Working time in Great Britain and Australia: an economic analysis

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WORKING TIME IN GREAT BRITAIN
AND AUSTRALIA: AN ECONOMIC ANALYSIS

by

Peter John Dawkins

A Doctoral Thesis

Submitted in partial fulfilment of the requirements
for the award of
Ph.D. of the Loughborough University of Technology
1986

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My thanks are also due to Angela Fletcher and the secretarial staff of NILS, for the typing of the thesis, and to NILS for funding the typing.
STATEMENT INDICATING THE AUTHOR'S RESPONSIBILITY FOR THE WORK SUBMITTED.

This thesis draws upon the output of various research projects, between 1977 and 1986, for which I have been solely or jointly responsible. These projects have been concerned with various aspects of the economics of working time in Great Britain or Australia. Chapters 1 and 14 have been entirely written specifically for the purposes of this thesis. All other chapters draw upon material which I have previously published in books, journals, research reports and working papers etc. Chapters 2 to 13, therefore, represent edited and usually condensed versions of some of my previous publications, incorporating some new material. Several of these chapters draw from more than one such previous publication. Some of the publications concerned have been co-authored with various other researchers in Great Britain and Australia. Some of them have been my sole responsibility.

The publications include nine journal articles, one article which is currently being considered for publication by a journal, five chapters drawn from three different books, nine chapters drawn from two different research reports and one working paper.

My publications which have been drawn upon are listed below in relation to chapters 2 to 13 of the thesis, to indicate the full extent of co-operative effort. In all cases of co-authorship, each author made, approximately, an equal contribution to the work. This is documented in statements from my co-authors presented to the examiners.

Chapter | Previous publications by the author from which material has been drawn
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8 (i) Dawkins, P.J. (1985b), Penalty Rates and the Organisation of Working Time in Australia (Chapters 3, 4 and 7) Research Report to the Business Council of Australia, National Institute of Labour Studies, Flinders University of South Australia.


11 (i) Dawkins, P.J. (1983), "Work-sharing: Panacea or Palliative?", Economics 19 (84) 131-146.


ABSTRACT

The subject of this thesis is the economics of working time in Great Britain and Australia, with special reference to the length and timing of working hours.

First, the incidence of and trends in work patterns, in Great Britain and Australia, are examined. The incidence of and trends in, normal hours, actual hours, overtime and part-time work in Britain and Australia, show a great deal of similarity. It is more difficult to compare "non-standard working hours" (hours outside of the normal spread of hours, e.g. shiftwork) because of problems with the data. It is clear, however, that non-standard hours of work are important in both countries.

Secondly, using survey and case-study evidence, economic and econometric models, the causes of and influences on work-patterns are analysed. Part-time work, hours worked by full-time employees, shiftwork and other forms of "non-standard" hours are considered. Economic analysis, using a supply and demand framework, is found to provide powerful explanations of patterns of working time. Institutional and social forces, nonetheless, are influential.

Various policy issues are discussed. "Work-sharing", by attempting to reduce normal hours or restrict overtime, is found to be an unlikely remedy for unemployment. Under certain conditions, however, the principle of work-sharing, has some practical potential. Influencing the structure of labour costs, to increase the incentive to employ extra persons rather than extra hours per person, could help. In this respect, shiftwork may have a role.

Various forms of regulation of working hours arrangements are considered and found to be lacking a strong rationale. The case is argued for allowing employers and employees greater flexibility to develop mutually advantageous packages of working time.
PART ONE: INTRODUCTION
Introduction

The subject of this thesis is the economics of working time in Great Britain and Australia. It is particularly concerned with the analysis of the length and timing of working hours. The supply of and demand for labour, operating under various working hours arrangements, are considered, as are various policy issues that are associated with these arrangements. Shiftwork, nightwork, weekend work, overtime, work-sharing, part-time and casual employment are all considered. The analysis is mostly microeconomic, although some macroeconomic issues are included.

In this chapter, the background and policy focus of the research undertaken in Britain and Australia are outlined first. Secondly, the methodology used in the research is discussed. Finally, the structure of the thesis is outlined and its content introduced.

Background and Policy Focus

As noted above, the length and timing of working hours are the central focus of this thesis. While the analysis of the length of working hours has traditionally received a significant amount of attention in the literature, the timing of working hours has received much less attention. The observation that a substantial amount of work takes place outside of "standard working hours", but that such working received so little attention in labour economics, was the initial motivation behind the research. Having embarked upon research into the economics of shiftwork, (a major source of such "non-standard" hours), it soon became clear that there were a number of important policy issues associated with working hours arrangements. It also became clear that a deep understanding of the timing of working hours required an analysis of the inter-relationships between the length and
timing of hours of work. What followed was a programme of research, firstly in Great Britain and later in Australia, concerned with the length and timing of working hours, incorporating a strong interest in their policy implications. Indeed most of the research reported here was carried out as part of a series of projects funded by various bodies with a special interest in policy issues.

The high levels of unemployment experienced in Britain led to questions being asked about whether the organisation of working time could be "better arranged" to secure higher levels of employment. For example, could more shiftworking be a way of providing the complement of capital for extra workers in an economy not investing at a sufficiently rapid rate to accommodate them on normal day work? Indeed Hughes (1977) submitted a plan to the Department of Employment and NEDO embodying this as a policy proposal. Also, could shorter working hours (less overtime and/or shorter normal hours) enable the work to be shared around and more jobs to be created? In conflict with the idea of encouraging shiftwork for employment reasons, was a concern about the effects of shiftwork on health, family and social life. This concern had become most prevalent in continental Europe, but membership of the European Communities was increasingly causing it to become a policy issue in Britain. In France there had been law reform to restrict the growth of shiftworking and the European Commission (1977) formulated proposals for protective legislation to counter the problems associated with shiftworking.

Another policy issue that was topical in Britain at the time of the research on shiftwork reported in this thesis, concerned the protective legislation for women. Under the Factories Act the employment of women on shifts had to receive special authorisation and the employment of women on night shifts had to be authorised by the Secretary of State for Employment. The different treatment of men and women under the law was a matter of concern to the Equal Opportunities Commission which was formulating recommendations to rectify the anomaly. The prohibition of
long hours of work for women covered by the Factories Act was another issue under consideration. The Equal Opportunities Commission put forward its recommendations in 1979. Furthermore, the Equal Opportunities Commission have taken a general interest in the work patterns of female employees. An issue of special interest for them has been the causes and consequences of part-time work, a form of work dominated by women.

On arrival in Australia, the author again found a high level of interest in the organisation of working time with a strong policy focus. However, while certain analogies could be drawn between the issues at the stake, the dominant policy issue in connection with non-standard hours was of a somewhat different kind. That is because it had arisen out of an ongoing debate about the effects of regulation on labour market flexibility. The Australian labour market is highly regulated with the Australian Conciliation and Arbitration Commission taking on special significance in the setting of wages and employment conditions. In common with developments in Great Britain there was a strong momentum for deregulation taking place in the Australian political economy. The floating of the Australian dollar, deregulation of the financial system and the gradual reduction of protection for Australian industry, were prominent examples of this. In this deregulatory environment there was a growing argument for deregulation of the labour market, for more flexibility to be built into the system, if not for the total dismantling of the arbitration system. A prominent issue in this debate was the regulation of non-standard hours of work with special reference to the "penalty rates" paid for such non-standard hours. Some politicians, commentators and business groups, were calling for more flexibility in the regulation of non-standard hours, including the reduction if not the elimination of penalty rates, especially in some parts of the service sector. Despite the thrust of deregulation in the economy, the incumbent Labour Government was, if anything, strengthening the hold of labour market regulation in the form of the "Prices and Incomes Accord" which formed the basis of the incomes policy which operated through the
Within this Accord with the Australian Council of Trade Unions (ACTU), the unions claimed that there was an implicit understanding that the system of penalty rates would not be changed. Against this, the Confederation of Australian Industry (CAI) argued, in the National Wage Case of April 1985, that the penalty rates component of wages should not be subject to the indexation to the consumer price index, which applied to wages generally. It was against this background that the research on penalty rates and the organisation of working time, reported here, took place. At the same time, incidentally, a Government enquiry (the Hancock Committee of Enquiry) was taking place, into Australian Industrial Relations Law and Systems, which was intensifying the debate about the costs and benefits of deregulation.

The existence of an historically high level of unemployment (though substantially lower than in Great Britain) had led to some interest, in Australia, in the possibility of reduced working time per employee as a way of creating more jobs. The call for such work-sharing was less pronounced than in Britain, but a recent general move towards a 38 hour week in Australia had been argued for by the trade unions, at least in part, on the basis of the possible employment creation. However, in common with Britain, the historically high level of unemployment coexisted with substantial amounts of overtime working, considered by many to be something of a paradox. In a paper about the Australian economy, Gregory and Smith (1983), introduced the link between overtime and wage inflation into the debate, suggesting that overtime may be a more sensitive indicator of the heat of the labour market, and that wage inflation could be better explained by overtime hours than by unemployment. This leads to important questions about the apparent divorce between the state of the external labour market as reflected in unemployment rates, and the pressure of demand for labour as reflected by hours of work in firms. This is of obvious importance for governments concerned with reducing unemployment. This inspired the work on "working hours, overtime and wage inflation" reported in this thesis.
Research Methodology

The framework of analysis for the research reported in this thesis is mostly in the neo-classical tradition, which still dominates especially microeconomics. The influence of the institutional environment on economic behaviour, however, is an important theme of the research. The methodology adopted is typical of a great deal of applied economic and social research. It is appropriate to mention that the author’s view of methodology has been influenced by the writings of McCloskey (1983) and Blandy (1985). Those writings accord with the author’s previous suspicions, about the methodological underpinnings of economics, based upon his research experience and a limited exposure to the literature on methodology, such as Blaug (1980). McCloskey and Blandy point out that while "positivist falsificationism" is often held to be the only proper scientific methodology of the social sciences, actual practice is now widely agreed to be rhetorical. Blaug deplores this, but McCloskey and Blandy applaud it. Having accepted the rhetorical nature of the social sciences, it is then the task of the researcher to draw upon various sources of ideas, data etc, using inductive and deductive reasoning, referring to the real world in case-study and survey research, using statistical and econometric techniques where appropriate, developing and amending theories, drawing upon guesses, intuition and beliefs, and upon the publications of other respected authors and journals, in such a way as to present a plausible story about the way the world behaves with reference to the issue at stake. Where the data is weak this should not necessarily deflect the researcher’s efforts. Make the best of what is available. Search around for the most useful leads. Consistent with this school of thought is the author’s enthusiasm for researching topics of interest and policy relevance, in which a small advance in knowledge could be of general concern, rather than pursuing esoteric research of a theoretical or empirical kind because of its theoretical elegance or the sophistication of the econometric analysis.
The Structure and Content of the Thesis

The main body of the thesis is in three parts. Part Two reports the findings of survey and case-study work. Part Three describes various pieces of theoretical and empirical research based upon economic and econometric models of various aspects of the economics of working time. Part Four focuses on a number of policy issues which were mentioned earlier in this introduction. The final part presents some conclusions. Each part of the thesis embodies material related to both Great Britain and Australia. Here the contents of Parts Two, Three and Four are briefly introduced.

Chapter 2 presents useful background data on the incidence of and trends in various working hours arrangements in Great Britain and Australia, with special reference to the length and timing of working hours. Chapter 3 focuses on shiftwork, a major source of non-standard hours of work in Great Britain and Australia, presenting case-study and survey material on the causes of and influences on the nature and extent of shiftwork in Britain and Australia. Chapter 4 presents research arising from the Equal Opportunities Commission's interest in the causes and consequence of part-time work in Great Britain. Chapter 5 focuses on the extent of non-standard hours of work in Australia and the associated penalty rate payments.

Chapter 6 develops a framework of analysis of the premia/penalties paid for working hours due to the length and/or timing of working hours, paying special attention to the argument that these payments represent a compensation for inconvenience to those supplying their labour. This framework is used to evaluate the shift and overtime premia paid in two British collective agreements. Chapter 7 turns to the labour demand side with special reference to the economics of shiftwork in manufacturing industry. A theoretical framework is developed linking the theory of capital utilisation with the choice of work patterns. This theoretical framework is then used for an empirical investigation of shiftwork in Great Britain including the
development and testing of an econometric model. Chapter 8 draws upon the material of the two previous chapters, to consider the economics of non-standard hours in Australia. In addition to shiftwork caused by the incentive to utilise capital intensively, the provision of non-storable products or services outside of normal hours is considered. A simple supply and demand framework is developed to consider the possible effects of penalty rates on Australian labour markets. It is considered that to examine the general equilibrium effects of penalty rates on the Australian economy, incorporating the foregoing theories of non-standard hours, would be of such complexity, that it was, as yet, an impossible task. In the meantime, a first step, in the consideration of the possible order of magnitude of the employment effects of "deregulating" non-standard hours, or reducing penalty rates, could be attempted by examining the influence of wage costs on employment in the various industry groups. This includes a simulation exercise on the Orani general equilibrium model incorporating input-output effects. Chapter 9 turns to the length of working hours estimating a supply and demand model, (using data for Great Britain), based on the previous work of Metcalf Nickell and Richardson (1976) but incorporating new features, including the consideration of the effect of normal hours on total hours, and the presence of shiftworking. Chapter 10 continues to consider the length of working hours, but turns to the macroeconomic issue of their link with wage inflation. This research was first undertaken in Australia as part of an ongoing Australian debate. However it was considered that a similar analysis of British data would be of interest for its own sake, as well as from a comparative point of view. Results using British data, therefore, are also presented.

Chapter 11 examines the case for attempts to "share the work around" by such methods as reducing working hours. Chapter 12 considers the issue of protective legislation in connection with shiftwork and long hours of work. Chapter 13 draws upon the evidence in Chapters 3, 5 and 8, to consider the case for changing the system of penalty rates in Australia.
[Material has been redacted from this thesis for reasons relating to the law of copyright. For more information please contact the author.]
PART FIVE: SUMMARY AND CONCLUSIONS
CHAPTER 14: SUMMARY AND CONCLUSIONS

Introduction

Having examined some survey and case-study evidence, some economic and econometric models, and some policy issues, this chapter presents a brief summary of some of the major findings and draws out some conclusions.

The Length and Timing of Working Hours in Great Britain and Australia - An Overview

Length of Working Period

Evidence going back to the mid-nineteenth century shows that there has been a secular decline in normal (prescribed) weekly hours of work of full-time employees, in both Great Britain and Australia. In the mid-nineteenth century normal hours were about 60 per week. Now, normal hours are about 38 hours per week. These reductions in normal hours have been concentrated into a small number of "waves". In Great Britain there were important reductions in the 1870s; 1919-20; 1946-49; 1960-62; and 1964-66. In Australia there were important reductions in the 1870s; the 1920s; and in 1947-48. In both Britain and Australia there have been further reductions in the early 1980s due to the introduction of the 38 hour week. Comparison of normal hours in the post-war period, shows that Britain and Australia both experienced important reductions in the 1940s but that from 1946 until about 1965, Australia had significantly lower normal hours. Since that time normal weekly hours for the two countries have converged. It should be added that in addition to the secular decline in normal weekly hours, both countries have also experienced a secular increase in annual holiday entitlements, which has reinforced the tendency for "annual normal hours" to decline.
Actual hours have also shown a secular decline but have been substantially higher than normal hours in both countries, due mainly to the overtime working of males. Full-time females (those normally working more than 30 hours in Britain and 35 or more in Australia) tend, on average, to work rather less than normal prescribed hours. Overtime hours are concentrated into a certain proportion of the workforce; about 30 per cent of operatives in manufacturing in Great Britain; about 18 per cent of all employees and 30 per cent of employees in manufacturing, in Australia. The operatives working overtime in Britain, work on average about 8 hours of overtime. In Australia all employees working overtime average about 7 hours of overtime, while those in manufacturing average about 8 hours.

In both countries females dominate part-time employment. Both countries have experienced a substantial growth of part-time employment in the last twenty years, due both to the growth of female employment and the increased incidence of part-time employment amongst females and males. Estimates of the incidence of part-time female employment in Britain, vary, but it would appear that the percentage of females working part-time has grown from about 35 per cent in the late 1960s and early 1970s, to about 40 per cent now. In Australia, the Labour Force Survey indicates that part-time employment amongst females grew from about 22 per cent in 1966 to about 37 per cent in 1985. As a proportion of total employment, female part-time employees grew in importance from about 6 per cent in 1966 to about 14 per cent in 1985. The figures, referred to above, imply a very similar trend for Great Britain. We should remember, in qualification, that the definition of part-time work in Britain is narrower, excluding those who normally work 30 to 35 hours per week.

It can be seen that while some differences can be detected, the incidence of and trends in, normal hours, actual hours, overtime and part-time work in Britain and Australia, show a great deal of similarity.
Timing of Working Hours - Shiftwork and other Non-Standard Working Hours

A central focus of this thesis has been the nature, extent, causes and policy implications of "non-standard" hours of work, i.e. hours outside of the normal spread of hours.

Shiftwork, defined as a situation in which one worker replaces another in the same job within a 24 hour period, is an important source of non-standard hours of work. Evidence from surveys in Great Britain in 1954, 1964 and 1978, suggests a secular increase in shiftwork. Shiftworkers as a percentage of all manual workers rose from 12.5 per cent, to 20.0 per cent to 34.5 per cent, causing an increase in the number of shiftwork hours outside of standard hours of work. Changes in the distribution of shift system types, however, caused a reduction in the proportion of shiftwork hours outside of standard hours. This was largely due to the increased importance of "double-day" shifts. Evidence from the New Earnings Survey, however, suggests that this long-run increase is shiftworking may have been arrested, perhaps only temporarily, possibly by the depressed state of the British economy, since the late 1970s.

There is much less evidence in Australia about shiftworkers. The main source of evidence comes from a survey in 1981 in which 8.3 per cent of all employees were found to be "rotating shiftworkers", of which about half worked nights. In addition to these, there are those on fixed shifts. We can only speculate about the number of these. It would seem unlikely, however, that this number would be trebled when including those on "fixed shifts", which would be necessary for us to find as much shiftwork as in Britain. In the 1981 survey, there were a similar number of nightworkers found to be working rotating shifts and other nightworkers, each representing about 4 per cent of employees. It is uncertain how many employees work on Australia's equivalent of the double day shift in Britain. One interesting difference, however, emerges. Whereas double day shifts in Britain typically operate from 6 am to 2 pm and 2 pm to 10 pm, in
Australia shift systems are designed around the concept of the standard working day of approximately 8 am to 4 pm. A double shift would result in, approximately, a 4 pm to 12 midnight shift. A three shift system would involve an extra shift from, approximately, 12 midnight to 8 am. This, it seems, is because the concept of standard working hours is ingrained in the Australian award system. Another interesting point is that "twilight shifts" are often found in Great Britain, involving an evening part-time shift usually with all female employees, working from about 6 pm to 10 pm, often without a shift premium. No evidence of such shifts has been found in Australia. This is probably because there is no allowance for such shifts in Australian awards, again reflecting that standard hours are ingrained in the award system and that, if such a shift were initiated, a significant penalty rate would have to be paid.

1981 data on nightworkers in Australia showed that 10.3 per cent of male employees, 5.4 per cent of female employees, and 8.4 per cent of all employees were nightworkers (defined as employed persons who in any one of the four weeks prior to the survey date worked a total of fifteen hours or more between 7 pm and 7 am). Another important form of non-standard hours is weekend work. 1976 data for Australia showed that about one quarter of full-time employees worked at the weekend in their main job, as did about one third of part-time employees.

Explaining the Length and Timing of Working Hours

The long run decline in normal and actual hours of work, of full-time employees, has generally been considered to be the result of increasing real wages leading employees to enjoy their increased living standards partly in increased leisure.

The importance of overtime working has enjoyed various explanations. First there is the incentive to spread the "quasi-fixed costs" of employment. Secondly, there is the adjustment to fluctuations in demand. Another reason is that
of utilising capital equipment more intensively than would be possible with a normal working week. On the other hand, it has been argued that some percentage of overtime is institutionally determined for reasons other than economic efficiency. In so far as this institutional influence, however, is due to trade union and employee pressure for overtime as a means of improving employee compensation, it could be regarded as reflecting supply side forces.

Chapter 9 of this thesis was concerned with estimating a cross-sectional (by industry) model of average working hours of full-time employees which, of course, incorporates normal hours plus overtime. The percentage of employees who were unskilled, the percentage living in conurbations, and the percentage who were shiftworkers were found to have a significantly negative effect, thought to be reflecting supply side factors. Some evidence of a backward bending labour supply curve was also found. The most startling result was the strong highly significant (positive) influence of normal hours of work, suggested by Metcalf et al. (1976) to show insufficient variation to lead to any concern about its omission from their model.

Turning to part-time employment, we have noted that its growth has been closely associated with the increased employment of females and the increased incidence of part-time employment amongst males and females. Chapter 4 of this thesis, was concerned with explaining the causes of part-time employment and the causes of the increased or decreased use by firms of part-time work. The analysis was based on a 1979 survey of employers in Great Britain. The most important reason for part-time work was that "jobs do not need full-time cover, not enough work for full-time". The second most important reason was "to cover busy times, peak seasons, and to cover other workers time-off". Problems of recruiting full-time employees and the desire to suit the needs of existing workers and to keep and obtain experienced workers, combined to represent a third major set of explanations. This suggests that while demand side factors may dominate the explanation of part-time work, factors associated with the
preference of many women for part-time employment, also contributed significantly. Where part-time employment had increased in recent times there were a variety of explanations. Again demand and supply side explanations contributed. The three main reasons given, for example, were: "difficult to find full-time workers"; "to suit the needs of a particular department/to suit work load"; and "expansion of department/jobs already employing part-timers". Responses about the reasons for reducing part-time employment showed the tendency to use adjustments in part-time employment as a way of responding to changes in the strength of the demand for labour.

Shiftwork has been an important focus of this thesis. Chapter 3 reported the findings of survey and case-study work examining the reasons for shiftwork. The survey work in the Chemicals industry in Britain suggested that capital savings associated with shiftwork, and the technological necessity of shiftwork were the main reasons for shiftworking. Our two case-studies in the same industry provided further evidence in support of this. There was however, tentative evidence of a cyclical decline in shiftwork between 1979 and 1982. A survey of shiftwork in Australia in 1976, also found capital savings and technological necessity dominating the explanation of shiftwork, although sales demand was another important explanation. Our case-study of a steel-works in New South Wales, found that shiftworking had declined substantially in recent years, especially "seven day" shiftwork. This was because Sunday work was the most expensive and in a period of contraction, it had tended to be eliminated except where it was technologically necessary. The areas where the seven day shiftworking existed were all part of an integrated continuous process operation. In other areas, continuous work was unnecessary but had been used at various times when output demand was high.

The case-studies, in Britain, suggested that there were factors, which would not be incorporated in a straightforward costing of the benefits of shiftwork, which sometimes deter employers from the adoption of shiftwork. These include the
substantial presence of female employees, the control problems associated with the existence of shiftwork, the desire for spare capacity to ensure product security, and even the perhaps rather paternalistic view of an employer that shiftwork is "unsocial".

In Chapter 7, a model was developed linking the theory of capital utilisation with the choice of work patterns, with the aim of explaining the use of shiftwork in manufacturing. In this model the "optimal" work pattern is selected at the point where the marginal capital savings, achieved through more intensive capital utilisation, is equal to the marginal labour cost associated with adopting that pattern. Estimates of labour costs and capital savings, associated with work patterns in British manufacturing industry, tend to support the view that such a model can predict the optimal level of capital utilisation and work pattern.

This theoretical model was further utilised in the development of an econometric model to explain the incidence of shiftwork in Great Britain. The model was based on shiftworking labour supply and demand equations and estimated both as a single equation (reduced-form) model, and as a simultaneous equations model. The results justified the view that the use of shiftwork is strongly founded upon economic grounds, especially the capital savings achieved and in some cases technological necessity. Other important influences were plant size, the percentage of manual employees and of female employees and the age of employees, confirming some other demand side and supply side influences. Wage variables were also significant. The simultaneous equations model was not as successful as had been hoped, especially in connection with the supply equation. One possible problem, with the simultaneous equations model, could be that the shift premium may not operate to equilibrate supply and demand in the way implied by the model. The shift premium may, rather, be an institutional constraint which in turn influences labour demand and supply but does not act as a pricing mechanism to lead to the amount of shiftwork that would result under free market conditions.
In addition to shiftwork, there is a considerable amount of other work during non-standard hours due largely to the timing of the demand for a non-storable product or service. Retailing, hospitality and fast-food are good examples of this. Consideration of this source of non-standard working hours in Chapter 8, suggested that labour demand of this type would depend upon a number of factors including: the level of product demand; the fixity or otherwise of the output-employment relationship; the variability of labour costs over the day or week, i.e. the effect of "penalty rates"; variations in other variable costs over the day or week; the number of hours per person employed; and legal and award constraints. Case-study work, reported in Chapter 5, produced examples of the way in which these variables impinged on various operations in retailing, hospitality and fast-food in Australia. Common practice was found to be the extensive use of casual employees during non-standard hours of work, to deal with peak demands, and to contain labour costs. The use of junior casuals was particularly prevalent in fast-food and retailing during the most "penalty prone" hours. The research in the hospitality sector found some evidence of reduced levels of service and employment because of the presence of penalty rates, especially at the weekend.

Compensation for Non-Standard Hours of Work

This leads us on to the debate about compensation for non-standard hours of work. The economic theory of labour supply can be used to illustrate the need for compensation through penalty rates if the marginal employee associates disutility with non-standard hours. In Chapter 6 a framework was developed to disentangle the "time of day" and "length of shift" compensation embodied in employees wages. This framework was used to analyse two British collective agreements. The time of day wage rhythm that emerged conformed with expectations based on traditional views about "unsocial" hours, with the intriguing quirk of a peak in the early morning as well as at around midnight. Whether the findings are considered to reflect market forces, depends on
the view taken about employee preferences. Our study of employee attitudes to non-standard hours of work, reported in Chapter 5, found widely varying preferences, with some preferring non-standard hours, although this appeared to be less true of shiftwork than other forms of non-standard working hours. Given the heterogeneity of preferences, the appropriate level of compensation can be expected to vary. It could also be expected to change over time. The increased labour force participation of married women and students, for example, has involved a change in attitudes about non-standard working hours. This in turn suggests that a rigid structure of penalty rates across industries and occupations could lead to substantial economic rent being paid to some employees in non-standard hours while many potential suppliers of labour during such times are dissatisfied.

The structure and levels of penalty rates in Australia, which has been a controversial issue, were examined in Chapter 5, and some comparisons made with provisions in various other countries. While there are clear examples of countries where penalty rates are substantially lower, it is difficult to find evidence of countries with penalty rates that are significantly higher. In particular, Australian penalty rates in the hospitality sector are particularly high. In comparison with Britain, this latter finding concerning the hospitality sector, was a prominent contrast.

**Work-Sharing**

At a time of high unemployment, especially in Britain, the idea that patterns of working time could be re-arranged to share the work around and create more jobs has been the subject of considerable debate. This issue was discussed in Chapter 11. The central focus was the idea, put forward by the TUC, of reducing normal hours which, they had suggested, would have a considerable job creating effect. Placed under close scrutiny this suggestion was found to be very doubtful. Would weekly wage rates fall commensurately? If not, could productivity really be expected to rise significantly? Where
would the necessary capital stock come from for the new employees to work with? Would there not be a tendency for overtime to increase to compensate for the reduced working hours?

With respect to the last question about overtime, the results of the cross-sectional analysis of hours and earnings reported in Chapter 9, would at face value be suggestive of the idea that reductions in normal hours could lead to at least an equivalent reduction in total hours. There was a strongly significantly positive coefficient on normal hours in the explanation of actual hours. It is more likely, however, especially in a cross-sectional inter-industry model, that this coefficient reflects the fact that industries in which the suppliers of labour wish to work fewer actual hours, also work fewer normal hours. That is, in the long run, normal hours are not exogeneous in the way implied by our simple model.

Despite the doubt about the efficacy of reduced working hours as a way of work-sharing, especially if the government is prepared to incur some of the cost against which it may be able to offset reductions in unemployment compensation, then work-sharing could have some potential. A reduction of the retirement age of men to 60 could be seen as a possible example of such a policy. It should also be noted, in defence of work-sharing, that there may be a significant proportion of the workforce, who would be prepared to reduce their working hours with a commensurate reduction in pay. The ABS survey concerning Alternative Working Arrangements (ABS, 1982), for example, found that about 8 per cent of Australian employees were in this category.

A further idea that was discussed in Chapter 11 was that adjustments in the tax-subsidy system associated with employment, to encourage employers to employ more persons rather than more hours per person, could be seen in the same context. Another question, raised earlier, was where would the complement of capital come from, for the new employees to work with? Encouraging shiftwork and other forms of non-
standard hours could be seen as a way of achieving this. We have seen that while there are strong economic reasons for the use of shiftwork, there is some evidence of a reluctance by some employers, to use shiftwork, particularly where female employees are concerned, for partially "non-economic" reasons. In this sense improving the image of shiftworking, by helping to improve shiftworkers quality of work life etc. and involving employees in the determination of their work patterns, could help. Furthermore if it became financially more attractive to employ extra workers rather than more overtime, the model developed in Chapter 7 would predict a significant expansion in the use of shiftwork. Bearing in mind that government interventions have tended to increase the costs of hiring, employing and firing employees, attempts by government to reduce these "quasi-fixed" costs may, rather than have a distorting effect on the labour market, have a beneficial effect.

In Chapter 10, an econometric model of wage inflation in Australia (also tested for Great Britain), was developed and estimated, which suggested that the strength of labour demand may be better reflected by levels of working hours than the level of unemployment. This may also be a reflection of the tendency of firms to adjust their hours worked rather than adjust employment levels and is suggestive of an increasing divorce between the internal and external labour market. Clearly this should be of some concern to governments seeking to reduce unemployment. The whole area, of the relation between work patterns, unemployment and wage inflation, requires further analysis, with a special emphasis on the microeconomic foundations of these macroeconomic problems.

Labour Market Regulation

The regulation of working hours arrangements has arisen as an issue in a number of ways in this thesis. Protective legislation concerning shiftwork and long hours of work in Britain has been one example. The structure of penalty rates
for non-standard hours in Australia, and to a lesser extent constraints imposed on working hours arrangements under the Arbitration System, have been others.

The protective legislation in the Factories Act in Britain concerning the employment of women on shiftwork and long hours, presented the Equal Opportunities Commission with an interesting question. Should such restrictions also be placed on men, or should they be removed from women? One argument, considered in Chapter 12, for imposing restrictions on long hours of work for men, was the possible work sharing/job creating effect. Again, for reasons similar to some discussed in connection with the reduction in normal hours, this was considered to be an unlikely outcome. The case, for restrictions on the length of hours or shiftwork, is presumably based on the idea that the workers themselves do not take into account the adverse effects of these working arrangements, or that there are external diseconomies placed on society which are not taken into account. The lack of hard evidence in support of these contentions suggests that such restrictions are inappropriate. Even if social costs are incurred it is not clear that blanket restrictions on working hours arrangements are the appropriate remedy. The Equal Opportunities Commission's recommendation of the removal of these restrictions was therefore a sensible decision in the circumstances. Concern about the possible adverse effects of patterns of working time on workers and their families and society at large, is best directed towards improving our understanding of the effects of shiftwork and other work patterns, on the health and quality of work life of employees and their families, to help employers and employees to take appropriate actions themselves. Starting and finishing times of shifts, the speed of rotation, the extent of flexible working hours, and the influence of employers over their own arrangements, are all examples of issues that deserve consideration. Developments along these lines, furthermore, could well be expected to improve productivity.

We have seen that, in Australia, working hours arrangements are subject to extensive regulation under the Arbitration
System. A quite rigid structure of penalty rates and working hours arrangements in the face of heterogeneous preferences amongst the labour force concerning working hours, has various detrimental effects. A more flexible approach to the use of non-standard hours of work, and in particular a dilution of the view that penalty rates are a sacred principle, could provide substantial benefits to employers and employees. It might be added, as mentioned in Chapter 13, that the importance of the concept of the standard working week and the system of penalty rates that applies, reflects the dominance of traditional attitudes about the principle breadwinner husband/father, as the dominant form of labour force participation. Another example of this is that part-time employment is not allowed in some awards and, in some others, constraints are imposed on the extent to which it can be used. It is also interesting to note as we did earlier, that the presence of twilight shifts in Britain does not appear to be replicated in Australia.

There is a strong case for some deregulation of working hours arrangements, such that the requirements of employers and employees could be more closely matched. In the Alternative Working Arrangements Survey (ABS 1983) it was found that about 28 per cent of employees in Australia wanted to work different numbers of hours (with commensurate changes in pay), with 8 per cent preferring to work less. The same survey found evidence of an excess supply of females wishing to work part-time, of which we saw similar evidence in Britain (Chapter 4). Also, we have seen that preferences about non-standard hours of work vary widely. In the light of these findings, there is a strong case for allowing employers and employees greater flexibility to develop mutually advantageous packages of working time.
REFERENCES
REFERENCES

ABS (Annual), Earnings and Hours of Employees Distribution and Composition, Cat. No. 6306.0.

ABS (Annual), Labour Statistics, Australia, Cat. No. 6101.

ABS (Monthly), The Labour Force, Cat. No. 6203.

ABS (Quarterly), Overtime, Cat. No. 6330.

ABS (1977), Work Patterns of Employees, Cat. No. 6327.0.

ABS (1978), Evening and Nightwork, Cat. No. 6329.0.

ABS (1982), Working Hours Arrangements, Australia, February to May 1981, Cat. No. 6338.0.


Chamber of Commerce and Industry, SA Incorporated, (1983), Schedule of Penalty Rates applying to Work Performed in Overtime and Shiftwork and Meal Allowance, mimeo, December.


Department of Educational Research, University of Lancaster (1973), Return to Teaching, University of Lancaster.


Department of Employment (DE), G.B. (Annual), New Earnings Survey.

Department of Employment, (DE), G.B. (Annual), Time Rates of Wages and Hours of Work, London, H.M.S.O.


Department of Science and Technology, Australia (1980), 
Shiftwork in Australia: a study of its effects, AGPS, 
Canberra.

Dixon, P.B., Parmenter, B.R., Sutton, J. and Vincent, D.P. 
(1982), ORANI: A Multisectoral Model of the Australian 
Economy, North Holland, Amsterdam.

Equal Opportunities Commission (1977), Protective 
Legislation: Who Benefits – Men or Women?, HMSO, London, 
1977.

Equal Opportunities Commission (1979), Health and Safety, 
Legislation: Should We Distinguish Between Men and Women? 
EOC.

European Commission (1977), "Memorandum on Shiftwork", EC 
Discussion Paper, V/1135/177 EN.

European Commission (1982), Memorandum on the Reduction 
and Reorganisation of Working Time, Brussels, December.

Feldstein, M.S. (1967), "Specifications of the labour input 
in the aggregate production function", Review of Economic 
Studies, 34, 375-86.

Financial Times (1978), "Tachograph Hearing Next Month", 
Financial Times, London, 10th November.

Fishwick, F. and Harling, G. (1974), Shiftwork in the 

Flemming, J.S. (1975), "Wage rigidity and employment 
adjustment" in J.M. Parkin and A.L. Nobay (eds.) Contemporary 
Issues in Economics, Manchester.

France, R.R. (1962), "Wages, Unemployment and Prices in 
the United States, 1890-1932, 1947-1957", Industrial and 
Labour Relations Review 15(2), 171-190

Freebairn, J. (1977), "Do Wages Matter?", Australian 
Economic Review, 3rd Quarter, 25-35.


Health and Safety Executive (1973), Hours of Employment of Women and Young Persons, Health and Safety Booklet No. 23, Department of Employment, HMSO London.


IFF (1978), Shiftwork in Manufacturing Industry, Research Report to the European Foundation for the Improvement of Living and Working Conditions, by IFF Research Ltd.

IFF (1979), Women and Work, Report to the EOC/SSRC Joint Panel by IFF Research Ltd.


Jones, J. (1976), Target 35: The Case for the 35 Hour Week, TGWU, Pamphlet, April 1976.


MacDonald, J. (1975), "Wages and Prices in Australia: on


Mott, P.E. et al., (1965), *Shiftwork: The Social Psychological and Physical Consequences*: Ann Arbor:


OECD (1966), Wages and Labour Mobility, Paris.


Sergean, R., Howell, D., Taylor, P.J. and Pocock, S.J.


TUC (1978), Economic Review.

TUC (1982), Programme for Recovery.


Wallace, M. ed., (1985), Shiftwork and Health, Brain-Behaviour Research Institute, Department of Psychology, La Trobe University, Bundoora, Australia, 3083.

