
'General Survey on the System of Wages and Working Hours', Ministry of Labour;
'Survey on the System of Welfare Facilities for Employees', Ministry of Labour;
'Wage Composition Survey', Ministry of Labour;
'Survey on Labour Costs', Ministry of Labour;
'Monthly Labour Survey', Ministry of Labour;
Other unpublished statistics.

Table 2.5

Wage and Non-Wage Labour Costs as a Proportion of Total Labour Costs:

Japanese Service Industry, 1967-85.

Year	Total Monthly Labour Costs (Yen)	As Percentage of Total Labour Costs								
		Contract Wages	Overtime Payments	Paid Holidays	Bonus	Statutory Welfare Costs	Voluntary Welfare Costs	Training Costs	Benefits in kind	Other NWLCs
1967	54977	67	3.6	2.8	15	3.6	3.4	0.65	3.3	0.6
1970	85767	63	3.0	2.7	19	3.4	3.8	0.67	3.1	0.7
1973	142322	56	3.2	2.0	25	4.5	4.3	0.51	3.8	1.1
1974	186214	55	8.8	2.0	24	4.9	4.6	0.78	3.3	1.3
1975	204302	61	6.1	2.1	19	5.5	4.3	0.45	3.4	1.4
1976	208118	57	4.6	2.0	21	5.6	4.9	0.55	3.5	1.7
1977	229603	56	5.9	2.0	21	6.0	4.9	0.49	3.3	1.9
1978	243599	57	6.2	2.0	20	6.1	4.8	0.54	3.4	2.4
1979	258284	56	6.4	2.0	20	6.2	4.8	0.58	3.1	2.3
1980	276029	56	6.9	2.2	20	6.4	4.7	0.58	3.1	2.4
1981	294565	56	7.4	2.0	19	6.9	4.9	0.58	3.7	2.3
1982	304364	56	7.0	2.0	19	7.0	4.9	0.59	3.5	2.5
1983	314229	56	6.8	2.0	19	7.0	5.0	0.57	3.0	2.5
1984	324870	56	7.0	1.9	20	7.1	5.1	0.53	2.3	2.8
1985	329785	59	7.7	2.1	18	7.1	5.1	0.53	2.4	1.1

Sources: 'Basic Survey on Wage Structure', Ministry of Labour;
'General Survey on the System of Wages and Working Hours', Ministry of Labo
'Survey on the System of Welfare Facilities for Employees', Ministry of Labour
'Wage Composition Survey', Ministry of Labour;
'Survey on Labour Costs', Ministry of Labour;
'Monthly Labour Survey', Ministry of Labour;
Other unpublished statistics.

Figure 2.2:

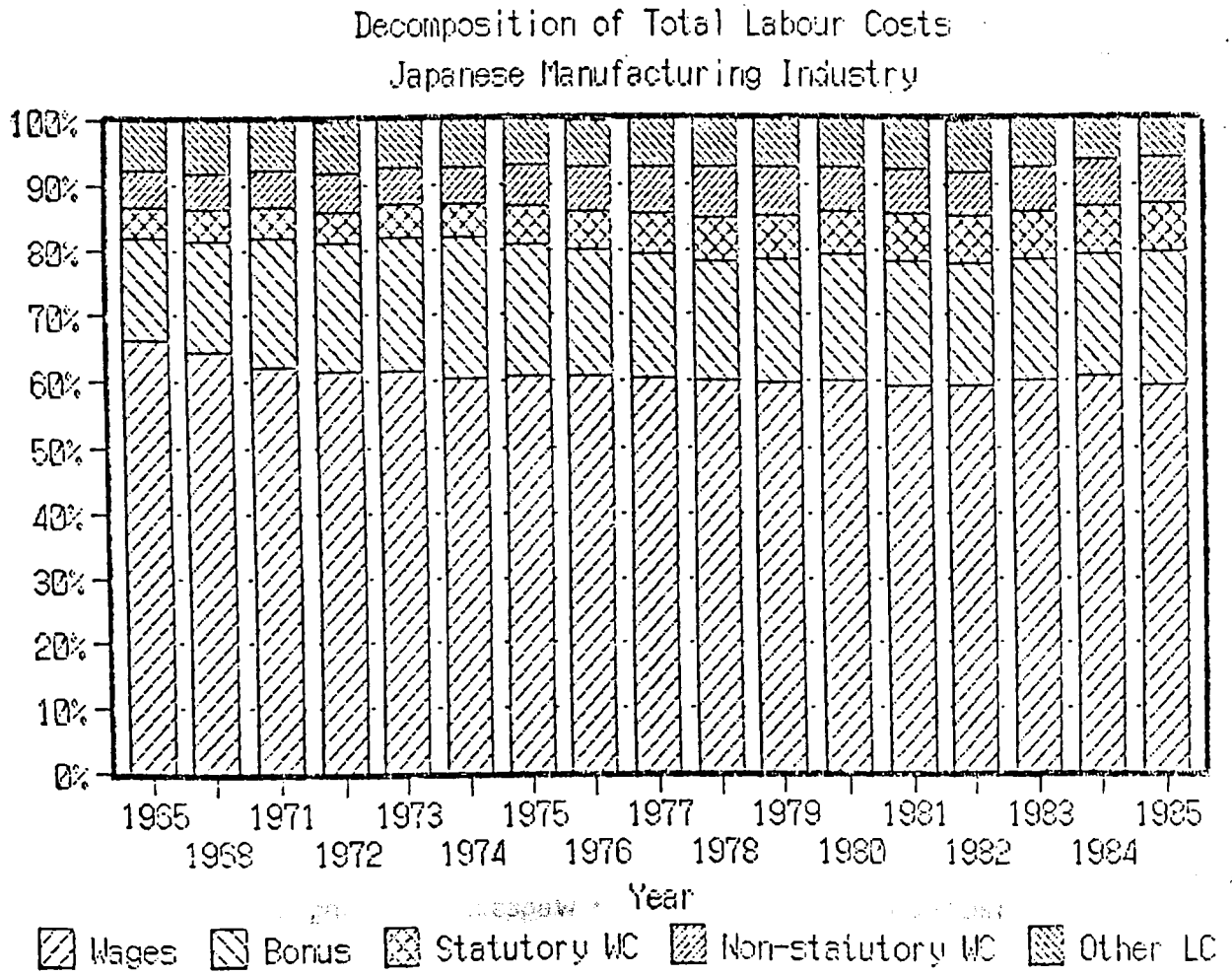
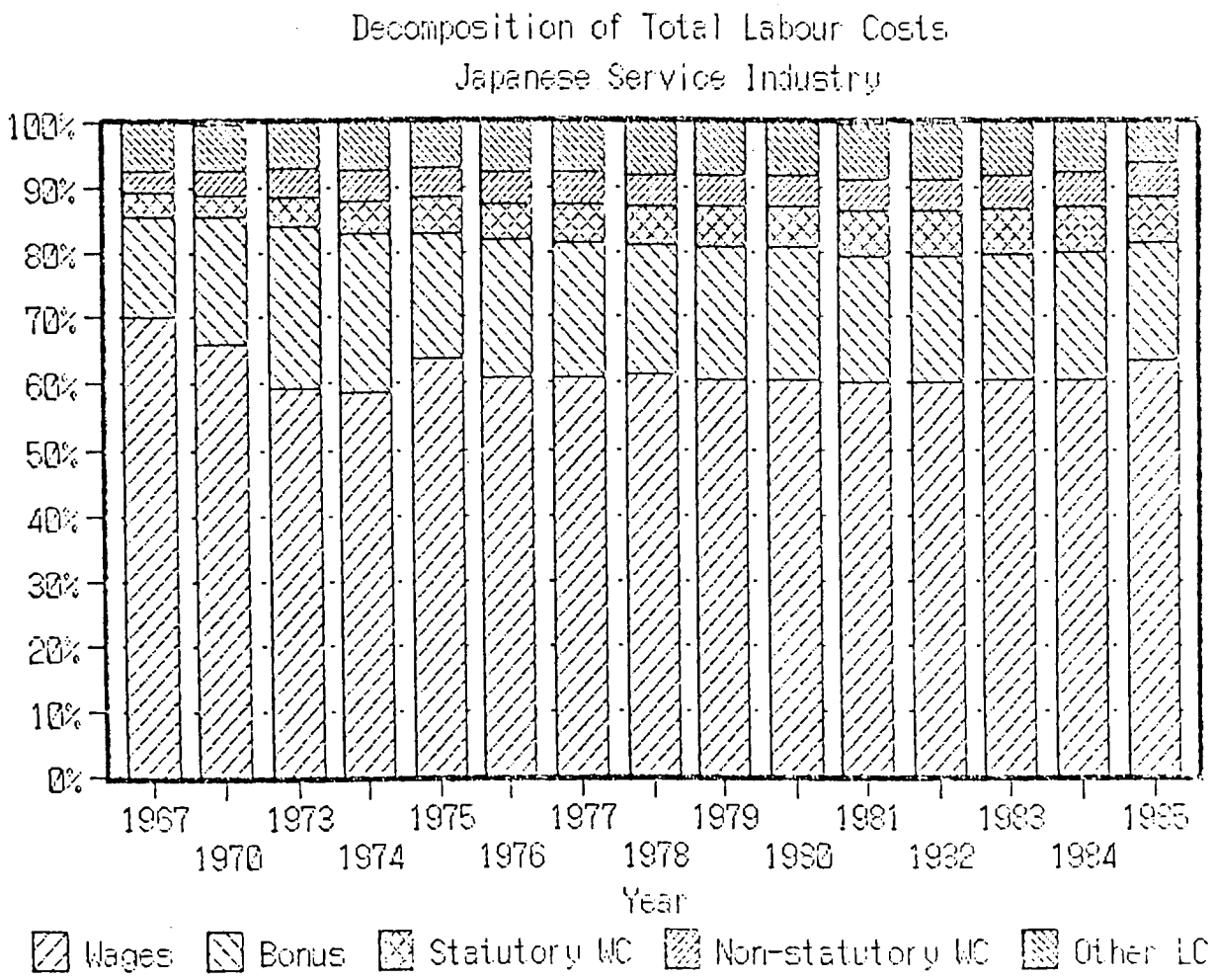

Decomposition of Total Labour Costs
Japanese Manufacturing Industry
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1965
1968
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
Year
Wages
Bonus
Statutory WC
Non-statutory WC
Other LC

Figure 2.3:


Decomposition of Total Labour Costs
Japanese Service Industry
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1967
1970
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
Year
Wages
Bonus
Statutory WC
Non-statutory WC
Other LC

(Hashimoto and Raisian, 1987; FitzRoy and Hart, 1987; Section 4.2). Fluctuations in excess labour demand on the external market – as represented by the rate of unemployment – is relatively unimportant in Japan. Also, Japanese workers change jobs significantly less frequently than, for example, their United States counterparts (Hashimoto and Raisian, 1985a). It is less likely under these circumstances that contract wage and bonus payments respond to unanticipated fluctuations in economic activity. High degrees of labour fixity (see below) are likely to induce firms to minimise costly turnover and meet demand fluctuations through variations in the utilisation rates of existing employees and nominal wage payments rather than through changing their stocks of workers.

This latter inference is supported by the above observation of relatively large cyclical variability in overtime payments. It is clearly this component of total compensation that accounts for the wide observation of relatively high variability in Japanese hourly wage compensation (e.g. Gordon, 1982; Hashimoto and Raisian, 1987).

Statutory welfare costs largely represent employers' contributions to social security schemes. In descending order of importance, the three main cost items relate to pension, health and unemployment benefit (see Hart, 1984a for FRG, Japan UK and USA breakdowns and Hart and Kawasaki 1987, for a very detailed FRG analysis). With the exception of a few countries (see, especially, section 2.3), this cost item has risen throughout OECD during this period. Its growth, and projected growth, is particularly marked in Japan, however, and it derives in the main part from the extraordinary growth in statutory pension contributions. The reason for this is that the growth rate of the retirement cohort in Japan relative to the economically active population is higher than for any other OECD country and, moreover, will accelerate towards the end of the century and into the next century (see

Hart, 1984a and 1987a). Contrary to the trend in most other countries, the Japanese are gradually increasing the average age of mandatory retirement in order to offset the inexorable rise of pension costs.

The above comments about the constancy of the contract wage and bonus payments should perhaps be tempered slightly by the observation of a growing share of voluntary welfare costs, essentially comprising private fringe benefits. As argued by Smith and Ehrenberg (1983) and others, employers and workers bargain over total compensation and not just direct remuneration and so wages, bonuses and fringes may be traded-off against one another. Given relatively long tenure among Japanese workers, it may be that, as real wage growth has progressed, they have placed greater emphasis on deferred compensation in the form of private health, pension and other benefits.

Two observations are worth making concerning training costs. First, in line with other countries (see Hart 1984a), they comprise a relatively small proportion of total NWLCs. (Despite enjoying a position in the labour market literature that would suggest the opposite!) Secondly, their fall in the total share during the second half of the 1970s, may well indicate some greater degree of economic uncertainty - in the wake of OPEC supply shocks - with respect to this aspect of specific human capital investments.

As we will see in the discussion of international comparisons in employment and hours variability in section 4.2, the relative size of Japanese fixed-to-variable labour cost ratios is an important consideration. Tables 2.6 and 2.7 provide the most detailed measures ever compiled on the sizes of these ratios in Japan, for manufacturing and service industries respectively. The tables show estimates of the ratios of fixed-to-variable labour costs based on three assumptions concerning which items should be included under fixed costs.

Table 2.6

Estimates of Fixed/Variable Labour Cost Ratios:
Japanese Manufacturing Industry, 1965-85

Year	Ratio I	Ratio II	Ratio III
1965	0.14	0.17	0.39
1968	0.14	0.16	0.41
1971	0.14	0.17	0.47
1972	0.14	0.17	0.49
1973	0.14	0.16	0.49
1974	0.13	0.16	0.50
1975	0.14	0.17	0.49
1976	0.15	0.17	0.48
1977	0.14	0.17	0.47
1978	0.16	0.19	0.47
1979	0.15	0.18	0.48
1980	0.15	0.17	0.48
1981	0.15	0.18	0.47
1982	0.15	0.18	0.47
1983	0.15	0.17	0.46
1984	0.13	0.16	0.44
1985	0.13	0.15	0.48

Sources: As for Table 2.4.

Table 2.7

Estimates of Fixed/Variable Labour Cost Ratios:
Japanese Service Industry, 1967-85

Year	Ratio I	Ratio II	Ratio III
1967	0.07	0.10	0.29
1970	0.08	0.10	0.37
1973	0.09	0.11	0.50
1974	0.08	0.11	0.48
1975	0.08	0.10	0.36
1976	0.13	0.16	0.50
1977	0.13	0.15	0.48
1978	0.13	0.16	0.47
1979	0.13	0.15	0.48
1980	0.13	0.16	0.48
1981	0.14	0.16	0.47
1982	0.14	0.16	0.47
1983	0.14	0.16	0.46
1984	0.13	0.15	0.46
1985	0.11	0.13	0.40

Sources: As for Table 2.4.

Ratios I and II are based on Hart, 1984a (see also OECD, 1986). The first is the narrowest definition, with fixed costs comprising all NWLCs other than paid holidays and bonuses that do not vary with hours worked. It should be noted that statutory welfare fixed costs are derived from detailed calculations that involve evaluating the relative importance of contributions that lie outside upper and lower tax ceilings on fitted wage distributions. A description of the methodology is given in Appendix 2.1 while further detailed analytical background can be found in Hart (1984a) and Hart and Kawasaki (1987). Ratio II further includes paid holidays as a fixed cost; it is argued in Hart (1984a) that such payments typically contain both fixed and variable elements which are usually impossible to separate in practice. Ratio III is significantly larger than the other ratios since it also includes bonus payments in the (fixed cost) numerator. Hashimoto (1979) and Hashimoto and Raisian (1987) argue that Japanese bonus payments largely reflect investments in specific human capital. As argued above, this view would seem to tie in with the constant share of the bonus observed in Tables 2.4 and 2.5. It would be difficult to imagine, however, that the bonus consists purely of such investments and so, as with Ratio II, the third ratio almost certainly contains some variable elements.

Graphs of the ratios in Tables 2.6 and 2.7 are shown in Figures 2.4 and 2.5, respectively. Since the early 1970s the ratios in manufacturing industry have remained quite stable with perhaps a slight tendency to decline in recent years. At least with respect to Ratio II, this contrasts with several other major OECD countries where larger growth is apparent. Undoubtedly the main reason for this latter observation is the fact that Japanese holiday payments, in contrast to almost every other OECD country, are small and constant over the entire period. The main difference in the service industry has been a much more marked dip in the bonus - thereby affecting Ratio III -

Figure 2.4:

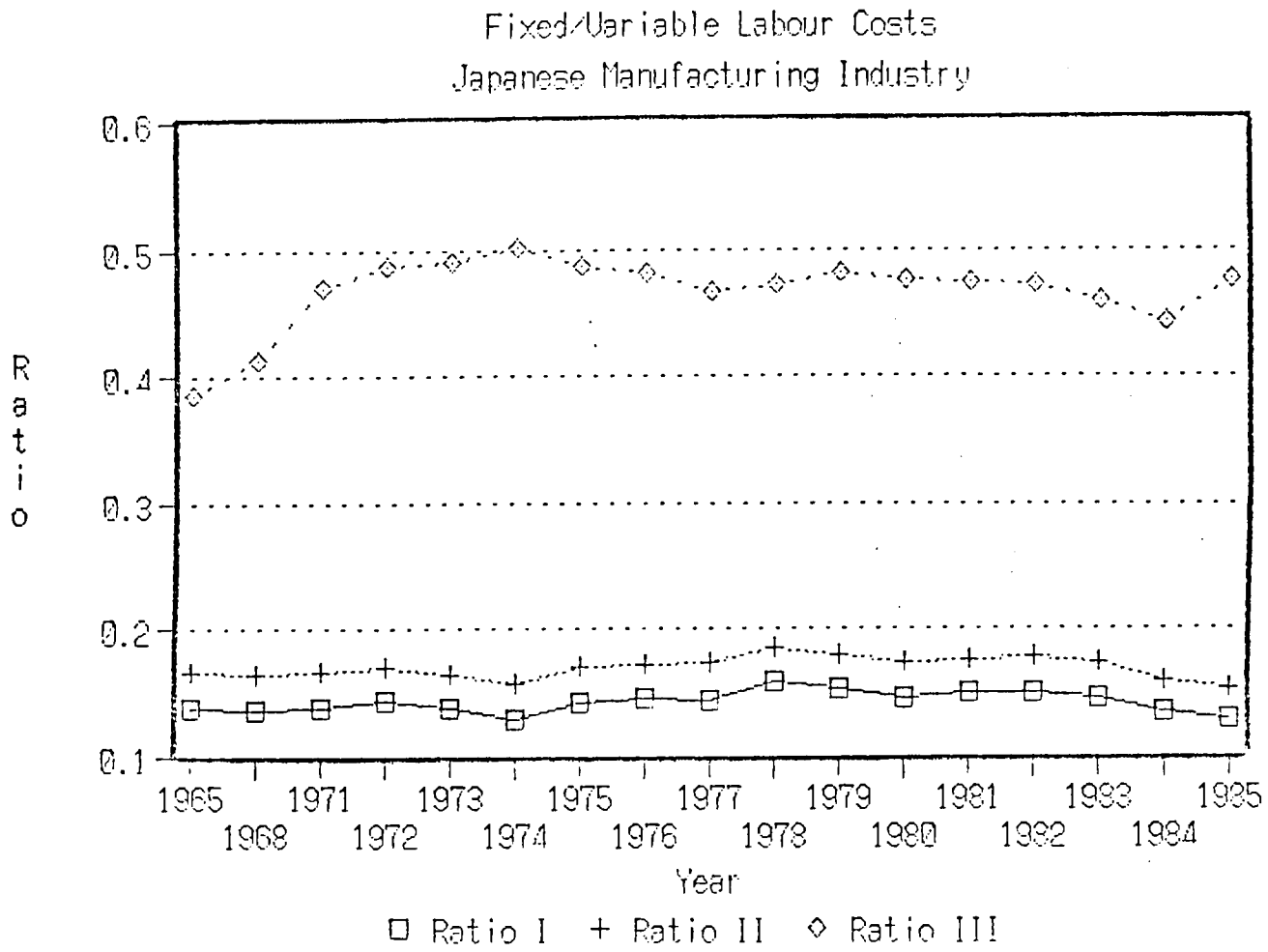
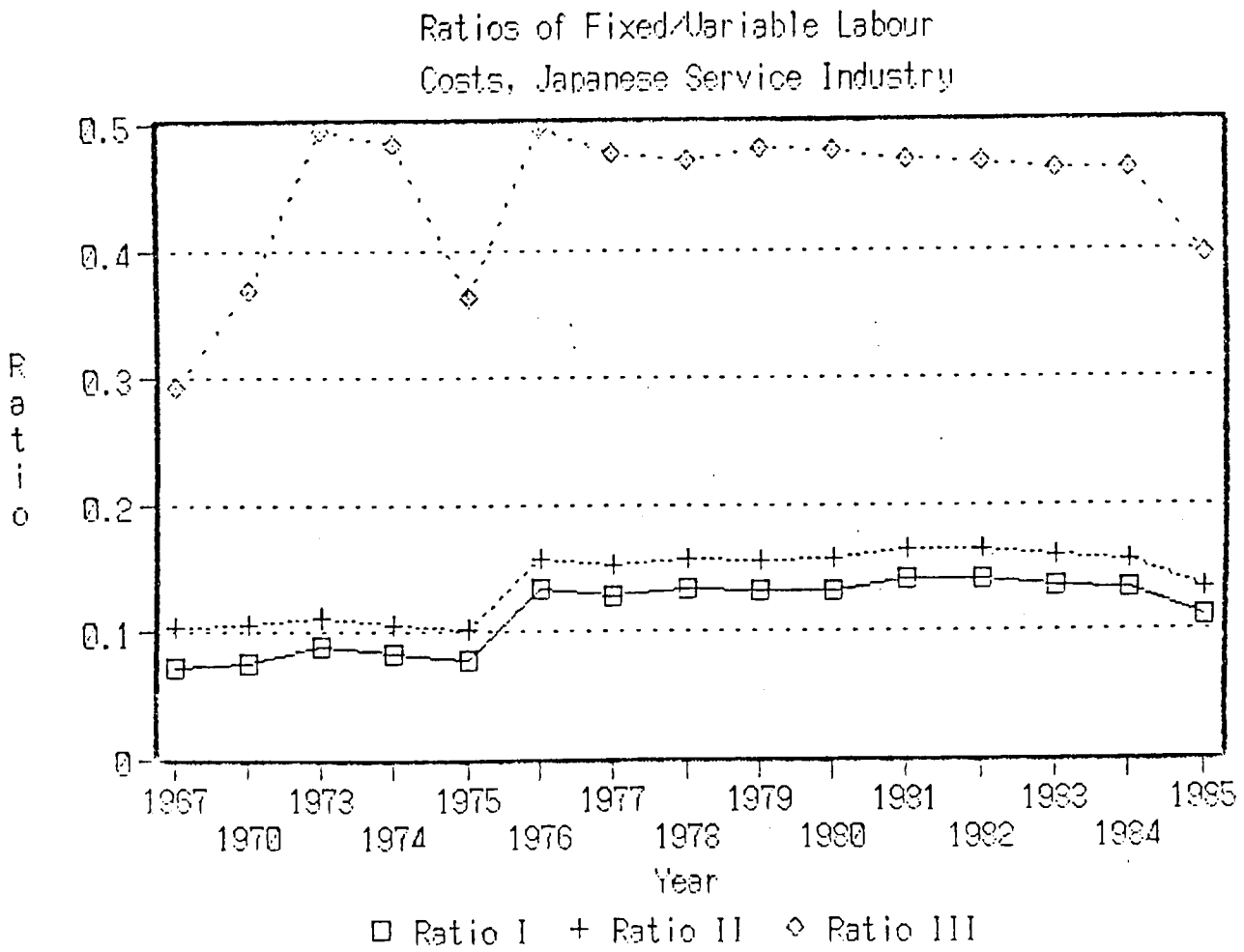

Fixed/Variable Labour Costs
Japanese Manufacturing Industry
Ratio
0.6
0.5
0.4
0.3
0.2
0.1
1965
1968
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
Year
Ratio I
Ratio II
Ratio III

Figure 2.5:


Ratios of Fixed/Variable Labour Costs, Japanese Service Industry
0.5
0.4
0.3
0.2
0.1
0
Ratio
1967
1970
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
Year
Ratio I
Ratio II
Ratio III

during the first OPEC supply shock together with a relatively pronounced rise in Ratios I and II between 1975 and 1977 after which time a fair degree of stability has been maintained.

In section 2.5 we will return to an international comparative evaluation of Japanese fixity ratios.

Table 2.8 shows indices of real non-wages and productivity between the base year 1965 and 1983 for Japanese manufacturing industry while Figure 2.6 illustrates these trends. Apart from a short period in the early 1970s when non-wages grew more than productivity relative to the base year, the latter variable has outgrown the former to a very considerable extent over the remainder of the period. These comparative observations are of great interest in the debate on employment/unemployment with respect to international comparative trends in labour costs and underline Japan's strong cost advantage over the period. As we have seen (see 2.1) real non-wage and productivity growth have been very similar in FRG in recent years while UK evidence (see Hart 1984a) suggests that growth in non-wages has outstripped that in productivity.

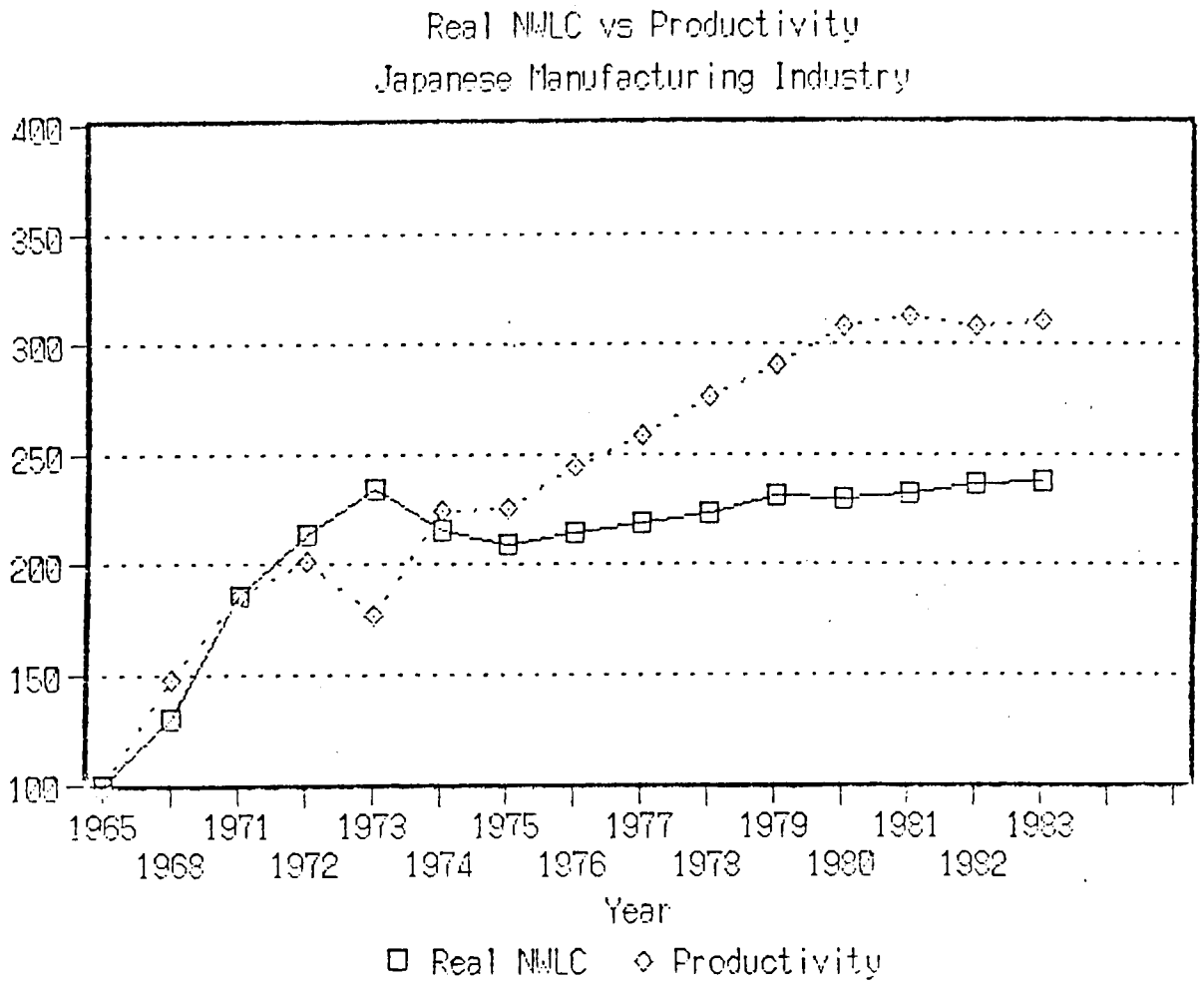
Table 2.8 Indices of Real Non-Wage Labour Costs and Productivity: Japanese Manufacturing Industry, 1965-85

Year	Real NWLCs*	Productivity**
1965	100	100
1968	130	148
1971	186	185
1972	213	201
1973	234	177
1974	215	224
1975	209	225
1976	215	244
1977	218	258
1978	223	276
1979	231	291
1980	229	308
1981	232	312
1982	236	308
1983	238	311

Notes: * Average Monthly Costs Deflated by Consumer Price Index.
** Output per person hour.

Sources: As for table 2.4 and, additionally, T Liesner, 'Economic statistics 1900-1983', The Economist, 1985.

Figure 2.6:


Real NWLC vs Productivity
Japanese Manufacturing Industry
400
350
300
250
200
150
100
1965
1968
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
Year
Real NWLC
Productivity

2.3 United Kingdom

The recent behaviour of the major components of UK labour costs is summarised in Table 2.9 from which it is clear that NWLCs fell as a proportion of total labour costs between 1981 and 1984 having risen in each Labour Costs Survey conducted since 1964. The breakdown of costs for 1981 and 1984 is portrayed in Figure 2.7. In this section, the behaviour of NWLCs in the recent past is considered and in particular some attempt is made to see how far, if at all, movements in NWLCs have been influenced by the dramatic changes which have taken place in the UK labour market during the 1980s.

One of the most striking characteristics of the recent behaviour of the UK economy has been the volatility of quantities relative to nominal prices. Between 1980 and 1986 manufacturing employment fell by 24.4 per cent and now accounts for only 21.4 per cent of the workforce. The number of self-employed people, having risen by only 5.3 per cent between 1971 and 1981, rose by 23.6 per cent to 2.7 million between 1981 and 1986. Between March 1980 and September 1986, the total number of hours worked in UK manufacturing fell by 24.5 per cent, mirroring almost precisely the fall in employment. Figure 2.8 shows how total hours and average weekly hours worked in the manufacturing sector varied between 1976 and 1986. These statistics on hours of work will be of value when the impact of NWLCs on labour utilisation is discussed (see Chapter 3).

Between 1980 and 1986, total unemployment grew by 83 per cent, from 1.8 million to 3.3 million and the number of long-term unemployed (unemployed for more than one year) grew by 270 per cent to 1.3 million. This was the main characteristic of the change in unemployment: the position was not that more were becoming unemployed but rather that those who did become unemployed experienced longer durations out of work. This finding is

Table 2.9

Breakdown of Wage Costs in UK Production Industries, 1964-1984

	Production and Construction Industries						Manufacturing	
	1964	1968	1973	1975	1978	1981	1981	1984
Wages and Salaries	91.8	90.2	89.3	87.5	83.9	81.6	82.1	84.0
National Insurance	3.6	4.3	4.9	6.4	8.4	8.9	9.0	7.4
Voluntary Social Welfare	3.1	3.2	3.7	4.2	5.1	5.6	5.2	5.3
Benefits in Kind	0.1	0.1	0.3	0.3	0.3	0.3	0.1	0.1
Subsidised Services	0.8	0.9	1.1	1.1	1.3	1.3	1.3	1.3
Training	0.5	0.6	0.4	0.3	0.4	0.3	0.3	0.3
All Other Costs	0.1	0.7	0.3	0.2	0.6	2.0	2.0	1.6
Total Labour Costs	100	100	100	100	100	100	100	100

Source: Department of Employment Gazette (various issues).

Figure 2.7:

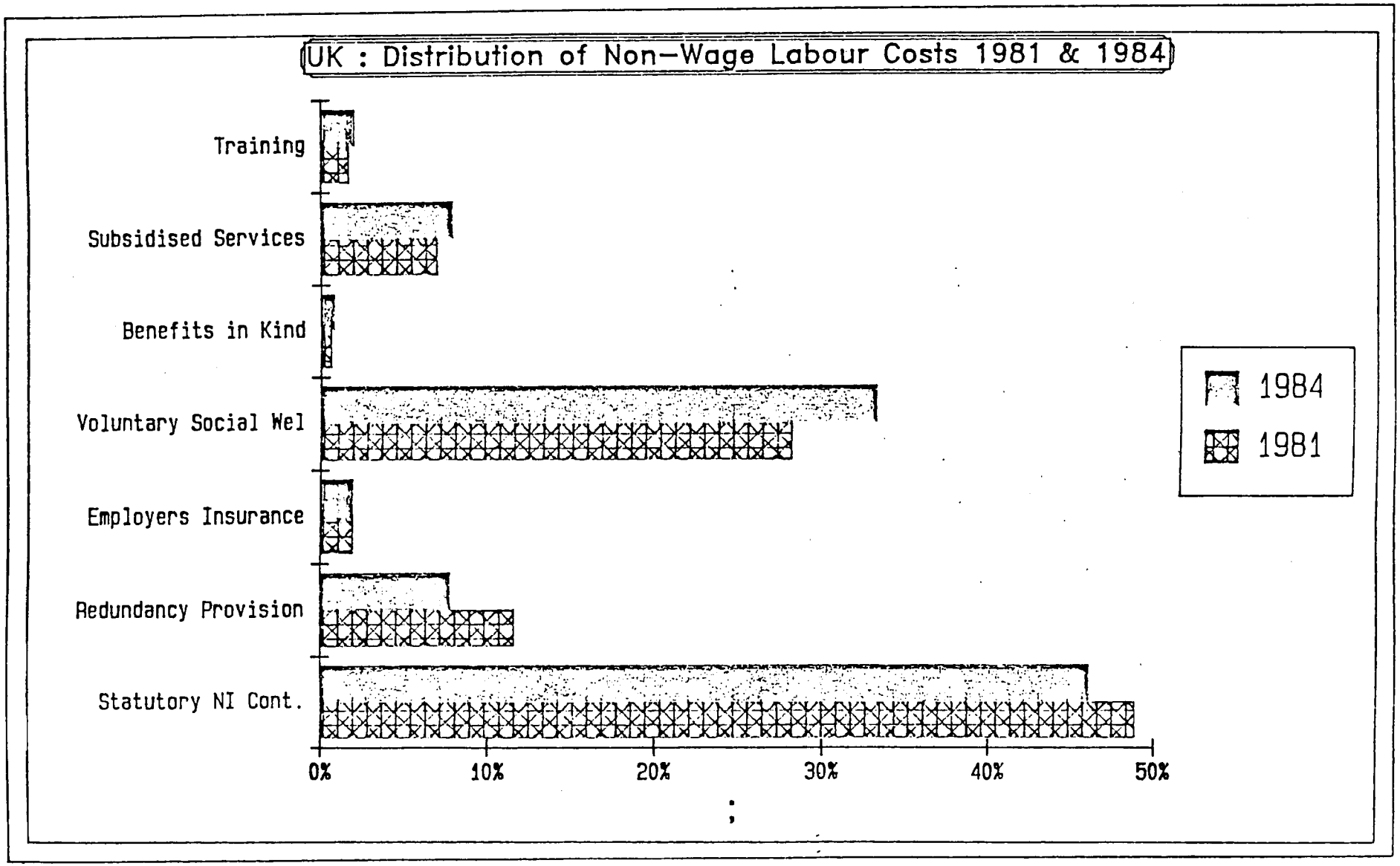
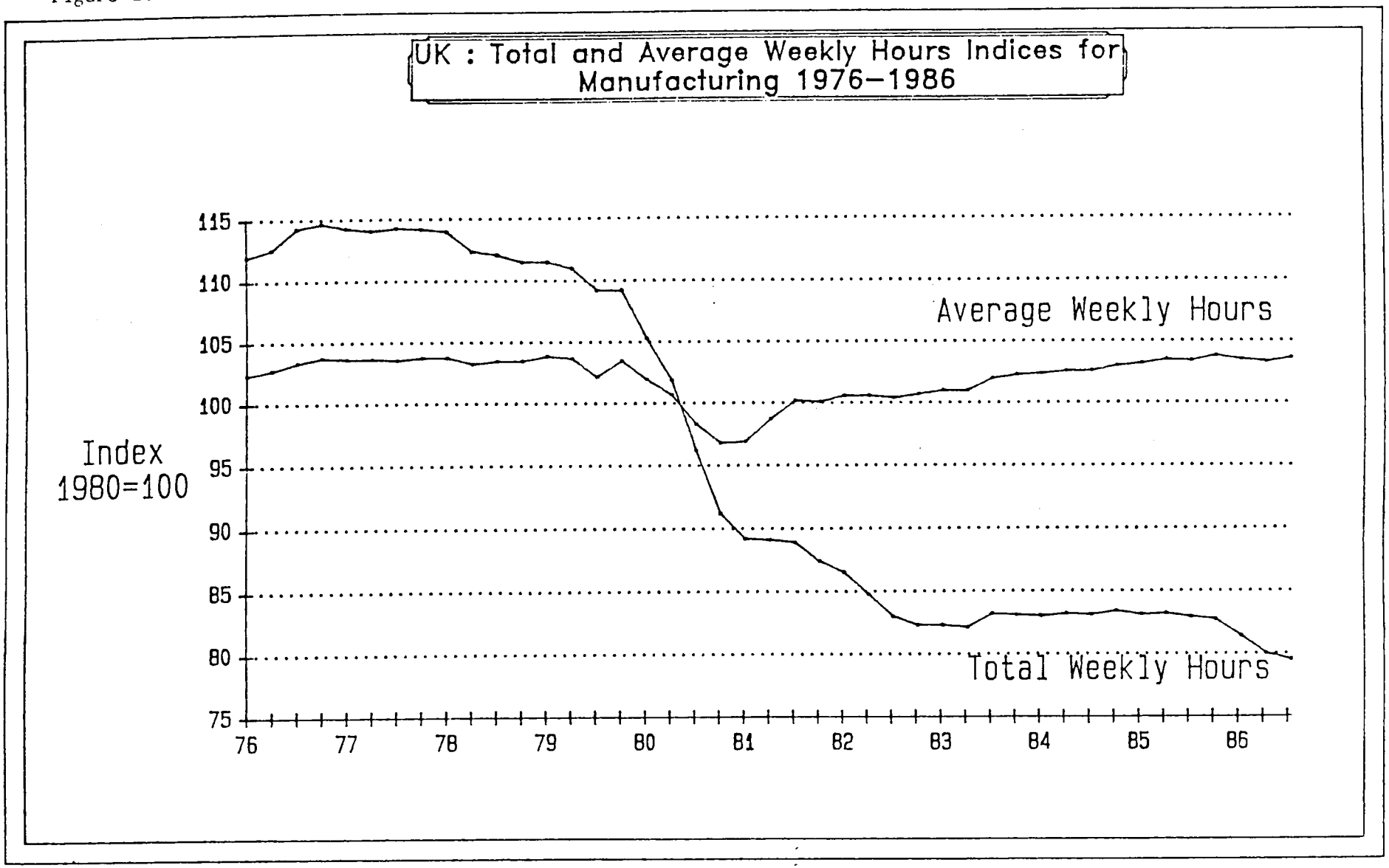

UK : Distribution of Non-Wage Labour Costs 1981 & 1984
Training
Subsidised Services
Benefits in Kind
Voluntary Social Wel
Employers Insurance
Redundancy Provision
Statutory NI Cont.
0%
10%
20%
30%
40%
50%
1984
1981

Figure 2.8:


UK : Total and Average Weekly Hours Indices for Manufacturing 1976–1986
Index 1980=100
115
110
105
100
95
90
85
80
75
76
77
78
79
80
81
82
83
84
85
86
Average Weekly Hours
Total Weekly Hours

reflected in the statistics on labour turnover in the manufacturing sector between 1975 and 1986 which are shown in Figure 2.9. These indicate a steady reduction in discharges from employment between 1975 and 1986 broken only by a slight rise during 1980 and 1981 during the worst of the recession. However, engagements have also been on a downward trend throughout this period and, in fact, fell more dramatically than discharges at the beginning of the eighties. Thus, once unemployed, workers found it exceedingly difficult to find new employment because of the low level of engagements.

The trend reduction in discharges and engagements indicates a longer average duration of employment spells which has important implications for the amortization of the fixed components of NWLCs such as training and redundancy costs. A lower rate of turnover implies that the returns to training and related once-over costs accrue over a longer period. Firms can cut down expenditure on training without reducing the average skill level of their workforce. Alternatively, by maintaining or increasing their level of expenditure on training, the average skill level will increase since individual workers, staying longer with the firm, will have greater exposure to training.

Amounts spent on training by UK firms are quite small (see Tables 2.10 and 2.11, column 9 for training expenditures by firms in different manufacturing sectors in 1981 and 1984). The increase which occurred between 1981 and 1984 may have been cyclical, with firms cutting back considerably on training during the worst of the recession. At present there is no available research on the effects of changing employment durations on training expenditures.

Another important change in training provision which has occurred during the 1980s has been the increase in government support for the training of young people under the auspices of the Manpower Services Commission

Figure 2.9:

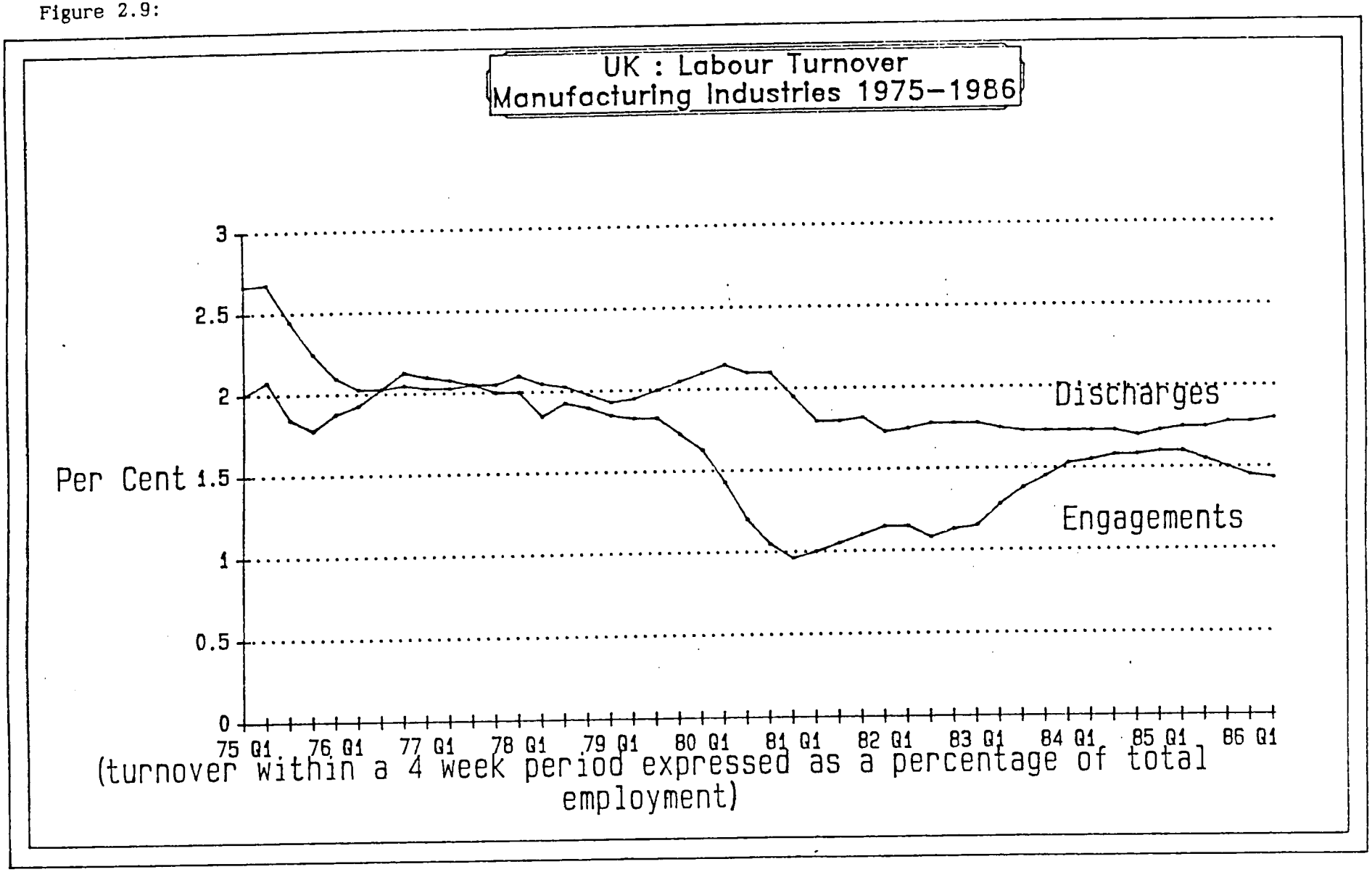

UK : Labour Turnover
Manufacturing Industries 1975–1986
Per Cent
3
2.5
2
1.5
1
0.5
0
Discharges
Engagements
75 Q1
76 Q1
77 Q1
78 Q1
79 Q1
80 Q1
81 Q1
82 Q1
83 Q1
84 Q1
85 Q1
86 Q1
(turnover within a 4 week period expressed as a percentage of total employment)

Table 2.10

Labour Costs Additional to Wages and Salaries for Hours Worked in 1984

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Energy excluding coal	14.4	3.2	8.2	2.4	0.2	19.4	0.2	2.8	1.3	-0.1	52.2
Water Supply	13.6	3.5	8.8	5.6	0.2	11.4	0.0	1.6	1.0	0.0	45.7
All Manufacturing	12.4	1.6	9.9	1.7	0.4	7.9	0.2	1.7	0.5	-0.1	36.3
Other mineral and extraction	12.1	1.8	9.5	2.1	0.6	10.2	0.2	2.4	0.5	0.0	39.3
Extraction of ores nes	11.7	1.7	10.1	0.6	1.1	5.7	0.2	1.4	0.3	0.0	32.8
Non metallic mineral products	11.2	1.1	9.9	2.0	0.5	6.0	0.1	2.0	0.2	0.0	33.0
Chemicals	12.9	2.7	9.2	2.5	0.4	13.1	0.3	3.2	0.6	-0.1	44.7
Man made fibres	11.0	2.0	10.7	2.1	0.8	2.8	0.1	1.8	0.3	0.0	31.5
Metal goods, engineering	13.5	1.5	10.2	1.4	0.5	6.7	0.1	1.6	0.5	-0.1	35.7
Metal goods nes	13.5	1.2	10.4	1.2	0.6	6.7	0.1	1.5	0.3	0.0	35.3
Office Machinery	13.6	2.5	9.4	0.1	0.1	6.6	0.0	1.9	0.9	0.0	35.1
Electrical and electronics	13.4	1.9	10.6	1.8	0.3	6.3	0.1	1.7	0.6	-0.1	36.6
Motor Vehicles & parts	14.3	1.2	9.6	2.6	0.6	8.0	0.1	1.4	0.5	-0.1	38.4
Other transport	13.4	3.1	9.2	2.0	0.5	9.2	0.1	1.7	0.7	0.0	40.0
Instrument engineering	13.2	2.3	10.8	1.1	0.2	8.1	0.1	1.8	0.6	0.0	38.1
Other manufacturing	11.9	1.3	10.2	1.6	0.3	6.1	0.3	1.6	0.3	-0.1	33.5
Food, drink & tobacco	12.2	2.0	10.0	2.3	0.3	7.5	0.5	2.3	0.3	0.0	37.4
Textiles	11.7	0.8	11.1	0.5	0.4	3.4	0.1	1.0	0.1	-0.1	29.2
Leather	10.8	0.3	11.0	0.5	0.6	3.2	0.1	1.5	0.1	-0.2	27.5
Footwear & clothing	12.0	0.4	11.2	0.9	0.3	2.8	0.1	1.5	0.1	-0.2	28.9
Timber & wooden furniture	10.4	0.8	11.0	0.4	0.6	3.9	0.3	0.8	0.3	-0.0	28.4
Paper, printing & publishing	12.1	1.4	9.6	1.9	0.3	7.2	0.2	1.3	0.3	-0.1	34.1
Rubber & plastics	12.3	1.0	10.5	2.3	0.4	5.8	0.1	1.6	0.4	-0.1	34.2
Other manufacturing	11.0	1.5	10.2	0.3	0.3	6.2	0.3	0.6	0.2	-0.1	31.5
Construction	9.6	0.7	9.9	0.7	0.6	5.2	0.3	0.8	0.5	-0.1	28.3

Column Headings for Table 2.10 (Figures are per cent additions to wages and salaries fo hours worked in 1984).
Source: Department of Employment.

(1) Holiday and other time off with pay
(2) Sick pay
(3) National Insurance
(4) Redundancy Provision
(5) Liability Insurance
(6) Voluntary Social Welfare Payments
(7) Benefits in Kind
(8) Subsidised Services
(9) Training (excluding wages)
(10) Government Contributions
(11) Total Additional Costs

Table 2.11

Labour Costs Additional to Wages and Salaries for Hours Worked in 1981

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
All Manufacturing	12.2	1.6	1.4	3.0	0.5	7.2	0.2	1.8	0.1	-0.6	38.5
Food, Frink & Tobacco	11.6	2.1	12.1	2.2	0.4	7.9	0.4	2.7	0.4	-0.1	39.5
Coal & Petroleum	11.1	2.5	10.5	1.3	0.3	17.0	1.4	3.8	0.7	-0.2	45.4
Chemicals & Allied	12.2	2.8	11.5	3.8	0.4	12.6	0.1	3.1	0.6	-0.2	47.1
Metal Manufacture	11.4	0.8	10.9	7.3	0.9	8.6	0.3	1.2	0.5	-0.8	41.1
Mechanical Engineering	12.4	1.4	12.7	2.7	0.7	6.8	0.1	1.6	0.5	-0.9	38.1
Instrument Engineering	12.9	2.3	12.7	3.4	0.2	7.9	0.1	1.9	0.4	-0.2	41.5
Electrical Engineering	12.7	2.0	13.2	3.0	0.3	5.9	0.1	1.8	0.6	-0.6	38.9
Shipbuilding & Marine	11.8	1.8	11.7	0.8	1.0	5.7	0.1	1.4	0.6	-0.6	34.7
Vehicles	14.2	2.2	11.8	5.3	0.4	8.5	0.1	2.1	0.4	-1.3	45.6
Metal Goods nes	12.3	1.0	13.0	2.3	0.6	5.6	0.2	1.3	0.3	-1.3	35.4
Textiles	11.5	0.9	13.6	1.3	0.5	3.7	0.1	1.1	0.2	-0.9	31.9
Leather & Fur	10.4	0.2	13.2	0.5	0.5	3.0	0.1	1.3	0.1	-0.5	34.7
Clothing & Footwear	11.6	0.4	13.9	1.4	0.3	2.4	0.1	1.1	0.2	-1.0	30.3
Bricks, Pottery, Glass	11.8	1.0	12.9	2.6	0.7	6.2	0.2	1.6	0.3	-0.5	36.2
Timber & Furniture	10.5	0.7	13.0	0.9	0.6	4.0	0.1	0.9	0.4	-0.6	30.4
Paper, Printing & Pub	11.7	1.3	12.0	2.0	0.3	6.9	0.1	1.2	0.5	-0.1	35.8
Other Manufacturing	11.9	1.1	13.1	2.1	0.6	6.5	0.1	1.6	0.3	-0.6	36.7
Mining and Quarrying	11.6	1.8	10.8	4.3	1.3	15.7	4.7	4.0	0.6	-0.1	54.7
Construction	9.5	0.7	12.8	0.8	0.8	3.6	0.1	1.0	0.4	0.0	29.6
Gas, Electricity & Water	14.3	3.6	10.9	3.0	0.3	20.4	0.1	2.0	1.1	0.0	55.7
All Index of Production Industries	11.9	1.6	12.3	2.8	0.6	7.8	0.4	1.8	0.5	-0.5	39.1

Column Headings for Table 2.11 (Figures are per cent additions to wages and salaries fo hours worked in 1981).
Source: Department of Employment.

(1) Holiday and other time off with pay
(2) Sick pay
(3) National Insurance
(4) Redundancy Provision
(5) Liability Insurance
(6) Voluntary Social Welfare Payments
(7) Benefits in Kind
(8) Subsidised Services
(9) Training (excluding wages)
(10) Government Contributions
(11) Total Additional Costs

Youth Training Scheme (YTS). Firms who are able to provide the MSC with acceptable proposals are able to claim the costs of employing and training young people who would otherwise be unemployed. Between June 1983 and June 1986, the number of trainees on YTS increased from 31 thousand to 305 thousand.

To some extent these trainees might have been taken on anyway. Equally, they may displace nonsubsidised trainees. Nevertheless it is clear that the effect of this scheme is to reduce the effective cost of training to firms and thus their fixed costs. Ceteris paribus, recorded NWLCs should decline. Further, YTS schemes do not preclude training being firm specific. Thus the UK government has shown itself willing to increase the supply of skilled labour even when the demand may derive from a very small number of firms.

Returning to general economic trends, output per person employed has grown at a rapid rate relative to historical trends: between 1973 and 1979 output per head in manufacturing rose by 0.7 per cent per annum, while between 1979 and 1986 its growth rate was 3.5 per cent. The changes in employment, unemployment and productivity are all indicative of very considerable change in the quantities transacted in the UK labour market during the 1980s.

Yet, since 1983, nominal earnings growth has remained remarkably stable. Between January 1981 and January 1983 earnings growth fell from 17 to 8 per cent. Since the beginning of 1983 it has never risen above 8 per cent nor fallen below 7.5 per cent. One explanation of this stability is that, for a variety of reasons, the institutional arrangements of the UK labour market do not promote wage flexibility. For example, the "insider-outsider" argument is that unions will drive for as high a wage settlement as possible subject to the constraint that they will not wish to see their members becoming

unemployed. Thus, their wage demands are likely to be low when unemployment is rising and vice versa. Given this argument, it is the change rather than the level of unemployment that determines earnings growth. Thus earnings growth declined rapidly in the early part of the recession when unemployment was rising, but is now stable because unemployment has levelled off. Wage claims will be the same whatever the level of unemployment so long as it is stable.

An alternative view is that the long-term unemployment causes a depreciation of human capital and a consequent reduction in effective labour supply. Wages can thus continue to grow quite rapidly even though recorded unemployment is high by historical standards. Budd, Levine and Smith (1985) investigate the increasing proportion of long-term unemployed in the UK labour market and find that it is quite consistent with the fact that the probability that an unemployed person finds a job declines with length of time unemployed. Not only may this occur because the long-term unemployed are less attractive to employers: it may also be the result of reduced search intensity due to the discouraging effects of long-term unemployment.

Yet another alternative is that while nominal earnings growth has been rigid, total labour costs may have fluctuated considerably due to shifts in the non-wage components of labour costs. This would be evidenced by shifts in the ratio of wage to non-wage costs. However, a brief comparison of the 1984 Labour Costs Survey with those from previous years (see Table 2.9) indicates that this is not the case. For manufacturing, there was a rise of 1.9 per cent in the ratio of wage to total labour costs between 1981 and 1984. This can be almost wholly explained by shifts in the exogenous components of NWLCs. Firstly there was a reduction in National Insurance contributions from 9.0 to 7.4 per cent of total labour costs and secondly the fall in the "All

Other Costs" category from 2.0 to 1.6 per cent was almost wholly attributable to reductions in government subsidies to wages.

In all, there is no evidence of any cyclical response to conditions in the labour market in negotiations concerning the magnitude of employees' non-wage benefits. Slackness in the labour market did not cause employers to take actions to reduce these benefits nor apparently did it make employees more ready to accept such reductions. This would seem to support the extension of the "insider-outsider" or the "hysteresis" arguments mentioned above to include employee non-wage benefits as well as earnings. From the limited evidence available, it appears that those endogenous non-wage benefits which are the outcome of employer/employee bargaining have been largely unaffected by the slackness of the external labour market in the UK during the recent past.

This finding is confirmed in Tables 2.10 and 2.11 which break down labour costs by industry into payments for days not worked as well as expanding the non-wage categories contained in Table 2.9. (Unfortunately, the industrial classification differs between Tables 2.10 and 2.11 due to the changeover to the NACE system in the 1984 labour costs survey.) The results for total manufacturing indicate a slight increase in payments for days not worked and for voluntary social welfare, both endogenous to the employer/employee bargain. Note, however, that the main component of voluntary social welfare payments are contributions to employees' pension funds. Being long-term commitments, these are unlikely to be a contentious issue in the annual wage round. Indeed, the administration of the pension fund, once established, may be essentially independent of employer and employee interference and thus can almost be treated as exogenous.

To summarize thus far, the period 1981 to 1984 was one where NWLCs

in UK production industries fell. This was primarily the result of exogenous changes imposed by government. National Insurance contributions were reduced but were slightly offset by less government subsidisation of wages. Even though the labour market was slack, there was no evidence of any negative effect on the non-wage elements of bargains. Indeed, there was a small increase in payments for days not worked and for social welfare relative to direct remuneration for hours worked. This occurred even though direct remuneration has continued to grow at a higher rate than would have previously been expected given the apparent excess supply of labour. Theories such as the "insider-outsider" and "hysteresis" which attempt to explain this seeming anomaly could be extended to include non-wage benefits as well as direct earnings.

Now consider whether the evidence is sufficient to justify the conclusion that the aggregate importance of NWLCs in the UK economy declined between 1981 and 1984. To extend this conclusion to the whole of the economy from the information on manufacturing alone is problematic, given that manufacturing employment now accounts for only 22 per cent of total employment. Such limited information as is available for nonmanufacturing industries does tend to indicate that they have experienced a similar decline in NWLCs. For example, in insurance, banking and finance, which now employs 2 million individuals, compared with 5.3 million in manufacturing, NWLCs have fallen from 29.7 per cent of total labour costs in 1981 to 26.9 per cent in 1984, thus seemingly confirming the downward trend in NWLCs at the industry level.

It is not necessarily the case, however, that the downward trend in NWLCs at the industry level necessarily implies reduced aggregate NWLCs. Composition effects arising from the rapid change in UK industrial

structure during the eighties may have resulted in an increased national NWLC bill. Employment in banking, insurance and finance rose by 260 thousand between the Censuses of Employment in 1981 and 1984 while employment in services as a whole rose by 433 thousand. In contrast, manufacturing employment fell by 731 thousand (12.1 per cent) over the same period. If the service sectors which have expanded relative to manufacturing have a higher ratio of NWLCs to total labour costs than manufacturing, then notwithstanding a downward trend in NWLCs at the industry level, there may have been an increase in aggregate payments of NWLCs.

Limited availability of data on NWLCs in the service sector prevents any definite conclusion on the importance of these composition effects being reached. Such information as is available suggests that there is wide variation in the importance of NWLCs within different parts of the service sector. For example, NWLCs accounted for only 16.2 per cent of total labour costs in distribution in 1984 against 16.0 per cent in manufacturing. In marked contrast, NWLCs made up 26.9 per cent of total labour costs in insurance, banking and finance, with significantly larger endogenous components in social welfare, benefits in kind and subsidised services. Any firm conclusion on the overall importance of NWLCs would require more comprehensive cost information in the service sector, but it is clear that the compositional switch out of manufacturing and into services such as finance will at least partly offset exogenous reductions in NWLCs since 1981 in determining aggregate expediture by employers on non-wage costs.

Changes in the division of total labour costs between fixed and variable components should, ceteris paribus, alter the balance between the stock and utilisation of labour. This possibility has received little attention in the UK partly because of the data problems inherent in accurately distinguishing fixed and variable labour costs. Layard and Nickell (1987)

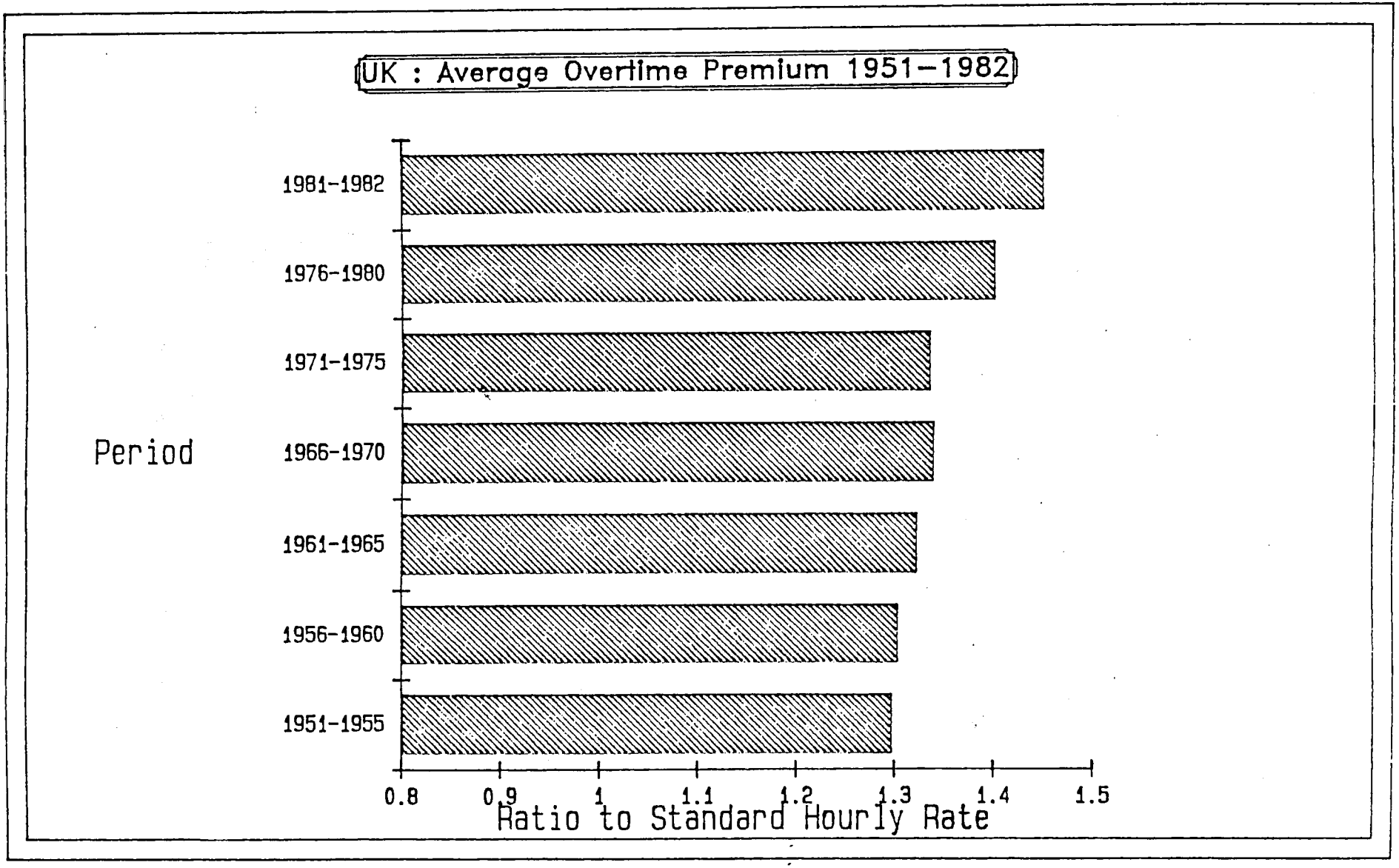
characterise the postwar behaviour of working time in the UK as follows:

> Since the war, real wages in Britain have risen steadily and this has led workers to want a shorter working week. Given trends in fixed labour costs there has been no corresponding reduction in firm's demand for weekly hours. In order to reconcile these conflicting desires, there have been a number of negotiated reductions in the workweek and a continuing rise in the level of overtime premia. The latter is clearly an important equilibrating phenomenon. It has to be admitted that there is little in the way of econometric evidence to back up this story. The problem here is that it is difficult to obtain precise estimates of the level of fixed costs and, in any event, given the long-run endogeneity of normal hours, overtime premia and indeed, these fixed costs, disentangling the supply and demand side forces would be extremely difficult."
>
> (Layard and Nickell, 1987, p.53.)

The gradual rise in overtime premia is shown in Figure 2.10. It is clear that hiring workers beyond their normal hours has become increasingly expensive in the UK.

The evidence of Figure 2.8 also suggests that average weekly hours in manufacturing industry have changed little in the last 10 years. There was a temporary reduction during the worst of the recession in 1981, but since then they have returned to the levels of the late seventies. The 1984 Labour Costs survey confirms this downturn in hours worked during 1981: hours worked per year rose in manufacturing between 1981 and 1984 (see Tables 6.4 and 6.5). This will have principally been a cyclical effect rather than any imposed

Figure 2.10:


UK : Average Overtime Premium 1951-1982
Period
1981-1982
1976-1980
1971-1975
1966-1970
1961-1965
1956-1960
1951-1955
0.8
0.9
1
1.1
1.2
1.3
1.4
1.5
Ratio to Standard Hourly Rate

increase in the length of working time. Indeed, recent events, as we shall see below, suggest that extensive reductions in working time may be about to occur in the UK.

Most of the large negotiated reductions in the UK working week took place in the late sixties whereas increases in paid holidays were common during the seventies. The increase in payment for days not worked between 1981 and 1984 indicates that this phenomenon was not wholly arrested during the early eighties. Nevertheless the changes in working time in the UK during this decade have so far been less dramatic than those of the previous two. There is no reason, however, to assume that further reductions in working time will not take place in the near future. The engineering unions are now close to settling an agreement with their employers which will lead to a reduction in the working week for their members from 39 to 37.5 hours. This will have an immediate impact on approximately 1.5 million workers and is likely to become the target for subsequent negotiations by other groups of workers.

Prima facie, the explanation of such further reductions in the working week must lie on the supply side as Nickell and Layard suggest. Employers appear to be acceding to workers' demands rather than pushing to introduce lower hours and they are demanding compensation in the form of more efficient work practices, thus reducing the probability of "shirking" by improving the monitoring of work effort. The increases in real wages which have occurred throughout the eighties coupled with the dominance of the income effect in labour supply appear to underly a leftward shift in the supply surve of labour. Recent changes in labour costs have not been sufficient to motivate a significant change in the balance of demand for labour towards reduced utilisation.

2.4 United States of America

This section collates and discusses data on NWLCs in the USA for the period 1965-85. The data presented come from two sources: (a) the U.S. National Income and Product Accounts, and (b) the U.S. Chamber of Commerce publication Employee Benefits. In Appendix 2.2 detailed information on NWLC data and data problems in the USA are presented.

2.4.1 NWLCs by Type, 1965-1985

Table 2.12 displays data on NWLCs as a proportion of total labour costs for all U.S. private domestic industries from 1965 to 1985. NWLCs are broken down into six groups: payments for time not worked (panel a), statutory social welfare costs (panel c), voluntary social welfare costs (panel d), benefits in-kind (panel e), other expenses of a social nature (panel f), and vocational training (panel g). Total social welfare costs (panel b) and total NWLCs (panel h) are also shown. As noted in Appendix 2.2, the U.S. National Income and Product Accounts provide data only on statutory and voluntary welfare costs (panels b, c, and d).

In preparing the figures in Table 2.12, the reclassification of U.S. NWLCs by the EC method, as presented in Table A2.6 of Hart (1984a), has been followed closely. Since Hart's Table A2.6 is written with specific reference to the Chamber of Commerce data, no special comment is required regarding the Chamber of Commerce figures shown in Table 2.12. However, use of the National Income and Product Accounts data required some minor reclassification that should be mentioned. For the Accounts data, statutory social welfare costs equal employer contributions for social insurance plus worker's compensation. Voluntary social welfare costs equal other labour income of private domestic industries minus workers' compensation. Note that because social welfare costs are the only NWLCs enumerated in the Accounts, total social welfare costs

Table 2.12

Non-Wage Labour Costs as a Proportion of Total Labour Costs by Type of Cost, U.S. Private Domestic Industries 1965-1985

Type of NWLC	Year	Data Source: National Income & Product Accounts	Data Source: Chamber of Commerce
(a) Payments for days not worked	1965	a	0.0762
	1966		--
	1967		0.0780
	1968		--
	1969		0.0806
	1970		--
	1971		0.0883
	1972		--
	1973		0.0874
	1974		--
	1975		0.0926
	1976		--
	1977		0.0879
	1978		--
	1979		0.0861
	1980		0.0885
	1981		0.0876
	1982		0.0770
	1983		0.0766
	1984		0.0720
	1985		0.0842

Table 2.12 (continued)

Non-Wage Labour Costs as a Proportion of Total Labour Costs by Type of Cost, U.S. Private Domestic Industries 1965-1985

Type of NWLC	Year	Data Source: National Income & Product Accounts	Data Source: Chamber of Commerce
(b) Total social welfare costs	1965	--	0.1026
	1966	0.0961	--
	1967	0.0965	0.1129
	1968	0.0997	--
	1969	0.1022	0.1192
	1970	0.1060	--
	1971	0.1113	0.1298
	1972	0.1188	--
	1973	0.1263	0.1412
	1974	0.1303	--
	1975	0.1365	0.1510
	1976	0.1444	--
	1977	0.1501	0.1625
	1978	0.1524	0.1617
	1979	0.1542	0.1620
	1980	0.1554	0.1635
	1981	0.1563	0.1662
	1982	0.1597	0.1732
	1983	0.1609	0.1733
	1984	0.1614	0.1769
	1985	0.1600	0.1697

Table 2.12 (continued)

Non-Wage Labour Costs as a Proportion of Total Labour Costs by Type of Cost, U.S. Private Domestic Industries 1965-1985

Type of NWLC	Year	Data Source: National Income & Product Accounts	Data Source: Chamber of Commerce
(c) Statutory social welfare costs	1965	--	0.0448
	1966	0.0493	--
	1967	0.0492	0.0532
	1968	0.0495	--
	1969	0.0507	0.0567
	1970	0.0499	--
	1971	0.0513	0.0558
	1972	0.0547	--
	1973	0.0620	0.0653
	1974	0.0634	--
	1975	0.0625	0.0681
	1976	0.0657	--
	1977	0.0674	0.0711
	1978	0.0699	0.0747
	1979	0.0717	0.0749
	1980	0.0704	0.0739
	1981	0.0729	0.0758
	1982	0.0727	0.0771
	1983	0.0742	0.0755
	1984	0.0783	0.0795
	1985	0.0780	0.0786

Table 2.12 (continued)

Non-Wage Labour Costs as a Proportion of Total Labour Costs by Type of Cost, U.S. Private Domestic Industries 1965-1985

		Data Source	
Type of NWLC	Year	National Income & Product Accounts	Chamber of Commerce
(d) Voluntary social welfare costs	1965	--	0.0578
	1966	0.0468	--
	1967	0.0473	0.0597
	1968	0.0502	--
	1969	0.0515	0.0625
	1970	0.0561	--
	1971	0.0599	0.0740
	1972	0.0641	--
	1973	0.0669	0.0759
	1974	0.0634	--
	1975	0.0740	0.0829
	1976	0.0787	--
	1977	0.0826	0.0914
	1978	0.0825	0.0870
	1979	0.0826	0.0871
	1980	0.0850	0.0896
	1981	0.0834	0.0904
	1982	0.0870	0.0961
	1983	0.0868	0.0978
	1984	0.0831	0.0974
	1985	0.0820	0.0911

Table 2.12 (continued)

Non-Wage Labour Costs as a Proportion of Total Labour Costs by Type of Cost, U.S. Private Domestic Industries 1965-1985

Type of NWLC	Year	Data Source: National Income & Product Accounts	Data Source: Chamber of Commerce
(e) Benefits in-kind	1965	a	0.0040
	1966		--
	1967		0.0031
	1968		--
	1969		0.0026
	1970		--
	1971		0.0023
	1972		--
	1973		0.0028
	1974		--
	1975		0.0026
	1976		--
	1977		0.0022
	1978		0.0020
	1979		0.0018
	1980		0.0023
	1981		0.0023
	1982		0.0015
	1983		0.0016
	1984		0.0015
	1985		0.0015

Table 2.12 (continued)

Non-Wage Labour Costs as a Proportion of Total Labour Costs by Type of Cost, U.S. Private Domestic Industries 1965-1985

Type of NWLC	Year	Data Source: National Income & Product Accounts	Data Source: Chamber of Commerce
(f) Other expenses of a social nature	1965	a	0.0145
	1966		--
	1967		0.0158
	1968		--
	1969		0.0152
	1970		--
	1971		0.0143
	1972		--
	1973		0.0144
	1974		--
	1975		0.0146
	1976		--
	1977		0.0149
	1978		0.0161
	1979		0.0169
	1980		0.0149
	1981		0.0141
	1982		0.0149
	1983		0.0146
	1984		0.0156
	1985		0.0163

Table 2.12 (continued)

Non-Wage Labour Costs as a Proportion of Total Labour Costs by Type of Cost, U.S. Private Domestic Industries 1965-1985

Type of NWLC	Year	Data Source: National Income & Product Accounts	Data Source: Chamber of Commerce
(g) Vocational training	1965	a	0.0008
	1966		--
	1967		0.0005
	1968		--
	1969		0.0006
	1970		--
	1971		0.0007
	1972		--
	1973		0.0006
	1974		--
	1975		0.0008
	1976		--
	1977		0.0009
	1978		0.0010
	1979		0.0012
	1980		0.0015
	1981		0.0016
	1982		0.0017
	1983		0.0019
	1984		0.0019
	1985		0.0021

Table 2.12 (continued)

Non-Wage Labour Costs as a Proportion of Total Labour Costs by Type of Cost, U.S. Private Domestic Industries 1965-1985

Type of NWLC (h)	Year	Data Source: National Income & Product Accounts	Data Source: Chamber of Commerce
Total NWLCs	1965	--	0.1981
	1966	0.0961	--
	1967	0.0965	0.2101
	1968	0.0997	--
	1969	0.1022	0.2181
	1970	0.1060	--
	1971	0.1113	0.2355
	1972	0.1188	--
	1973	0.1263	0.2464
	1974	0.1303	--
	1975	0.1365	0.2614
	1976	0.1444	--
	1977	0.1501	0.2684
	1978	0.1524	0.2695
	1979	0.1542	0.2679
	1980	0.1554	0.2706
	1981	0.1563	0.2717
	1982	0.1597	0.2685
	1983	0.1609	0.2679
	1984	0.1614	0.2679
	1985	0.1600	0.2738

Sources: U.S. Department of Commerce, Bureau of Economic Analysis, The National Income and Product Accounts of the United States, 1929-82; Statistical Tables (Washington, D.C.: USGPO, 1986); Survey of Current Business 66 (July 1986); U.S. Chamber of Commerce, Employee Benefits, various years.

a. The U.S. National Income and Product Accounts do not report the following as separate cost items: payments for days not worked, in-kind benefits, other expenses of a social nature, and vocational training. Payments for days not worked and benefits in-kind are included as direct wage and salary payments. Other expenses of a social nature and vocational training appear to have no counterpart in the Accounts.

(panel b) and total NWLCs (panel h) are the same for the Accounts.

Panel h of Table 2.12 suggests that NWLCs have grown dramatically during the last 20 years in the U.S. Defining NWLCs as contributions to social welfare programmes (see the column headed "National Income and Product Accounts"), NWLCs have grown from just under 10 per cent of total labour cost in 1966 to about 16 per cent in the mid-1980s. Defining NWLCs more broadly to include payments for days not worked, benefits in-kind, other social expenses, and vocational training (see column headed "Chamber of Commerce"), NWLCs have grown from just under 20 per cent of total labour costs in 1965 to over 27 per cent in 1985.

Although panel h of Table 2.12 shows that NWLCs as a whole have grown significantly during the past 20 years, other panels reveal that not all components of NWLCs have increased. The Chamber of Commerce data suggest that - although payments for days not worked grew as a proportion of total labour costs during the 1970s - between 1982 and 1985 they returned to roughly the same level as during the late 1960s (see panel a). Benefits in-kind actually fell as a proportion of total labour costs during the 20-year period (panel e). Other social expenses grew insignificantly (panel f), and vocational training remained a minuscule proportion of total labour costs (panel g).

The conclusion is that the growth of NWLCs during the 1965-1985 period can be attributed almost entirely to the growth of statutory and voluntary employer contributions to social welfare (see panels c and d). Fortunately, these are the NWLC cost components that exist in both the Chamber of Commerce and National Income and Product Accounts data, so that reliable inferences can be drawn.

Panels c and d of Table 2.12 suggest that the pattern of growth of statutory social welfare costs has been more even than that of voluntary social welfare costs over the past 20 years. The National Income and Product

Accounts data indicate that statutory social welfare costs grew (as a proportion of total labour costs) by 27 per cent from 1966 to 1975 (2.7 annual rate of growth), by 13 per cent from 1975 to 1980 (2.4 per cent annual rate of growth), and by 11 per cent from 1980 to 1985 (2.1 per cent annual rate of growth). (The Chamber of Commerce data suggest a similar pattern of growth of statutory social welfare costs, if percentage changes for 1967-75, 1975-80, and 1980-85 are computed.) This seemingly even growth does mask some changes within the package of statutory social welfare costs: contributions to social security (OASDHI) grew slowly during the late 1970s, but have grown rapidly since the 1983 reform of the social security financing system (data are not shown in the table). Workers' compensation grew rapidly during the 1970s, only to decline as a proportion of total labour costs in the 1980s (data are not shown in the table). Nevertheless, the overall pattern of growth of statutory social welfare costs is remarkably even.

In contrast, the growth of voluntary social welfare costs slowed dramatically and reached a plateau during the 20 year period, as can be seen in panel d of Table 2.12. Both the National Income and Product Accounts and the Chamber of Commerce data show that voluntary social welfare costs grew dramatically between the mid-1960s and 1975 - by 58 per cent in the Accounts data (5.2 per cent annual rate of growth), and by 43 per cent in the Chamber of Commerce data (3.7 per cent annual rate of growth). But voluntary social welfare costs grew less rapidly during the late 1970s (by somewhere between 8 and 14 per cent as a proportion of total labour costs, or at an annual rate of 1.6 to 2.8 per cent). Moreover, voluntary social welfare costs grew at a still slower rate during the early 1980s. Indeed, the Accounts data suggest that voluntary social welfare costs fell by over 3 per cent (as a proportion of total labour costs) between 1980 and 1985. A detailed discussion of these past, as well as the expected future, trends is left to chapter 5.

2.4.2 Estimates of Fixed and Variable Labour Costs

Tables 2.13 and 2.14 display estimates of the percentage of total labour costs that are fixed NWLCs, and of the fixed/variable labour cost ratio. In Table 2.13 these figures are derived for each of the one-digit industries reported in the U.S. National Income and Product Accounts in five selected years spanning the mid-1960s through 1985. In Table 2.14 the figures are derived for each of the industries reported in the Chamber of Commerce data, again in five selected years spanning the mid-1960s through 1985.

The figures displayed are based on methods developed in Hart (1984). Table 2.13's figures are conceptually similar to Hart's "Fixed NWLC I" and "Ratio I (fixed/variable)" measures in Table 2.8 (p.17), in that they exclude pay for time not worked, and hence implicitly treat pay for time not worked as a variable cost. Specifically, Table 2.13's figures take fixed NWLCs to be employer contributions to state Unemployment Insurance, supplemental unemployment insurance benefits, pensions, health insurance, and life insurance. In terms of the Accounts, then, fixed NWLCs are Unemployment Insurance plus Other Labour Income minus workers' compensation. Variable NWLCs, on the other hand, are employer contributions to social security (OASDHI) and workers' compensation. Again in terms of the Accounts, variable NWLCs are Social Insurance contributions (excluding Unemployment Insurance) plus workers' compensation.

Because the Accounts do not enumerate each required item by industry, it was necessary to impute Unemployment Insurance and workers' compensation by industry. This was accomplished by using industry-level data from the Chamber of Commerce. Specifically, the ratio of UI contributions to the sum of UI and social security contributions was computed by industry in the Chamber of Commerce data, and the ratio applied to the Accounts figure for contributions for social Insurance, in order to obtain an estimate of UI contributions by industry. Also, a similar ratio was constructed for workers'

compensation contributions and applied to the Accounts data in order to obtain an estimate of workers' compensation contributions by industry.

Table 2.14's figures are based on the Chamber of Commerce data. They are conceptually similar to Hart's "Fixed NWLC II" and "Ratio II (fixed/variable)" measures (Hart, 1984, Table 2.8, p.17), in that pay for time not worked is now treated as a fixed cost. Consequently, Table 2.14's figures take fixed NWLCs to be all NWLCs except employer contributions to social security (OASDHI) and worker's compensation, which are taken to be variable.

Table 2.13

Estimates of Percentage of Fixed/Total Labour Costs by Industry, 1966, 1971, 1976, 1981, and 1985: U.S. National Income and Product Accounts Data

Industry	1966	1971	1976	1981	1985
Fixed NWLC as per cent of total labour cost:					
All private domestic	6.01	6.54	8.90	9.28	9.59
Agriculture	2.99	2.88	4.96	5.47	5.57
Mining	8.82	8.97	11.35	10.99	10.96
Construction	3.94	3.84	7.40	8.63	10.28
Manufacturing:					
Durable	7.90	9.25	12.02	12.42	12.26
Nondurable	7.22	7.28	9.97	11.58	11.68
Transportation	5.22	6.16	9.22	8.66	9.89
Communications	12.53	17.03	17.21	16.93	16.73
Utilities	10.23	11.58	16.41	14.49	14.61
Trade:					
Wholesale	3.88	4.93	6.44	6.71	7.66
Retail	4.16	6.89	5.07	5.61	6.70
Finance and insurance	8.14	8.84	12.29	10.99	10.80
Services	3.32	6.85	5.77	6.46	6.97

Table 2.14

Estimates of Fixed/Variable Labour Costs
in the U.S. by Industry, 1965, 1971, 1977, 1981, and 1985:
U.S. Chamber of Commerce Data

Industry	1965	1971	1977	1981	1985
Fixed NWLCs as percent of total labour cost:					
All	17.6	20.2	23.0	22.8	23.0
Manufacturing	16.6	19.7	23.0	22.9	23.7
Food, tobacco	18.8	21.1	22.3	22.3	23.3
Textiles, apparel	12.9	14.8	17.8	18.8	19.6
Wood products	14.1	18.2	20.6	21.3	20.2
Printing and publishing	15.3	18.4	22.2	22.7	21.3
Chemicals	19.2	22.5	26.5	26.1	26.0
Petroleum	19.9	23.5	25.8	27.2	23.4
Rubber and plastics	17.4	19.7	22.8	21.7	23.0
Stone, glass	15.8	19.8	21.9	22.4	20.5
Metals:					
Primary	17.6	21.9	25.8	24.8	27.9
Fabricated	15.9	18.3	23.0	22.6	24.8
Machinery:					
Electrical	16.7	19.5	23.0	23.1	23.8
Other	17.0	19.7	23.2	23.0	24.0
Transportation Equip.	16.5	22.3	24.0	23.4	25.0
Instruments, other	16.4	20.3	21.4	21.5	21.0
Nonmanufacturing	19.2	20.8	23.0	22.7	22.5
Utilities	19.3	21.9	25.2	25.8	25.3
Trade:					
Department stores	16.3	15.4	20.3	18.6	18.5
Other	16.4	16.0	19.1	18.6	19.2
Finance	22.5	23.6	25.5	24.2	21.6
Insurance	18.7	21.3	23.7	24.2	23.5
Hospitals	–	–	16.4	19.4	21.2
Other	–	–	21.7	20.7	21.2

Table 2.14 (continued)

Estimates of Fixed/Variable Labour Costs
in the U.S. by Industry, 1965, 1971, 1977, 1981, and 1985:
U.S. Chamber of Commerce Data

Industry	1965	1971	1977	1981	1985
Fixed /Variable Labour Cost Ratios:					
All	0.213	0.253	0.298	0.296	0.299
Manufacturing	0.199	0.2463	0.299	0.297	0.310
Food, tobacco	0.231	0.268	0.287	0.287	0.304
Textiles, apparel	0.148	0.174	0.217	0.232	0.244
Wood products	0.164	0.222	0.260	0.271	0.253
Printing and publishing	0.180	0.226	0.286	0.293	0.270
Chemicals	0.238	0.290	0.361	0.353	0.352
Petroleum	0.249	0.307	0.347	0.373	0.305
Rubber and plastics	0.211	0.246	0.296	0.277	0.298
Stone, glass	0.188	0.247	0.280	0.288	0.257
Metals:					
Primary	0.213	0.280	0.348	0.330	0.387
Fabricated	0.189	0.224	0.299	0.292	0.329
Machinery:					
Electrical	0.200	0.242	0.299	0.300	0.312
Other	0.205	0.246	0.302	0.299	0.315
Transportation Equip.	0.197	0.287	0.315	0.305	0.333
Instruments, other	0.201	0.254	0.274	0.265	
Nonmanufacturing	0.238	0.263	0.298	0.294	0.291
Utilities	0.239	0.280	0.337	0.348	0.339
Trade:					
Department stores	0.195	0.182	0.255	0.229	0.227
Other	0.196	0.190	0.236	0.229	0.238
Finance	0.290	0.308	0.343	0.320	0.276
Insurance	0.230	0.270	0.310	0.320	0.307
Hospitals	-	-	0.196	0.240	0.269
Other	-	-	0.277	0.261	0.269

2.5 Some Wider International Comparisons

Table 2.15 shows, for 1981, the three most important NWLC items as proportions of total labour costs in manufacturing industry for our four featured economies together with France and Italy. While, in general, the data are compiled so that each main category conforms to the EC classification of labour costs (for computational details, see Hart, 1984a) precise matching is impossible to achieve in practice. Nevertheless, the information is reliable enough to indicate the most important differences among the countries. Two of these stand out in particular. In the first place, payments for days not worked in Japan are considerably below the other countries. In the second place, European countries - though particularly France, FRG and Italy - have far higher statutory compared to voluntary social security contributions while in Japan and the USA there is reasonable balance between these two cost items.

The relatively high levels of statutory relative to voluntary social security contributions in Europe compared to Japan and the USA also pertain to the respective growth rates. This is illustrated in Table 2.16 which shows the growth of private and statutory schemes for the same six countries between 1965 and 1983. Noticeably, France, FRG and Italy exhibit far higher growth rates in statutory relative to voluntary contributions over the period in contrast to Japan where they are of similar magnitude and the USA where the relative position is reversed. (Although, as indicated in the previous section, the recent shorter term trends in the USA indicate a falling-off in the growth of voluntary contributions.) Interestingly, the UK appears to stand alone among the major European economies in showing more longer term growth in private relative to statutory schemes (see section 2.3 for a detailed examination of shorter term trends).

Table 2.15

Main NWLC items as proportions of total labour costs and fixed/variable cost ratios: Selected OECD countries (Manufacturing Industry), 1981.

	France	FRG	Italy	Japan	UK	USA
Payment for days not worked	8.3	11.5	10.4	2.2	10.9	8.7*
Statutory Social Security	18.9	16.1	21.9	7.2	9.4	7.8*
Voluntary Social Security	6.8	3.6	1.5	6.7	6.3	8.9*
Ratio I	0.14	0.07	0.03	0.15	0.12	0.13
Ratio II	0.24	0.21	0.15	0.18	0.26	0.25

Sources: Hart (1984a); OECD (1986); Tables 2.4 and 2.6.

Note: * all industries.

Table 2.16

Growth of employers' contributions to social security schemes, 1965-83

(Percentage of total employee compensation)

	Private Schemes	Statutory Schemes	Total
France	-0.5	5.0	4.5
FRG	1.1	4.6	5.7
Italy*	-0.5	0.7	0.2
Japan	2.6	3.0	5.5
UK	3.5	2.4	5.9
USA	5.8	2.8	8.4

*1965-82

Source: OECD (1986)

Comparative estimates of the ratios of fixed to (total) variable labour costs are also presented in Table 2.15 for Ratios I and II (see section 2.2 in particular). Given the problem of allocating payments for days not worked into fixed and variable costs, Ratio I is perhaps the safest on which to base international comparisons. The picture is one of rough comparability among France, Japan, UK and USA with FRG and Italy showing considerably smaller degrees of fixity on this narrow definition.

As we will see in section 4.2, a crucial comparison in relative degrees of labour fixity in the literature concerns Japan and the USA. On the ratio definitions relevant to Table 2.15 and given the uncertainty over allocating payments for days not worked, there is little to choose between the two countries. As argued by Hashimoto and Raisian (1987) (see also sections 2.2 and 4.2), the key consideration is where Japanese bonus payments should be allocated. If these authors are correct and bonuses should be regarded primarily as returns to specific investments, then the more broadly based Ratio III (see Tables 2.6 and 2.7) applies and the relative picture is transformed. As we have also seen earlier (see Tables 2.4 and 2.5), Japanese bonus payments comprised about 19 per cent of total labour costs in 1981. This figure is far in excess of bonus payments in any other OECD country. Although it is difficult to match the Japanese definition of bonus, it is nonetheless a simple matter to establish the large difference. For example, if we take the somewhat broader EC definition, 'bonuses and premiums', then Italy - at 9.1 per cent of total labour costs - had the largest proportion of total cost in this category of the remaining five countries. This is only half of the Japanese bonus figure.

Appendix 2.1

Sources and Construction of Data on Japanese Labour Costs

A2.1.1 Data Sources

Consistent data for Japanese labour costs have been constructed from several data sources, since there exists no single data set that satisfies all requirements. Two data sets were constructed: (i) time-series data for 9 sectors (mining, construction, manufacturing, wholesale and retail, finance and insurance, real estate, transportation and communication, electricity-gas-water supply, and services) from 1965 to 1985, and (ii) cross-sectional data set of 20 manufacturing industries for 1984.

In order to construct a consistent set of data from several sources with different bases and different coverages, the following procedure was adopted. The "Basic Surveys of Wages" was selected for the base of the consistent data set and was combined with the figures of other data sources (after adjusting them by the ratio of contractual, or regular, wages (= contractual wages + non-contractual wages) obtained from the "Basic Surveys"). Since sampling bases of data and sampling dates in the year are generally different from survey to survey, this procedure may generate certain biases in the constructed data set. No attempt has been made to correct for these, however.

The major data sources used in our surveys are as follows:

A Basic Surveys of Wages (Ministry of Labour).

This is by far the most extensive survey on wages and other related items for establishments with over 10 employees. The extracted items are hours worked, contractual and non-contractual cash payments, annual special payments, numbers of employees, and wage distributions.

B Welfare Surveys (Ministry of Labour).

This survey, sampled from enterprises with more than 30 employees, includes various components of NWLCs and detailed decomposition of obligatory and non-obligatory welfare costs. The extracted items are severance payment, benefits in kind, obligatory welfare costs, non-obligatory welfare costs, costs of housing and food services in non-obligatory welfare costs, regular cash payments, recruitment costs, training costs, other non-wage labour costs, and statutory and other paid holidays.

C Surveys on Systems of Wages and Working Hours (Ministry of Labour)

The extracted items are travelling allowances, housing allowances, family allowances, statutory paid annual holidays actually taken, and all items listed in B for 1984. (The Welfare Survey of 1984 did not cover these items.) The sample is taken from enterprises with more than 30 employees.

D Labour Cost surveys (Ministry of Labour)

This survey was conducted from 1965 to 1971 for the items listed under B. However, each sector was covered only every three years: manufacturing was covered in 1965, 1968 and 1971; mining, construction transportation and communication, and electricity-gas-water supply in 1966 and 1969; and wholesale and retail, finance and insurance, and services in 1967 and 1970. Real estate sector was excluded in this survey.

E Survey on Wage Composition (Ministry of Labour)

This, sampled over enterprises with more than 30 employees, was conducted only before 1965. Figures for various allowances in contractual wages as listed in C for 1965 are listed.

F Survey on Wage Conditions (Central Labour Committee)

This is a very small survey (about 500 enterprises) and is limited to large enterprises with more than one thousand employees and more than five hundred million yen of capital. This was used only for various allowances in

contractual wages in 1984 and 1985 and for the information on the service sector, since these are lacking in the official statistics of the Ministry of Labour.

G Survey on Working Hours and Holidays (Central Labour Committee)

This survey has a small sampling base similar to Survey on Wage Conditions, but it has been conducted only every other year. The series on statutory paid annual holidays which were actually taken is of relevance here and the usable period was from 1968 to 1984.

There are some missing data in the original statistical sources. Major cases are as follows.

1 The decomposition of labour costs was given only every three years for each sector during the period from 1964 to 1971. No interpolation was done for the missing years. Interpolation would have produced very artificial results, because observed years are different from industry to industry.

2 The information on benefits in kind is lacking in the official statistics for 1984 and 1985: they were included in other non-wage labour costs. Since there are no reliable data available for these items, they are left as missing.

A2.1.2 Computation of Costs for Paid Holidays

In Japanese official statistics, the costs for paid holidays have never been calculated with the exception of several sporadic trials in the Surveys on Labour Costs. Even statistics on the numbers of paid holidays are rather poor: the numbers were given on the annual basis only after 1980, and the fitures on non-statutory paid holidays were published only once during the period from 1964 to 1985. The method adopted to compute a consistent series of costs for paid holidays involved constructing consistent data for paid holidays from a few sources and then converting them into costs for paid holidays by some multiplying factors.

For paid holidays, the complete annual data for the nine sectors are only available from Data C (see previous section) for the period 1980-1985. Data D give such figures for the period 1965-1971, but they are too sporadic to be used for present purposes. Instead we employ Data G. However, this set of data has also many defects. Namely, this survey is conducted only every other year, and it uses a different industry classification which lacks a real estate sector. Furthermore, the sample size is rather small (about 500 in 1984) and limited to large enterprises with more than 500 employees and more than 500 million yen of capital. As the result, the variances of the series are relatively large. In order to minimize the effcts of these problems, OLS is fitted to the observed series as a linear function of time after removing some outliers, and estimated values are assumed to represent annual data points. As mentioned, one serious problem of Data G is that they contain no information on the real estate sector. However, Data C show that the movement of paid holidays of this sector is very similar to that of the construction sector during the period 1980-1985. Therefore, it is assumed that the movement of paid holidays was also the same in real estate and construction throughout the whole period, although their levels might be different. In this way, a set of annual data of paid holidays was constructed for all the sectors and for the whole period. Then this data set was scaled so that the values of 1980 of the set are equal to those of Data C. These steps provide a consistent set of annual data which consist of Data C for the period 1980-1985 and the newly generated data for the period 1965-1979. This series is only for statutory paid holidays actually taken, excluding non-statutory paid holidays. Since Data B of 1975 are the only published statistics, we are obliged to assume that the ratio of statutory and non-statutory paid holidays was stable for each sector throughout the whole period. Adjusting the series by this ratio for each sector, an annual series of total paid annual holidays for nine sectors is obtained.

(6)

The final conversion of total paid holidays into costs of total holidays involved the following formula:

$$HC = \frac{HT}{12} \times 8 \times \frac{\text{Monthly regular wages}}{\text{Monthly regular working hours}}$$

where HT and HC denote total paid holidays and costs of paid holidays, respectively.

A2.1.3 Conversion into EC-Compatible Data

Japanese and European classifications of labour-cost statistics are different. Table A2.1.1 shows how to convert Japanese data into EC-compatible data. Although it seems that this conversion is on the whole quite reasonable, some discrepancies exist (see Japanese Ministry of Labour (1967) for detailed discussion of these points.) The main problems are:

1 Japanese benefits in kind include some travelling costs, such as commuting fares, while ECs do not. Since the available data do not give detailed decomposition of benefits in kind, such discrepancies are not dealt with. Accordingly, converted figures are still larger than correct figures for benefits in kind, while the figures of other labour costs are smaller by the same amount.

2 Japanese welfare costs include personnel expenses such as wages and salaries of doctors, nurses, and training personnel. This makes the welfare costs and the total labour costs in Japan larger than those in the EC countries.

3 Japanese data do not contain the costs of financial services. Therefore, the Japanese labour costs are smaller by this amount than the European equivalent.

A2.1.4 Computation of Quasi-Fixed and Variable Labour Costs

As mentioned in the main text, one of the most important decompositions of labour costs involves the distinction between quasi-fixed and variable costs. Some labour costs, such as training costs, are incurred only when extra employees are hired. This kind of costs are per-worker costs, or quasi-fixed costs. On the other hand, costs such as wages, changing with the amount of man-hours, are variable costs. Therefore we can express the total labour costs as

$$LC = zN + vhN = (z + vh)N, \qquad \text{(i)}$$

where z, v, h, N denote, respectively, quasi-fixed and variable labour costs, average hours worked, and the number of workers.

Some labour costs are easily classified into either fixed or variable costs: wages and overtime payments are variable, while several NWLC items belong unambiguously to quasi-fixed costs. Bonus payments - in some of our presented statistics - are classified as fixed costs, which might be a little controversial. There are some ambiguities on payments for days not worked.

Social security costs contain both fixed and variable cost elements in most countries. The employer's contribution consists of the amount of wages multiplied by a certain rate in the case of an employee whose wages lie between the floor wages and the ceiling wages statutorily prescribed. This portion of social security costs is proportional to man-hours, so that it is variable. On the other hand, the employer pays a fixed amount of contributions in the case of an employee whose wages are either under the floor wages or over the ceiling wages. This part of social security costs, proportional only to number of employees, is quasi-fixed.

Major social welfare contributions in Japan cover health, pension, unemployment and accident insurance. Only health and pension insurance incorporate the 'floor-ceiling' system. The contributions of other social

insurance are proportional to employers' wages so that all these costs are variable. In the case of health insurance, there exist two systems, one operated by the government and the other operated by unions. The schemes of floor-ceiling and standard income classification are the same for the two systems, while the contribution rates differ. The pension insurance has only one system, but the contribution rates are different for males and females. Table A2.1.2 and Table A2.1.3 summarize employers' contribution schemes with respect to health and pension insurance.

Our method of estimating the fixed and variable components of the health and pension insurances is first to obtain the wage distributions of industries and then directly to compute the two components of social security costs according to the contribution schemes of the insurances (see Hart and Kawasaki (1987) for the application of the same method to FRG data).

The data source of wage distributions is found in Data A. The data are in the form of numbers of employees for each wage class. For simplicity of computation, we approximate these discrete distributions by some continuous distributions. In order to utilize fully the information contained in the discrete distributions, we avoid the usual fitting of a simple probability function - such as the log-normal distribution - and instead use the spline approximation of the empirical distributions. Considering that the data are given in a discrete form, we first convert the original distributions into cumulative distributions, and then apply the spline method to obtain continuous wage distributions.

A wage convenient form of spline is a cubic spline. Letting x_k and y_k represent an observed point for k=1, 2, ..., n, where $x_1 < x_2 < .... < x_n$, the cubic spline is defined as:

$$y = f_k(x) = A_k + B_k x + C_k x^2 + D_k x^3. \qquad \text{(ii)}$$

The parameters A_k, B_k, C_k and D_k are uniquely determined by the continuity conditions which require that the function, the first and second derivatives are all continuous at the k given points and by some end point conditions such as zero second derivatives at the end points. The cubic spline, however, produces often more or less non-monotonic functions as a result, which are clearly inappropriate for the cumulative distributions in our cases. One solution to this problem is to use a special rational spline developed by Spaeth (1973). In this case, the interpolating function is given by

$$y = f_k(x) = A_k u + B_k t + C_k u^3/(pt+1) + D_k t^3/(pu+1) \qquad \text{(iii)}$$

where $t = (x-xk)/(xk+1-xk)$, $u = 1-t$, and $-1 < p$. If p is zero, this function reduces to the normal cubic spline defined in (ii) above. As p becomes larger, the function approaches the linear interpolating function which is just the linear spline. If the observed points are all monotonically located, the interpolating function can be made monotonic by adjusting p. We have incorporated a search procedure to select the smallest p that keeps the function monotonic.

Given the wage distributions, contribution rates, floor wages and ceiling wages of social insurances, we can compute the quasi-fixed and variable components of employers' contributions to health and pension insurance. Since the distributions of male and female wages are quite different, we compute the two components separately for male and female, and then combine them to obtain the final results. Another point to be noted is that the contributions are computed continuously by integrating the product of the rate, wages, and wage density function. In reality, however, the employer pays contributions discretely according to the standardized income classes in which given wages fall. The discrepancy does not seem significantly large, however.

The quasi-fixed social security costs are incurred either when the employers' wages are under the floor level or when they are over the ceiling level:

$$FC = r(w_f \int_0^{w_f} f(w)\,dw + w_c \int_{w_c}^{\infty} f(w)\,dw). \qquad \text{(iii)}$$

where FC, r, w_f, w_c, f(w) are respectively the quasi-fixed costs, the contribution rate, the floor wages, the ceiling wages, and wage density function, while the variable costs (VC) are given by

$$VC = r \int_{w_f}^{w_c} w\, f(w)\,dw. \qquad \text{(iv)}$$

In actual computation, we differentiate between male and female employees, health and pension insurances, and government and union schemes of health insurance. Thus, fixed and variable costs are computed for each case and then aggregated to obtain the desired two components of costs.

The quasi-fixed and variable costs of health and pension insurances were computed for two sets of data, namely for nine sectors from 1965 to 1985, and for twenty manufacturing industries in 1984. The amount of computation and necessary wage distribution data are so huge that we used the following convention in the case of the nine sectors: the two components were computed only for the total sector for each year and the computed proportion was assigned to the nine sectors of the same year, assuming that the ratio of the fixed to variable costs is the same for the nine sectors for a given year.

Table A2.1.1 Reclassification of Japanese Labour Costs by EC Method

EC Classification		Japanese Equivalent
I.	Direct remuneration	A. Regular cash earnings - Travel allowance (A) - Housing allowance (A) - Family allowance (A)
II.	Over-time payment	B. Over-time payment
III.	Bonuses and gratuities	C. Bonuses and other irregular payments
IV.	Payments for days not worked	Estimation: $\frac{\text{Regular cash earnings}}{\text{Regular working hours}} \times 8 \times$ (days of paid holidays actually taken) $\times \frac{1}{12}$
V.	Statutory social welfare costs	D. Statutory social welfare costs
VI.	Customary, contractual, or voluntary social welfare costs	E. Non-obligatory social welfare costs - Food and housing costs (E) + F. Severance payment + Family allowance (A)
VII.	Benefits in kind	G. Benefits in kind + Housing allowance (A) + Food and housing costs (E)
VIII.	Vocational training cost	H. Vocational training cost + I. Recruitment cost
IX.	Other labour costs	J. Other labour costs + Travel allowance (A)

Note: The letter in parentheses denotes the item to which the item with this letter originally belonged.

Table A2.1.2 Employer Payroll Tax Rates and Wage Limits of Health Insurance in Japan

Year	Government Membership (10,000)	Rate (%)	Union Date of Revision	Union Membership (10,000)	Union Rate (%)	Wage Limits (Yen) Floor	Ceiling	Date of Revision
		3.15	1960/1			3000	52000	1957/4
1965	1143			710	3.962			
1966	1170	3.25	1966/4	733	4.027	3000	104000	1966/4
1967	1220	3.5	1967/8	759	4.045			
1968	1253			803	4.059			
1969	1285			851	4.042			
1970	1315			909	4.036			
1971	2602			2124	4.042			
1972	2600			2225	4.039			
1973	2673	3.6	1973/1	2326	4.033	20000	200000	1973/1
1974	2741	3.8	1974/11	2464	4.033			
1975	2772			2557	4.071			
1976	2812	3.9	1976/1	2609	4.156	30000	320000	1976/7
1977	2872			2639	4.348			
1978	2904	4	1978/2	2674	4.429	30000	380000	1978/7
1979	2971			2696	4.447			
1980	3060			2703	4.498			
1981	3129	4.2	1981/3	2750	4.557			
1982	3091	4.25	1982 /11	2793	4.578	30000	470000	1982/1
1983	3149			2837	4.610			
1984	3193	4.2	1984/3	2862	4.616	68000	710000	1984/1
1985	3233			2911	4.625			

Sources: Annals of Social Welfare (Federation of Health Insurance Unions) and communication with Social Insurance Agency, Ministry of Health and Welfare

Table A2.1.3 Employer Payroll Tax Rates and Wage Limits of Pension Insurance in Japan

Year	Membership (10,000)	Rate (%) Male	Female	Date of Revision	Wage Limits (Yen) Floor	Ceiling	Date of Revision
		1.75	1.5	1960/5	3000	36000	1960/5
1965	1763	2.75	1.95	1965/5	7000	60000	1965/5
1966	1842						
1967	1916						
1968	1992						
1969	2072	3.1	2.30	1969/11	10000	100000	1969/11
1970	2158						
1971	2226	3.2	2.40	1971/11	10000	134000	1971/11
1972	2251						
1973	2307	3.8	2.90	1973/11	20000	200000	1973/11
1974	2371						
1975	2365						
1976	2365	4.55	3.65	1976/8	30000	320000	1976/8
1977	2385						
1978	2390						
1979	2418						
1980	2471	5.3	4.45	1980/1	45000	410000	1980/1
1981	2524		4.50				
1982	2570		4.55				
1983	2603		4.60				
1984	2636		4.65				
1985	2675	6.2	5.65	1985/1	68000	470000	1985/1

Sources: Annals of Social Welfare (Federation of Health Insurance Unions) and communication with Social Insurance Agency, Ministry of Health and Welfare

Appendix 2.2

NWLC Data and Data Problems in the USA

Tracking NWLCs in the U.S. poses a severe problem because govenment efforts to maintain suitable statistics have been sporadic. The National Income and Product Accounts are an excellent source of data on employer contributions to both legally mandated and voluntary social welfare programmes, but the Accounts suffer from omission of other types of NWLCs. Specifically, the Accounts subsume payments for days not worked and in-kind benefits under direct wage and salary payments. Also, the Accounts have no counterpart to various other expenses of a social nature or to vocational training. These deficiencies are augmented by a reluctance of the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce to publish detailed data. For example, although the BEA publishes a series on Employer Contribution to Social Insurance (Table 6.12) by one-digit industry, it does not disaggregate these contributions into their components - chiefly contributions to social security (OASDHI) and unemployment insurance. Similarly, although the BEA does disaggregate Other Labour Income - composed mainly of contributions to pensions, health insurance, life insurance, workers' compensation, and supplemental unemployment insurance - into its components on an economy-wide basis, it does not publish disaggregations by industry. Although it is possible to adjust the Accounts data using other data sources in order to partially overcome these aggregation problems, the usefulness of the Accounts remains limited for our specific purposes.

It is worth noting that the Bureau of Labor Statistics (BLS) of the U.S. Department of Labor gathered excellent data on NWLCs for about a

decade. It is unfortunate that the Survey of Employer Expenditures for Employer Compensation (EEEC) was gathered only from 1966 through 1977. Since 1977, BLS has gathered data for the Employment Cost Index (ECI), but these data are published in a way that makes them extremely awkward to use. (Also, the ECI public-use data files on magnetic tape are unwieldy.)

Because of the lack of current government statistics on NWLCs, the private U.S. Chamber of Commerce has gathered data on NWLCs since the late 1940s. The Chamber of Commerce data have the advantage that they are the only available source of data for several NWLCs, such as payments for days not worked, in-kind benefits, other expenses of a social nature, and vocational training. However, they have the disadvantage that they are taken from a self-reported survey of a self-selected sample of employers. As a result, they pose four problems. First, the composition of the sample has changed over time, and year-to-year changes that are observed may be sensitive to that changing composition. Second, in any given year, the figures shown in the Chamber of Commerce survey seem not to represent average labour costs of U.S. employers, again because of self-selection in response (this can be seen in panel d of Table 2.12. Third, cross-sectional comparisons of industries or groups of workers may be distorted by which employers in each industry choose to respond to the survey. Finally, self-reporting could give rise to various biases that can only be guessed at. All of these problems suggest that the Chamber of Commerce survey could give a biased picture of NWLCs in the U.S.

Various ways of benchmarking the Chamber of Commerce data so as to overcome the sampling bias that exists in the data have been explored. Unfortunately, these attempts have not been successful to date. The basic strategy of benchmarking would be to find elements of

the Chamber of Commerce data that are shared with scientifically-sampled surveys such as the National Income and Product Accounts and the Survey of Employer Expenditures for Employee Compensation (the survey that ended in 1977). By comparing the components of compensation that are reported in both the Chamber of Commerce and the scientifically-sampled surveys, it should in principle be possible to adjust the components of compensation that are uniquely available in the Chamber of Commerce survey. Attempts to do just this have been unsuccessful for two reasons. First, the Chamber of Commerce data and the National Income and Product Accounts overlap only in two series - legally mandated and voluntary contributions to social welfare programmes. In one of these series - legally mandated contributions - the two data sources are in reasonable accord (see Table 2.12, panel c). In the other - voluntary social welfare costs - they diverge in some years by over 25 percent (see Table 2.12, panel d). How similar or divergent other series would be is a matter of speculation; hence, it would be unwise to adjust all Chamber of Commerce figures downward by some fixed percentage. Second, use of the EEEC as a benchmark has been stymied because the EEEC, contrary to the belief of many researchers, appears not to be representative of the population of all firms in the U.S. The Employment Cost Index (ECI) still needs to be fully explored as a possible benchmark for the Chamber of Commerce data, but the task has not yet been undertaken.

The figures reported in section 2.4 that come from the U.S. National Income and Product Accounts make use of the recently completed major revisions to the Accounts. Unfortunately, unpublished disaggregations of the Accounts (disaggregations of certain cost items and disaggregations by industry) that have been requested have not yet been received. Certain adjustments have been made to the Accounts data as a result.

Chapter 3 Employment and Labour Utilisation

Fixed NWLCs are independent of the length of working hours. They are a price that attaches only to the stock dimension of the labour input. Their growth relative to variable - i.e. hours related - labour costs may promote the cost minimising strategy by firms of increasing labour utilisation relative to employment. Such potential substitution between the stock and utilisation dimensions of the labour input has provided an important aspect of the general study of employment and labour compensation and the intention of this chapter is to review the most recent work in the related research fields.

Three main employment areas are highlighted. The first - and most important in a European content - concerns the trade-off between standard working hours on the one hand and employment/overtime hours on the other. Cuts in working hours in order to stimulate the creation of new jobs has been a central consideration in the European working time 'debate' and a recent upsurge in theoretical and empirical investigation has helped to clarify the relative strengths and weaknesses of this form of worksharing. The second relates to the policy strategy of attempting to stimulate employment by reducing firms' social security payroll taxes, often regarded as a 'tax on jobs'. Since payroll taxes contain both fixed and variable elements, changes in tax rates and tax ceiling limits also involve hours/workers substitution responses. The third topic concerns working time with respect to working life rather than shorter per-period spells. In particular, we focus on retirement and show that several parallels to the discussion in the previous sections pertain. The fourth area relates to the strong current interest into the link between profit sharing and job creation. It would appear that introducing the notion of labour fixity and the workers-hours trade-off into the profit sharing literature provides some interesting modifications to the existing policy discussion.

3.1 Cuts in Working Time

3.1.1 Theory and policy background

In the relatively depressed years of the late 1970s/early 1980s, a considerable debate took place - in such diverse economies as Australia, West Germany and Norway (and elsewhere) - on the efficacy of relieving high and persistent levels of unemployment through cuts in the standard working time of full time employees. The debate is summarised in Hart (1984c and 1987a). Over the same period to the present time, considerable economic research work on the relationships between employment and working time was undertaken.

The most important aspects of this work has developed in a microeconomic context and NWLCs have featured prominently in both theoretical and empirical modelling. Since a rather thorough analysis of these studies already exists (Hart, 1987a), the intention here is to restrict comment to two areas of interest. First, we will attempt to explain the importance of NWLCs to these analyses. Secondly, we will summarise some very recent - and potentially influential - new research findings.

In the late 1960s/early 1970s, economists developed a class of labour demand models that differentiated the labour input into a stock dimension and a utilisation dimension. The former refers to numbers of workers while the latter, usually, refers to average working hours per worker per period of time (e.g. a week or a year). Interestingly, although the issue of hours cuts has never been seriously in the policy domain in the USA, it was North American economists who made the early breakthroughs. The most quoted work is that of Brechling (1965), Rosen (1968), Ehrenberg (1971) and Nadiri and Rosen (1969 and 1973).

The work of Brechling and Ehrenberg, in particular, incorporated the vital distinction between standard and overtime hours. The first variable was

treated as being determined exogenously - through national-level collective bargaining - so that the typical firm had no short-term control over standard hours. Overtime hours, on the other hand, were regarded as being endogenously determined by the firm itself. Both Brechling and Ehrenberg examined the effects of an exogenous cut in standard hours on employment and overtime working. In the context of the Australasian and European 'debate' a decade or so later, these early studies were seen as useful models on which to build and a recent surge of, largely European, interest has produced some significant advances. The early demand models have been further developed by Raisian (1978), Bell (1982), Hart (1984a, b), FitzRoy and Hart (1985a), Santamäki (1983, 1984, 1986 and 1987), Calmfors and Hoel (1987a) and others.

Most of these models produce the conclusion that, at best, a policy of increasing employment/reducing unemployment through cuts in working time should be treated with great caution while, at worst, such a policy should be avoided completely. Inevitably, there exist several variations on the central model and the following is a brief attempt to summarise the workings of a simple version of the most standard of the models.

The typical methodology proceeds as follows. Separate demand functions for workers and hours of work (and, in some studies, their capital equivalents - the stock of capital and capacity utilisation, respectively) are derived as functions of relative factor prices (fixed and variable labour costs and user capital costs) and scale variables (e.g. output and technology). A critical assumption is whether the firm in equilibrium works overtime.

In the first place, suppose that the firm does work overtime in equilibrium. As mentioned above, overtime is treated as being endogenously determined while standard hours are exogenous. The essential point to grasp is that if a firm makes a decision over whether to employ an extra (overtime) hour of work or a new worker, it must consider the price at the so-called

intensive relative to the extensive margin. The intensive margin involves changes in labour utilisation - especially changes in working hours - while the extensive margin involves changes in the stock of workers. At the intensive margin, the firm must pay overtime premium rates while at the extensive margin it has to incur training, hiring and other fixed NWLCs of employment. Recall, such fixed costs are, by definition, independent of hours worked and so attach only to the stock dimension of the labour input. If one makes relatively simple assumptions concerning wage schedules - e.g. that wages are paid at standard rates up to the end of standard working hours and then at a premium rate that has a fixed relationship to the standard rate (e.g. 'time-and-a-half') thereafter - then unequivocal results are obtained. A reduction in standard hours will increase the price of a new worker relative to an extra hour of work and the firm will substitute at the margin more overtime working for less employment. It turns out that this result is obtained over different specifications of this model-type although, as shown by Santamäki (1983 and 1984), alternative assumptions concerning the wage schedule and the production function can produce ambiguity over outcomes. Few versions of the model, however, produced the result that reductions in standard hours will increase employment.

It is worth dwelling on this somewhat surprising conclusion for a moment. Suppose that the firm's prime goal is to minimise its costs of production while meeting an exogenous production requirement. For simplicity, therefore, we treat the product demand as a given variable, outside the firm's control. Also, we assume that its capital stock is fixed. If the firm is initially in (cost minimising) equilibrium and it experiences a cut in standard hours then, in order to meet its given demand, it must either increase the workforce or overtime hours per worker or a combination of both. At the extensive margin, marginal labour costs would rise with a workforce increase:

a smaller proportion of each worker's per-period working hours are now compensated at the cheaper standard rate. At the intensive margin, if we regard the overtime premium as some fixed proportion of the standard rate, marginal costs remain unaltered. The optimum strategy for the firm would therefore be to meet demand through a combination of a smaller workforce working longer average total hours per worker. If, incidentally, we were to assume the more general objective of profit maximisation, in which output is regarded as endogenous or controlled by the firm itself, then we would expect an even worse effect on employment in this situation (see, especially, Calmfors and Hoel, 1987a). The same hours-worker substitution effect would occur but now it would be reinforced by a negative scale effect on employment as higher labour costs are reflected in reduced output.

In the second place, what if the firm works only standard hours in equilibrium? While there are some important exceptional cases, it would be predicted that a cut in standard hours is likely to increase employment in this event. This is especially the outcome for a cost minimising firm with a fixed number of shifts and no part-time working. Typically, a profit maximising firm in this situation will experience employment-hours substitution given the cut in hours offset - as in the cost minimising case above - by employment reduction due to an unfavourable scale effect.

The distinction between 'overtime' and 'non-overtime' firms will be returned to in the review of recent empirical findings below. First, however, it is worth reporting on two other empirical approaches, both of which also feature NWLCs quite prominently.

In the work just described the firm's quit rate is usually taken into consideration, but treated exogenously. The influence of quits is closely tied to that of fixed NWLCs. Certain costs, such as those concerned with hiring, redundancy and training, entail once-over expenditures by the firm. Clearly the

the higher the quit rate, ceteris paribus, then the higher are once-over costs.

In a recent study, however, quits play a far more central rôle in the theoretical developments (Hoel and Vale, 1985 and 1986). This work is linked very closely to the efficiency wage literature, especially with the so-called labour turnover model (for summaries, see Stiglitz, 1984, Akerlof and Yellen, 1986; Katz, 1986). Firms with relatively high skilled labour are likely to display a tendency to protect their share of human capital investments in specific training in order to minimise the costs associated with unexpected quits. A rise in quits results in two types of labour cost increase. In the first place, the amortisation period and, therefore, the expected return to specific human capital investments are reduced. Secondly,the firm will need to replace at least some of its quits by new hires and this involves extra once-over expenditures on search, hiring and training. Variations in costs associated with quits not only occur as a result of fluctuations in product demand but also through changes in working time. The idea can be illustrated with a simple example.

Suppose that a firm works only standard hours with no opportunity for overtime working. Further, assume that its only significant specific investment involves training expenditure for a given proportion of its workforce. If there is no other slack time, its effective total working hours per period are equal to standard hours adjusted for non-productive training time (in the immediate sense) and multiplied by the size of the workforce. As mentioned above, the training time itself has to be adjusted by the quit rate since a higher rate of quits, provided they are matched by new hires, involve a greater proportion of total working time devoted to training. A cut in the standard workweek will reduce the proportion of productive to total working time. The firm's effective wage rate will increase and there will be an incentive for the firm to attempt to re-establish the former level of wages by

reducing quits. Firms may attempt to do this by increasing their actual wage rates relative to that of their near competitors. Therefore, in this type of model, quits and wage rates are endogenously determined. Also, it is not difficult to imagine that this sort of wage reaction as a means of optimising the rate of quits may not be conducive to a growth in employment.

In this framework, Hoel and Vale investigate the effects of an exogenous cut in working time on a representative wage setting and profit maximising firm in a competitive market. They integrate both demand and supply aspects of the problem. In the simplest version of their model they show that a reduction in working time will increase the rate of unemployment and reduce effective labour input in both the long and short-run. Their general conclusion, after investigating a range of possibilities, is that 'shorter working hours is a very uncertain policy for reducing unemployment - as the effect might very well be the opposite of what is intended' (Hoel and Vale, 1985, p.23).

Note that negative employment/unemployment reactions are predicted in this work despite the assumption of exogenously given standard hours. In the foregoing labour demand models, the assumption of hours exogeneity gave, at least, some hope of more beneficial labour market repercussions.

The work of Hoel and Vale undoubtedly points the way to important new avenues of research. As it stands at present, however, there are two limitations of the approach. In the first place, the work does not allow for endogenous changes in labour utilisation, such as less labour hoarding or more overtime working. This is a marked deficiency compared to the foregoing myopic optimising models. Secondly, no allowance is made for the fact that specific investments are shared investments. There is a well-known literature (e.g. Hashimoto, 1975 and 1981, and Okun, 1981) that convincingly argues that it is in firms' and the workers' mutual interest to share the

quasi-rent accruing from specific training and other investments. In order to protect these investments, there may well be an advantage for both sides to undertake long-term, seniority-based, contractual commitments with a large element of deferred compensation (such as fringe benefits, pension rights and so on). In part, therefore, firms attempt to insure against unanticipated quits by designing a payment structure that favours longevity within the firm. Quits are perhaps more likely to be minimised by long-term contractual arrangements rather than short-run variations in the wage rate.

Recent developments in the theory of trade unions (for example, Oswald 1982, and Sampson, 1983) have provided a strong conceptual framework for studying the effect of working time reductions in a situation where a large monopoly union controls wages leaving it to the employer to set the level of employment. While the collective bargaining set-up in many countries limits the importance of this type of model, it is perhaps a reasonable paradigm for (sections of) several economies, particularly the Scandinavian. Two reasonably similar approaches within this framework are provided by Calmfors (1985) and Hoel (1984, 1986). One limitation of these studies is that they consider only the case of working hours as an exogenous factor input. Very recently, Booth and Schiantarelli (1987; see also 1986) have extended the model structure to allow for (endogenous) overtime working. Their model is dynamic with utility and profits maximised intertemporally and with fixed NWLCs indirectly measured in terms of employment adjustment costs.

In this type of model, the union chooses a wage rate that maximises utility defined in terms of employment, wages and leisure. The firm is a profit maximiser with equilibrium employment a function of relative factor prices. Then, in a recursive manner, the union optimising wage is a given variable to the firm which then determines the employment level. If a cut in

working time increases the desired wage, via the union utility function, the firm cuts back on hours of work and employment. The models generally show that the effect of standard hours within the union utility function can move the wage in either direction. Indeed, the short-run effects in these papers are somewhat ambiguous although, in a long-run context given a desired return on capital, Hoel shows that a reduction in hours will lead to a fall in employment.

Finally, it should be added that a number of micro-studies have extended the type of analyses mentioned above by including other interconnected variables lying outside the immediate labour market - for example, international trade considerations, productivity effects of hours changes and inflation trade-offs. Examples include Drèze and Modigliani (1983), Ström (1984) and Brunstad and Holm (1984). This last study is also concerned with the productivity impacts of hours reductions, as is the work of Hübler (1987) and de Regt (1987) (see below).

In summary, the key to much of the above work is that the prices of adjusting labour at the extensive and intensive margins are not the same - given the existence of fixed NWLCs - and it therefore becomes necessary to untangle the decision to change employment from that of changing hours. This in turn provides the possibility of dividing hours into an exogenous standard component and an endogenous overtime component so as to analyse the implications of changes in the former variable both on the latter variable as well as workers and/or the stock of capital.

3.1.2 Recent Empirical Evidence

The bulk of the empirical investigation of the above theory has concerned the impact of hours reductions within the first type of model framework; that is, through the development of labour demand models for workers and hours. Much of the earlier quantitative work into this question

proved to be largely inconclusive (see Hart, 1987a, ch.6), probably due to a combination of over-simplified modelling and the use of somewhat aggregate data on which to test the essentially micro theory. More recent developments, however, have remedied some of the earlier deficiencies.

Without going into much technical detail, it is nevertheless worth writing down the general forms of the production and cost functions typically incorporated in these studies. The (instantaneous) production function can be written

$$Q = F(h,N,K) \quad F_i>0,\ F_{ii}<0,\ F_{ij}>0 \tag{3.1}$$

where Q is output, h is average hours per worker, N is the size of the workforce and K is the capital stock. Total costs, C, are expressed

$$C = [w_s h_s + w(h-h_s) + z]N + rK \tag{3.2}$$

where w_s is the standard wage, h_s is standard hours, w is the overtime wage rate, z is fixed NWLCs and r is the user cost of capital. In most studies, the overtime wage is expressed simply as

$$w = aw_s \qquad a \geq 1 \text{ (constant)} \tag{3.3}$$

where a is the overtime premium (e.g. a = 1.5).

Expression (3.1) is written generally with particular functional forms (often Cobb-Douglas or close variants) incorporated in specific research investigations. The main point is that there is no presumption - following arguments by Feldstein (1967), Benanke (1986) and others - that returns to N and h should be equal. Expression (3.2) is incomplete since it omits variable

NWLCs although these can easily be accommodated (see Hart and Kawasaki, 1987) and act in the same way as wages. The overtime function in (3.3) is the simplest possible; as mentioned earlier, Santamäki (1983, 1984, 1986 and 1987) has examined a fairly comprehensive range of more elaborate alternatives.

In the standard labour demand approach to modelling, two alternative optimising assumptions are made. In the first, and simpler, it is assumed that the firm minimises costs in (3.2) subject to the production constraint in (3.1) with output, Q, treated as being exogenously determined. The second assumption is that the firm maximises revenue (given by Q in (3.1) multiplied by product price) net of cost (given by 3.2).

From these optimising rules, it is possible to derive factor demand functions for desired factor inputs (h^*, N^* and K^*). Taking the cost minimising method as an example, these functions take the general forms:

$$h^* = h^*(w_s, z, h_s, a, r, Q), \qquad h_i^* = 0 \quad i=1, \ldots, 6 \tag{3.4}$$

$$N^* = N^*(w_s, z, h_s, a, r, Q), \qquad N_i^* < 0 \quad i=1, 2, \; N_3^* > 0, \quad N_j^* = 0, \; j=4, 5, 6 \tag{3.5}$$

$$K^* = K^*(w_s, z, h_s, a, r, Q), \qquad K_i^* = 0 \quad i=1, \ldots, 6, \tag{3.6}$$

where the h^*_i (etc) notation denotes the signs of the partial derivatives. Complete derivations of the equations in (3.4)-(3.6) can be found in Hart (1984a, b) and König and Pohlmeier (1986). Often, more explicit functional forms are obtained by an explicit choice of functional form in (3.1). This also may allow more unambiguous signs of partial derivatives to be obtained. For example, in this latter respect, the choice of Cobb-Douglas technology produces, among other new unambiguous outcomes, $\partial h^*/\partial h_s > 0$ and $\partial h^*/\partial z < 0$ (see König and Pohlmeier, 1986, and Hart, 1987a). The two most important expectations in the context of this chapter are:

(A) A rise in fixed-to-variable NWLCs induces a fall in N* and rises in h* and K*.

(B) A fall in h_s induces a fall in N* and rises in h* and K*.

Comparable outcomes for a profit maximising firm using Cobb-Douglas technology can be found in Hart (1987b).

In what follows, we examine the evidence for (A) and (B), concentrating our attention on two of our four highlighted countries, the FRG and the UK.

FRG studies

Recently, König and Pohlmeier (1987a, b) have presented estimates of factor demand elasticities to the static system of equations in (3.4)-(3.6). Their estimation method follows a methodology suggested by Hall (1973) to allow linearisation of the system given the initial problem of the non-linear (due to overtime working) cost function in (3.2). The method permits the use of flexible functional forms for the cost functions; these are translog, generalised Cobb-Douglas and generalised Leontief functions. (See Guilkey et al., 1983, for a useful comparative analysis of these functions.) Their work is based on aggregate FRG manufacturing data.

König and Pohlmeier's results with respect to expectation (A), as in several other studies, are mixed. While a rise in fixed costs, z, induces a fall in N, it also has a negative influence on h; using a different construction of z, König and Pohlmeier (1986) obtain the expected hours-effect. (See Ehrenberg and Schumann, 1982, for extensive investigations of the rôle of z in USA overtime equations.) Changes in variable costs also have mixed outcomes vis à vis the underlying theory. It should be pointed out, however, that the general functional forms adopted by König and Pohlmeier preclude unambiguous sign predictions in most cases. On the other hand, their results

with respect to expectation (B) are far more in line with theoretical prediction. They estimate that a reduction in standard hours will serve to decrease employment, increase overtime working and produce substitution in favour of capital.

The König and Pohlmeier work represents an attempt at estimating the standard system in such a way as to match the underlying model structure and thereby produce a more consistent set of estimates. To this extent, their model may be regarded as providing a more reliable test of the underlying theory than many of the earlier aggregate studies. Nonetheless, as with much of the earlier work, they use aggregate data on which to test the essentially micro theory.

Hübler (1987), by contrast, tests a modified version of the standard theory using FRG socio-economic household panel data that characterises 1031 individuals who worked overtime over a period in 1984. The modification to the theory involves an attempt by the author to integrate the relationship between work effort and average hours per period. For example, effort may increase with working hours over the first part of the working day and then, after reaching a peak, decrease as fatigue (and boredom) set in. De Regt (1984) (see also Hart, 1987a) provides a useful representation of this type of effort function.

Now, the effect of standard hours reductions on employment/overtime working will additionally include the length of an individual's existing average hours in relation to her/his effort curve. One particularly strong appeal of Hübler's formulation is the prediction that, if overtime is worked and in the range of overoptimal work intensity, a reduction in standard hours can result in a reduction in average total hours. In the conventional models the sign prediction is usually opposite contrary to empirical findings. Clearly, questions related to an individual's position on the effort curve involves

studying heterogeneous workers, and not the homogeneous workforce implicitly assumed in many studies; hence the use of more detailed individual panel data. Hübler is able to distinguish in this sample between young and old, skilled and unskilled, and short- and long-tenured workers.

Hübler estimates an overtime equation - with measures of z, w and h_s as arguments - in order to test whether his 'varying labour intensity' model is superior to the standard model. One extremely interesting feature of the work is that his household sample is split between workers with short and long tenure (defined as less than or equal to 3 years and greater than 3 years, respectively). Using appropriate techniques to correct for the potential selectivity biases associated with distinguishing between both overtime/non-overtime and long/short tenure workers, Hübler estimates separate equations for the different tenure lengths. He obtains support for the need to account for work intensity in studies of this type. In line with the standard theory (and expectation A), he also finds that overtime hours increase with a rise in fixed NWLCs and with falls in the wage rate and standard hours.

It should be added that de Regt (1987), working along the same lines as Hübler, although with both overtime and employment demand functions, does receive some support for a positive employment response to a cut in working hours. De Regt estimates a dynamic labour demand model based on Dutch aggregate manufacturing data for the period 1952-82, along the lines suggested by Nickell (1984). His results for the overtime function are generally rather unconvincing, however, and despite the relative sophistication of the dynamic system, Hübler's micro panel data appear to provide the more reliable (and believable) set of estimates.

Moreover, Hübler tests - with some success - the interesting hypothesis that young workers with short tenure will have higher optimal work intensity than others. Once-over fixed NWLCs concentrate in the first phase

of a worker's lifetime with the firm and - given sharing agreements over these costs (Hashimoto, 1981) - it is in the interest of both firms and workers to work overtime in the initial years of working life. For their part, firms are able to discount specific investments more speedily while the workers are able to maintain earnings that would otherwise have been eroded by their share of investment costs.

UK studies

Two recent UK studies also examine hours reductions in a micro-context. While the first does not explicitly integrate the rôle of NWLCs, its findings relate closely to the quasi-fixed cost theory outlined earlier. It consists of a series of questionnaire-type surveys carried out on establishments in UK manufacturing industry between 1979-1983. The work is reported in White (1983) and White and Ghobadian (1984). The first survey (in 1979/80) was undertaken shortly before a national engineering industry agreement on shorter working hours - involving a one hour reduction in the standard workweek - was concluded. Case studies were made of companies that had introduced working time reductions. The second survey covered establishments in industries that had introduced shorter hours through national agreements in 1981. The industries covered here were engineering, pharmaceuticals, printing and construction. A third survey, carried out in 1982/83, was a follow-up study of establishments affected by working hours reductions. An attempt was made to quantify the effects of shorter hours through examining production and accounting data from the companies involved. Overall, the surveys show quite conclusively that the hours reductions had either a zero or a negative effect on employment while overtime tended to rise. With respect to the latter variable, however, it proved to be extremely difficult to ascertain if the overtime reaction resulted

from standard hours cuts or extraneous demand effects. On the employment-side, the authors reject any notion that the employment cutbacks were less than might have been the case had there been no workweek reduction. At the very least, the fact that the overtime and employment reactions work in opposite directions is in line with the predictions from the conventional theory.

The second study (Hart and Wilson, 1987) is an econometric analysis that concentrates on a more homogeneous sub-set of establishments over a similar time period to the White and Ghobadian study. It is based on a detailed set of data (see Wilson, 1985, for full information) on 52 establishments in the British metal working industry for 5 separate years, 1978-82. An attempt is made to estimate as closely as possible full labour demand specifications arising from the underlying standard theory as well as incorporating a wide range of important control variables.

Of the 52 enterprises, 43 worked some overtime in one or more years of the study: these are classified as 'overtime establishments'. Hart and Wilson estimate labour demand equations based on all the establishments as well as, separately, on the overtime and non-overtime establishments. Moreover, they estimate separate equations for workers, total average hours and average overtime hours. The hours variables refer to annual average hours. (Depending on the model specification, three types of estimating techniques are adopted; these are ordinary least squares, TOBIT estimation and pooled cross-section/time-series GLS estimation.)

The general feature of the Hart-Wilson results with respect to cuts in scheduled annual hours are summarised in Table 3.1.

In general, they lend reasonably strong support for the theoretical predictions of the type of workers/hours responses discussed in section 3.1.1 . In particular, evidence is found that is much in line with expectation (B). In

Table 3.1

Workers/Hours Responses to a Cut in Scheduled Annual Hours:

Hart/Wilson Study

All Establishments		
(a)	average total hours	a significant less-than-proportional fall with elasticities similar to those found in another UK study (Neale and Wilson, 1985)
(b)	average overtime hours	a significant rise – in those enterprises working some overtime that is more than proportional to the cut in scheduled hours.
(c)	workers	an insignificant response in the size of the workforce.
Overtime Establishments		
(a)	average total hours	a significant less-than-proportional fall.
(b)	workers	a significant reduction in the size of the workforce.
Non-Overtime Establishments		
(a)	workers	an increase in the size of the workforce*

* Although this result lies outside the significance bounds of a standard 5% t-test.

the case of expectation (A), however, while Hart and Wilson obtain a negative impact on employment given a rise in the ratio of fixed-to-variable labour costs, they do not obtain the opposite impact in the hours equation. This variable also enters with the 'wrong' sign in two of the three König and Pohlmeier empirical papers. The failure of this variable, in both FRG and UK studies is almost certainly due to an inadequate measure of fixed costs, however.

3.1.3 Microeconomic versus Macroeconomic Studies

On the face of it policymakers should be quite encouraged by the findings of the more carefully undertaken macroeconometric studies of employment responses to working time reductions. A review of a variety of European models and results is presented by van Ginneken (1984) and Hart (1987a) while Whitley and Wilson (1986 and 1987) produce extensive UK evidence from simulations on UK systems. Although the outcomes of these and other studies are, inevitably, conditional on varying underlying assumptions and subject to many qualifications, they nevertheless seem to point firmly to the conclusion that a reduction in the standard workweek will serve, to a greater or lesser extent, to stimulate employment. This seems to be all the more encouraging because this type of study covers economic relationships that are often erroneously held fixed in the more partial approaches. In this latter respect we would include international trade considerations, assumptions concerning monetary and fiscal responses and several aspects of capital markets.

Notwithstanding the advantages of the broader approaches, the outcomes of these models should be treated with utmost caution and certainly they should not be used as the basis for hard policy decisions.

The fundamental problem with all the existing macroeconomic models is that they do not represent adequately underlying labour market relationships. The better micro-studies are at pains to distinguish carefully between stocks and flows of employment and the interaction among (components of) input factors given scale and relative factor price changes. In the case of factor prices, great improvements have been made in attempting to separate fixed from variable labour costs. Almost without exception, macroeconomic models do not separate the important components of the labour input and they come nowhere near to measuring relative factor prices accurately. For example, no single macroeconomic study to date, at least to the author's knowledge, has fully specified and integrated complete measures of labour costs, both fixed and variable. But this is a critical omission since microeconomic theory - from a range of underlying modelling assumptions - tells us that it is the ratio of these costs that plays an important part in determining the relative changes in labour stocks and utilisation. Few macro models come anywhere near this level of analysis. Indeed, when the recent West German collective bargaining discussions were held involving a 35 hour workweek demand, at least one internationally well-known econometric model faced the somewhat fundamental problem of being unable to simulate the likely effect because not even hours of work were included within the system! Even where this somewhat basic requirement is satisfied, simplifications and crude specifications in some models have led to ludicrously optimistic predictions about employment responses to hours cuts (see van Ginneken, 1984, for some examples).

Inadequate modelling of the labour market leads to fundamental misspecifications and makes it impossible for factor substitution effects to be measured or even the scale impacts to be accurately determined. Moreover, if the immediate labour market representation is inaccurate, then it does not

appear to be particularly illuminating to study the interaction of other markets in the system since errors are merely compounded.

3.1.4 Related Extensions

Part-time employment

Where part-time employment occurs the labour input can be divided into workers and average hours of both part-time and full-time employees together with their respective factor prices. Then, changes in the ratio of fixed-to-variable labour costs of one category of worker may have implications not only for the demand for the utilisation dimension of that category but also for the demand for both stock and utilisation of the other category. Also, a reduction in weekly standard hours - affecting only full-time employees - may now produce cross-responses in part-time workers and hours. The full-range of possibilities within the conventional demand model framework are explored by FitzRoy and Hart (1986). Empirical work can be found in Owen (1979), Disney and Szyszczak (1984) and Ehrenberg et al (1987) and a wide review is presented in Hart (1987a).

Two policy issues are worth noting here. First, although hard evidence is difficult to obtain, increases in statutory job protection for part-timers in Europe and elsewhere are likely to have had the effect of increasing fixed NWLCs of part-time relative to full-time workers. While there are undeniable benefits to workers of such legislation, there is a potential offsetting cost. Rises in fixed costs may serve to lead to a greater emphasis by employers on extending utilisation rates of existing employees at the expense of part-time jobs. (See Nickell, 1979, for a related discussion as well as section 4.3.) Secondly, reductions in standard hours may not only produce hours-worker substitution among full-time workers but also increase the proportion of part-time workers whose relative cost advantage would

improve. As pointed out by Hart (1987a), this is a rather ironic outcome vis a vis typical trade union policy over part-time work. Unions in Europe are generally opposed to the extension of part-time work but favour workweek reductions. It may well be that the two goals are incompatible since success in the latter may inevitably exacerbate the growing trend towards part-time employment (see also Robinson, 1984).

Shift-working

For closely related theoretical reasons, increases in fixed NWLCs and standard hours may stimulate another type of intensive margin reaction by firms. They may try to minimise costs by increasing the number of shifts per period. Developments here in relation to the foregoing variables and ideas are comprehensively presented in Calmfors and Hoel (1987b).

3.2 Changes in Payroll Taxes and Ceilings

As is clear from chapter 2, statutory social security contributions by firms comprise one of the most important elements of NWLCs. In almost all OECD countries, the basic system of payment is the same. Firms contribute to state pension, health, unemployment and (sometimes) other benefit schemes in the form of a payroll tax which, for a given period of time and over some minimum ceiling limit varies directly with wages up to an upper-wage ceiling cut-off limit. For employees with wages above this ceiling, the contribution per period is calculated as a tax rate (where the rates may or may not vary across each main benefit item) multiplied by the ceiling wage. In such cases the contributions act as fixed NWLCs since changes in per period average working hours do not alter the contribution (unless, of course, wage ceilings are crossed). Currently in most countries, the payroll tax ceilings operate

towards the upper-tails of national average wage distributions. At one end of the spectrum, a firm with a predominantly female or low-skilled workforce is likely to experience purely wage-related, or variable, social security contributions. At the other, high technology, male-dominated firms may experience a high degree of fixity in their total contributions.

The necessary division of statutory contributions into fixed and variable NWLCs automatically links any analysis of changes in tax rates and ceilings limits to the foregoing hours/utilisation discussion. In particular, for reasons earlier established, it is important to study the employment effects of the changes within a framework that includes the distinction between stock and utilisation dimensions of the labour input.

But why discuss tax and ceiling changes? One policy argument that has prevailed in Europe since the mid-1970s and during the ensuing employment/unemployment problems is that rises in real social security contributions have effectively represented a tax on jobs. At the same time, ever more generous tax relief and depreciation allowances on capital have adversely affected the relative factor prices and stimulated capital-labour substitution. The view is succinctly summarised by a group of EC experts:

> "The granting of interest rate subsidies, tax relief in respect of depreciation, and investment aids (regional or others) lowers the cost of using capital. Furthermore, the use of wages as the base for social security contributions and certain parafiscal charges lead to changes in the parameters within which the employer makes his calculations and tends to accelerate the substitution of capital for labour." Commission of the European Communities (1976)

In this section, we will attempt to explore these issues emphasising the rôle of social security contributions as fixed and variable NWLCs and thereby linking them to the demand for workers and hours. The discussion will concentrate on the UK and FRG economies. A detailed assessment of the effect of recent social security contribution changes on employment in the UK is presented and this is followed by a report on quantitative work undertaken for FRG.

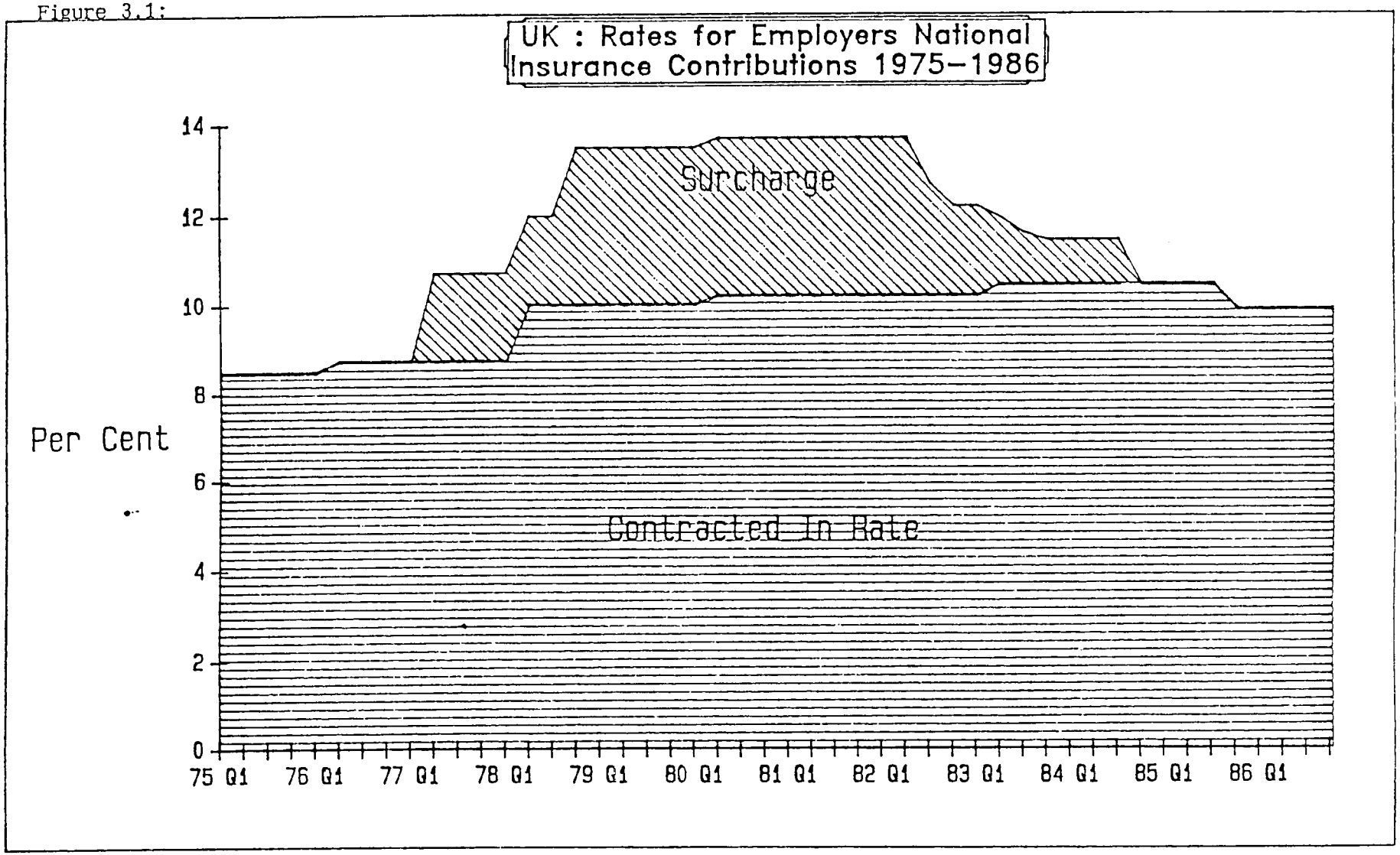
3.2.1. Recent UK experience

From Table 2.8 (see also Figure 2.7) it is clear that the major change in NWLCs that occurred during the period 1981-1984 was the reduction in employers' contributions with respect to National Insurance (NI) contributions. Between 1981 and 1984, NI payments fell as a proportion of total labour costs in manufacturing by 1.6 per cent, from 9 per cent to 7.4 per cent. This change accounted for 84 per cent of the reduction in NWLCs from 17.9 per cent to 16 per cent of total labour costs over this period.

Thus, having steadily increased as a proportion of total labour costs between 1964 and 1981, employers' statutory NI contributions have become a less important component of the cost of labour in recent years. The reasons why this reversal has taken place can be found by briefly considering the UK macroeconomic environment. Changes in employers' NI rates from 1975 to 1986 are plotted in Figure 3.1.

Following the sterling crisis of 1976 a much tighter control of public sector borrowing was instigated. This involved both reducing public spending and increasing tax revenues. One method of increasing revenue was through the introduction of a "temporary surcharge" on employers' NI contributions. This was introduced, initially, at 2 per cent by the Labour administration in

Figure 3.1:


UK : Rates for Employers National Insurance Contributions 1975–1986
Per Cent
14
12
10
8
6
4
2
0
Surcharge
Contracted In Rate
75 Q1
76 Q1
77 Q1
78 Q1
79 Q1
80 Q1
81 Q1
82 Q1
83 Q1
84 Q1
85 Q1
86 Q1

early 1977. Much resented by employers, this tax was nevertheless increased to 3.5 per cent in 1978 and maintained by the new Conservative administration who were also keen to maintain control over public sector borrowing through the Medium Term Financial Strategy (MTFS) which sought to reduce the size of the Public Sector Borrowing Requirement as a proportion of GDP. Proceeds from the National Insurance Surcharge formed part of the government's general tax revenue rather than being added to the National Insurance Fund. This difference in treatment of the proceeds was the reason for not consolidating the contribution rates. In fact, the NI surcharge differed from standard income tax only insofar as it was paid by the employer and not the employee.

Not only were employers required to pay the NI surcharge, they also had to pay increased standard rates of contribution: these rose from 10.2 per cent in April 1981 to 10.45 per cent in April 1984. Contribution rates remained at this latter rate through 1986, though as is discussed subsequently, lower income earners are now subject to reduced rates of contribution.

The reason why the overall NI burden on employers has been reduced is that the NI Surcharge was gradually decreased after 1982 and finally abolished on 1 October 1984. One explanation put forward by contemporary commentators for the disastrous performance of the UK labour market in 1981 and 1982 was that labour was too heavily taxed vis à vis other factor inputs - in line with the previous EC experts quote - and that this was at least partly responsible for the rise in unemployment. The debate on the NI surhcarge was largely couched in terms of the tradeoff between labour and capital: more subtle points such as the shifts in the tradeoff between changes in the size and the utilisation of the labour stock arising from changes in the NI scheme received little attention.

Employers found the Conservative administration more sympathetic to

their views, showing some commitment to shifting the tax burden from direct to indirect taxation. Thus the surcharge was first reduced from 3.5 per cent to 2 per cent in August 1982 for all employers other than Local Authorities. This latter (somewhat bizarre) exclusion was presumably the result of a feeling by Central Government that Local Authorities were overstaffed, inefficient and should be encouraged to reduce employment. A further reduction to 1.5 per cent in the surcharge rate occurred in 1983 with, as mentioned above, full abolition coming in 1984.

Not only have the overall rates of NI changed in recent years - thereby altering the quantitative importance of NWLCs - but there have also been important detailed changes in the administration of the schemes that have affected the balance of NWLCs as between fixed and variable components. These came as a result of the 1985 Finance Act which introduced lower contribution rates for low paid employees and their employers. These were financed by abolishing the upper earnings limit on employers' contributions.

The precise changes were as follows:

(1) For employees earning less than £35.50 per week no NI contributions were payable.

(2) For those earning between £35.50 and £54.99 an employee's contribution of 5 per cent and employer's contribution of 5 per cent on all earnings was payable.

(3) For those earning between £55.00 and £89.99 an employee's contribution of 7 per cent and employer's contribution of 7 per cent on all earnings was payable.

(4) For those earning between £90.00 and £129.99 an employee's contribution of 9 per cent and employer's contribution of 9 per cent on all earnings was payable.

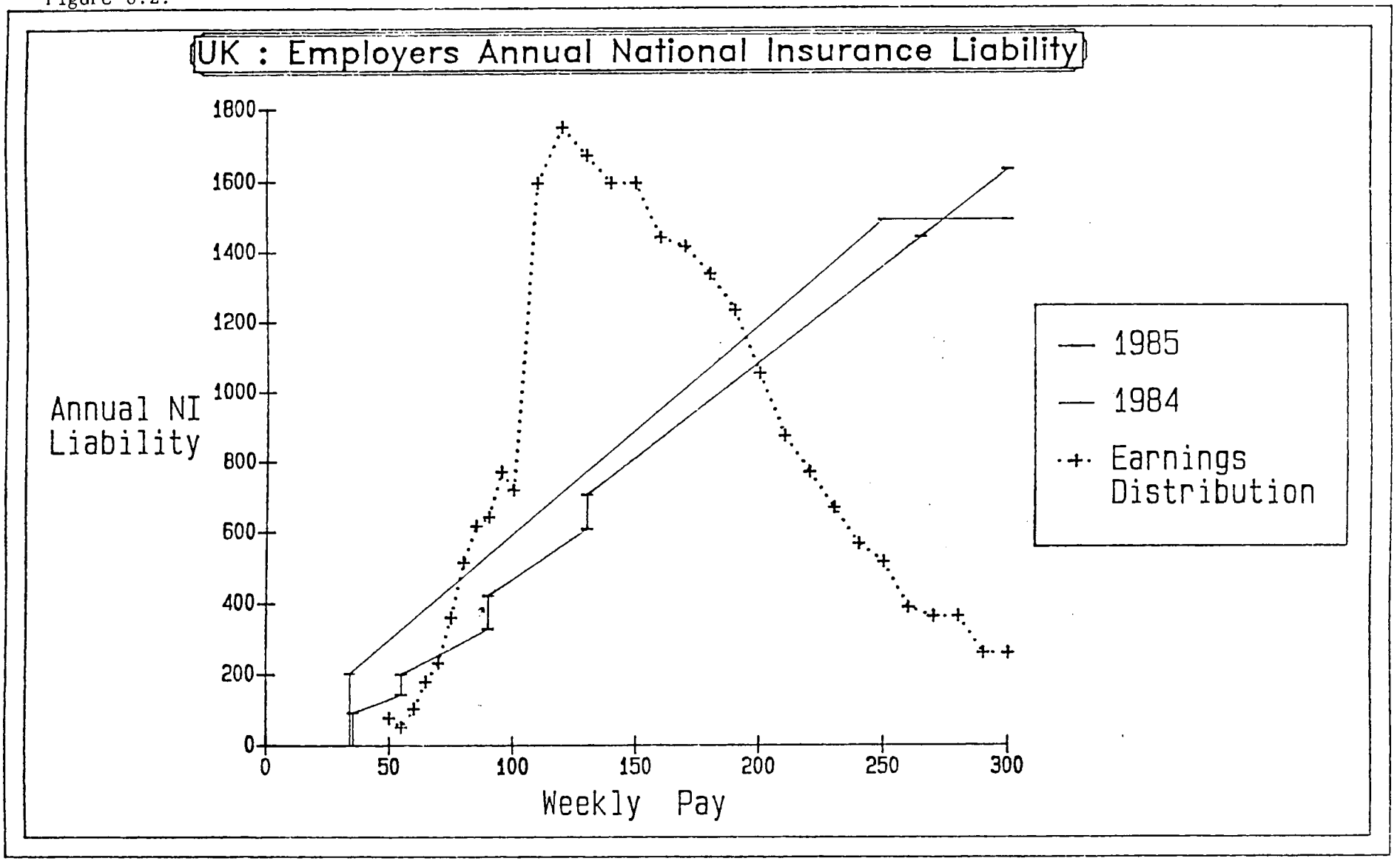
(5) For those earning between £130.00 and £265.00 an employee's contribution of 9 per cent and employer's contribution of 10.45 per cent on all earnings was payable.

(6) For those earning above £265.00 per week no additional employees' contribution was payable but employers still had to contribute 10.45 per cent of earnings to the National Insurance Fund.

(7) These regulations applied to those who were contracted in to the state scheme's additional pension. For those who contracted out (i.e. with their own pension arrangements), employees paid the same rates of contribution up to the lower earnings limit (£35.50 per week) and then reduced rates (by 2.15 per cent) thereafter. Employers similarly paid the same rates of contribution up to the lower earnings limit and thereafter rates reduced by 4.1 per cent below the contracted-in rates. Above the upper earnings limit (£265.00 per week), however, employers had to contribute at the full rate of 10.45 per cent (i.e. at the same rate as for contracted in employees).

The new regulations are clarified in Figure 3.2 which plots weekly pay against employers' annual NI liability for the years 1984 and 1985. In 1984 a single rate of duty was payable and there was a ceiling on employers' contributions. The more complicated scheme with reduced rates as described above was introduced in 1985. Also shown superimposed on this figure is the earnings density function for all adult workers over the age of 21 in April 1985: this gives an idea of the proportion of the adult workforce that experienced changes in the NI regulations. The total number of workers affected by the reduced rates will be somewhat greater than that indicated by the Figure because young workers aged 18-21 are not included in the displayed earnings distribution. Nevertheless it is clear that the reduced rates are

Figure 3.2:


UK : Employers Annual National Insurance Liability
Annual NI Liability
1800
1600
1400
1200
1000
800
600
400
200
0
0
50
100
150
200
250
300
Weekly Pay
1985
1984
Earnings Distribution

likely to be relevant to only a small proportion of workers since they are operational only in the lower tail of the earnings distribution.

The removal of the earnings ceiling on contributions reduced the fixed component of NWLCs while increasing the variable component for a significant group of high income earners. Since the change has no effect on the "consumption wage" there will be no effects on labour supply. Rather the effects will come on the demand side where the degree of substitutability between high and low wage earners, between high paid workers and capital and the possibilities of substitution between the utilisation and the stock of high paid employees must all be considered. At present no evidence is available on such effects though one suspects that there may be little latitude to vary the utilisation of high paid workers since part of the reason for them being highly paid is that they are self motivated and are already prepared to supply whatever hours are necessary. Further, if these high paid workers have a monitoring rôle, then it may be suboptimal for a firm to change its monitoring technology by changing the ratio of high paid to low paid workers, thus reducing the possibility of substitution between the high and low paid. Finally, it is arguable that highly skilled (and therefore highly paid) workers are complements rather than substitutes for capital. Thus, presumably as the government hoped, it is not clear that the removal of the ceiling on high income earners will have any significant effect on their employment opportunities. West German empirical evidence on these sorts of questions is reported on in the next section.

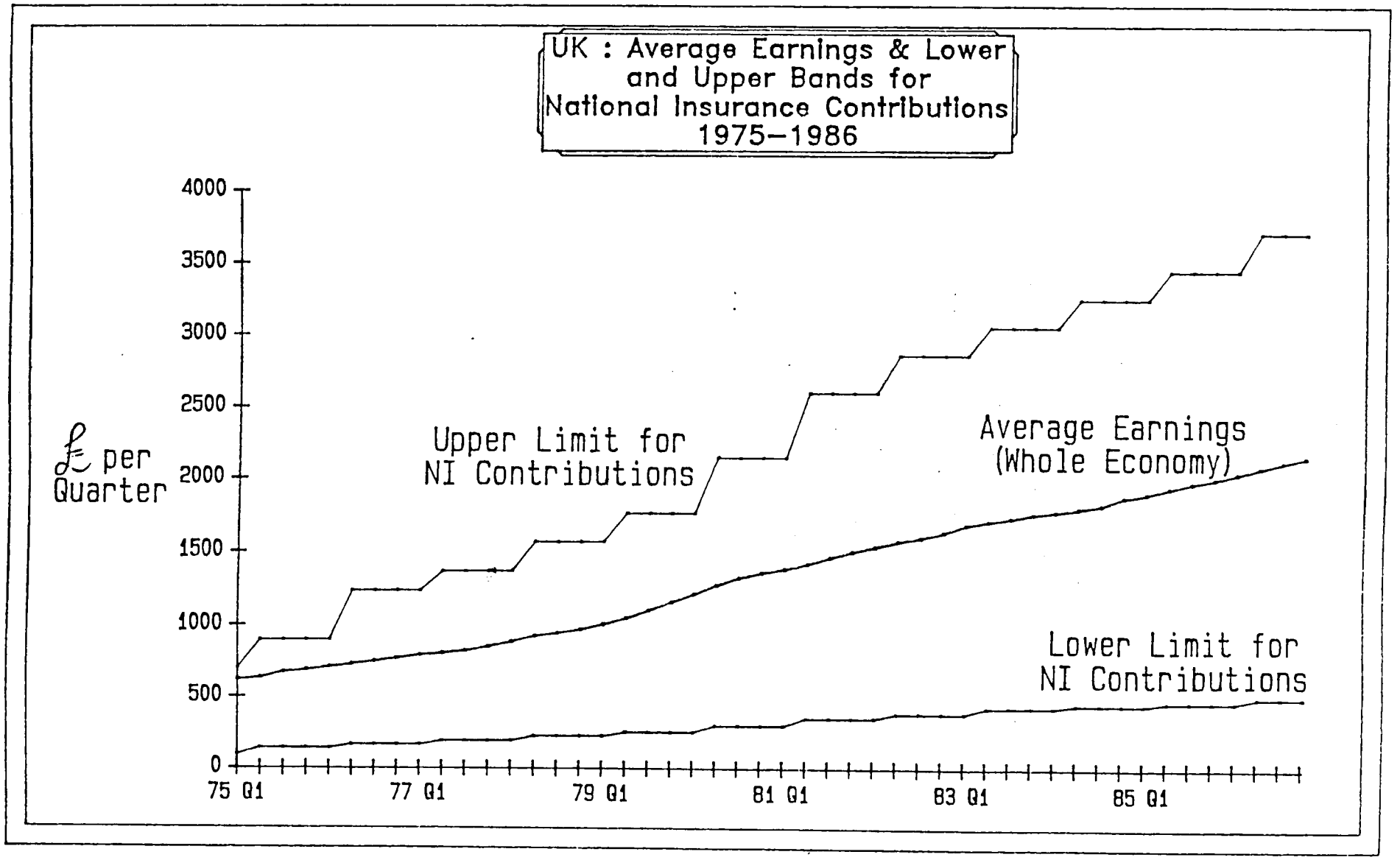
The reduced rates of contribution for low paid workers were clearly introduced in the hope of increasing employment amongst the low paid. This reflects the view that excess supply of labour is most acute amongst the unskilled and low status workers. Bell (1981) discusses the theoretical effects of changes in contribution rates on employment and labour utilisation in the

context of a labour costs function which reflects both contribution ceilings and premium rates of pay for overtime working. Applying his argument, reduced rates will tend to lower variable costs relative to fixed labour costs and so promote utilisation relative to employment. However, large increases in utilisation will incur substantial fixed cost penalties if the consequent increase in earnings takes workers above the earnings limit for the relevant contribution band. Thus the argument for increased utilisation only applies within each of the contribution ranges: once these ranges are crossed the fixed associated penalty makes the argument less clear-cut.

UK policymakers probably viewed substitution between hours and workers as being a less important effect of the changes in NI regulations than the potential employment gains arising from substitution between labour and capital. A number of macroeconomic studies including those of Layard and Nickell (1986) have found significant factor substitution effects arising from changes in relative prices or have concluded that the evidence is supportive of the classical proposition that the demand for labour is a negative function of the real product wage. In particular, Layard and Nickell argue that the 13 per cent rise in "employment taxes" has raised UK unemployment by 1.4 per cent (approx. 390 thousand). The cuts in NI contribution rates are presumably expected to reverse some of this increase by boosting employment at given levels of demand.

The upper and lower bands on NI contributions have been adjusted with changes in earnings during recent years. (The lower band here refers to the lowest level of weekly income under both the pre- and post-1985 NI regulations while the upper band refers to the ceiling on employee contributions since post-1985 there has not been a ceiling on employer contributions.) The relationship between average earnings for the whole economy and the upper and lower bands is shown in Figure 3.3. While in 1975

Figure 3.3:


UK : Average Earnings & Lower and Upper Bands for National Insurance Contributions 1975–1986
£ per Quarter
4000
3500
3000
2500
2000
1500
1000
500
0
75 Q1
77 Q1
79 Q1
81 Q1
83 Q1
85 Q1
Upper Limit for NI Contributions
Average Earnings (Whole Economy)
Lower Limit for NI Contributions

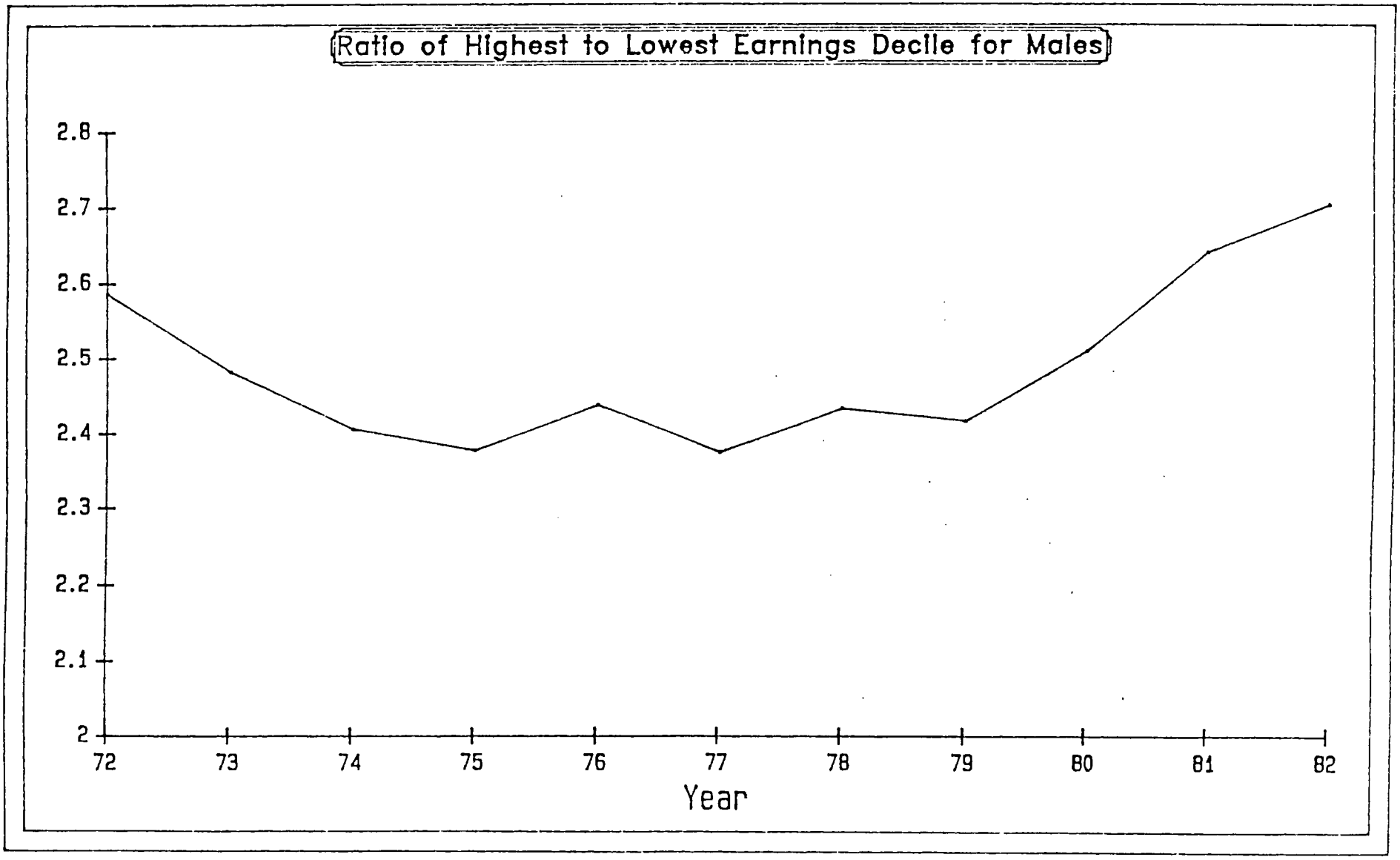
average earnings were close to the contributions ceiling, changes since then have maintained the lower limit at about 75 per cent below average earnings and the upper limit around 75 per cent above the average. (The ratio of the upper to the lower contribution limit deviates very little from a factor of 7.4 from year to year.)

If the earnings distribution were stable this close linkage of contribution limits to ceilings would imply little change in the proportion of workers below, between and above these limits. This would then imply no overall change in the ratio of the fixed to the variable components of NI contributions across the earnings distribution. However, an increase in the dispersion of earnings will lead to a greater proportion of the workforce with earnings either below the lower limit or above the upper contribution limit, thus increasing the proportion of NI contributions that are fixed.

There is evidence that earnings inequality in the UK has increased since 1979. Figure 3.4 plots the ratio of the highest to the lowest earnings decile for the period 1973 to 1985. After reaching a minimum of 2.3 in 1976, this ratio has clearly increased, though the upward trend has not been uniform from year to year. This seems to imply, notwithstanding the close relation between the contribution limits and average earnings, that the degree of fixity of NI contributions in the UK has been increasing in recent years because the increase in the dispersion of earnings implies that a greater proportion of workers have been earning less than the lower contribution limit or more than the upper contribution limit (prior to 1985).

To conclude this section, the major change in NWLCs in the UK in recent years has been the reduction in NI contributions. This has come about mainly as a result of the removal of the NI surcharge. This was possible through changes in UK macroeconomic policy which sought to alleviate the problem of unemployment by easing the pressure on labour costs. Not only

Figure 3.4:


Ratio of Highest to Lowest Earnings Decile for Males
2.8
2.7
2.6
2.5
2.4
2.3
2.2
2.1
2
72
73
74
75
76
77
78
79
80
81
82
Year

did overall rates of contribution come down, there was also a radical change in the structure of NI with lower contribution rates for low income earners and the removal of the ceiling on employers' contributions.

These factors changed the ratio of fixed-to-variable labour costs in a fairly complex manner although the main motivation for the introduction of the lower contribution bands was to increase the demand for labour by reducing the real product wage. Finally, although the contribution limits have changed little relative to average earnings in recent years, the effect of the increased dispersion of earnings will be to increase the proportion of workers for whom NI contributions constititute fixed NWLCs.

3.2.2. FRG empirical evidence

In the previous section, we commented on possible employment impacts of recent changes in social security contribution rates and ceilings in the UK. While the government's prime aim in reducing contributions was to induce favourable employment scale responses, changes in the ratio of fixed-to-variable labour costs may also have led to substitution responses between stocks and utilisation rates of labour. Hart and Kawasaki (1987) have attempted to quantify these effects for FRG.

They develop a profit-maximising demand model of the same basic structure as (3.4)-(3.6) and carry out estimation and simulation using FRG aggregate annual manufacturing data for the years 1951-81. Social security contributions are divided into fixed and variable elements by fitting distributions to the FRG wage data and then estimating mean contributions for employees with wages above and below the wage ceilings. All other fixed and variable NWLCs as well as direct wage costs are included in the demand analysis. The special problem of Christmas payments (Weihnachtsgeld) -

affecting the allocation of fixed and variable social security contributions - is also accommodated.

After estimating the three factor demand system (for workers, effective hours, and the capital stock) - augmented to allow for the dynamic interrelation of factor inputs due to adjustment costs - Hart and Kawasaki carry out simulations based on the year, 1981. The simulations involved three basic questions:

(1) What are the factor demand implications of changes in tax ceiling limits?

(2) What are the factor demand implications of changes in payroll tax rates?

(3) What would be the required change in existing capital subsidies - from 1981 levels - to produce the equivalent effects on employment as each given wage ceiling and tax rate change?

Before commenting on the results, it is important to establish that, in 1981, the wage ceilings (in common with most other OECD countries) were situated towards the extreme right tail of the aggregate (monthly) wage distribution. (In 1981, variable social security contributions (VT) in FRG accounted for 11.8% of total labour costs in manufacturing and fixed NI contributions (FT) for only 1.2% - see Figure 2.1).

Given wage ceilings located towards the right tails of wage distributions, a given percentage change in the ceiling produces a more than (less than) proportionate change in fixed (variable) payroll tax contributions. Therefore, for example, a cut in the wage ceiling increases the ratio of fixed to variable labour costs. From the last three columns of Table 3.2, it can be seen that a cut in the wage ceiling is predicted to produce percentage increases in all three factors. The percentage increase in workers are significantly greater than those for average hours. These outcomes are

Table 3.2

Simulated Effects of Payroll Wage Ceilings and Payroll Tax Rates on Per-Capita Social Security Contributions and Factor Demand: FRG Manufacturing Industry, 1981

percentage changes in	estimated percentage changes in				
wage ceilings	variable payroll contri-butions (VT)	fixed payroll contri-butions (ZT)	number of workers (N)	effective average hours (h)	capital stock (K)
-5.00	-3.30	25.75	0.65	0.04	0.17
-10.00	-7.48	58.33	1.28	0.23	0.38
-15.00	-13.12	101.80	1.92	0.68	0.63
5.00	2.57	-20.52	-0.66	0.08	-0.15
10.00	4.57	-36.70	-1.33	0.25	-0.29
15.00	6.50	-52.05	-2.15	0.54	-0.49
payroll tax rates	(VT)	(ZT)	(N)	(h)	(K)
-5.00	-5.00	-5.00	-0.27	0.86	0.12
-10.00	-10.00	-10.00	-0.56	1.78	0.24
-15.00	-15.00	-15.00	-0.86	2.76	0.37
5.00	5.00	5.00	0.26	-0.81	-0.11
10.00	10.00	10.00	0.51	-1.58	-0.22
15.00	15.00	15.00	0.74	-2.32	-0.31

Source: Hart and Kawasaki (1987)

almost certainly explained through favourable scale responses. Total payroll costs are reduced since, on the average, less tax is liable on that proportion of the workforce that lies between the old and the new ceiling limits. The estimated induced employment increases, from a sample population of 5.8 million workers, range from 37.7 thousand for a ceiling cut of 5 per cent to 111.4 thousand for a cut of 15 per cent. Note that for ceiling increases, the stock variables (i.e. workers and capital) are predicted to decrease while average hours increase slightly.

Therefore, as far as ceiling changes are concerned, these results give some, albeit rather modest, support for a government initiative to reduce tax ceilings. It might be added, by contrast, that the recent policy by most European governments has been to increase the ceilings towards the upper tail of the wage distributions thereby inducing (likely) negative scale impacts on employment.

Across-the-board cuts in payroll tax rates have the effect, as shown in the lower half of Table 3.2, of increasing labour utilisation and reducing both stock variables. For tax rate reductions in the range 5-15 per cent, the magnitudes of the respective employment decreases lie between 15.6 and 49.9 thousand workers: the comparable hours effects - from a monthly average in 1981 of 138.5 hours - lie between increases of 1.19 and 3.82 hours. Tax rate increases reverse the direction of response in each factor input.

These latter simulations provide a stark illustration of a likely major source of weakness in policy initiatives to cut NI contributions. Our estimates indicate that payroll tax decreases do stimulate labour-capital substitution, but only with respect to the utilisation dimension of total labour input. This, in large part, reflects the important variable, hours-related, element in the taxes and emphasises the resulting necessity of dividing labour services into stock and utilisation components when analysing these sorts of

(9)

questions. As a corollary, increasing payroll taxes does not, on our estimates, decrease numbers employed suggesting that the sort of policy statement represented by the EEC-quote on page 90 requires, at least, substantial modification.

From a "policy effectiveness" standpoint, it is also important to consider another aspect of this work. In their factor demand equations, Hart and Kawasaki's factor adjustment coefficients reveal that the mean adjustment time of workers to new "desired" levels is considerably longer than that of average hours (12.9 compared to 0.6 years). In effect, the short-run tax changes on the size of the workforce are negligible with hours adjustment bearing the main burden of the total labour response.

The simulated effects of changing capital subsidies in order to obtain equivalent employment changes to those resulting from the tax changes in Table 3.2 are reported in Table 3.3.

As an example, suppose the government wanted to know the required magnitude of change in existing (i.e. 1981) capital subsidies in order to achieve the same employment gain as that for a 5 per cent cut in wage ceilings (i.e. 0.65 per cent from Table 3.2). An employment gain would be achieved by reducing user cost of capital subsidies thereby increasing the price of capital relative to labour and inducing labour-capital substitution. Detailed manufacturing estimates for 1981 (Gerstenberger et al., 1984) reveal that total subsidies (i.e. tax and depreciation allowances) reduced user costs from their unsubsidised, or basic, price by 9.7 per cent. The results in Table 3.3 reveal that existing subsidies would need to be reduced by one-half in order to induce this size of employment effect. Indeed, the magnitude of the required subsidy changes revealed by Table 3.3 - especially with respect to ceiling changes - are such as to lie beyond credible short-term policy objectives. This conclusion is reinforced when it is considered that, in any case, the

Table 3.3

Estimated Changes in User Cost of Capital Subsidies to Produce Equivalent Wage Ceiling and Tax Rate Employment Effects: FRG Manufacturing Industry, 1981

percentage changes in payroll wage ceilings	equivalent percentage changes in existing capital subsidy rate	percentage change in payroll tax rates	equivalent percentage changes in existing capital subsidy rate
-5.0	-51	-5.0	21
-10.0	-104	-10.0	42
5.0	50	5.0	-20
10.0	98	10.0	-40

Source: Hart and Kawasaki (1987).

workforce is estimated to be extremely sluggish to adjust. Again, the earlier quote of the EEC experts should be treated somewhat cautiously.

3.3 Retirement, Employment and Pension Contributions

Recent interest in the relationships between employment and labour utilisation has also featured another dimension of working time, that is the length of working lifetime. The main attention has focused on the subject of retirement. This has included the employment implications of changes in full-time mandatory, early and partial retirement (for a comprehensive review, see Hart, 1987a). One specific topic of particular relevance to this present study is the relationship between changes in pension contributions - both statutory and voluntary - and employment. Clearly, this area is closely related to the discussion of the relationship between employment and payroll taxes in the previous section since statutory pension contributions comprise a sub-set of such taxes.

The majority of state and private pension schemes impose actuarial penalties on those who remain in employment beyond a mandatory retirement age. It might be imagined that attempts to reduce such penalties might serve to worsen employment prospects of workers in the younger age cohorts as older workers would tend, on the average, to postpone retirement. Some evidence for this has been found with respect to recent USA legislation along these lines (see Gustman and Steinmeier, 1985). It might appear that policies that seek to increase such penalties or that reduce actuarial losses for those who retire before the mandatory age may achieve beneficial employment effects. As pointed out by Ehrenberg (1979) and Hart (1987a), however, such an employment strategy involves a series of potential complicating factors

that would be expected to produce offsetting negative impacts on employment. Five of these are mentioned here.

First, if earlier retirement is encouraged in this way, workers in the pre-retirement cohorts may attempt to adjust their income streams in order to offset the anticipated income losses. They may, for example, work longer average hours. Burkhauser and Turner (1978 and 1982) find USA support for this possibility in their estimation of an asset maximisation life cycle model. The authors are interested in the effects on pre-retirement work patterns of both social security benefits that penalise older workers and 'earnings tests' that reduce the net wage of those who accept the benefits. They estimate that the offsetting lifecycle reallocation of work has increased the workweek of prime age males by over 2 hours. Evidence on earnings tests is by no means consistent, however; Blinder et al. (1980) for the USA and Zabalaza et al. (1980) for the UK have queried their importance in general retirement decisions.

A second employment problem relates closely to the foregoing section on payroll taxes. If pension benefits are improved for the pre-retirement workforce as an inducement to retire early then this would almost certainly be accompanied by higher average pension contributions. But we have already seen that, given the typical configuration of tax ceilings, this would mainly increase variable labour costs and so would be likely to result in both a negative scale impact on employment combined with an hours-worker substitution effect.

Thirdly, increased pension contributions connected with a policy of inducing early retirement would serve to exacerbate existing pressure on pension financing. The age-distribution of most advanced industrial countries is such that the retirement cohort is rising relative to the total population with the accompanying demographically-led pressure on social security. The

position is especially problematic in Japan where great efforts are currently being made to increase the average age of mandatory retirement.

Fourthly, it may be the case that net increases in pay-as-you-go social security contributions arising, at least in part, from pension financing serve to depress private saving (e.g. Feldstein, 1974 and 1977). In a longer term perspective this may result in capital shortages and thus to reduced growth rates of output, productivity and employment.

Finally, early retirement changes the discount period over which human capital investments are amortised. Partial early retirement - where an older worker shares her/his job with a young new recruit who, under most European schemes, has been previously unemployed - involves complications with amortisation periods for two classes of worker. While, under typical situations, the resulting implications for employment are ambiguous, it is shown in Hart (1987a) that negative employment effects are not unlikely.

In all, as with the previous discussion on payroll taxes and employment, the relationships among retirement, employment and pensions involve complex issues and employment policy prescription with respect to changes in pension financing should be approached with considerable caution.

3.4 Profit Sharing

The policy discussion in this chapter has centered on labour responses at both the intensive and extensive margins to changes in working time and labour costs. This type of treatment of the labour market would appear to be highly relevant to the current interest in the introduction of profit sharing schemes as a means of stimulating employment. The seminal work of Weitzman (e.g. 1983 and 1985) has stimulated a large theoretical, empirical and policy interest (e.g. Estrin et al., 1987) that has progressed as far as

producing some active government support in European countries like France and the UK.

The fundamental idea behind the Weitzman story can be explained by means of a simple micro example, although much of Weitzman's own work is cast in a macro perspective. In the neoclassical theory, the 'conventional' optimising firm pays a wage that equates the marginal cost and marginal product of labour. We might label such a wage as the marginal wage. If the firm switches to profit sharing, workers in the short run would be paid a base wage that is less than the conventional marginal wage as well as a share of profits. The latter payment does not affect the margin but, rather, drives a wedge between average and marginal labour costs. Assuming that the firm follows the optimising condition stated above, there is an incentive to increase employment. This can be the outcome even if the total compensation under profit sharing (i.e. the base wage plus the profit share) is higher than the conventional marginal wage.

Most of the theoretical work in this area has suffered from (at least) one serious shortcoming. The labour market has been modelled solely in terms of the extensive margin without regard to the intensive dimension. The inclusion of hours of work - and other labour utilisation variables - serves to modify the Weitzman results. The introduction of profit sharing not only alters the marginal wage but also alters the relative price of labour at the extensive compared to the intensive margin. In other words, in line with earlier arguments in this chapter, scale responses of changes in wage costs will be augmented by substitution effects between workers, hours (and the capital stock). As earlier, these results hinge on the fact that there are fixed NWLCs attached to the labour stock but not to utilisation rates.

It can be shown (see Hart, 1987b for technical details; see also FitzRoy, 1987) that the inclusion of labour utilisation into the Weitzman model

serves to modify earlier outcomes. Not only might the profit share benefit the unemployed through the creation of new jobs but also it might benefit existing employees by inducing longer average working hours. The reason is that the reduction in the marginal wage due to profit sharing may have a positive scale effect on employment but also an incentive for firms to increase average hours since, in most circumstances, the price of labour on the intensive margin falls relative to the extensive margin.

To our knowledge, no empirical work exists on this aspect of profit sharing. It should be interesting to test empirically whether, ceteris paribus, profit sharing firms utilise their workforce more intensively (i.e. through longer average hours, more shifts and so on) than conventional firms. Also, but involving a somewhat more difficult task, it is worth testing for an inverse relationship between employment gains to profit sharing and the ability of firms to vary their rates of labour utilisation.

Chapter 4 Labour Market Fluctuations and Non-Wage Labour Costs

4.1 Adjustment Costs, the Demand for Labour Services and Employment Multipliers

At various earlier stages, we have discussed a number of costs that may produce caution on the part of employers in decisions to hire new workers. The most obvious of these are 'once-over' fixed NWLCs that involve investments in workers' specific human capital. These would include search, selection and training costs. They may also include potential once-over costs that occur at later stages of working life with a given employer. For example, anticipation of high statutory redundancy costs in the event of layoff may induce the employer to be risk averse in her/his hiring strategy.

Once workers are hired, firms may be reluctant to resort to subsequent layoff - given unanticipated falls in product demand - if they have invested heavily in specific human capital (Oi, 1962; Becker, 1964). This latter type of argument is often advanced to suggest that firms with relatively high specific investments are likely to hoard labour during short-run periods of depressed economic conditions. Indeed, there are strong theoretical reasons for supposing that both employers and workers may find it to be in their joint interest to remain together during, at least, short periods of depressed economic conditions (Hashimoto, 1975 and 1982).

Since such sunk specific investments are not, in the main, attached to hours of work, one sensible reaction to unanticipated changes in product demand may be for firms to adjust average working hours and then, if demand changes are deemed to be long-lasting, gradually to change the size of the workforce over a somewhat longer adjustment period. From early contributions in the 1960s - notably including Brechling (1965), Fair (1969) and Nadiri and Rosen (1969) - to the present time, tests of differential

workers/hours adjustment lags have been undertaken in numerous studies (see Hamermesh, 1976, for a summary of early work and Hamermesh, 1987, for updated references). In most cases, the findings support the hypothesis of longer adjustment lags in employment relative to average hours.

In line with the underlying theory, researchers have also found that workers with relatively high skills (as a proxy for specific human capital endowment) exhibit relatively lower employment adjustment speeds than less skilled workers. In studies by Morrison and Berndt (1981) for the USA and Nissim (1984a, b) for the UK, non-production workers (with relatively high skills) are found to have significantly slower adjustment than production workers (with relatively low skills). Kraft (1987) estimates separate workers and hours for blue- and white-collar workers for FRG 2-digit industries. He obtains moderate support for the hypothesis of faster employment adjustment in the former compared to the latter group due to skill differentials. Also, in line with most other studies, he obtains strong support for significantly speedier adjustment in hours compared to workers.

The employment lags discussed above are associated with two broad categories of adjustment cost. One arises from the hiring costs that are incurred in the decision to increase the workforce given an unanticipated demand upturn. The other relates to sunk costs that would be written-off in the event of layoff due to anticipated demand falls. Hamermesh (1969) presents evidence for US manufacturing industry that these cost categories act asymmetrically on firms' employment decisions with the adjustment lag related to the latter form of cost estimates as being shorter than the lag attached to the former.

As will be discussed in section 4.3, the main policy oriented research arising from the employment lag effects of adjustment costs relates to the study of job security legislation. Since the formal protection of jobs and

employees' rights often imposes fixed adjustment costs on the employer, economists have tried to gauge the effect of such policy indirectly by testing for possible changes in employment/hours lags following the introduction of a given piece of legislation.

In this section, we will concentrate on two - highly related - areas of research that involve adjustment costs. To the extent that employment exhibits a lagged response to unanticipated changes in product demand, combined with firms' ability to vary labour utilisation more speedily, we are likely to observe relatively small short-run, or impact, employment multipliers. In other words, employment will be observed to vary less than proportionately to output. The costs associated with these expected observations have already been referred to above and relate principally to the once-over fixed costs of labour: the higher such costs then the longer the expected lag of actual to desired employment levels.

The second research area concerns the decision over the size of the firm's inventory holdings to a given set of economic circumstances. Firms may well make interrelated decisions between hoarding physical product in times of unanticipated demand falls and hoarding labour. To give extreme examples and assuming no layoffs, a firm may <u>either</u> hold normal inventories and increase labour hoarding so as to accommodate fully the demand reduction <u>or</u> require labour to work normal per-period hours at normal intensity and build-up inventories by the amount equivalent to the demand downturn. In general, the higher the costs of holding inventories relative to hoarding labour, the longer would be the expected employment response lag and the smaller the associated impact multipliers. Such propositions have been tested on USA manufacturing data - under the so-called 'reserve labour hypothesis' - by Miller (1971) and Greer and Rhoades (1977). Further, if the firm faces significant levels of fixed labour or inventory costs then we may expect to

observe large discrepancies between short- and long-run employment multipliers. (Long-run multipliers measure employment-output responses after full labour market adjustment is allowed for.) Until recently, no attempt has been made to unravel short- and long-run multiplier responses and to include both fixed labour and inventory costs.

Hart and McGregor (1987) have undertaken a somewhat more detailed analysis of these questions using a two-stage estimation procedure. In the first stage, they estimate an interrelated factor demand system - with workers, effective hours and inventories as inputs - based on models earlier proposed by Nadiri and Rosen (1973), Topel (1982) and Rosanna (1983). The explanatory variables consist of lagged dependent variables, anticipated sales, unanticipated sales, quantities of other stocks and a time trend to represent technological improvement. Estimation is carried out on quarterly data, 1964(1)-1982(4), for 28 separate FRG industries. For each industry, they obtain estimates of three employment parameters. These are:

(i) the employment own-adjustment lag,

(ii) the unforecasted sales impact multiplier, and

(iii) the unforecasted sales long-run multiplier.

Most of the results are in line with those obtained in earlier studies. The main findings are:

(1) Employment exhibits much more sluggish own-adjustment than hours of work.

(2) The own adjustment lags of employment and inventories are of similar orders of magnitude.

(3) Estimated employment and hours impact multipliers are generally larger with respect to unforecasted than to forecasted sales.

(4) There is weak evidence of meaningful inventory responses to forecasted and unforecasted sales.

In the second-stage, the authors construct industry cross-section equations with the measures in (i), (ii) and (iii) as dependent variables. The explanatory variables in these regressions include the fixed labour and inventory cost arguments above as well as a set of control variables. Specifically, the explanatory variables are:

FIXRAT proportion of quasi-fixed to total labour costs,

STOSAL stock of finished goods expressed in production equivalents,

BIGFMS proportion of large to total firms,

FEMRAT proportion of females in the total labour force,

SKLRAT proportion of skilled workers.

The first measure, FIXRAT, is intended as a direct proxy for employment adjustment costs. It should be noted that it contains all fixed NWLCs including fringe benefits; theoretically it is not appropriate to restrict fixity measures merely to costs related to specific human capital. The second, STOSAL, is intended as a proxy for inventory costs. It would be expected to be negatively related: firms holding small amounts of inventories relative to output may reasonably be regarded as facing relatively high inventory costs.

Some reasons for including the remaining control variables are as follows. Following arguments in Freeman (1981) and Woodbury (1983) (see also section 6.2 below), large firms would be expected to pay larger fringe benefits than small firms. Since fringes contain significant elements of deferred compensation that represent essentially fixed costs, then controlling for firm size might well be important to an analysis of this type; hence the inclusion of BIGFMS. On first reflection, the proportion of females (FEMRAT) in the total workforce might be expected to be positively related to adjustment speeds since females are often attached to jobs with low fixed

costs. A complication arises in FRG, however, since a high proportion of females work part-time (30% of total female employment in 1983) and so a significant element of female labour adjustment may take place on the intensive margin - in the form of variations in part-time hours - and this would serve to reduce the sizes of employment adjustment parameters. Finally, the proportion of skilled employees (SKLRAT) is included to improve the proxy of training and set-up costs for which it is notoriously difficult to obtain reliable information.

Second-stage results are presented in Table 4.1 and they are largely in line with a priori expectations. Both fixed and inventory costs exert negative influences on the employment own-adjustment speed. Fixed costs display an asymmetrical association with the two multipliers. Hart and McGregor argue that there are two countervailing effects of fixity on the long-run unanticipated sales multiplier. The first is the 'hoarding effect' which would be expected to depress the size of the multiplier. The second is the 'industry effect' which refers to the sort of employment response to unforecasted sales expected in a given industry irrespective of hoarding. The authors argue that their data indicate that such industries are relatively prone to employment adjustment since industries with low degrees of fixity (like clothing and textiles) were greatly affected by long-term structural influences over the study period. The overall results indicate that the industry effect is stronger than the hoarding effect. Since the short-run unforecasted sales multiplier comprises a linear combination of own-adjustment and long-run multiplier parameters, its sign is indeterminate. It is clearly dominated by the long-run multiplier since it is significantly positive. The inventory cost proxy, STOSAL, exerts a positive influence on both multipliers, a result in line with the reserve labour hypothesis. Hart and McGregor argue, with respect to the

Table 4.1 Determinants of Employment Own-Adjustment, Impact Multiplier and Long-run Multiplier Parameters: FRG Industries

Independent Variables	Dependent Variables		
	Estimated Own-Adjustment	Estimated Impact Multiplier	Estimated Long-run Multiplier
FIXRAT	-0.045	0.066*	0.800*
	(1.085)	(1.736)	(2.678)
STOSAL	0.074*	0.007*	0.683*
	(1.834)	(2.506)	(2.321)
VARSUN	-0.133	-0.045	-0.643
	(1.238)	(0.451)	(0.829)
BIGFMS	-0.091	-0.037	-0.380*
	(3.407)	(1.416)	(1.964)
FEMRAT	-0.120*	-0.040	-0.173
	(4.245)	(1.550)	(0.845)
SLKRAT	0.056	0.225*	2.884*
	(0.525)	(2.148)	(3.632)
R^{-2}	0.50	0.19	0.37
F	4.53	1.76	2.94

* Significant at the 5% level

long-run multiplier, that these outcomes may also partially reflect structural industrial characteristics.

4.2 Unemployment and International Labour Market Flexibility

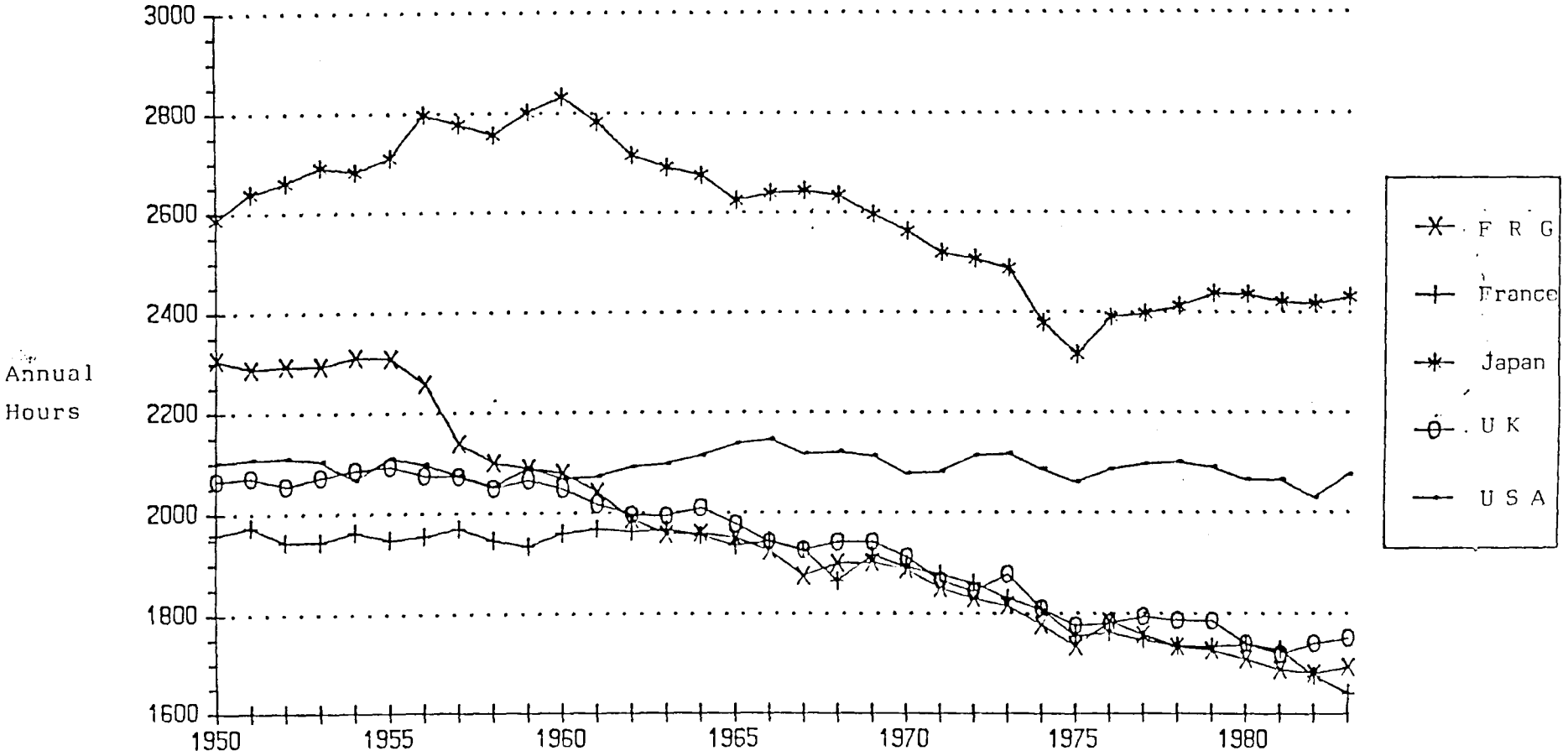
One extraordinary labour market phenomenon over the past 15 years or so has been Japan's persistently low rate of unemployment compared to the rest of the OECD bloc. The comparative picture is illustrated by Tachibanaki (1987) for the period 1970-83. During this period, Japan averaged 1.9% unemployment with FRG at 3.9% its closest rival. For other major economies, like France, Italy, UK and USA the equivalent rates lay between 5.8% (UK) and 6.8% (USA).

Not surprisingly, European and United States policy makers have shown great interest in trying to discover reasons for Japan's relative success. Explanations are varied but there is a growing consensus among international labour market economists that one key explanation may lie in the fact that, in certain respects, Japan displays far more labour market flexibility than elsewhere. In particular it is now reasonably well established that Japanese working hours and labour compensation systems exhibit greater degrees of cyclical variation than in other large OECD economies while employment and unemployment remain relatively stable. Recent explanations of these tendencies have focussed on the relative degree of labour fixity in Japan compared to the United States and elsewhere and so this whole area is very relevant to the developments here.

4.2.1 Evidence

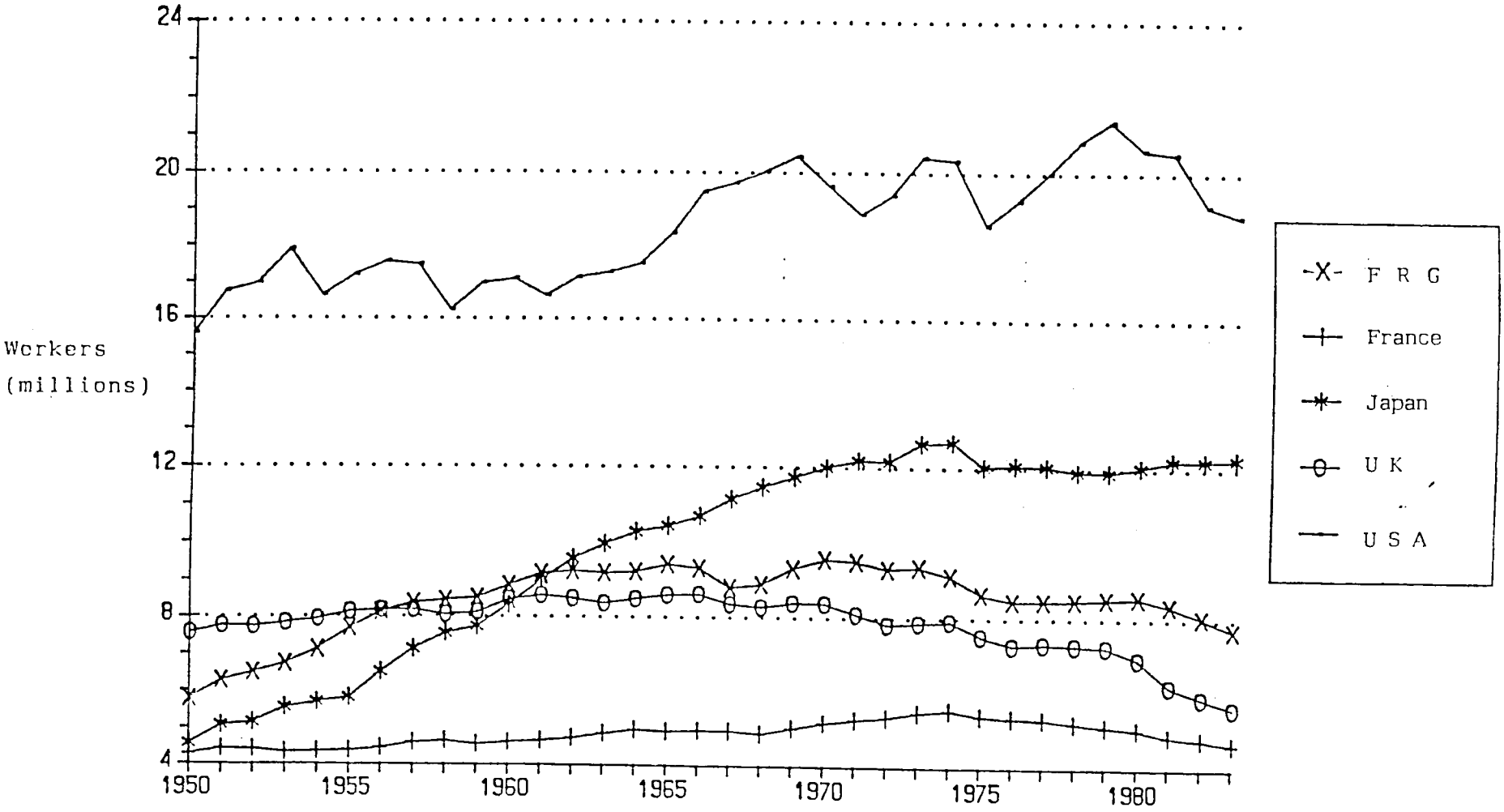
Figures 4.1 and 4.2 show, respectively, average annual hours and manufacturing employment between 1950 and 1983 in our four featured economies as well as in France. Japanese hours display a degree of cyclical

Figure 4.1: Average Annual Hours per Worker in Manufacturing Industry: FRG, France, Japan, UK, USA, 1950-83.



Source: US Department of Labor, Bureau of Labor Statistics, Washington D.C., June 1985.

Figure 4.2: Numbers of Workers in Manufacturing Industry: FRG, France, Japan, UK and USA, 1950-83.



Source: US Department of Labor, Bureau of Labor Statistics, Washington D.C., June 1985.

variability not shared by the other four countries. In fact hours in the USA have been remarkably stable over the entire period while in Europe they have shown a fairly persistent downward trend. By contrast, employment in the USA reveals high cyclical variability with Japan exhibiting extremely strong growth until the mid 1970s after which time, following a fall around the first oil shock, it has remained fairly constant. Compared to Japan, European manufacturing employment has grown less spectacularly during the 1950s and 1960s and, contrary to both Japan and the USA, it has declined systematically since the mid 1970s. European countries and, particularly, Japan have experienced less employment variability than the USA. Corroborating evidence of these relative patterns of hours/worker variability can be found in Gordon (1982) and Tachibanaki (1987).

Hart (1987a) has analysed the data represented in Figures 4.1 and 4.2 in more detail. He compares the trends in total hours (Nh: i.e. employment multiplied by average hours) with those of hours (h) and workers (N) separately. In the USA, deviations from the Nh trend are dominated by movements in N rather than h. At the other end of the spectrum, the relative positions are reversed in Japan. Further, in the initial year following the first OPEC oil shock, it is found that all countries appear to respond by reducing hours below trend with employment adjusting downwards in the following years. This is in accord with the differential hours/employment adjustment discussed in the previous section. In Japan and the UK, however, the largest part of the total Nh adjustment to the stock is through h rather than N while, in FRG and USA, it is N that plays the decidedly dominant overall rôle.

Over and above the evidence of relative Japanese employment stability in recent years, Hashimoto and Raisian (1985a) have established that Japanese workers average significantly longer firm tenure than in the USA. It should be added that the USA itself experiences fairly long job durations by

workers within a given firm (see Hall, 1982). One revealing statistic given by Hashimoto and Raisian is that by the time the typical Japanese male worker reaches 65 he will have changed jobs approximately 5 times on average compared to the equivalent US worker who will have experienced 11 changes. Further, Hashimoto and Raisian show that while tenure is longer in large firms, workers in small Japanese firms, contrary to popular belief, also enjoy relatively long tenure.

A principal reason for the far greater cyclical variability of employment in the USA is that temporary layoffs provide a far more prevalent means of reacting to demand downturns than in other countries. Feldstein (1975) and Lilien (1980) show that, on average, about two-thirds of all layoffs in US manufacturing are temporary in the sense that the laid-off workers subsequently return to their original employer. Topel (1982) provides industrial breakdowns and shows that temporary layoffs account for just under one-half of all employer initiated layoffs. It would appear that temporary layoffs play a rôle in the USA that is equivalent to average hours fluctuations in Japan.

As for wages, Gordon (1982) finds far greater nominal wage changes relative to hours worked or employment in Japan compared to the USA. In a more detailed analysis, Hashimoto and Raisian (1987) conclude that:

> '...procyclical hourly compensation adjustments holding weekly hours worked constant are ... much more pronounced in Japan than in the US, especially the proportion of compensation attributable to bonus payments. In the US, much of the procyclical variability in hourly compensation is instead attributable to wage premiums associated with procyclical weekly hours variability rather than pure procyclical compensation variability in the absence of hours variability.'
>
> (Hashimoto and Raisian, 1987, p.26)

Finally, Hashimoto and Raisian (1985a) also show that the typical Japanese worker has a more steeply rising earning profile than US workers and that the profiles peak in about the same year after entering the current firm in both countries. These results hold after controlling for type of industry and educational attainment.

4.2.2 Explanations

It would appear that one explanation of the different unemployment experiences between Japan on the one hand and Europe and the USA on the other lies in the fact that Japan shows greater wage and labour utilisation flexibility in the face of unanticipated economic events whereas the other countries rely far more on quantity adjustment. In other words, wages and hours act as a buffer to economic fluctuations in Japan. But, of course, the fundamental question is why Japan has greater recourse to such adjustment mechanisms.

One possible answer to this question is that Japanese workers are endowed with higher degrees of specific human capital investments. Given sharing agreements over the returns to such investments (Hashimoto, 1981), it may well be in the interests of both employers and workers to avoid costly separations in times of unforeseen falls in demand by agreeing to work sharing and wage reductions. Following standard theory, providing (expected) marginal product covers variable labour costs, it will pay the parties to remain together during downturns in demand that are perceived to be temporary.

As we have seen in Table 2.15, section 2.5, there is no evidence that Japanese fixity ratios are significntly different from elsewhere on the basis of conventional measures of fixity. Of crucial importance is the interpretation of the bonus. If the bonus itself is considered to be part of the returns to specific invetments then, without any doubt, Japanese fixity levels would be

considerably higher than elsewhere (see the evidence presented in sections 2.2 and 2.5). Hashimoto (1979) argues strongly that the bonus largely does represent such returns although there are varied views among economists on the primary function of the bonus system (see Tachibanaki, 1987, for a useful review). Even if the bonus only partially reflects returns to specific investments, however, this would still mean that Japanese fixity is in excess of other countries given its parity as far as the narrower fixity measures are concerned.

Hashimoto and Raisian (1985a and 1987) also argue that the steeper wage and longer tenure profiles of Japanese workers compared to their United States counterparts may further be indicative of higher worker specificity. They summarise the position thus:

> '... a Japanese male worker who enters a large firm immediately after the completion of schooling can expect to see his earnings increase by 214 per cent after twenty years of employment, most (85 per cent) of which is attributable to firm-specific tenure. In contrast, a similar individual from the US can expect a 93 per cent earnings growth, less than half (39 per cent) of which is attributable to firm-specific tenure ... On the basis of shapes of wage-tenure profiles for the two countries, we also project that Japanese workers invest more than twice as many resources as US workers on the development of income-producing human capital.' (Hashimoto and Raisian, 1987, p.29)

But even if we accept the view of relatively high fixity in Japan, this still begs the further question of why Japanese employers and employees are willing to incur high degrees of specific investments. Hashimoto and Raisian (1987) argue that the reason can be found in the fact that there are lower

'transaction costs' attached to these investments in Japan. Transaction costs in this context refer to the exchange of information. Evaluating returns to specific investments requires knowledge concerning product demand, process and product innovation, technological change, work organisation, etc., that are likely to affect the own-firm and its competitors. The information costs involved are both high and asymmetrical. Hashimoto and Raisian argue, and cite other supporting evidence, that the general system of industrial relations in Japan – with its high levels of employer-employee trust and cooperation – is such that the transaction costs are rendered below its main competitors.

If investment in Japanese human capital is indeed significantly higher than elsewhere then, as mentioned at the beginning of this section, worksharing and flexible wages may be jointly agreed by employers and workers in order to avoid sub-optimal separations that would involve net investment losses. In turn, this may provide a mechanism that detaches labour costs from their market clearing rôle (see also FitzRoy and Hart, 1987) thereby providing employment and unemployment stability. At the present stage of research, such conclusions should be treated with considerable caution, however.

In the first place, the Japanese wage-tenure profiles observed above could be interpreted in a way that is largely divorced from (specific) human capital theory. Under the agency hypothesis, for example, the steep earnings profiles may be interpreted as a mechanism to induce optimum productivity profiles without incurring significant monitoring costs that may be particularly high in large and complex firms. Agency theory does not depend on human capital investments and so provides radically different interpretations of relative variations of stock and utilisation variables. Although Hashimoto and Raisian (1985) argue that the circumstantial evidence tends to favour human capital rather than agency explanations, it certainly cannot be claimed that the matter is settled.

Secondly, there is some evidence to suggest that the picture of Japanese unemployment as both very low and very stable is oversimplified and that correcting for measurement problems as well as age, occupational and sectoral diversity serves to reduce the gap between the unemployment rates in Japan and elsewhere. This subject area is reviewed by Tachibanaki (1987).

Given interpretational and measurement problems, international economic comparisons often do not yield conclusive evidence concerning different economic practices between countries. One way forward in this particular area would be to investigate in much more depth the elements that make up labour fixity, its quantitative importance and its effect on labour market variables in different sectors of Japan itself. This might be carried out, for example, by means of a disaggregated industrial analysis. That there does exist large differences among Japanese industrial sectors in employment/hours variations is illustrated in Table 4.2 for the broad aggregates, mining, construction, manufacturing, electricity and services. In mining and electricity, the standard deviations of monthly percentage changes of employment are far greater than those of hours of work for all four sub-periods in the range 1971-1984. In construction, manufacturing and services the relative variability reverses. The sectors are too large and heterogeneous to infer anything meaningful concerning their relative degrees of fixity - and besides the deviations are also certainly due in part to structural and other extraneous economic influences which would need to be controlled for - but they do at least indicate that examining measures of fixity in the light of more disaggregate Japanese data may prove to be rewarding.

Table 4.2

Variation of employment and hours worked by the main Japanese industrial sectors, 1971-84

		Standard deviations of monthly per cent changes			
		1971-74	1975-79	1980-84	1971-84
Mining	Employment	11.66	13.63	16.41	41.20
	Hours worked	3.56	3.58	3.92	3.70
Construction	Employment	3.66	2.28	2.41	2.79
	Hours worked	5.22	5.32	5.25	5.27
Manufacturing	Employment	1.56	1.74	1.34	1.56
	Hours worked	8.19	7.72	7.30	7.72
Electricity	Employment	8.56	8.17	9.32	8.71
	Hours worked	4.46	4.31	4.46	4.41
Services	Employment	2.00	1.79	1.65	1.81
	Hours worked	5.08	5.50	5.76	5.48

4.3 Job Security

In most of the major OECD countries since the 1960s there has been a marked rise in measures designed to secure greater employee job security. Some of these have followed employer-union collective bargaining agreement while others have derived from statutory government legislation. Examples include protection against arbitrary or unfair dismissal, special compensation in the case of redundancy and the implementation of rules concerning the ordering of layoffs (e.g. inverse seniority). A detailed examination of the range of job protection policies in OECD countries is provided by Gennard (1979 and 1985).

Certain policy initiatives have been undertaken with the view to achieving job security provisions for disadvantaged groups of workers that are on a par with the norms for other workers. Perhaps the most important example in this respect is the legislation recently enacted, or currently proposed, to provide part-time workers with working conditions equivalent to comparable full-time workers (see Robinson, 1984, and Disney and Szyszczak, 1984).

This whole policy area is highly relevant to the discussion here since the typical job security agreements and regulations constitute fixed NWLCs to the firm. In other words, job protection or redundancy provision or seniority privileges often involve costs that are independent of the rate of utilisation of workers as measured, say, by average working hours over some time period. Of course, the costs of job security provision may also include examples of variable NWLCs. For example, this would be the case where redundancy payments are in some way linked to previous earnings.

Recent attempts have been made to evaluate the relative strengths and weaknesses of job security policies as opposed to the practice of employment-at-will where dismissal, redundancy payments and other

provisions are left solely to the discretion of the employer. In very general terms, European countries and Japan have developed far more in the former direction compared to the USA where, despite some recent changes towards more job security, employment-at-will is a more common phenomenon. Lazear (1987) has attempted to evaluate theoretically the broad economic arguments for and against the two employment strategies.

Proponents of the retention of employment-at-will typically argue that:

(a) The fixed NWLCs associated with job security provision may actually act as a disincentive to employment and, rather, encourage employers to increase labour utilisation and/or induce capital-labour substitution.

(b) Where eligibility to redundancy payments and job projection is not vested as soon as the worker is employed or does not apply if the worker works too few hours per period of time, this may encourage employers to terminate employment before eligibility is established or to limit severally per period working hours, respectively.

(c) Job security provision adds to employment costs and produces competitive disadvantages in sectors - due to localised collective bargaining agreements or partial legislative coverage - that have to bear a disproportionate burden.

Proponents of job security legislation typically advance arguments that include:

(a') Obstacles to permanent layoffs help to preserve jobs that otherwise would have been more easily terminated.

(b') Job security provides a form of insurance against temporary layoffs during unanticipated downturns in economic activity.

(c') Job security may produce more committed and motivated workers thereby enhancing productivity.

We will comment on each of these issues in turn. There is little doubt, under (a), that most economists believe - in the context of work sharing versus job security - that the existence of fixed costs can lead to inefficiencies in the labour market that may serve to impair employment or worsen unemployment (see Nickell, 1979; Hart, 1984a; Lazear, 1987). In times of unanticipated declines in demand, constraints on employment reductions, but not on hours of work, will produce sub-optimum factor allocation since firms will be forced to respond by moving away from their optimal mix of labour inputs. This may produce longer-term substitution between capital and labour or between groups of workers endowed with different levels of job security. Given unanticipated upturns in demand, on the other hand, firms may be reluctant to employ workers to levels that would have been reached in the absence of security rules in the anticipation of the subsequent employment constraints in relation to fixed costs.

Concrete evidence on (b) is hard to obtain. One likely possibility, often referred to in the literature, concerns the lower wage ceilings for social welfare contributions. Suppose, for a given wage rate, there is a lower wage earnings ceiling that is reached by working h_c hours per period. Below h_c no social welfare contributions are incurred while at and beyond h_c contributions are incurred for the interval $[0-h_c]$ as well as for $[h-h_c]$. This, for example, is the system that operates in FRG. As shown in Hart (1987a, Ch. 6), the payment for the below-ceiling interval represents a fixed NWLC to the firm. (It pays for the interval whether employees work few or many hours above the ceiling.) Accordingly, firms may attempt to avoid such costs by employing part-time workers on very short average hours; that is, for hours which, at the given wage rate, would ensure that earnings are below h_c. Buechtemann (1987) quotes figures that are, at least, consistent with this reaction. A recent series of FRG studies have all found that working time

preferences for those willing to work part-time concentrated largely in the range 25-35 weekly hours. In contrast, 89 per cent of the (considerable) expansion of part-time employment in FRG between 1976 and 1984 has involved hours in the range of up to 20 per week.

Sectoral labour cost disadvantages due to the unequal incidence of job security rules - as mentioned under (c) - may occur with respect to relative workforce skill (see Hamermesh, 1987), part-time and full-time employment (see FitzRoy and Hart, 1986) and different industrial sectors compared intra- or internationally (see Lazear, 1987). Increases in relative fixed NWLCs due to job security provision falling disproportionately among sectors may cause labour substitution against the sectors that experience the greatest increases. Not only may this represent a generally inefficient allocation of resources but also it may induce temporary bottlenecks due to job mismatching that could cause short- and medium-term employment and unemployment problems.

While the view under (a') may be true for existing employees - at least in the short-run - note should also be made of the longer term disadvantages mentioned under (a) above. Support for the combined strategy of job security and hours reductions during restructuring in the European steel industry rather than a much greater reliance on worker adjustment as practised in the United States steel industry is given by Houseman (1987). During systematic industrial restructuring, Houseman argues that both jobs and plant were preserved in Europe due to a work sharing/job security strategy. Her comparative empirical evidence is based on employment adjustment equations for the steel industries of France, FRG and USA. (Bittlingmayer, 1987, provides an interesting critique of these empirical results.) In a similar vein, Odagiri (1986) argues, in the background of a Keynesian macroeconomic analysis, that a general strategy of firms emphasising employment stability

rather than maximising short-run profits helps to stabilise both macro-employment and national income. In line with expectation, he finds that in Japan, France and the UK the employment trends in relation to GNP and other measures seem to indicate that employment stability strategy dominates short-run optimisation while the USA evidence is not consistent with this ranking.

From the contributions of Baily (1977) and others, there is a well established literature that views employment contracts as a form of insurance arrangement. As suggested in (b'), job security rules can be viewed in similar fashion. When comparing work sharing in Europe with temporary layoffs in the United States, however, a similar kind of insurance principle can be arguably said to apply in both situations. As Houseman (1987) points out, differences between the two strategies in times of cyclical demand fluctuations are not critical since one is simply comparing subsidised short-time working in Europe with subsidised temporary layoffs (given less-than-perfect experiencing rating) in the USA. Indeed, short-time working is funded through the state unemployment insurance system in FRG in fairly similar fashion to temporary layoffs in the USA. Perhaps more importantly, Lazear (1987) stresses that an insurance principle that is not designed to approximate individuals' optimum insurance wages is inefficient. The information costs that would be required to enable the government to provide such insurance are likely to be prohibitively high, however. Lazear recognises that job security legislation at least overcomes the problems of enforceabilty encountered in privately undertaken implicit contracts but argues that, given the inefficiency arguments, it would be better for the government to play the rôle of enforcer of explicit contracts undertaken privately between the worker and the firm.

The last point, under (c'), is perhaps the most difficult to evaluate. In employment-at-will arrangements, productivity gains comparable to those

(possibly) achieved through job security may be realised by relating the wage partially to performance (Bellmann, 1987). Such monitoring costs would then be compared with the costs pertaining strictly to job security, highlighted under (a) and elsewhere.

As mentioned in section 4.1, empirical tests of the labour market impacts of job security rules usually feature employment (and often hours) adjustment equations. The examples featured here cover most aspects of job security legislation referred to above.

Nickell (1979) has tested for the effects on employment and hours adjustment of the increasing incidence of job security policies in British manufacturing industry over the period 1955-76. In accord with expectation, he finds that the adjustment lag in employment rose over this period while that of hours declined. In a further analysis, Nickell (1982) attributes the reduction of both hiring and flows from employment to an increase in unfair dismissal legislation between the middle 1960s and 1970s.

Hamermesh (1987) has broadened Nickell's 1979 study geographically by testing for separate changes in employment adjustment and hours adjustment to unanticipated output changes in twelve OECD countries during the 1970s. For well known reasons largely related to oil supply shocks, many countries adopted protectionist policies in the 1970s that were designed to slow the rate of employment adjustment. Hamermesh estimates an integrated vector-autoregression model using quarterly data for the period (for most countries) 1961:I to 1985:II with a break point at the end of 1973:III (thereby coinciding with the first oil shock) to facilitate the test for changes in average length of lag. For the six largest countries - Canada, France, FRG, Japan, UK and USA - there is clear evidence that the average employment adjustment lag exceeds that of hours. Results for other countries are more difficult to interpret. Further, Hamermesh finds a fairly

general tendency for the average lag of employment to have increased in the 1970s. However, in only two countries - Japan and UK - does Hamermesh replicate Nickell's UK observation of both lengthening employment lags and shortening hours lags during this period.

An obvious means of effecting greater job protection is through expanding the existing social security programmes. Changes in social security payroll taxes can also have differential implications for workers/hours adjustment. This arises essentially, as discussed in chapter 3, because payroll taxes contain both fixed and variable cost elements. One particularly interesting set of payroll taxes are those relating to unemployment contributions by employers in the USA. Since, in general, such taxes are eligible up to relatively low wage ceiling limits, they constitute fixed labour costs for most US employees. In other words, they may be expected to influence employment/hours adjustment in similar fashion to most types of job protection legislation (see Hart, 1982, and FitzRoy and Hart, 1985, for theoretical discussion). Some direct empirical evidence for this is provided by Hamermesh (1978) who finds that an extension of the unemployment insurance programme produced short-run hours-employment substitution. (See also Brechling, 1977 and 1981 for theoretical and empirical analyses, respectively, of the factor demand effects of changes in USA unemployment insurance taxes.)

As a final example of the use of employment adjustment models to test for the effects of increased job security, it is worth commenting on the work of Disney and Szyszczak (1984) on part-time employment. Before 1975, there was relatively little employment protection in the UK for part-time workers employed for less than 21 hours per week. The Employment Protection Act in that year considerably narrowed the gap in protection enjoyed by full-timers and part-timers. The authors find that, due to low

adjustment costs, variations in part-time employment were used as a substitute to variations in average hours of work before the Act while, after 1975, differential speeds of adjustment between the two categories of employment were eliminated.

4.4 Non-Wage Labour Costs and Macroeconometric Models

The policy discussion so far in this chapter, as well as in the previous chapter, has been carried out against the background of somewhat partial empirical analyses that have tended to concentrate on limited aspects of the labour market. Empirical work at a more detailed macroeconomic level is clearly hampered by the fact that macroeconometric systems rarely include any treatment whatsoever of NWLCs. It is possible, however, to gain some insights into the rôle in such models of at least one important non-wage component, that is employers' contributions to social security. The systems generally do include, as exogenous policy instruments, rates of employers' (and employees') social security contributions. We have already paid quite close attention to the effects of changes in contributions on factor inputs in section 3.2. Here, the emphasis is switched to macroeconomic implications of contribution changes using a UK model. (Relatively little empirical work involving NWLCs has been undertaken for the UK, a point we dwell on in the Appendix to this chapter.)

As is clear from Table 2.9, employers' National Insurance contributions are the largest components of NWLCs in the UK. It is possible to vary rates of NI contribution and examine their full macroeconomic effects using various UK macroeconometric models. The remainder of this section is taken up with describing the results of just such a simulation using the London Business School (LBS) model of the UK economy.

In the LBS model, employers' NI contributions partly determine the real product wage by adjusting upward hourly earnings deflated by producer prices. Employment is then determined by the real product wage and the level of output. The coefficient on the product wage is not the elasticity of demand for labour since the level of output is endogenous. Nevertheless, this formulation is one way of writing the demand for labour equation. Hence the LBS model assumes that the outcome in the labour market must lie along the demand for labour schedule. Thus employers retain the right to determine employment. In the Liverpool model - another UK macro-system - by contrast, the wage is determined only by those factors which affect the union's bargaining position such as benefit levels and the participation ratio, etc. This is the "union monopoly" model. In the LBS wage equation, factors which affect the unions and the employer play a rôle in determining the "Nash bargain".

NI contributions form part of the "tax wedge" between product and consumption wages. They also form part of real labour costs, reductions in which will induce employers to increase their demand for labour. Thus the rate of NI contributions appears directly in the employment equations both for manufacturing and non-manufacturing.

As well as the direct effects on the labour market occurring through the employment equations, the change in NI contributions will also change government finances. Since this is a simple simulation rather than a scenario building exercise, no compensating alterations have been made in other tax instruments. The fiscal stance becomes one of being less restrictive rather than being maintained at a constant level. The increase in demand has a further beneficial effect on employment. However, the increase in employment leads to lower unemployment, increased wage demands and higher prices. The exchange rate depreciates which further boosts price. Nominal

wages have to rise to maintain workers target real wages. Further the increase in prices has a negative impact, via wealth effects, on consumption and thence on output. The full impact on the economy of, say, a 1 per cent cut in employers' NI contributions is thus difficult to predict a priori. Figures 4.3 and 4.4 plot percentage changes in the major aggregates: output, prices, employment and wages arising as a result of a one per cent cut in employers' NI contributions for a seven year simulation on the LBS model.

By the end of the period the employment effect has become almost insignificant while the effect on output has become negative. The cause of this disappointing outcome is the extent to which the initial improvement in the labour market feeds through into wage demands and worsens inflation. The public sector borrowing requirement increases throughout the simulation finishing £320m higher. With the final increase in employment being only 30 thousand, this implies a cost per job created of approximately £10,000. Nevertheless this cost compares favourably with equivalent cuts in income tax (£18,000) or reductions in VAT (£20,000).

These simulations demonstrate that the full macroeconomic impact of a change in NWLCs may be quite different from that which appears to follow from microeconomic considerations of the policy change. In particular, in an economy as open as the UK, changes in prices and wages are crucial since they feed through to the exchange rate and therefore affect the level of demand. Nevertheless, the LBS model indicates that reductions in employers' National Insurance contributions are at least as cost effective in increasing employment as are income tax or VAT rate cuts.

Note finally, however, that the exclusion of labour utilisation effects of contribution changes in this simulation may have biased the results in favour of employment responses (see section 3.2).

Figure 4.3:

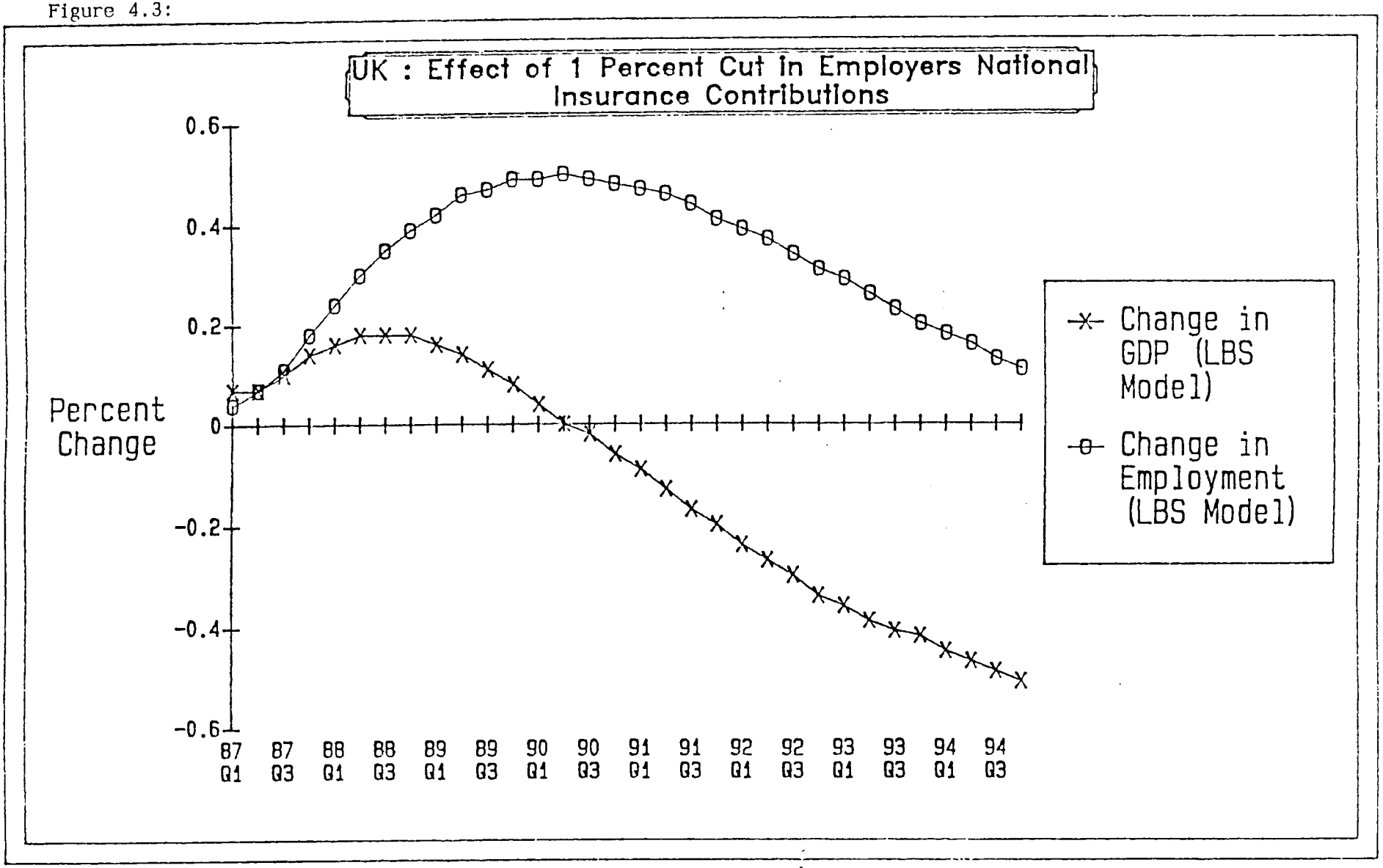
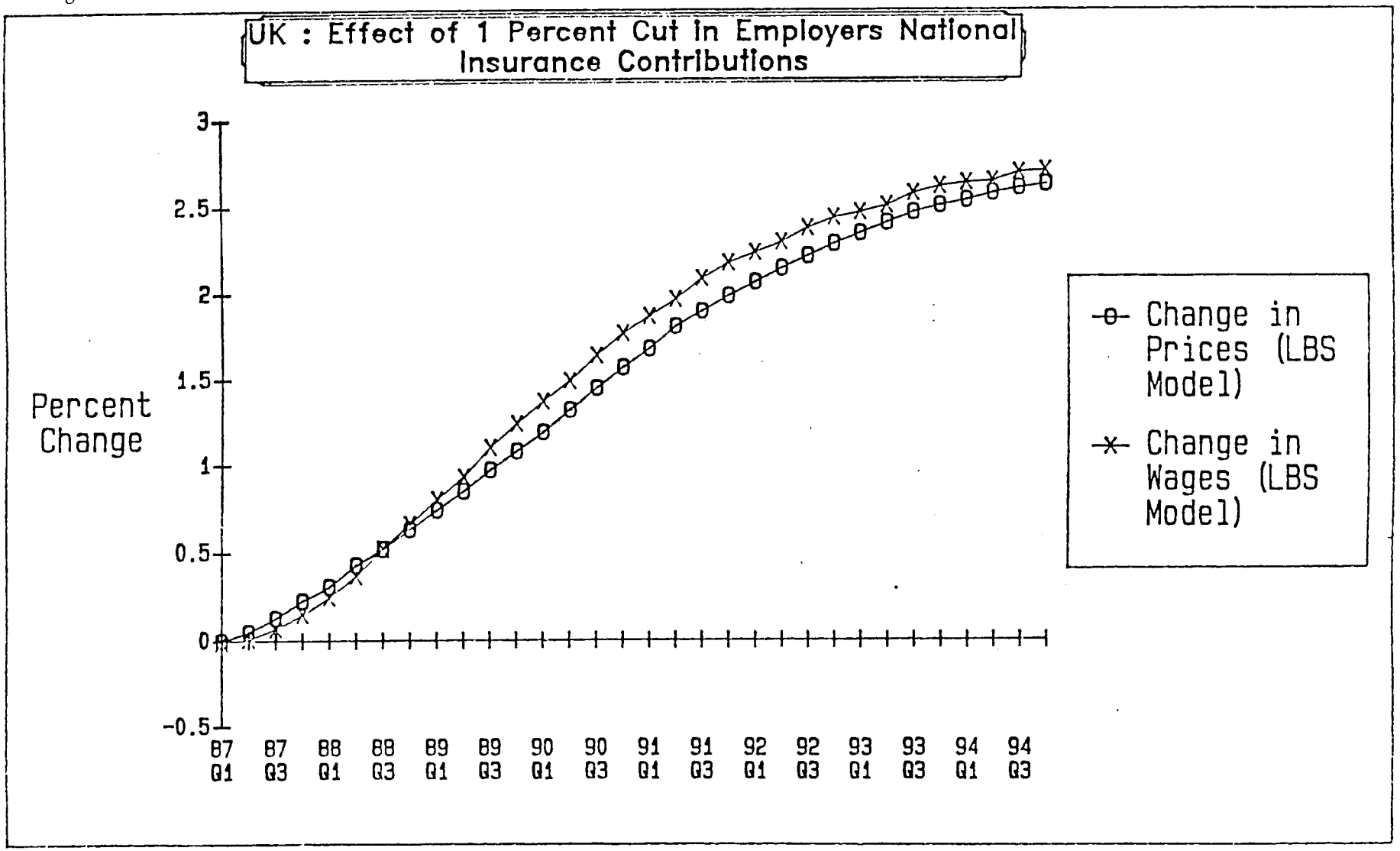

UK : Effect of 1 Percent Cut In Employers National Insurance Contributions
Percent Change
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
87 Q1
87 Q3
88 Q1
88 Q3
89 Q1
89 Q3
90 Q1
90 Q3
91 Q1
91 Q3
92 Q1
92 Q3
93 Q1
93 Q3
94 Q1
94 Q3
Change in GDP (LBS Model)
Change in Employment (LBS Model)

Figure 4.4


UK : Effect of 1 Percent Cut in Employers National Insurance Contributions
Percent Change
3
2.5
2
1.5
1
0.5
0
-0.5
87 Q1
87 Q3
88 Q1
88 Q3
89 Q1
89 Q3
90 Q1
90 Q3
91 Q1
91 Q3
92 Q1
92 Q3
93 Q1
93 Q3
94 Q1
94 Q3
Change in Prices (LBS Model)
Change in Wages (LBS Model)

Appendix 4.1

Research on NWLCs in the United Kingdom

Labour market research in the UK has tended to focus on areas such as the rôle of trade unions or on aggregate labour market models in recent years and relatively little attention has been devoted to the influence or importance of NWLCs even though employers' organizations have frequently argued that high NWLCs have an adverse effect on employment. In this Appendix an attempt is made to describe areas of current "mainstream" UK labour market reseach which do consider NWLCs, albeit somewhat casually.

Econometric models of the aggregate UK labour market, as developed by e.g. Nickell and Layard (1986) have centred round a more carefully specified framework of both supply and demand in labour and product markets than has hitherto been the case. Particular assumptions about the nature of agents' action in the markets are made which enable restrictions to be placed on the econometric specifications of the various schedules.

For example, one can start from a general labour demand specification such as

$$n^d = n^d(w, Z^d) \qquad \text{(i)}$$

which gives employment as a function of nominal wages (w) and a group of exogenous and endogenous variables (Z^d). Assumptions such as profit maximization or cost minimization subject to an output constraint which permit marginal productivity conditions can then be made to restrict the very general specification contained in (i).

Andrews (1987) gives a clear exposition of this general class of model showing how further assumptions can be made in order to arrive at estimable systems of equations given current data constraints. For example, the

Nickell/Layard model takes the product market to be imperfectly competitive. Because of its current popularity as a vehicle for explaining the recent rise in UK unemployment, we shall concentrate on this model. For further information on its precise specification see Nickell and Layard (1985). However, the concern here is with two particular issues relevant to NWLCs. Firstly, because theory suggests that NWLCs will affect demands for the stock of labour and for its utilisation differently, it is firstly worth considering the way in which the labour services input is measured in the Layard/Nickell model.

The flow of labour services depends functionally on both the stock of employees and the rate at which they are utilised. Yet the Layard/Nickell model concentrates solely on the stock of employment and ignores the utilisation dimension of labour services. This is the result of a specific assumption about the functional form of the labour services input. The reasons for not considering hours of work are laid out in Layard and Nickell (1985, p.16). There it is assumed that the stocks of labour and of capital are utilised for the same time each week. Then output per week depends on the number of machine hour times output per machine. Thus

$$Y = hKf(Y/K) \qquad \text{(ii)}$$

where Y is output, h is hours and K is the capital stock. Now, if output is produced under constant returns to scale with a production function of the form

$$Y = g(K,N) \qquad \text{(iii)}$$

where N is the level of employment then we can write

$$Y/K = g(N/K)vN = g^{D}(Y/K)K. \qquad \text{(iv)}$$

Then rearranging (ii)

$$Y = hKp(N/K). \qquad \text{(v)}$$

Assuming perfect competition, employment is determined by equating weekly marginal product to the weekly wage. That is

$$dY/dN = hKf(N/K) = wh. \qquad \text{(vi)}$$

Since h cancels out on both sides of (vi), Layard and Nickell argue that employment depends only on the hourly wage and not on hours themselves. This seems to imply that a cut in hours of work will have no impact on employment. A different way of looking at the Layard/Nickell result is as follows: suppose that the production function is given by

$$Y = hf(N,K) \qquad \text{(vii)}$$

where h is a scaling factor measuring the utilisation of both labour and capital. Then dividing both sides by K and recalling the assumption of constant returns to scale, (v) immediately follows. Thus (vii) should be seen as the production function underlying the result in (vi) rather than (iii). Totally differentiating (vii), it is clear that $dN/dh = f(N,K)/f_{N}(N,K)$ which does not involve h and so a change in hours does not affect the demand for employment. However, the decision to "proceed as though hours do not matter" (p.17) follows from the specific production function (vii) which, because it is essentially fixed coefficients technology in hours, inevitably

precludes substitution between factor stocks and utilisation. Layard and Nickell seem happy to make this decision without any specific test on the suitability of (vii) against alternatives, many of which have been discussed in the literature on nonwage costs (see e.g. Santamäki, 1987).

The second issue in the Layard/Nickell work relevant to the discussion of NWLCs is the way in which labour costs are represented. Nickell (1983) discusses the response of employment and hours in the framework of fixed and variable labour costs and derives the standard result that increased fixed costs will tend to favour utilisation at the expense of employment. He argues that desired hours will be independent of the level of output if the production relation is homothetic. (This is another way of stating Ehrenburg's result that "if the labour services function is additively separable, equilibrium hours are invariant to scale"; Ehrenburg, 1971.) Further, if the elasticity of output with respect to employment is constant then equilibrium hours are independent of the factor price ratio (the ratio of the hourly wage to the rental price of capital). He also considers the factors affecting the workers' decision to supply hours and concludes that it is very difficult to identify separate supply and demand factors empirically. In particular, there are considerable problems in developing an accurate measure of the ratio of fixed to variable labour costs. We have already seen, in respect of National Insurance contributions in the UK, that there are difficulties in this regard. Econometric equations which include a variable measuring the ratio of fixed to variable labour costs perform poorly and Nickell puts this failure down to the poor quality of this variable.

Perhaps this experience explains why, in his more recent work, Nickell does not attempt to model substitution between workers and hours. The difference between wages paid to workers and labour costs paid to firms forms part of the "tax wedge" which separates the product and the consumption

wage. Union bargainers will be aware of each type of tax (employers' taxes, direct taxes and indirect taxes) which reduce the consumption wage. In determining their real wage target, unions should be indifferent between these. "Under full rationality the effect of all these taxes would be the same. Only their units would matter, for a given level of real unemployment benefit" (op.cit., p.31). Employers' labour taxes will reduce the demand for labour as well as affecting the target real wage.

The variable used to proxy employers' labour taxes, which are treated as exogenous, is the ratio of "total labour costs per unit of output for the whole economy" and "wages and salaries per unit of output for the whole economy" as published by the Department of Employment. This variable emerges as significant in the wage equation and is reckoned to have "added a little less than two percentage points to unemployment at constant demand and around three percentage points to the natural rate taking account of induced demand reductions" (op.cit., p.71).

Nevertheless, it is not clear that this variable should accurately proxy the employers' tax rate on the product wage since it must include non-tax components of wage costs such as voluntary social welfare payments which have become increasingly important since 1964 (see Table 2.9). Once this omission is acknowledged, then the supposed exogeneity of this variable becomes much more questionable. For example, social welfare payments must be the outcome of bargaining between employers and employees and it is difficult to see how they could reasonably be treated as exogenous.

To conclude the discussion in this Appendix the following points appear to have emerged from recent UK aggregate labour market research. Firstly, labour utilisation has attracted little attention and has not been included explicitly in aggregative models which seek to explain the rise in UK unemployment over the last twenty years. Research has rather concentrated

on the factors which have affected the demand for workers at given levels of the capital stock. NWLCs have consequently attracted little attention as potentially altering the balance of the labour input as between its stock and its utilisation. The cost of labour is acknowledged as an important influence in determining the level of employment and the "tax wedge" is an important consideration as wage bargainers determine the "target" real wage. Non-wage benefits form no part of this calculation.

Chapter 5 Private and Statutory Wage Supplements

The quantitative importance of wage supplements in the form of voluntary and statutory social welfare payments is clearly established in Table 2.15. Somewhat surprisingly, labour market resarch on those categories of NWLCs has been relatively slow to develop. In recent times, however, research activity has gathered pace. Much of the important work has been undertaken in the USA and this present chapter attempts to survey the most important work. While attention is focussed on US work, there are clear parallels for EC countries with respect to non-wage (and taxation) experience and policy and, hopefully, this present review may help to stimulate similar European studies.

Since the resolution of the so-called Social Security funding crisis in 1983, the issues of NWLCs that have held the attention of policy makers in the USA have been related primarily to voluntary social welfare costs, of which pensions and health insurance are by far the largest components. In particular, rising health care costs and the regulation of private pensions under the Employee Retirement Income Security Act of 1974 (ERISA) have been the subjects of much work. Accordingly, Sections 5.1 and 5.2 below review work on the favourable tax treatment of employee benefits (which has been blamed by many for rising health care costs), and on the effects of pension regulation.

Certain statutory welfare costs have also been researched in the USA because the programmes to which they are related have experienced funding crises similar to the Social Security crisis of the early 1980s. In particular, the Unemployment Insurance and Workers' Compensation systems have experienced an array of problems during the 1980s that have brought the programmes to the attention of policy makers. Section 5.3 briefly reviews some the issues that have arisen in relation to these programmes.

5.1 Tax Treatment of Employee Benefits

The following is a review of the recent US work on private pensions and health-insurance plans with a focus on a few questions that are of immediate importance of policy. Four types of question are discussed. What accounts for the pattern of growth of pensions and health insurance? Who is covered and what are the implications of the existing pattern of coverage for income distribution? What changes in the tax treatment of nonwage benefits would yield significant revenue gains? What are the implications of these changes for the equity of the tax system?

5.1.1 Explaining the US pattern of Growth of Pensions and Health Insurance

Panel d of Table 2.12 documents the overall pattern of growth of voluntary social welfare costs, which are predominantly the costs of private pensions and health insurance. A main conclusion of section 2.4 was that voluntary social welfare costs grew at an annual rate of 4 to 5 per cent between 1965 and 1975, at an annual rate of roughly 2 per cent during the late 1970s, and experienced no growth during the first half of the 1980s. This slowing growth of pensions and health insurance requires explanation.

Unfortunately, there is less certainty about the causes of the pattern of growth of voluntary social welfare costs than there is about the pattern itself. The litany of reasons for the provision of voluntary employee benefits includes: preferential treatment under the federal personal and corporate income tax codes; economies of scale in the provision of pensions and health insurance; efforts to improve workers' productivity and reduce turnover by deferring payment of benefits; unionization; changing demographic composition of the labour force; and rising real incomes. (Good general discussions of these factors include Rice (1966), Lester (1967), and Long and Scott (1982). The issue of improving productivity and reducing turnover - the

so-called agency incentive for providing deferred benefits has been treated by Logue (1979) and Lazear (1981).)

To what degree can each of these factors explain the pattern of growth of fringe benefits? Although there is substantial evidence that unions and collective bargaining exert a positive independent effect on the provision of nonwage benefits (Freeman 1981, Alpert 1982, Rossiter and Taylor 1982, Fosu 1984; and Mincer 1983), the stagnation of private-sector union growth since the 1950s makes unionism a rather unpromising source of significant changes in employee benefit provision. Similarly, it is unclear that the "technology" of benefit provision has changed so that scale economies of benefit provision now exist where they did not before (Mitchell and Andrews 1981).

Deferral of income has been shown quite convincingly to reduce labour turnover and, by inference, to improve productivity (Schiller and Weiss 1979; Wolf and Levy 1984). But again, it is unclear that the desire to reduce turnover has been a driving force behind changes in the pattern of provision of employee benefits. The only existing study of this question, by Mumy and Manson (1985), concludes that considerations of productivity and turnover are far less potent explanators of pension growth than is the tax treatment of pension contributions.

The most likely causes of changes in the growth of fringe benefits, then, are the aging of the labour force, changes in the tax treatment of benefits, and changes in real incomes. Several early studies of employee benefit provision concentrated on the growth of pensions and health insurance, since up until 1980 growth (not slowing growth and stagnation) was the pattern that required explanation (Alpert 1983; Atrostic 1983; Holmer 1984; Leibowitz 1983; Long and Scott 1982, 1984; Sloan and Adamache 1986; Taylor and Wilensky 1983; Turner 1981; Vroman and Anderson 1984; and Woodbury 1983).

In particular, most of these studies pointed to increases in the marginal tax rate on earned income as the main explanation of employee benefit growth, and gave correspondingly short shrift to changing real incomes and the aging of the labour force.

It seems, however, that these early studies of the demand for employee benefits had difficulty in separating the effect of increasing marginal tax rates from the effects of changes in real income. The reason for the difficulty, of course, is that incomes and marginal tax rates tend to change together over time; indeed, even in cross-section there is a close relation between the income and marginal tax rates faced by a household. This close relation poses problems for econometric estimation.

Recently completed work (Woodbury 1987) suggests that changes in real income may be at least as important as changes in marginal tax rates in explaining the pattern of voluntary social welfare benefits. Like previous research, Woodbury (1983) finds that both pensions and health insurance are good substitutes for wages. But unlike previous research, this work finds that the income elasticities of demand for pensions and health insurance both significantly exceed one. It turns out that we can explain the slowing growth of voluntary social welfare costs if we accept (1) that voluntary social welfare costs are driven primarily by workers' demands for pensions and health insurance, and (2) that higher incomes and higher marginal tax rates on earnings tend to increase the demand for compensation in non-wage forms. During the 1965-75 period, incomes and marginal tax rates were both rising rapidly in the USA, and these increases led to higher proportions of total compensation being received as pensions and health insurance. During the 1975-80 period, marginal tax rates continued to rise significantly, but income growth was much more moderate. Hence, only one of the two factors favouring non-wage benefit growth existed, and as a result the growth of

non-wage benefits slowed. Finally, during the 1980-85 period, marginal tax rates were checked by the Reagan tax cuts, and income growth continued to be modest. The result has been minimal growth to no growth of voluntary social welfare cost.

How can voluntary social welfare costs in the USA be expected to change in the future? Recent changes in the US tax laws promise to reduce marginal tax rates even further, reducing still further the incentive for workers to receive compensation in non-wage forms. Also, most existing forecasts suggest that income growth will continue to be modest in the USA. It seems unlikely that voluntary social welfare costs will increase greatly in the near future.

Since it seems unlikely that voluntary social welfare costs will rise further, it may be fair to predict that any further growth of NWLCs overall will have to occur as a result of increased statutory social welfare costs. Whether statutory social welfare costs will in fact increase is extremely difficult to predict. Nevertheless, in the absence of legislative changes that mandate greater employer contributions to statutory social welfare programmes, it seems unlikely that NWLCs in the USA will continue to grow as a percentage of total labour costs, as they have in the past.

5.1.2 Fringe Benefit Coverage and Income Distribution.

As discussed in section 6.1.3 below, NWLCs vary greatly by industry, occupation, sex and race. Transportation, communications, utilities, manufacturing, and mining have been historically high-benefit industries, whereas services and trade have offered relatively low benefits (see table 6.6).

The distribution of employee benefits in several other dimensions has been considered by Smeeding (1983, especially tables 6.6 and 6.7). Regarding occupations, Smeeding finds that the high-benefit occupations are as one

(12)

might expect: managers and administrators, professional and technical, craft workers, and certain operatives. Service, sales, and clerical occupations are, as one would also expect, the low-benefit occupations. Regarding differences by sex, Smeeding finds that, even among full-time and full-year workers, women receive lower benefits and are less likely to be covered by benefits than are men. As for black-white differentials, blacks are somewhat less likely to be covered by health insurance and pension benefits (34.8 per cent for blacks, 38.2 per cent for whites), and fringe benefits make up a smaller proportion of black than of white workers' total compensation.

Smeeding (1983) also finds that, as a whole, voluntary employer contributions to pensions and to health and life insurance tend to make the distribution of income more unequal: high-wage workers receive a larger share of their total compensation as deferred income and insurance than do low-wage workers. Smeeding's findings are supported by the findings of Taylor and Wilensky (1983) and Chollet (1984) on health benefits, and of Kotlikoff and Smith (1983) on pensions. But Smeeding also shows that it is important to decompose nonwage compensation into health and life insurance, on the one hand, and pensions and other deferred compensation, on the other. The reason is that health and life insurance benefits are roughly proportionately distributed, whereas deferred compensation is highly regressively distributed. Specifically, Smeeding's findings indicate that insurance benefits increase from 3.7 per cent of compensation for low-wage workers to 6.2 per cent of compensation for a middle-wage group, but then decline to 2.9 per cent for the highest-wage group. In contrast, deferred compensation is only 0.4 per cent of the earnings of the lowest-wage group, but 7.2 per cent of the compensation of the highest-wage group.

Legally required contributions, such as social security, unemployment insurance, and workers' compensation, differ markedly from voluntary

contributions in their effect on income distribution. Legally required contributions tend to be distributed progressively, and hence bring about greater equality.

In sum, voluntarily provided fringe benefits, unlike legally mandated contributions to social insurance, seem to have a disequalizing influence of income distribution. This naturally raises questions about the desirability of exempting these benefits from federal payroll and personal income taxes. (See Hart 1985 for a further discussion of tax exemption that includes some European reference.)

5.1.3 Equity of the Tax System and Revenue Losses Resulting from Fringe Benefit Exemptions

If a larger proportion of the total compensation of high-earnings workers is received as nonwage benefits, as appears to be the case in the USA, then the exemption of those benefits from payroll and personal income taxes is clearly a regressive aspect of the US tax system. That is, exemption of nonwage benefits violates the vertical equity precept that those with greater ability to pay for government services should do so. This concern has been the subject of an extensive study by the Congressional Budget Office (1987), which advocates reducing the tax advantages now associated with pensions.

In addition, exemption of nonwage benefits creates situations where horizontal inequities can - and undoubtedly do - arise. Consider two workers, each with total compensation (wages plus contributions to health insurance, life insurance, and pensions) of $20,000. Suppose also that they are both single and declare one exemption and the zero-bracket amount. If Mutt receives $17,000 in wages, whereas Jeff receives $18,500 in wages, then Jeff pays more taxes and faces a higher marginal tax rate than Mutt. But this clearly violates the notion of horizontal equity - that households equally situated should be taxed equally.

The "pure solution" to this problem, as Munnell (1984) has called it, is to include all employer contributions for employee benefits in taxable gross income. (Increases in accrued pension contributions would also be included in gross income, since such increases constitute an increase in an individual's lifetime income.) The pure solution is attractive in principle because it would mitigate inequities in the tax system. It is also attractive in the sense that it would either raise federal revenues or permit federal marginal income and payroll tax rates to be lowered. For example, Munnell (1984, Table 2) estimates the revenue gain from such a comprehensive tax to be $64.3 billion. The practical difficulties of implementing this pure solution are minimal. Indeed, those problems that exist pale beside the political opposition such a proposal would almost certainly meet. In view of the strong potential opposition to taxing fringe benefit contributions, some workable alternative must be sought.

One alternative that has gained some interest, and that has been introduced in a variety of guises in legislative proposals, is to limit the amount of the employer's contribution to both pensions and health insurance that is excluded from the worker's taxable gross income. There have been numerous discussions of such proposals (Adamache and Sloan 1985; Chollet 1984; Halperin 1984; Katz and Mankiw 1985; Korczyk 1984; Steuerle and Hoffman 1979; Sullivan and Gibson 1983), and the 1986 Tax Reform did tighten limits on certain forms of retirement saving (Congressional Budget Office 1987). But limits on the tax advantages given to health insurance have not been imposed, although such limits have attracted much attention. It is alleged that limits would serve to stem what many observers believe to be an inefficient and excessive use of the health care system. Hence, in addition to raising considerable revenues, some believe that a "tax-cap" on health benefit contributions would help correct a distortion of the price system that has led to an inflated health care sector.

Mark Pauly (1986) has recently challenged those who advocate taxing health benefit contributions, arguing that the efficiency effects of removing the tax-favoured status of health insurance are ambiguous. The ambiguity arises because the health care market is so imperfect. Even in the absence of tax-subsidies, the health care sector would never be perfectly competitive. Moreover, there are externalities associated with health care provision, and the market for health insurance is plagued by adverse selection. In such a case, the theory of second best tells us that removing a distortion may or may not be welfare improving.

There are two other potential drawbacks to taxing health insurance contributions. First, as already noted, insurance contributions alone among voluntarily provided fringes are distributed roughly proportionately. Hence, taxing them would not serve to improve the vertical equity of the tax structure - in fact, calculations by Taylor and Wilensky (1983) and Chollet (1984) show that the effects of a tax ceiling on health contributions would be felt disproportionately by lower-income groups. Second, many employers have expressed concerns that taxing health insurance contributions would lead to increased total labour costs (Chollet 1984). They believe that (a) workers would demand higher wages to compensate for the taxes they would pay on health insurance; (b) workers with low expected medical expenses would demand less insurance, leaving the employer to insure high risk workers at correspondingly high cost. The merits of these arguments have not been examined critically or analytically.

5.2 Pension Regulation

The aging of the labour force in the USA has triggered a large literature on the economics of pensions. In addition to treating the favoured tax treatment of pensions, much of this literature has concerned regulation of

private pensions by the Employee Retirement Income Security Act of 1974 (ERISA).

Ippolito (1986) has divided the literature on pensions into two parts, an "old" and a "new'. The "old" literature views pensions as savings devices and turns on the important issue of whether (and how much) pensions affect savings and asset accumulation. Examples of this literature include Munnell (1976) and, more recently, Pozo and Woodbury (1986). The most recent evidence, based on the 1986 Survey of Consumer Finances, suggests that increases in private pensions tend to induce both an earlier planned retirement and greater pre-retirement asset holdings (Pozo and Woodbury 1986).

The "new" literature, as Ippolito calls it, views the pension as an institutional innovation that is intended to affect workers' behaviour and ultimately the productivity of the firm. The beginning of this literature is Burkhauser's work (1979), which develops the notion of "pension wealth", or the present value of the pension promise, and shows how pension wealth is the central variable in an analysis of the effects of pensions on behaviour. Specifically, Burkhauser shows that pension wealth increases up to the age of "normal" retirement, then declines. Subsequent work has shown that this variation of pension wealth around the age of retirement does induce workers to change their behaviour. Specifically, the research suggests that workers who are covered by pensions (a) tend to retire around the normal retirement age - that is, before the level of pension wealth declines greatly (Burkhauser and Quinn 1983; Fields and Mitchell 1984) and (b) have much lower quit rates than workers who are not covered (Mitchell 1982; Allen, Clark, and McDermid 1986). Together, these findings suggest that workers respond to the pension wealth profile and retire so as to maximize wealth - they retire neither too early nor too late.

In effect, the new pension literature offers evidence against the need for regulation of private pensions. If pensions are essentially contracts that result in gains in efficiency, as Lazear (1981) among others has argued, then to regulate pensions is to constrain workers and employers in the contracts they can negotiate, and ultimately to reduce the efficiency of the labour market. The new pension literature tends to downplay three aspects of pensions that would argue in favour of regulation:

(a) that pensions are long-term contracts, and hence a problem of imperfect information exists in the market for pensions;

(b) that employers can terminate a pension plan unilaterally and impose a large capital loss on the worker; and

(c) that the pension contract is usually implicit, and hence unenforceable in court.

Any of these latter points would suggest that pension regulation might be an appropriate and important function of government.

In the USA, legislation regulating pensions was adopted in 1974 with the passage of ERISA, and the legislation has been frequently amended. Despite concerns that ERISA would increase the cost of pension provision and thwart and legitimate economic functions of pensions, little work has been done to determine the actual effects of pension regulation. The only clear effect of ERISA has been that new pension plans tend to be defined-contribution plans rather than defined-benefit plans (Wendling, Crabb-Velez, and Carlsen 1986). The value of a defined-contribution plan is determined by the pecuniary contributions of the worker and the employer to an account that is earmarked for the worker. The value of a defined-benefit plan typically is determined as a function of a worker's length of service, earnings at retirement, and age at retirement. Defined-contribution plans are essentially unregulated, whereas defined-benefit plans are subject to regulated standards

of vesting, reporting, participation, and funding.

There has been no empirical demonstration that the efficiency gains from the provision of pensions are great. Only one study to date has examined the importance of the tax and income incentives to provide pensions versus the efficiency (sometimes called "agency") incentives (Mumy and Manson 1985). The conclusion of the study is that considerations of turnover and productivity - the "agency" incentives - are relatively minor explanators of the provision of pensions.

5.3 Statutory Programmes and Their Costs

The funding crises that the Unemployment Insurance and Workers' Compensation programmes have experienced in the USA have made them the most prominent of the statutory welfare costs that have been researched. Recent research on these two programmes is briefly reviewed here.

5.3.1 Unemployment Insurance

During the 1980-1982 recession, the Unemployment Insurance Trust Funds of several states were exhausted as the incidence and duration of insured unemployment rose, and as increasingly generous benefits were paid (Vroman 1985). The state-by-state reforms that have followed on the heels of these states' funding crises have driven up Unemployment Insurance payroll taxes and (it appears) have improved the so-called experience rating of the Unemployment Insurance (UI) system. Although the implications of these reforms for employment and the labour market are as yet little understood, at least empirically, employers have reacted strongly to increased UI costs, and some states that feel threatened with plant closings have reacted by sponsoring studies of interstate differentials in UI costs (Hunt 1986).

Increased UI costs and the various possible distortions introduced by the UI system have become such a concern that considerable attention has been devoted to finding schemes of improving the system and reducing the

system's costs. These schemes are of several kinds. First, the well-documented belief that UI increases the duration of insured unemployment has led to several experiments that attempt to induce workers to return to work more rapidly than they otherwise would. The experiments that have been completed to date suggest that paying cash bonuses to workers who return to work before one-third of their benefit eligibility period has elapsed may indeed reduce unemployment duration (Woodbury and Spiegelman 1987). But paying cash bonuses to employers who hire UI beneficiaries appears to be a less promising route (Woodbury and Spiegelman 1987).

Second, there has been interest in testing and improving the effectiveness of the Job Service in its rôle of matching workers with jobs. Recent work by Johnson, Dickenson and West (1985) suggsts that the Job Service is more effective than informal job search only for women. A controlled experiment currently being conducted in the State of Washington should improve our understanding of which (if any) activities of the Job Service are effective in reducing the duration of Unemployment and improving subsequent earnings (Spiegelman and Woodbury 1987).

Third, Kingston and Burgess (1987) have documented large overpayments of UI benefits to recipients. These overpayments stem largely from benefits that are paid to claimants who fail to meet the work search requirements of the UI system. Kingston and Burgess have considered two possible remedies to this problem. One is to make eligibility for UI benefits contingent on a more substantial work history than is currently required. This would eliminate many workers who are currently eligible for benefits but who are unlikely to search for work, and thereby eliminate the need for a work-search requirement. The other is to implement "statistical screening" of UI recipients, which would entail auditing UI recipients who, based on their characteristics, are most likely to abuse the system. Since under statistical

screening, claimants who are less likely to search for work would be more likely to be audited, administrative resources would be more effectively directed.

To the alarm of some, not all the contemplated changes in the UI system would reduce the uses of, and the burden on, the UI Trust Fund. For example, Short-Time Compensation (or Worksharing UI) would allow the payment of benefits to workers whose hours are reduced, rather than require that a worker be separated from employment in order to receive UI. In Europe, the FRG has a well established UI system of this type. Of course, the intent of short-Time Compensation is to encourage employers to implement work-sharing arrangements when demand is slack, rather than to lay off workers, so the question whether Short-Time Compensation would in fact place an added strain on the UI system is open (Morand 1987; Spiegelman and Woodbury 1987).

5.3.2 Workers' compensation

The US Occupational Safety and Health Act of 1970 established the National Commission on State Workmen's Compensation Laws, which issued its final report in July 1972. Of the 19 "essential recommendations" included in the Commission's report, nine pertained to Workers' Compensation benefit levels. The Commission's recommendations triggered a wave of post-1972 reforms, and the US Department of Labor (1981) has found that the states have made much progress in complying with the recommendation, in particular with the benefit recommendations. It is clear that compliance with the benefit recommendations has led to enhanced generosity of benefits: Berkowitz and Burton (1987) have recently noted that in 1972, only six of the 51 states (including the District of Columbia) had maximum weekly benefits that were at least two-thirds of the state's average weekly wage, whereas in 1986, 31 of the 51 had maximums that were 100 per cent of state average weekly wage, and only nine had maximums below two-thirds.

Improvements in the benefits (and also the coverage) of Workers' Compensation have led to a surve in the programme's costs. Between 1972 and 1984, the cost of insurance premiums and administrative expenses of the programme incrased from 1.14 to 1.66 per cent of payroll (Berkowitz and Burton 1987).

A major concern is that increased benefit levels may reduce the incentive for workes to act in a way that is consistent with safety on the job. That is, enhanced benefits could lead to higher costs both directly (because higher benefits are paid), and indirectly because they induce more job related accidents. Chelius (1977) and Butler and Worrall (1983) have marshalled empirical evidence to show that increased Workers' compensation benefits are related to higher industrial accident rates, supporting the notion that workers do change their behaviour depending on incentives - if it is less costly to suffer an accident, workers will do less to prevent an accident.

The response to the rising costs of the Workers' Compensation programme in the wake of the post-1972 reforms has been a second wage of reforms that have been taking place in the 1980s. The approach to reform has differed greatly from state to state, and the mechanisms adopted to reduce Workers' Compensation costs have been wide-ranging, as a reading of the papers in the Chelius volume (1986) or the discussion in Berkowitz and Burton (1987) suggest. Direct approaches include changing the benefit schedule, the maximum benefit or the minimum benefit. More indirect approaches include coordinating benefits with other sources of disability benefits, tightening the definitions of the injuries and disabilities that qualify a worker for benefits, imposing medical cost regulations, and allowing greater competition in the setting of Workers' Compensation insurance rates.

Chapter 6 Industrial Characteristics

In this chapter, we discuss the broad range of NWLC statistics at a more disaggregated industrial level. General industrial characteristics are discussed in section 6.1 while special attention is given, in section 6.2, to firm size, a topic of increasing interest in the wage compensation literature.

6.1 General Industrial Characteristics

6.1.1 Federal Republic of Germany and Japan

In this section, we highlight industrial cross-sectional differences in labour fixity as well as comparable data on overtime working and employee skill. These latter two variables would be expected a priori to be positively related to the degree of fixity. The work is based on FRG and Japanese data with a comparable UK analysis provided in Hart (1984a).

Table 6.1 presents two estimates of ratios of fixed-to-variable labour costs, Ratios I and II, for 34 FRG manufacturing industries in 1984. The Ratios are based on the calculations in Hart (1984a). Recall that Ratio I is the narrow definition of fixity while Ratio II includes the cost category, 'payments for days not worked', as a fixed cost. With some exceptional cases, industries with high Ratio values - like mineral oil refining, iron and steel, chemicals and aerospace are industries that would be expected to have relatively skilled workforces. Unfortunately, our proxy for skill in Table 6.1 (last column) - the ratio of non-manual to total employees - is both rather crude and available for only a limited number of the industries.

Also we would expect, following the discussion through chapter 3, that relatively high fixed-cost industries would employ relatively high average

Table 6.1

Fixed/variable cost ratios, overtime and skill ratios, German Manufacturing industries 1984.

NACE	Industry	Fix/var Ratio I 1)	Fix/var Ratio II 1)	Weekly overtime hours per worker 2)	Ratio of non-manu to total workers
14	Mineral Oil Refining	0.23	0.31	0.7	
22	Production and preliminary processing of metals	0.18	0.27	(2.2)	0.25
221	Iron and steel	0.23	0.33	2.1	
224	Prod. a preliminary proc. of non-ferrous metals	0.11	0.20	2.3	
24	Manufacture of non-metallic mineral products	0.09	0.17	3.7	0.25
247	Manufacture of glass and glassware	0.10	0.19	2.0	
248	Manufacture of ceramic goods	0.10	0.18	1.6	
25	Chemicals	0.16	0.24	1.1	0.49
31	Manufacture of metal articles	0.08	0.16	(2.1)	0.26
311	Foundries	0.08	0.17	(2.2)	
314	Manufacture of structural metal products	0.14	0.22	(2.3)	
316	Manufacture of tools and finished metal goods	0.04	0.12	(1.2)	
32	Mechanical engineering	0.13	0.21	1.4	0.40
35	Manufacture of motor vehicles	0.11	0.21	1.9	0.24
36	Manufacture of other means of transport	0.13	0.22	(1.9)	
361	Shipbuilding	0.13	0.23	3.8	
364	Aerospace equipment manufacturing and repairing	0.15	0.24	1.0	
37	Instrument engineering	0.09	0.16	1.2	0.34
41/42	Food, drink and tobacco industry	0.09	0.17	4.1	0.33
429	Manufacture of tobacco products	0.24	0.33	0.7	
43	Textiles	0.06	0.13	2.6	0.24
44	Leather and leather goods	0.05	0.12	(3.6)	
45	Footwear and clothing	0.05	0.13	1.3	0.20
46	Timber and wooden furniture	0.07	0.14	(1.8)	0.21
47	Manufacture of paper and paper products	0.07	0.14	(2.5)	
471	Manufacture of pulp, paper and board	0.10	0.18	3.0	
472	Processing of paper and board	0.07	0.14	2.3	
473	Printing and allied industries	0.06	0.13	2.2	
48	Processing of rubber and plastics	0.07	0.15	1.7	
481	Manufacture of rubber products	0.07	0.16	1.7	
483	Processing of plastics	0.06	0.14	2.1	
49	Other manufacturing industries	0.05	0.13	-	
	Total manufacturing	0.10	0.19	(2.0)	0.33

Sources: Labour-cost-calculations: Statisches Bundesamt FS 16 "Arbeitskostenerhebung 1984"
overtime-figures: Statisches Bundesamt, FS 16, Reihe 2.1

1) Ratios I and II are calculated, respectively, with and without the cost item "payments f
days not worked:

2) The survey, which provides the overtime-figures, uses the German "Wirtschaftszwei
Systematik". This is totally different from the "Nace-classification" used in case of t
Labour-cost Surveys. For this reason the overtime-figures - broken down by industry
are only approximate values. Figures given in brackets are very problematic.

overtime working per period. As with the skill ratios, FRG overtime data are particularly difficult to obtain on a consistent basis to the EC NACE classification, and, in particular, the bracketed overtime figures in Table 6.1 are rather tentative. We have stopped short of testing the associations of the two Ratios and the skill/overtime variables because of the poor quality of the latter variables but casual observation suggests that these are not strong.

In the case of Japan, we are able to overcome the data deficiencies with respect to overtime and the skill proxy thereby enabling us to go somewhat further with the analysis along the lines of Hart (1984a) for similar UK industries.

Table 6.2 contains estimates of the fixed/variable cost ratios for 20 manufacturing industries in 1984. The constructions of the three different Japanese ratios are discussed in section 2.2. In line with FRG and UK, capital intensive industries like chemicals and petroleum display the highest ratios with the more labour intensive industries like clothing and timber at the other end of the rankings.

One feature of the fixed/variable ratios is unique to Japan, however. While, as in FRG and UK, the rank-orders of Ratios I and II are very similar, a number of industries change their rank-orders quite significantly under the cost allocation included in Ratio III. This is especially the case with textiles, paper, ceramics, transport machinery and precision machinery, and it is due to the influence of bonuses. (Recall, bonuses are included as fixed costs in Ratio III.) These outcomes once again underline the necessity of understanding the rôle played by bonus payments within total labour compensation in Japan.

With somewhat more precision than the FRG statistics shown in Figure 6.1, information on per-period overtime hours and the ratio of non-manual to total workers by industry is given in Table 6.2 as well as their respective rank orderings. From the Spearman's rank coefficients, it is evident that the rank

Table 6.2

Fixed/Variable Cost Ratios, Overtime and Skill Ratios: Japanese Manufacturing Industries, 1984

Industry	Ratio I	Rank (1)	Ratio II	Rank (2)	Ratio III	Rank (3)	Monthly Overtime Hours per Worker	Rank (4)	Ratio of Non-Manual to Total Workers	Rank (5)
Food	0.13	11	0.16	12	0.44	12	13	14	0.28	14
Textiles	0.14	10	0.16	10	0.39	15	12	15	0.21	18
Apparel	0.10	18	0.12	18	0.30	18	6	20	0.20	20
Timber	0.10	19	0.12	19	0.28	20	11	18	0.22	17
Furniture	0.09	20	0.11	20	0.30	19	12	15	0.25	16
Paper	0.14	8	0.17	7	0.45	10	16	10	0.31	10
Printing	0.17	4	0.19	4	0.52	3	20	6	0.47	3
Chemicals	0.21	2	0.25	2	0.68	2	12	15	0.54	1
Petroleum	0.25	1	0.29	1	0.73	1	15	12	0.48	2
Rubber	0.16	5	0.18	5	0.47	7	18	7	0.28	13
Leathe	0.12	17	0.14	17	0.33	17	7	19	0.21	19
Ceramics	0.13	12	0.16	11	0.39	14	15	12	0.28	12
Steel	0.18	3	0.21	3	0.51	4	17	8	0.27	15
Non-ferrous metals	0.15	6	0.18	6	0.46	8	24	2	0.34	7
Metal products	0.12	16	0.14	16	0.37	16	21	5	0.30	11
Machinery	0.13	13	0.15	14	0.43	11	23	3	0.45	4
Electrical machinery	0.15	7	0.17	8	0.49	6	22	4	0.40	5
Transport machinery	0.13	14	0.16	13	0.45	9	27	1	0.32	8
Precision machinery	0.14	9	0.17	9	0.49	5	16	10	0.37	6
Others	0.13	15	0.15	15	0.41	13	17	8	0.32	9

Spearman's rank coefficients (R^S)

$R^S_{1,4} = 0.36$ $R^S_{1,5} = 0.62$ $R^S_{2,4} = 0.35$ $R^S_{2,5} = 0.61$

$R^S_{3,4} = 0.48$ $R^S_{3,5} = 0.78$

correlations between the fixity ratios and overtime are weaker than earlier obtained for the UK (Hart, 1978). Noticeably, the correlation is strongest with respect to Ratio III (0.48) than Ratios I and II (0.36 and 0.35, respectively). The correlations are stronger between each of the three ratios and the skill proxy, although again below the comparable results for the UK. Again, with respect to these latter results, Ratio III (0.78) outperforms the other two Ratios (0.62 and 0.61). Figures 6.1 and 6.2 depict the Ratio III relationships with respect to overtime and skill, respectively.

6.1.2 United Kingdom

The main information for the UK industrial breakdowns can be found in Table 2.10 which presents data for 1984 and Table 2.11 which gives the same data for 1981 using the 1968 SIC. These tables cover manufacturing sectors while Table 6.3 gives 1984 figures for other sectors. Annual hours of work by industry for 1981 and 1984 are listed in Tables 6.4 and 6.5 respectively.

It is immediately apparent from Table 6.3 that there are quite marked differences between industries in payments for days not worked, voluntary social welfare, subsidised services, etc. Some of these differences are readily explained by the nature of working conditions in the industry: the mining industry (extraction of ores) pays higher liability insurance than any other sector because of the dangerous nature of the work involved.

Figure 6.1:

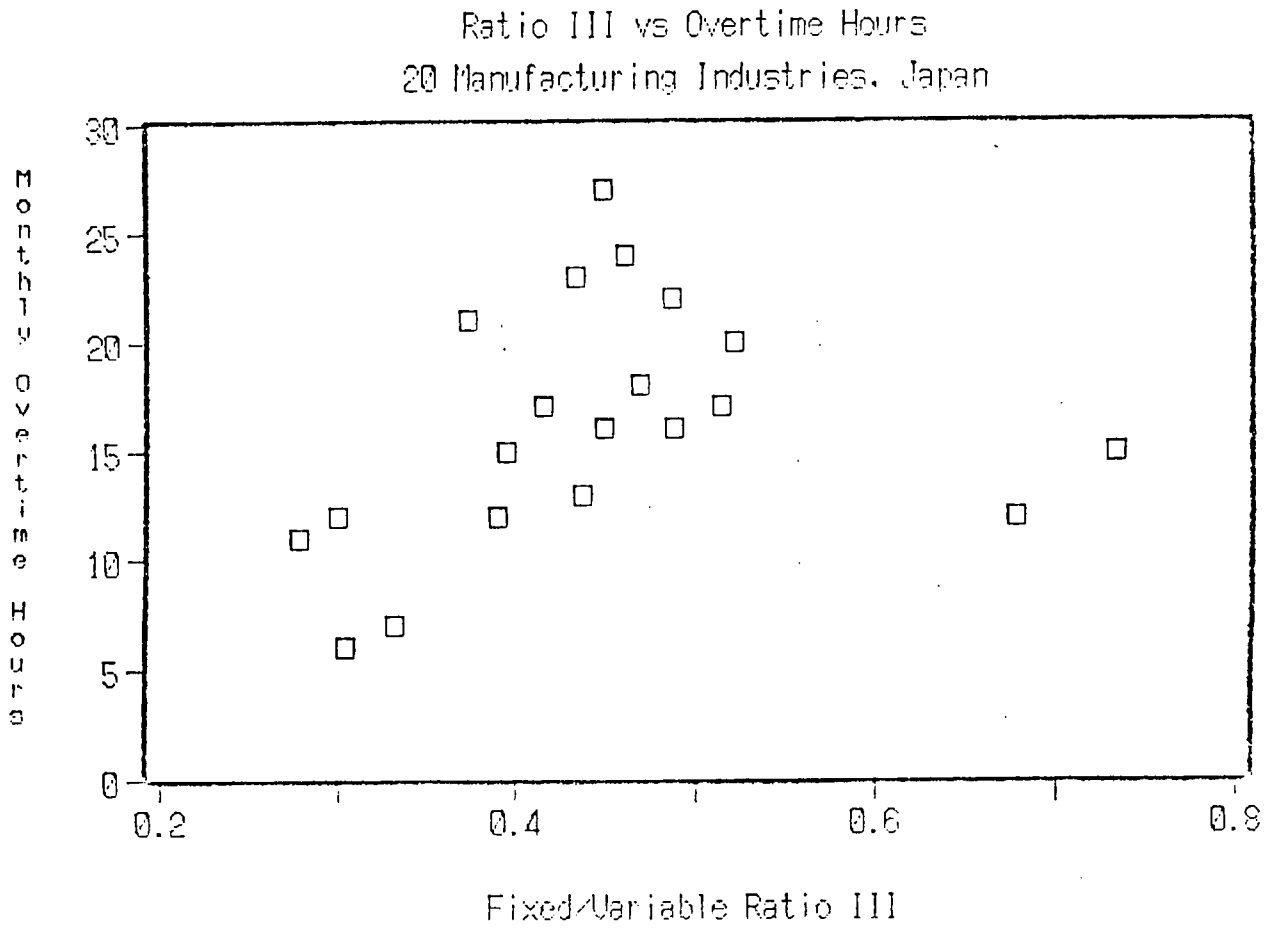

Ratio III vs Overtime Hours
20 Manufacturing Industries, Japan
Monthly Overtime Hours
30
25
20
15
10
5
0
0.2
0.4
0.6
0.8
Fixed/Variable Ratio III

Figure 6.2:

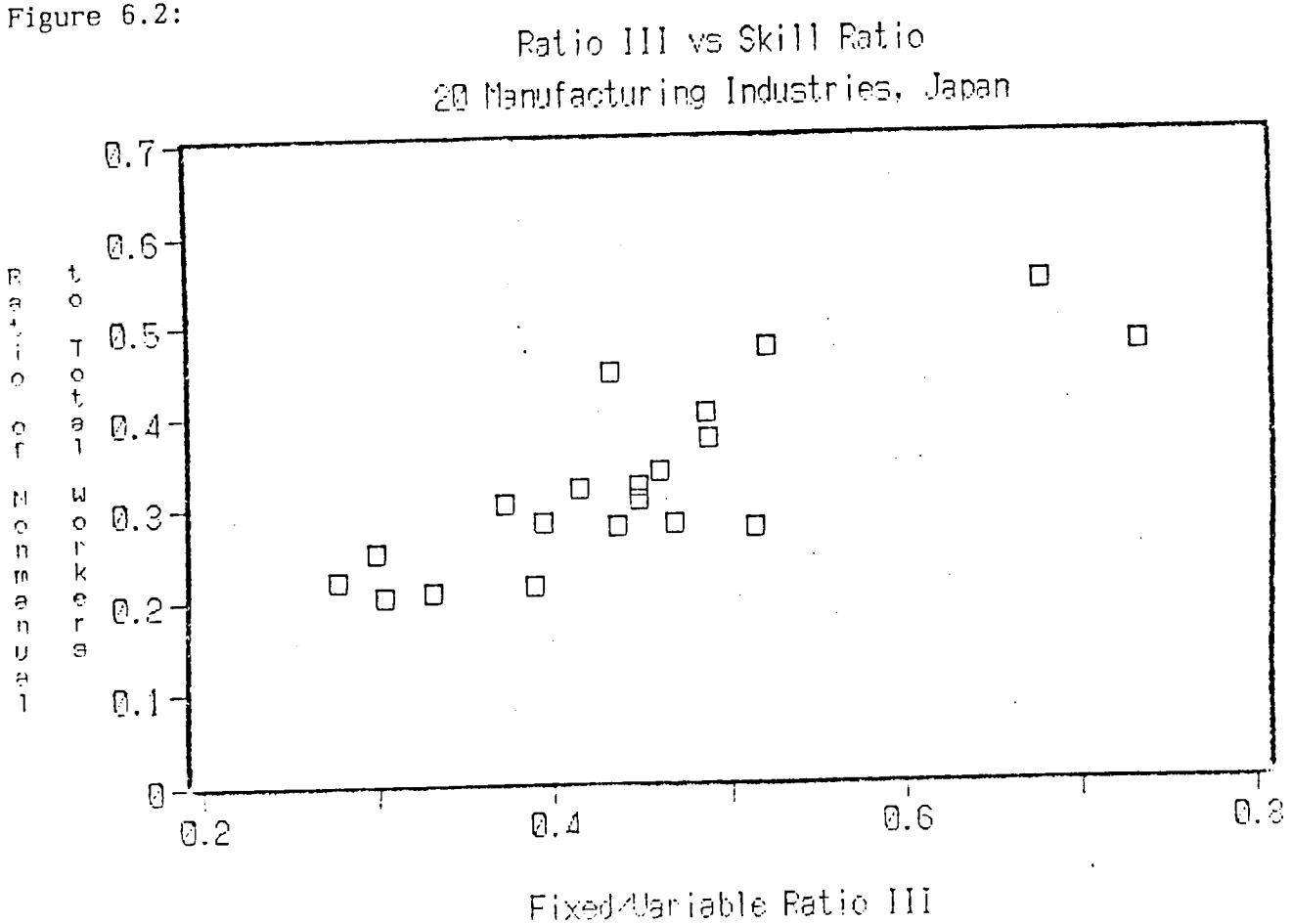

Ratio III vs Skill Ratio
20 Manufacturing Industries, Japan
Ratio of Nonmanual to Total Workers
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.2
0.4
0.6
0.8
Fixed/Variable Ratio III

Table 6.3

Labour Costs by Sector in 1984

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Energy excl. coal	14167.15	77.3	5.4	1.6	0.2	12.8	0.1	1.9	0.9	0.0
Water Supply	11435.22	80.4	6.0	3.8	0.1	7.9	0.0	1.1	0.6	0.0
Manufacturing	9294.86	84.0	7.4	1.3	0.3	5.3	0.1	1.2	0.3	0.0
Construction	9198.62	86.0	7.7	5.7	0.4	4.1	0.2	0.6	0.4	0.0
Distribution	6747.67	87.5	7.5	0.4	0.2	7.2	0.2	1.2	0.2	0.0
Banking	11928.88	72.2	5.1	0.4	0.0	15.1	0.3	6.3	0.6	0.0
Finance	10000.08	75.5	5.9	0.8	0.0	10.3	0.3	6.4	0.7	0.0
Insurance	12175.11	74.0	5.5	0.5	0.0	12.6	0.7	6.1	0.6	0.0
Total Finance	11706.93	73.1	5.3	0.5	0.0	13.8	0.4	6.3	0.6	0.0

Column headings: column 1 gives Annual Labour Cost in Pounds; Columns 2–10 give percentage breakdown of this figure by category of labour cost
Source: Department of Employment

(1) Annual Labour Cost per Employee (Pounds)
(2) Wages and Salaries (%)
(3) National Insurance (%)
(4) Redundancy Provision (%)
(5) Liability Insurance (%)
(6) Voluntary Social Welfare Payments (%)
(7) Benefits in Kind (%)
(8) Subsidised Services (%)
(9) Training (excluding wages) (%)
(10) Government Contributions (%)

Table 6.4

Annual Hours of Work 1984

	(1)	(2)
Energy and Water Supply	1692	1721
All Manufacturing	1823	1875
Other Mineral Ore Extraction	1867	1897
Metal Manufacture	1814	1832
Non Metallic Mineral Products	1938	1970
Chemicals	1817	1854
Man-made Fibres	1917	1926
Metal Goods, Engineering	1819	1858
Metal Goods nes	1850	1894
Mechanical Engineering	1851	1871
Office Machinery	1794	1806
Electrical & Electronics	1800	1841
Motor Vehicles & Parts	1769	1786
Other Transport	1811	1822
Instrument Engineering	1779	1849
Other Manufacturing	1812	1953
Food, Drink & Tobacco	1813	1952
Textiles	1805	1878
Leather	1773	1845
Footwear & Clothing	1716	1783
Timber & Wooden Furniture	1915	1963
Paper, Printing & Publishing	1812	1884
Rubber & Plastics	1836	1894
Other Manufacturing	1880	1946
Construction	1934	1958
Wholesale Distribution	1811	1923
Retail Distribution	1489	1821
Total Distribution	1595	1858
Banking	1587	1641
Finance	1631	1746
Insurance	1627	1679

Column Headings: figures are average number of hours worked per year for both manual and non-manual employees
Source: Department of Employment
(1) All Employees
(2) Part-Time Employees converted to Full-Time Equivalents

Table 6.5

Annual Hours of Work 1973-1981

	1973	1975	1978	1981
All Manufacturing	1872	1814	1844	1811
Food, Drink & Tobacco	1857	1829	1852	1823
Coal & Petroleum	1891	1848	1876	1878
Chemicals & Allied	1889	1831	1870	1853
Metal Manufacture	1854	1836	1884	1837
Mechanical Engineering	1915	1882	1894	1829
Instrument Engineering	1772	1823	1833	1807
Electrical Engineering	1885	1766	1800	1801
Shipbuilding & Marine	1915	1815	1931	1913
Vehicles	1889	1818	1814	1772
Metal Goods nes	1878	1810	1828	1803
Textiles	1844	1730	1794	1782
Leather & Fur	1844	1826	1794	1782
Clothing & Footwear	1700	1606	1698	1695
Bricks, Pottery, Glass	1970	1952	1932	1888
Timber & Furniture	1954	1901	1943	1846
Paper, Printing & Publishing	1914	1814	1857	1794
Other Manufacturing	1861	1812	1813	1817
Mining & Quarrying	1467	1632	1665	1667
Construction	2176	2074	2053	1972
Gas, Electricity & Water	1888	1832	1847	1769
All Index of Production Industries	1878	1840	1863	1825

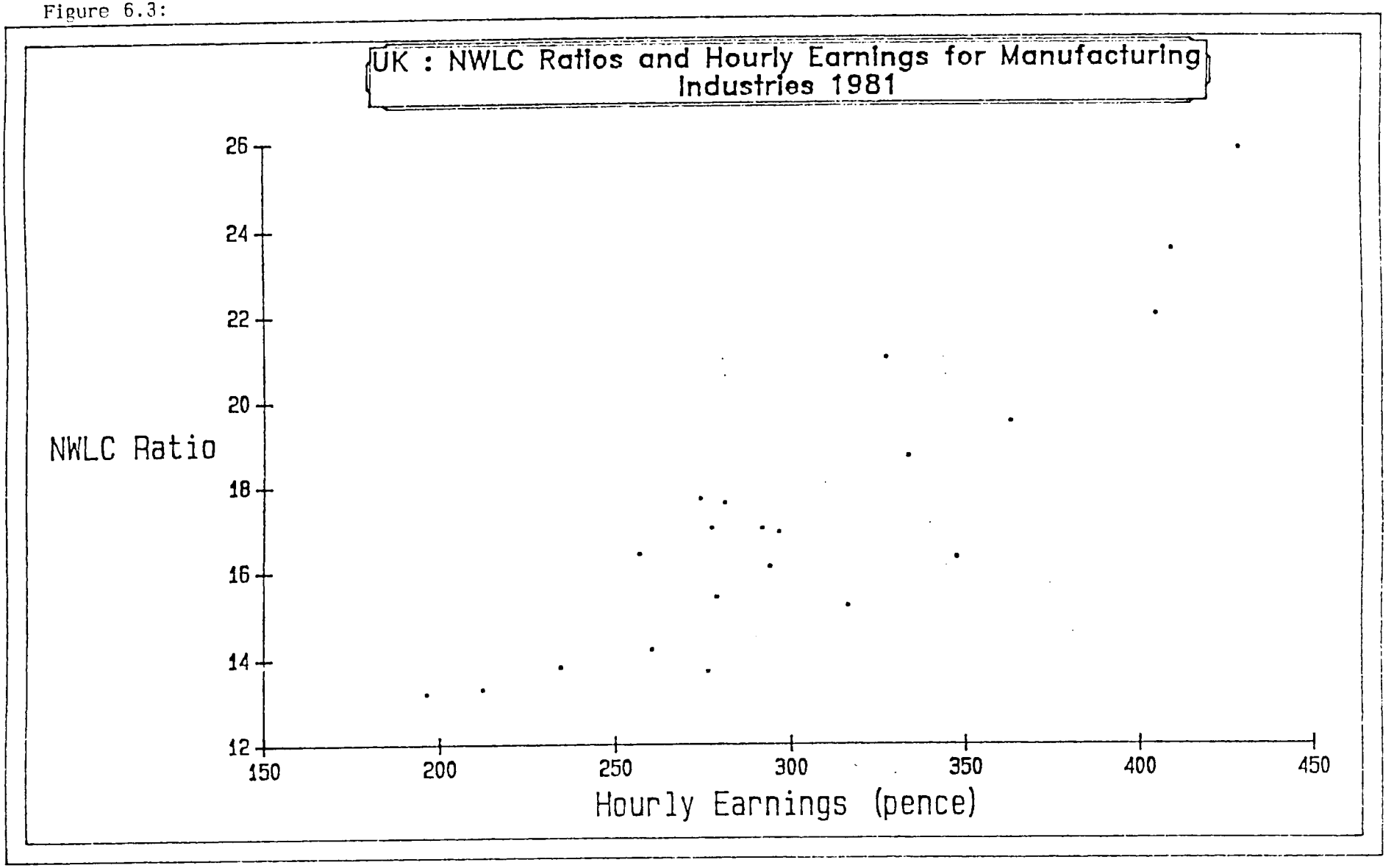
Notes: Figures are average number of hours worked per year for both manual and non-manual employees: no conversion of part-time employees: 1968 SIC used.

Source: Department of Employment.

Other differences are not so readily explained. In manufacturing as a whole other costs added an average of 36.3 per cent to wages and salaries for hours worked in 1984. Within the manufacturing sector, chemicals and other transport paid out considerably larger proportions at 44.7 per cent and 40 per cent respectively. Some paid considerably less: textiles at 29.2 per cent, leather at 27.5 per cent, footwear and clothing at 28.9 per cent and timber and furniture at 28.4 per cent all paid out considerably less. Outside of manufacturing (see Table 6.3) there is considerable variation in the share of NWLCs as a proportion of total labour costs. Distribution and construction have a low share of NWLCs: interestingly these are both low wage industries. In contrast, the financial sector has a very high share of NWLCs with much larger expenditure on voluntary social welfare and subsidised services than other sectors. Yet wages are not particularly high in banking, finance or insurance: their average wage is less than that paid in manufacturing while NWLCs account for 26.9 per cent of total labour costs against 16 per cent in manufacturing. Nevertheless Figure 6.3 which plots NWLC Ratios against hourly earnings in pence for various index of production industries in 1981 shows that there is a fairly strong positive association between the NWLC ratio and hourly earnings.

The question of whether the 1984 statistics reflect similar inter-industry disparities as were observed in previous surveys is complicated by the change in the industrial classification. Nevertheless a comparison of Tables 2.10 and 2.11 indicates that the 1984 results would have been predictable from the 1981 data. Chemicals and vehicles are well above the average share of NWLCs (38.5 per cent) for manufacturing as a whole while leather, textiles, clothing and timber & furniture are well below. The construction industry has a low ratio of NWLCs while the utilities and mining have high ratios, just as in 1984.

Figure 6.3:


UK : NWLC Ratios and Hourly Earnings for Manufacturing Industries 1981
NWLC Ratio
26
24
22
20
18
16
14
12
150
200
250
300
350
400
450
Hourly Earnings (pence)

Taking this backward comparison further, Figures 6.4 and 6.5 plot NWLC ratios and hourly earnings, respectively, in 1975 and 1981 for manual workers in a variety of index of production industries. The positive association for both variables indicates a degree of stability in their industrial rankings. Thus, just as some industries seem consistently to pay wages above average so do some industries consistently incur above average nonwage costs. Further, the evidence of the positive association between high earnings and high NWLC ratios in Figure 6.3 seems to suggest that those industries paying high wages are also the industries incurring high nonwage costs.

If the labour market were competitive and workers had similar preferences and capabilities, then interindustry mobility would eliminate wage differentials. If one allows for the possibility that individuals are heterogenous, then wage differentials might be explained by differences in the stock of 'human capital' with which each individual is endowed. Any remaining differentials might be attributable to fringe benefits and/or working conditions. It is extremely difficult to control for nonpecuniary benefits such as working conditions: nevertheless, the labour costs data presented here do give some indication of the extent of fringe benefit payments. And the evidence reviewed above tends to suggest that workers in high wage industries receive a higher level of fringe benefits than do workers in low wage industries. Further, these workers have been able to maintain their advantageous position both with respect to earnings and fringe benefits through time. Thus fringe benefits are additive to earnings differentials rather than compensating for them. This confirms the findings of Freeman (1981) and Krueger and Summers (1986).

Figure 6.4:

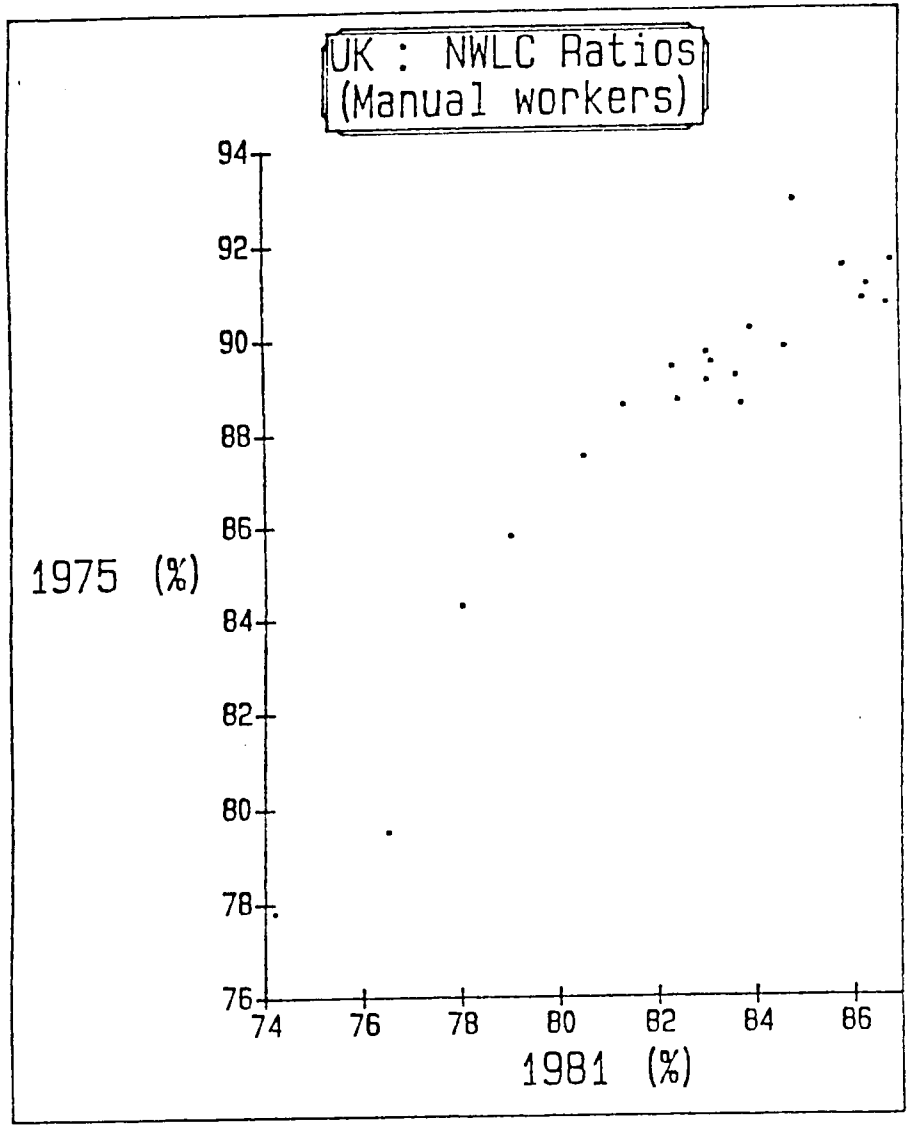
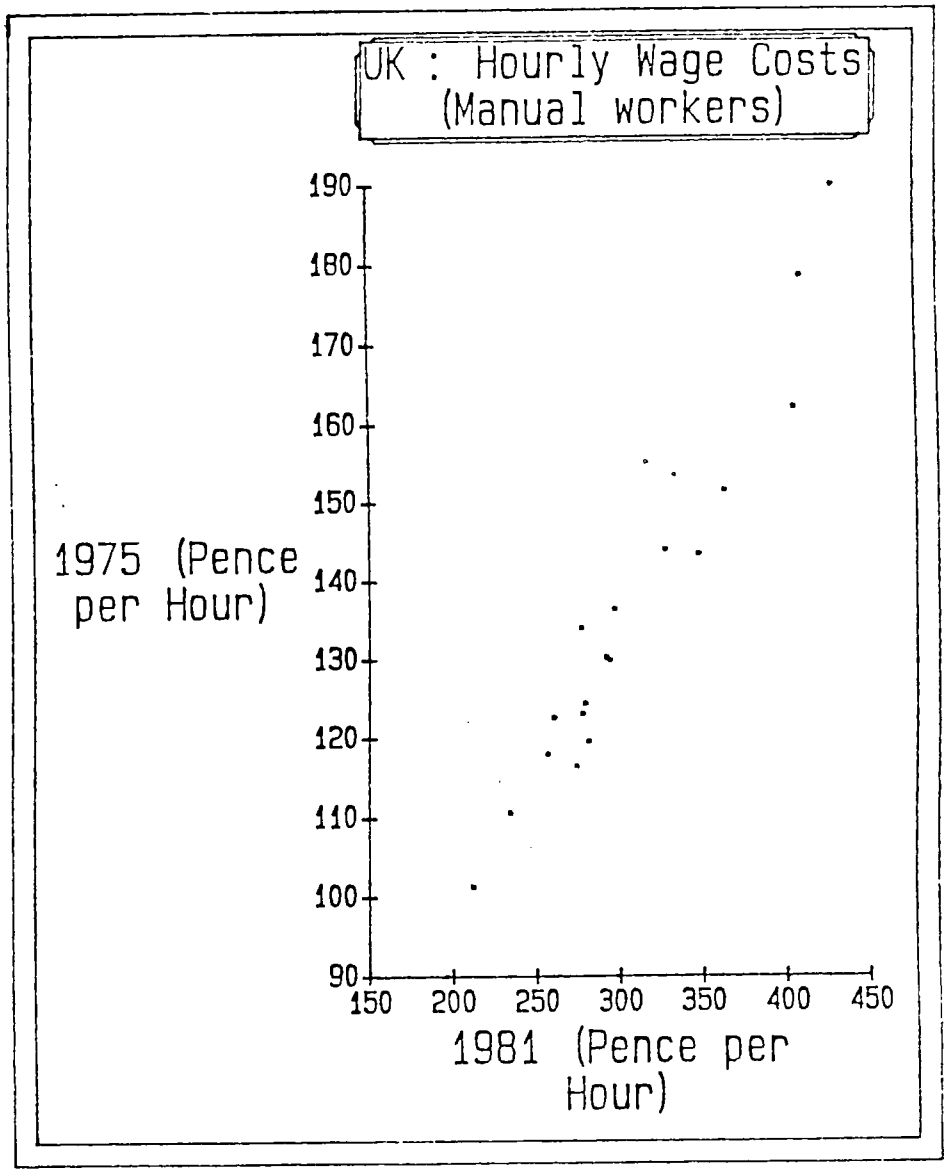


Figure 6.5:



Since the evidence does not appear to be consonant with the competitive labour market paradigm, a number of noncompetitive alternatives have been suggested. If some industries are consistently more profitable than others, then workers are likely to develop some structure which will give them some access to the rent which their firm is earning. This is consonant with the view of Freeman and Medoff (1979) that the process of forming a union is endogenous and is determined by firm or industry characteristics. Thus wage differentials are essentially the end-result of differences in industry characteristics, whatever form of collective voice workers use to express their preferences. Another explanation of interindustry differentials is contained in the 'shirking' model where firms pay a wage above that required for market clearing thus creating involuntary unemployment in order to prevent workers from 'shirking'. Different industries will pay different wages because the incentive required to induce nonshirking behaviour will differ amongst workers as will the cost of monitoring shirking. Yet another view is that because some workers in an industry require to be paid a high wage (e.g. because they are in short supply), other workers in the industry will also require to be relatively well paid in order to maintain their morale and thus their productivity.

To summarise this section it is certainly the case that industries differ substantially in the proportion of their total labour costs which are spent on nonwage items. It appears the ranking of industries by the ratio of NWLCs to total labour costs is not random: rather this ranking has remained fairly stable through time. further those industries which pay high wages are also likely to pay out a higher than expected amount in nonwage benefits, implying that these add to the differences resulting from the inequality of earnings rather than compensating for them. Various theories have been put forward to explain interindustry earnings differences. Some are consistent

with the behaviour observed in the Labour Costs Survey but discrimination between them is beyond the scope of the present study.

6.1.3 United States

Tables 6.6 and 6.7 show NWLCs as a proportion of total labour costs in five years disaggregated by industry. Table 6.6's industry disaggregations are based on the National Income and Product Accounts. Each proportion shown is simply the sum of employer contributions to social insurance and other labour income, divided by Compensation. Table 6.7's proportions are based on the Chamber of commerce data, and are computed by transforming "all employee benefits as a percent of payroll" into all benefits as a proportion of total labour costs. ($p = 1/[1 + [1/(x/100)]]$, where p is NWLCs as a proportion of total labour costs, and x is all employee benefits as a percentage of payroll.)

Tables 6.6 and 6.7 both indicate strong interindustry variation in the incidence of NWLCs. Moreover, the pattern of interindustry variation changed over the 20 year period in question. Table 6.6 shows that in 1966, communications and utilities had the largest proportion NWLCs (13 to 15.5 per cent), whereas agriculture, services, the trade sector, and construction had the lowest (6 to 8 per cent). By 1985, this pattern had changed somewhat; construction experienced an explosion of NWLCs and had a proportion of NWLCs similar to manufacturing. Also, NWLCs in finance, insurance, and real estate had lost ground in relative terms, so that the financial sector had NWLCs at roughly the economy-wide average.

A comparison of Table 6.6 with Table 2.13 (and similarly a comparison of Table 6.7 with Table 2.14) suggests that the growth of fixed NWLCs, both in aggregate and by industry, has been similar to that of NWLCs generally. For example, Tables 6.6 and 2.13 reveal that NWLCs as a proportion of total labour cost and the fixed/variable labour cost ratio both

grew by 66 per cent between 1966 and 1985. Also, the growth of NWLCs in an industry is mirrored in the growth of the fixed/variable labour cost ratio in the same industry with only two notable exceptions. The exceptions are construction, where NWLCs grew by 118 per cent while the fixed/variable labour cost ratio grew by 179 per cent, and wholesale trade, where NWLCs grew by 78 per cent while the fixed/variable labour cost ratio grew by 105 per cent.

Tables 6.8 and 6.9 attempt to show the relationships between fixed labour costs on the one hand, and skill levels and overtime hours on the other. Table 6.8 repeats the 1985 data on fixed/variable cost ratios from Table 2.13, and adds data on skill levels by industry. The variable used to proxy skill level is real capital consumption allowance per full-time equivalent worker. This variable has been used frequently to approximate firm-specific human capital, for the reason that it measures real capital use per worker, which in turn is believed to be related to the amount of firm-specific skills possessed by workers (Long and Scott, 1982). The Spearman rank correlation coefficient between the fixed/variable cost ratio and the skill proxy is 0.88, suggesting that industries that use highly skilled labour also face (or voluntarily take on) relatively high fixed labour costs.

Table 6.9 repeats the 1985 data on fixed/variable cost ratios in manufacturing industries from Table 2.14, and adds data on overtime hours by industry. The overtime data derive from US Department of Labor statistics, as described in the notes to Table 6.9. The Spearman rank correlation coefficient between the fixed/variable cost ratio and average overtime hours is lower in this instance, 0.59. Nevertheless, there is still the suggestion that industries facing high fixed labour costs tend to make greater use of overtime, rather than add workers to their payrolls. In that the relationship betwen fixed labour costs and skill appears stronger than that between fixed labour costs and overtime hours, the figures accord with Hart's findings for UK manufacturing (Hart, 1984, Table 2.9).

Table 6.6

Non-Wage Labour Costs as a Proportion of Total Labour Costs by Industry, 1966, 1971, 1976, 1981, and 1985: U.S. National Income and Product Accounts Data

Industry	1966	1971	1976	1981	1985
All private domestic	0.0961	0.1113	0.1444	0.1563	0.1600
Agriculture	0.0602	0.0744	0.1027	0.1338	0.1321
Mining	0.1229	0.1345	0.1618	0.1674	0.1713
Construction	0.0817	0.0907	0.1364	0.1590	0.1787
Manufacturing:					
Durable	0.1150	0.1391	0.1768	0.1890	0.1887
Nondurable	0.1092	0.1222	0.1577	0.1822	0.1830
Transportation	0.1016	0.1170	0.1644	0.1654	0.1862
Communications	0.1566	0.2064	0.2176	0.2214	0.2227
Utilities	0.1320	0.1500	0.2100	0.1998	0.2034
Trade:					
Wholesale	0.0763	0.0924	0.1176	0.1280	0.13359
Retail	0.0755	0.0872	0.1107	0.1231	0.1337
Finance and insurance	0.1100	0.1240	0.1647	0.1593	0.1587
Services	0.0639	0.0775	0.1051	0.1205	0.1275

Table 6.7

Non-Wage Labour Costs as a Proportion of Total Labour Costs by Industry, 1966, 1971, 1976, 1981, and 1985: U.S. Chamber of Commerce Data

Industry	1966	1971	1976	1981	1985
All	0.198	0.235	0.268	0.272	0.274
Manufacturing	0.191	0.234	0.272	0.276	0.284
Food, tobacco	0.214	0.249	0.268	0.273	0.284
Textiles, apparel	0.159	0.191	0.225	0.237	0.244
Wood products	0.169	0.221	0.254	0.266	0.261
Printing and publishing	0.174	0.215	0.259	0.269	0.255
Chemicals	0.215	0.255	0.302	0.303	0.301
Petroleum	0.219	0.263	0.290	0.308	0.281
Rubber and plastics	0.201	0.233	0.275	0.271	0.286
Stone, glass	0.188	0.238	0.267	0.275	0.254
Metals:					
Primary	0.200	0.258	0.302	0.302	0.332
Fabricated	0.186	0.223	0.274	0.275	0.296
Machinery:					
Electrical	0.192	0.228	0.268	0.273	0.281
Other	0.194	0.231	0.273	0.278	0.286
Transportation Equip.	0.188	0.259	0.281	0.280	0.293
Instruments, other	0.192	0.237	0.254	0.280	0.293
Non-manufacturing	0.212	0.237	0.264	0.266	0.266
Utilities	0.212	0.245	0.284	0.295	0.292
Trade:					
Department stores	0.188	0.195	0.242	0.234	0.235
Other	0.194	0.197	0.235	0.234	0.240
Finance	0.243	0.263	0.285	0.278	0.257
Insurance	0.213	0.241	0.211	0.278	0.273
Hospitals	-	-	0.204	0.237	0.256
Other	-	-	0.252	0.248	0.253

Table 6.8

Fixed/Variable Labour Cost Ratios and Skill Levels in the US
by Industry 1985
US National Income and Product Accounts Data

Industry	Fixed/ Variable Cost Ratio	Rank	Skill Proxy	Rank
All private domestic	0.1061	-	3.82	-
Agriculture	0.0590	12	2.57	9
Mining	0.1231	5	12.09	3
Construction	0.1146	7	1.63	10
Manufacturing:				
Durable	0.1397	3	5.84	5
Nondurable	0.1317	4	8.58	4
Transportation	0.1097	8	5.82	8
Communications	0.2009	1	21.05	2
Utilities	0.1712	2	23.01	1
Trade:				
Wholesale	0.0830	9	2.63	8
Retail	0.0719	11	1.43	11
Finance and insurance	0.1211	6	3.74	7
Services	0.0749	10	1.19	12

Notes: The skill proxy is constructed from National Income Product Accounts data by dividing real capital consumption allowance by full-time equivalent employment. The Spearman rank correlation coefficient between the fixed/variable cost ratio and the skill proxy is 0.88.

Table 6.9
Fixed/Variable Labour Cost Ratios and Overtime Hours in US Manufacturing Industries, by Industry 1985
US Chamber of Commerce Data

Industry	Fixed/ Variable Cost Ratio	Rank	Average Overtime Hours	Rank
All manufacturing	0.310	-	3.3	-
Food, tobacco	0.304	8	3.7	5
Textiles, apparel	0.244	14	2.0	14
Wood products	0.253	13	3.5	6.5
Printing and publishing	0.270	10	2.7	11.5
Chemicals	0.352	2	3.4	8.5
Petroleum	0.305	7	4.2	3
Rubber and plastics	0.298	9	3.1	10
Stone, glass	0.257	12	4.8	1.5
Metals:				
Primary	0.387	1	3.8	4
Fabricated	0.329	4	3.5	6.5
Machinery:				
Electrical	0.312	6	2.7	11.5
Other	0.315	5	3.4	8.5
Transportation Equip.	0.333	3	4.8	1.5
Instruments, other	0.265	11	2.4	13

Notes: Overtime hours are from US Department of Labor, Bureau of Labor Statistics, Employment and Earnings 33 (March 1986). Overtime hours for several of the industry groupings reported in the Chamber of Commerce data needed to be constructed as a weighted average of two or more industries reported in Employment and Earnings. (Food, tobacco is an average of Food and kindred products and tobacco manufactures; Textiles, apparel is an average of Textile products and Apparel and other textile products; Wood products is an average of Lumber and wood products, Furniture and fixtures, and Paper and allied products; Rubber and plastics is an average of rubber and miscellaneous plastics products and Leather and leather products; and Instruments, other is an average of Instruments and related products and Miscellaneous manufacturing.) The Spearman rank correlation coefficient between the fixed/variable cost ratio and average overtime hours is 0.59.

6.2 NWLCs and Firm Size

There is a considerable amount of international evidence that wage costs rise with firm size. Evidence in the cases of FRG and UK is given in Figures 6.6 and 6.7, respectively, which show annual wage and non-wage costs in 1984 broken down by six categories of firm size.

A number of explanations have been put forward for the (direct) wage phenomenon. These include:

(1) Workers in large firms have to be compensated for their more specialised skills so as to induce low rates of turnover (see e.g. Oi (1983)). Nevertheless, if only large firms employ such specialised workers, market conditions may be such as to ensure low turnover without the requirement for large wage differentials.

(2) Large firms are arranged on a hierarchical basis due to the need for supervision of workers. To induce workers to move up the hierarchy, higher wages must be paid (see e.g. Calvo and Wellisz (1978)).

(30 Large firms are likely to enjoy more market power. Workers, realising this, will seek to apportion a share of the monopoly profits for themselves.

(4) More productive firms will tend to have larger workforces. They must attract more workers per period than smaller firms in order to maintain equilibrium. In order to do so they will tend to have to offer higher wages (see e.g. Strand (1987)).

These explanations are concerned exclusively with the relationship between wage costs and firm size. They do not consider how nonwage costs and firm size might be related. The positive relationship between total labour costs and firm size in the FRG and the UK is shown in Figures 6.6 and 6.7, respectively. In the UK, for example, workers in manufacturing firms employing more than 1000 workers cost their employers on average 36 per

Figure 6.6: F R G: Annual Labour Costs 1984 by Size of Firm

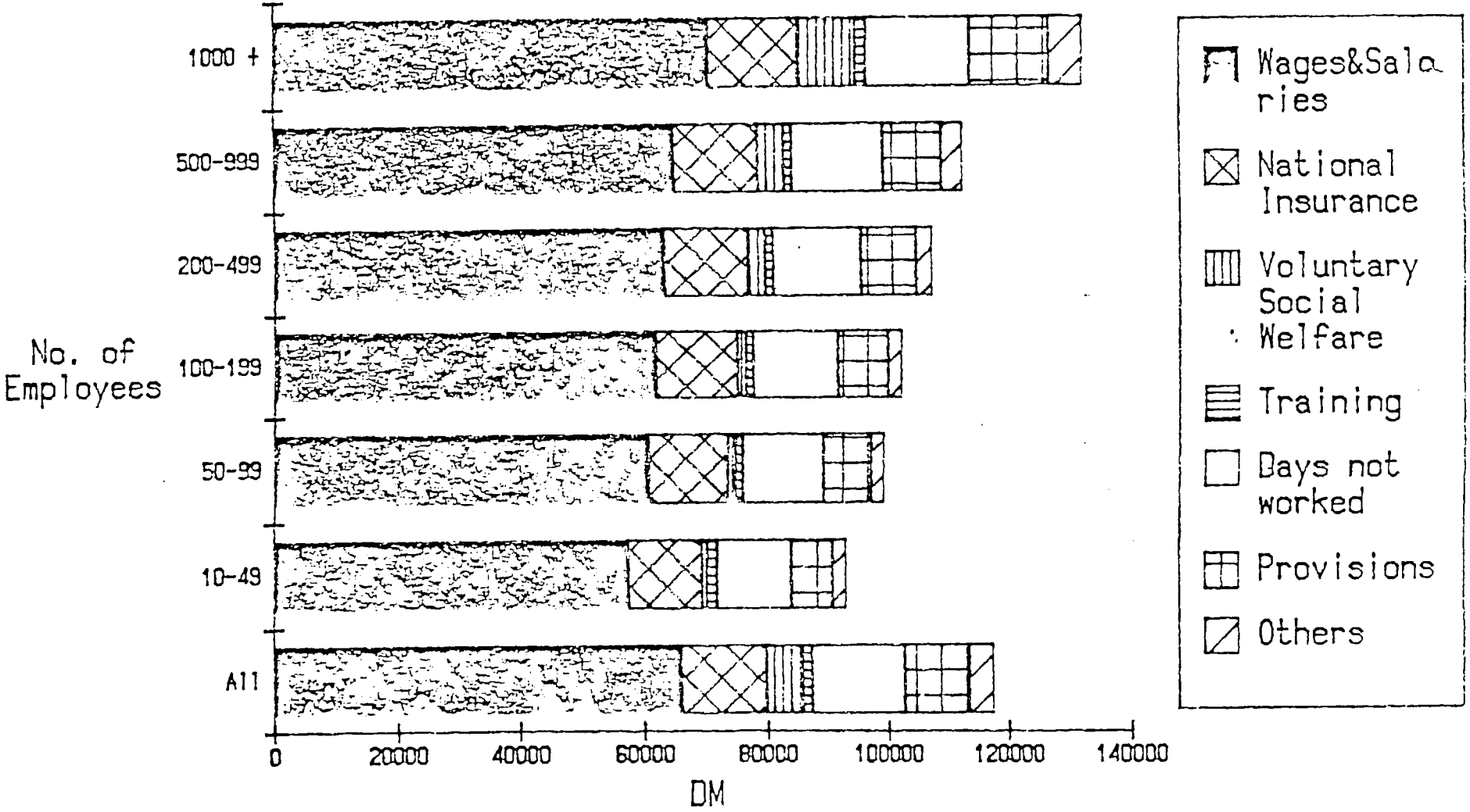
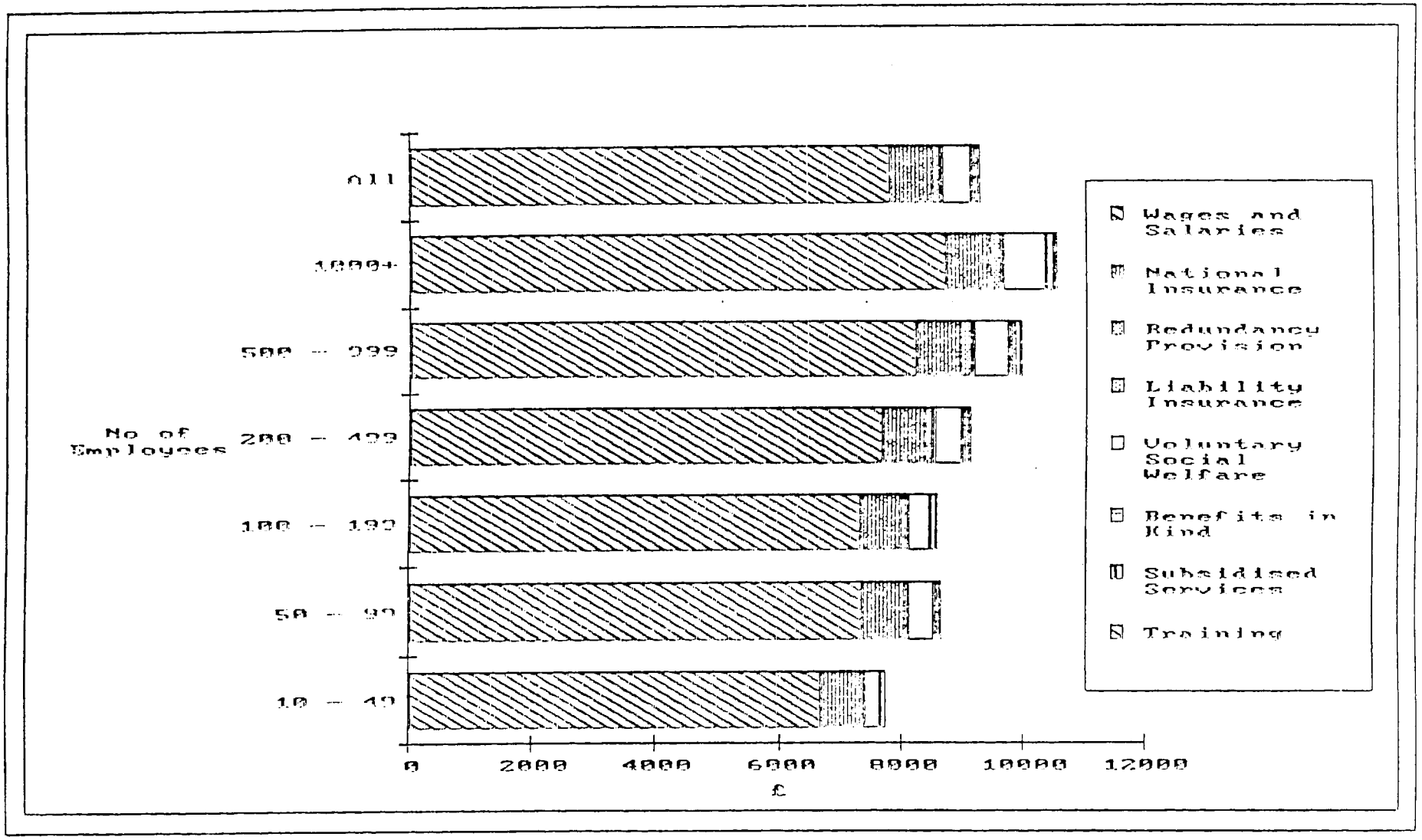


Figure 6.7: UK: Annual Labour Costs 1984 by Size of Firm



cent more than those in firms employing between 10 and 49 workers. Similar differences between size categories are also apparent within industries.

Not only do wage costs increase with firm size, so do NWLCs. This is evident from Figure 6.8 for FRG and Figure 6.9 for UK (see also Hart, 1984, for further FRG, Japanese and UK evidence) which gives the absolute amount spent by firms of different sizes on different categories of NWLC. Obviously National Insurance charges will be closely related to earnings and one would expect these therefore to increase with firm size, given the above wage information, but the relationship of other NWLCs to wage costs is not so predictable a priori. Nevertheless, the association does appear to be positive with larger firms spending more on voluntary social welfare, subsidised services, etc. Simple regression analysis of the 1984 results by size of firm confirms the existence of a positive association between annual wage costs and the endogenous component of non-wage costs (comprising the sum of all components of NWLCs which are not determined by government). Further analysis of the residuals indicates significant firm size and industry effects on endogenous NWLCs above those which can be explained by earnings alone.

What special features of NWLCs in their own right provide a positive association with firm size? The following would appear to be among the most likely explanations:

(A) Insurance and other fringe benefits bought through the firm may be cheaper than equivalent purchases on the open market due to the availability of group discounts. This sort of advantage would appear to be positively related to firm size since, as pointed out by Freeman (1981), large firms not only can spread the fixed costs of implementing and running deferred compensation schemes but also can expect to pay lower per worker fees for management of the various funds.

Figure 6.8: FRG: Non-Wage Labour Costs 1984 by Size of Firm

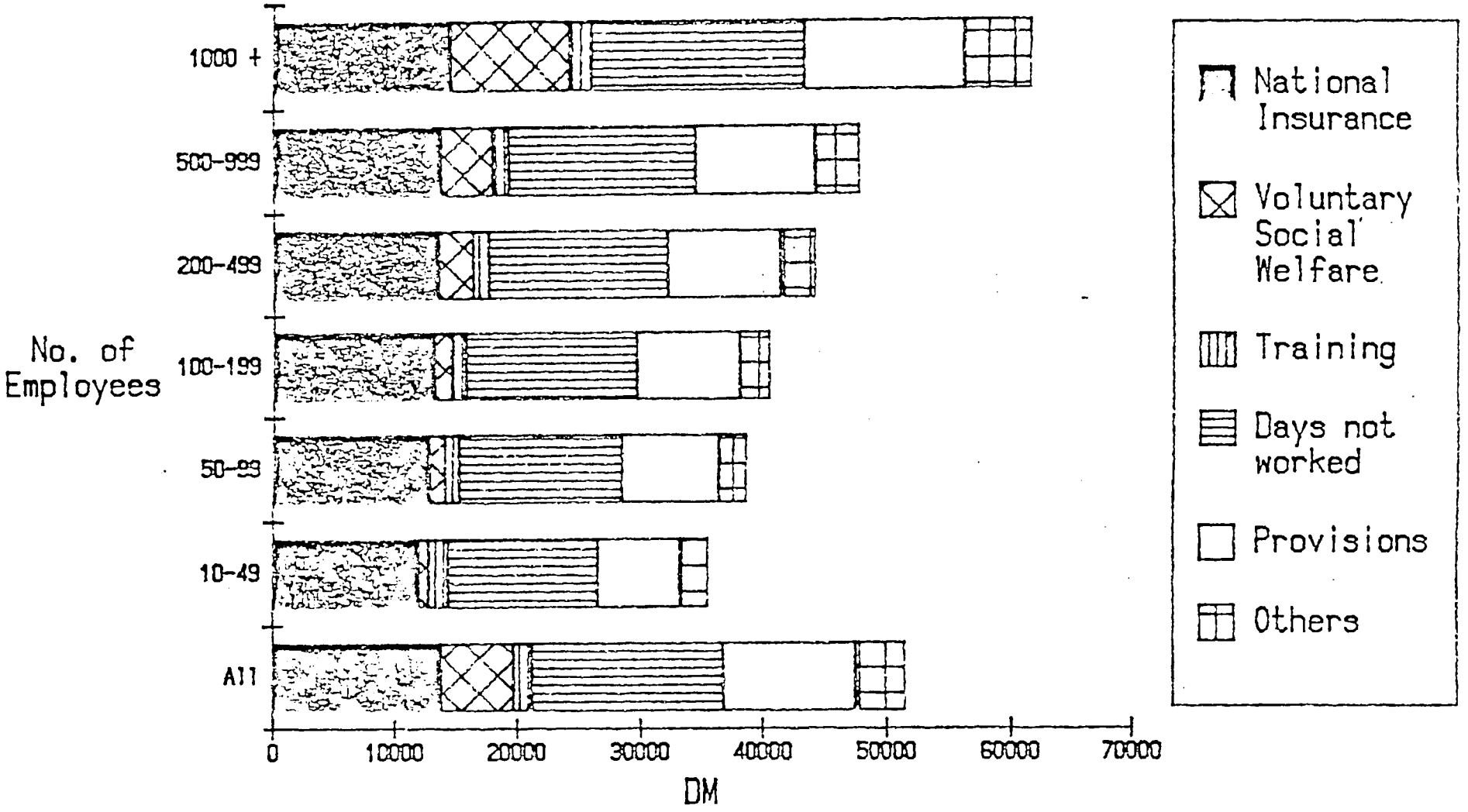
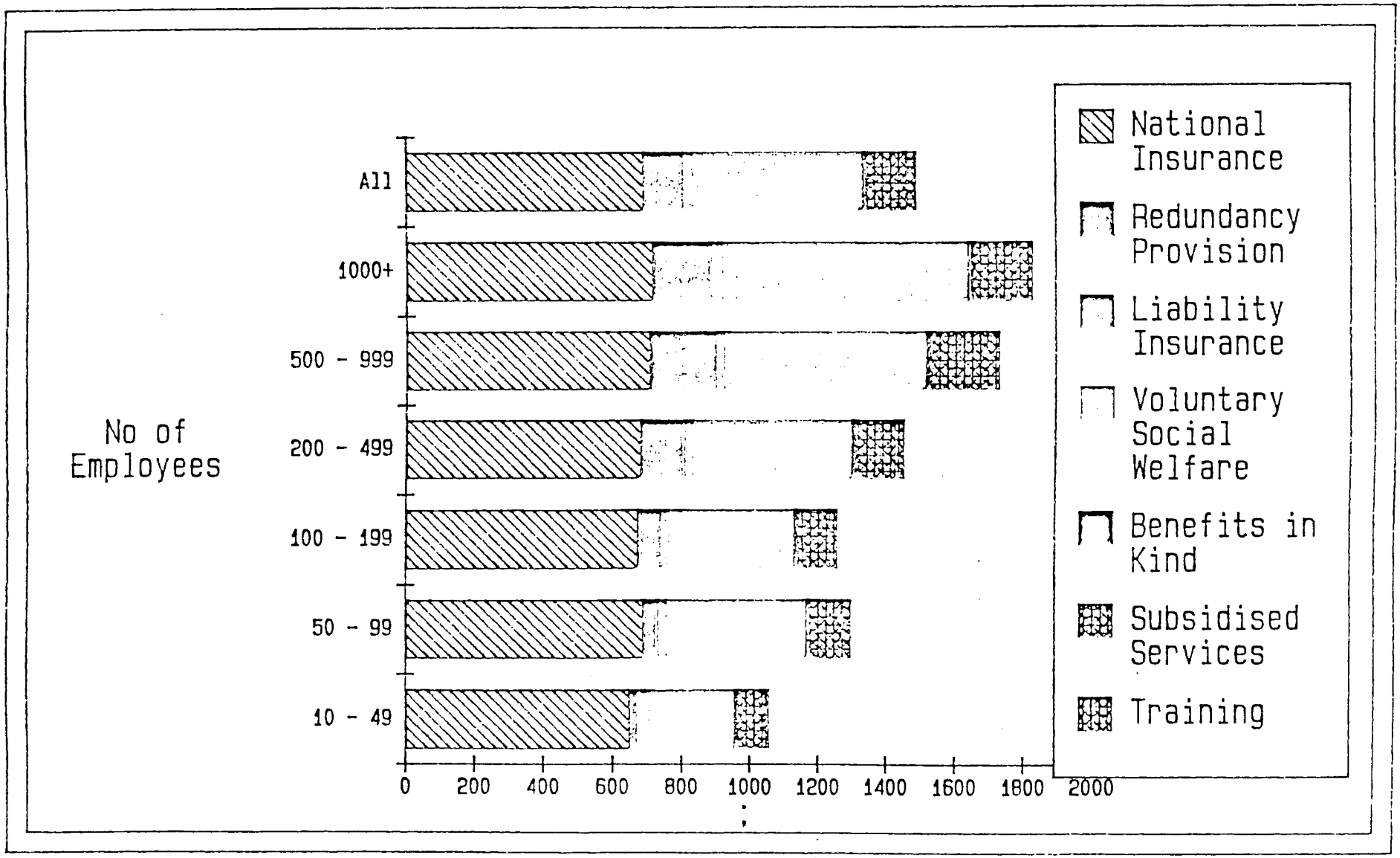


Figure 6.9: UK: Non-Wage Costs 1984 by Size of Firm



(B) Workers in large firms have relatively long average tenure due, for example, to greater opportunities for internal mobility. For their parts, such firms should be particularly aware of the benefits of providing deferred compensation packages in order to encourage firm attachment.

(C) Longer tenure and greater opportunities for acquiring specific human capital in larger firms may encourage the firm to compensate labour in line with the 'agency' principle (Lazear, 1981). Firms may offer the possibilities of wage supplements at later stages of working life - through pension, health and other fringe benefits - as an incentive for younger workers to avoid shirking and to attempt to climb the promotion ladder as quickly as possible. By paying workers more than their marginal products in later years and less than their marginal products in the early years, firms inbuild a mechanism that encourages efficient working practices and avoids monitoring costs. The scale and complexity of large firms may render the latter type of cost to be particularly high.

(D) Large firms are more likely to employ groups of highly interdependent workers whose quit costs to the firm may be particularly severe. There may be great incentives, therefore, to minimise turnover costs by providing wage and fringe compensation considerably above the going market rate.

Chapter 7 Conclusions

Non-wage labour costs comprise between 30 and 40 per cent of total labour costs in the average firm within the OECD bloc of countries. Fixed NWLCs account for up to 20 per cent of total labour costs in most countries and a considerably higher percentage in Japan. Moreover, both total and fixed NWLCs have grown systematically in relative importance over several decades and, in many countries, are likely to continue to expand their total labour cost shares. Yet, despite these impressive magnitudes and trends, research work and policy analysis has focussed attention, until very recently, almost exclusively on the rôle of direct wages. This deficiency is compounded when it is considered that there now exists a strong body of theoretical literature that has established a set of distinctive labour market effects of various types of non-wages.

After somewhat gradual progress from the mid 1960s to the early 1980s, labour market economists have started to pay considerably more empirical and policy attention both to NWLCs as an aggregate phenomenon as well as to the main component parts of non-wages. The roots of the modern work were established during the 1960s in the analyses of Oi, Becker, Rosen and others. These studies concentrated on human capital aspects of NWLCs - like training and hiring costs - and established the fundamental importance of distinguishing between fixed and variable elements of non-wages. Early attention was concentrated, in particular, on the implications of the existence of fixed and variable costs for cyclical movements in employment. It was also established in some of these early studies that the existence of fixed labour costs necessitated the explicit division of the labour input into stock and utilisation dimensions. In essence, the later work has built on these foundations and cast fresh light on important labour market

problems which feature other types of non-wages, together with their fixed and variable dimensions. One objective of the present report has been to provide a comprehensive coverage of the key issues of current concern.

Perhaps the single most important topic of current interest is that featured in section 4.2, namely the relative flexibility of working hours and nominal wages in Japan compared to most other OECD countries. Some economists hold the view that explaining such flexibility is an essential step towards understanding Japan's persistently low rates of unemployment; in essence, hours and wages are seen as providing a buffer to fluctuations in aggregate demand leaving the employment stock relatively immune from the effects of 'surprise' economic events. By contrast, the USA and European countries appear to rely far more heavily on employment quantity adjustments to changing economic conditions.

Hitherto, it has proved to be particularly difficult to obtain convincing explanations of these distinctly different reactions to economic fluctuations. Very recent work, however, has provided some vital clues. The work has been concerned primarily with comparative international levels of fixed NWLCs. On first reflection, the argument that Japan's distinct position is due to it having far higher per capita fixed non-wages than elsewhere is not convincing. It might well be expected that fixed costs associated with hiring, training, machine set-up, fringe benefits and so on are likely to occur, more or less, with equal incidence in Japan and any other large industrial capitalist country. Estimates of these categories of fixity for Japan, FRG, UK and USA in chapters 2 and 6 of this report certainly do not indicate any truly exceptional Japanese traits. What makes the fixity explanation far more convincing is the possibility that bonus payments in Japan largely reflect returns to workers' human capital investments. In terms of magnitude, there is nothing in Europe or the USA that matches the

Japanese bonus system. If it is the case that - at least in large part - the bonus represents the workers' share of the quasi-rents arising from human capital investments then an explanation for stronger worker-employer attachments in Japan compared to workers elsewhere is more firmly established. Further, given greater job specificity, there are sound reasons why Japanese workers would be relatively willing to accept work sharing - in the sense of reduced average hours - and wage reductions in the face of downturns in economic activity.

It should be stressed, however, that there is no general agreement over the main economic rationale for bonus payments in Japan. Certainly, both theoretical and empirical support for the proposition that Japanese labour specificity is significantly higher than its main competitors is by no means conclusive. The above comments merely point to the fact that this is a potentially very rewarding avenue to explore in considerably more depth. For example, if wage compensation structures could be introduced on the European scene that helped to induce more flexibility with respect to both intensive market activity and nominal wages then a set of significant strategies for dealing with the problems of unemployment might be established. One approach already advocated along these lines - primarily linked to the work of the economist Martin Weitzman - has been to suggest the introduction of more profit sharing schemes in Europe. In this work, Japanese bonuses are viewed essentially as profit shares. It might be mentioned in this respect - following the discussion in section 3.4 - that the analysis of these issues incorporating the separation of workers and hours and accommodating NWLCs does not produce unambiguous policy conclusions. It points, for example, to a positive relationship between profit sharing and labour utilisation (e.g. longer hours) in the profit-sharing firm and may give some pointer to the fact that the Japanese working hours are more flexible than in many other countries.

In sharp contrast to Japan, the internal labour market in Europe has been marked by strict rigidities rather than inbuilt flexibility. This has been no more apparent than in the European debate - particularly in FRG - on the length of working hours. European unions have envisaged work sharing in the face of high unemployment levels in the form of systematic once-for-all reductions in weekly or annual hours of work. Again, NWLCs have featured prominently in the analysis of related labour market issues. Fixed non-wages constitute a 'premium' for hiring new workers equivalent to the overtime and shift premiums incurred by employers who wish to extend working hours. Reductions in standard, or normal, hours can have the effect of increasing marginal employment cost on the extensive relative to the intensive margin thereby inducing less, not more, employment. Rather, firms may seek to extend overtime working or introduce more shiftworking or employ more part-time workers as a means of offsetting these relative cost effects. Chapter 3 presents a wide range of theoretical and empirical evidence that tends in large part to underline the high risks of adopting strategies of systematic working time reductions in order to alleviate high and persistent levels of unemployment. Interestingly, as discussed in section 3.3, parallel economic arguments exist over policies designed to reduce the mandatory age of retirement in order to create new jobs in the younger age cohorts. Younger workers may attempt to adjust to shorter expected working lifetimes - or more stringent social security penalties for remaining at work beyond a given age - by increasing average hours in order to provide themselves with offsetting earnings improvements.

Another distinguishing feature of the European approach to recent labour market problems has been the extension of legislation covering job security. Again, this introduces a form of market rigidity and involves fixed NWLCs. In section 4.3, we attempt to summarise the main benefits and

costs of job security and, while not coming down firmly on one side or the other, it is clear that the introduction of each new item of legislation involves the risk, in a longer term context, of potentially threatening some of the jobs it seeks to protect. It is quite clear that given security proposals should be examined in their own right and that generalised policy prescription should be avoided.

In all European countries, statutory social welfare contributions constitute the largest individual component of NWLCs in the typical firm. The contributions take the form of taxes on that section of the firm's payroll that lies between legislatively proscribed lower- and upper-wage ceilings. Tax rates have tended to grow systematically through time and, especially in recent times, upper-ceiling limits have grown faster than average wages in several countries. In part, such growth rates have occurred in order to meet the growing demand for resources for state pensions, health provision and unemployment benefits. At the same time, European industrial and regional policies have tended to provide increasing capital subsidies for such purposes as assisting ailing industries and encouraging industrial mobility to poorer geographical areas. An influential view has been that statutory social welfare contributions are a 'tax on jobs' and thus detrimental to employment prospects and, moreover, that the position is aggravated by capital-labour substitution induced by the relatively favourable capital subsidies. These issues are examined closely in section 3.2 through a discussion of recent reductions in UK statutory contributions, partly as a result of the above types of argument, as well as through recent empirical work into the employment effects of changed in FRG payroll taxes and ceiling limits. More macro-based empirical work is also reported on in section 4.4. As with the discussion on job security, the view is taken that while certain obvious employment scale advantages may result from payroll tax reductions there

are offsetting problems that, at least, point to the need for great caution in this policy domain. For example, since payroll taxes comprise overwhelmingly variable NWLCs to the average firm, given the existence of relatively high upper-wage ceilings, tax reductions would serve to induce firms to substitute more labour utilisation - perhaps through longer average hours - for fewer workers. This results from the fact that fixed non-wages rise relative to variable labour costs. Indeed, the FRG evidence reported on in section 3.2.2 suggests that this negative substitution effect may be large enough to overwhelm the positive scale effect. On the other hand, while other types of complication arise in a more macro context, the reported findings in section 4.4 suggest that job creation by this sort of approach may, at least in the context of the UK economy, be more cost effective than the policy alternatives of reductions in income or value added taxes.

In many countries, average non-statutory wage supplements in the form of fringe benefits are roughly comparable to statutory social welfare payments as percentages of total labour costs. Chapter 5 contains a thorough review of the most recent USA research into the causes of the pattern of growth of the two most important voluntary supplements, private pension and health insurance. Perhaps the most important economic issues related to these types of NWLC concern the economic implications of the growth rates for tax revenues and for the equity of the tax system. Potential problems arise because fringe benefits are often exempted from certain types of corporate and individual taxes or incur relatively low marginal tax rates. The pros and cons of attempting to tax non-wages on a similar basis to direct wages are discussed in Chapter 5. The chapter also deals with pension regulation as well as aspects of statutory programmes and their costs.

In large part, private fringes and statutory social welfare payments cover broadly similar domains. Both forms of non-wage are dominated by health and pension provision. While the discussion in chapter 5 embraces the two categories of wage supplement, it stops short of an in depth evaluation of how the systems may be rationalised so as to allocate total resources - from private and state sectors - more efficiently (see Hart, 1985, for a general policy discussion). It is in this context that, ultimately, the current research activity into the economic causes and implications of each main type of private and statutory wage supplement may prove to be particularly rewarding.

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Final report

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