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WHY HAS WORK EFFORT BECOME MORE INTENSE?

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Abstract

Effort-biased technological change and other explanations for work intensification are investigated. It is hypothesised that technological and organizational changes are one important source of work intensification and supportive evidence is found using establishment data for Britain in the 1990s. Work intensification has also been stimulated by the use of high-commitment human resource policies. A reduction in union power, and a rise in the use of temporary agency workers and contractors, were positively associated with work intensification; however, their impact during the 1990s was comparatively modest.

JEL Classification: J22, J33 and J51.

Key words: Labour supply, work effort, work intensity, wages, technical change, work organization, unions, high commitment policies, incentives.

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NON-TECHNICAL SUMMARY

In previous papers, I have confirmed, through survey and other evidence, the widespread suspicion that the pace of work in Britain was becoming more intense during much of the 1980s and 1990s. In this paper, I investigate the main reasons why this has happened, using managers' perceptions of effort change in a large establishment based survey, the Workplace Employee Relations Survey of 1998.

I find that technological change is a prime reason for this intensification. By technological change I include also many of the organisational changes that have been taking place in Britain's workplaces, such as those brought about through a Total Quality Management system. The changes have enabled improved control over the pace of work, partly by raising the efficiency with which work can be delivered to the worker, with no gaps, and partly by raising management's ability to monitor the work rate of employees. The call centre is just one example that has exemplified these tendencies. I call the increases in efficiency a process of "effort-biased technological change", since these changes tend especially to raise the productivity of high-effort workers. Multi-skilling, which enables establishments to use utilise their workforce more flexibly, is one route through which technological change impinges on workers.

The technological changes have been reinforced in some cases by the spread of human resource policies designed to involve employees more in the organisation, and by the creation of more incentive schemes linked to worker effort.

In a small number of cases, effort has also been brought about by a reduction in collective bargaining, or by a rise in the usage of insecure temporary workers. In an even smaller number of cases (less than one percent), work intensification is a direct result of privatisation.

WHY HAS WORK EFFORT BECOME MORE INTENSE?

1. Introduction

There is a widespread impression, evident from popular reports and casual empiricism, of an increasing ‘tension’ and ‘strain’ across many workplaces in recent decades.¹ In part, the impression of increasing work strain may have come from changing work hours. Although in most industrialised countries average weekly hours of work have come down or, at remained steady since the early 1980s, those hours have been concentrated in fewer households (Gregg and Wadsworth, 1996; Green, 2001). At the same time the proportion of United Kingdom workers putting in over 48 hours has risen. A similar trend towards increasing variation of hours is observed in the United States (Cappelli et al, 1997). However, just as relevant to the sense of rising strain, there is also now an array of formal studies substantiating work intensification in thirteen European Union countries, that is, an increase in the proportion of effective labor performed for each hour of work (European Foundation, 1997; Green, 2001; Green and McIntosh, 2001) and considerable supportive case study evidence (see below).

In this paper, I investigate explanations for this work intensification. Despite the difficulties of measurement, work effort occupies an important place in psychological models of the labor contract. High levels of effort are, for example, assumed to be generated in the model of the “high commitment work organization”, but are also an ingredient of a more traditional Taylorist form of organization in which managers exercise detailed control of the production process. Increasing the level of work intensity has been found, in a variety of studies of well-being at work, to lead to substantial reductions in welfare, as measured by job satisfaction and by indices of affective well-being (Warr, 1987; Green and Gallie, 2002). The level of work effort is also pivotal in efficiency wage models of the economy, and to several accounts of economic growth in the short period. Thus, changing work intensity figures prominently in certain critical accounts of productivity change. At the organization level, for example, downsizing has been seen sometimes as just a “quick fix” for a firm’s efficiency shortcomings leading only to temporary improvements as surviving employees work harder but become demoralised (deVries and Balazs, 1997). Hence the verdict on downsizing as a managerial strategy is mixed. At the economy level, work

intensification is shown to be an ingredient of the 1980s productivity boom in U.K. manufacturing, and critics have questioned the sustainability of this mode of growth in both the US and the UK (Roach, 1996; Evans *et al*, 1992; O'Mahoney, 1994).

In view of these wider implications, an improved understanding of the sources of work intensification is called for. There is only a little extant research on this issue, not because it is unimportant but because of the scarcity of usable measures of work effort over time. It happens that the basic facts about work intensification are clearest in the context of Britain. That the period from the early 1980s until 1997 was one of work intensification has been established using several methodologies:

- i. Overviews of bargaining agreements in several sectors in which workplace concessions, including productivity deals, are prominent (Andrews and Simmons, 1995; Elger, 1990; Tomaney, 1990);
- ii. Case studies of particular organizations (e.g. Burchell *et al*, 1999; Edwards and Whitston, 1991; Foster and Foggett, 1999; Adams *et al*, 2000; Ackroyd and Bolton, 1999);
- iii. Subjective perceptions of recent effort change among survey respondents, either in broadly representative surveys or in specialist surveys of employees in selected organizations or occupations (Edwards *et al*, 1998; Edwards and Whitston, 1991; Burchell *et al*, 1999; Batstone and Gourlay, 1986; IRS, 1996);
- iv. Substantive increases in directly reported subjective effort levels between successive comparable representative surveys during the 1990s (Green, 2001; Green and McIntosh, 2001);
- v. Large increases from 1986, through 1992 to 1997 in the number of perceived factors pressurising employees to work hard, as revealed in successive comparable surveys (Green, 2001).

By way of illustration and an update, Table 1 presents some trends using method (iv). The first panel gives responses to successive national surveys in 1992, 1997 and 2001, each drawn randomly from a target population of 20 to 60 year olds in employment. The responses imply that there was an intensification of work effort between 1992 and 2001, but this intensification took place during the first part of this interval, that is, up to 1997. For example, respondents were asked: “My job requires

that I work very hard'. Do you strongly agree, agree, disagree, or strongly disagree with this statement?"² The proportions in the private sector strongly agreeing rose from 32 percent in 1992 to 38 percent in 1997, while in the public sector the proportions rose even more, from 32 percent to 44 percent. After 1997 there was no significant change in reported work effort. In the second and third panels of the table a similar picture of work intensification between 1992 and 2001 is given by two further indicators or proxies for work effort – the extent to which the job involves working at high speed, and the extent to which the job involves working “under a great deal of tension”. Findings from comparisons of other questions within the same surveys, and from using other data sets, show a broadly consistent picture of change across a range of effort indicators. Work intensification has taken place quite broadly across occupations and sectors. However, the increase in effort has been somewhat greater than average for women, for those aged over 40, for service sector and for public sector workers. Consistent with previous studies in the United States and in Britain, the level of perceived work effort is greater for women than for men (Bielby and Bielby, 1988; McIntosh, 1997).

Why has work effort become more intense? Recent studies have attributed work intensification either to increased competitive pressure being passed on to workers (Burchell *et al*, 1999) or to the rising power of bosses relative to declining unions (Green and McIntosh, 2001). An additional, related, explanation is that effort intensification is complementary with technological change. For the purposes of this paper I include in the phrase “technological change” both technical innovations in the production process and changes in work organization. Many of these changes, I shall argue, have raised the ability of managers both to monitor the labor process and to control the flow of work to workers. The introduction of human resource policies designed to encourage greater worker involvement and commitment, including incentives that link effort with pay, could also be driving some of the increased effort. Effort intensification might also come from exogenous changes on the labor supply side, including a shift in workers' preferences over effort and income.

All these types of explanations are, at least superficially, potentially valid. The multiplicity of plausible explanations leads me to eschew any encompassing formal labor market model, because these explanations operate in a range of contexts

(including competitive, bilateral bargaining and efficiency wage models). Rather, I first delineate the explanations using a variety of standard labor market frameworks (Section 2). These suggest a number of hypotheses about work intensification that are, to varying degrees, amenable to testing through a reduced form specification. I then present evidence based on a survey of establishments in Britain, the Workplace Employee Relations Survey of 1998. I describe the data and specification in Section 3, and the findings in Section 4.

My justification for this approach is, simply, that a partial understanding of this phenomenon is superior to none. There is insufficient data to allot prime causation to any of these hypotheses with complete confidence, using a full structural model, but it is possible to provide empirical support for certain explanations, while at the same time casting doubt upon others. To anticipate, I find support for the proposition that effort intensification is associated with technological change. There are also findings to suggest that the use of high commitment human resource policies has been a notable influence. Neither the decline of union influence *per se*, nor changes in the use of non-standard labor, turn out to be major sources of work intensification.

2. Theory and Previous Evidence.

One important explanation for the intensification of work lies in the technological changes of recent decades. Ultimately, these changes are associated with the changing competitive environment and the changing structures of power between capital and labor. For present purposes I take this changing context as read, wanting in particular to focus on the nature of the links between technical innovations, organizational changes and work intensification. On one hand the innovation of new information technologies has revolutionised the control of work flows. On the other there have been pervasive developments in managerial strategies affecting the way work is organised and controlled. In the first part of this section I argue that such changes would tend to raise work effort, and refer to the somewhat limited evidence there currently exists. In the second part, I move beyond the immediate production sphere to developments in human resource policies that condition the way in which effort is motivated. I review theories which incorporate the view that new human resource policies may have become more effective in soliciting effort from employees.

Finally in this section, I consider two key aspects of structural change in the labor market which, it has been argued, affect work intensification, namely declining union power and rising job insecurity.

2.1. Technological Change and Work Intensification

Recent decades have seen the diffusion of a range of new techniques and methods of work organization that generate both new products and production processes. Take three prominent innovations, namely “Just-In-Time” (JIT) production methods, “Total Quality Management” (TQM) and teamworking: each of these practices had been adopted by at least 7 in 10 UK manufacturing sites by 1996 (Waterson *et al*, 1996). Such techniques have been diffused and adapted through many countries, and across sectors to embrace services as well as manufacturing, and the public as well as the private economy. These techniques have normally been complementary to the expansion of the new information technologies.

I make the assumption that, quite frequently, technological and organizational changes generate improvements in technical efficiency: that is, they enable the same outputs to be produced with less of at least one input, or more output with additional inputs. Throughout this paper, I use the term “efficient” only in this formal sense.³ However, technological change often also alters the monitoring and work control environment. I shall argue here that work intensification may be the consequence of *both* the increased potential for controlling the labor process, *and* the kinds of efficiency gains that have been made possible in recent years.

Thus, one important part of the intensification story concerns the changes that have occurred in the capacity of employers to monitor conformity with employment contracts. Such changes often constitute additional consequences of new production and management methods. For example, the computerisation of workflows, symbolised in the call centre, not only efficiently allocates work tasks, it also monitors their execution and measures work rate with great precision. Similarly, a feature of TQM and JIT is that they raise the “visibility” of work (Sewell and Wilkinson, 1992). Deficiencies in work quality can be more easily traced to individual workstations, with the dual aim of raising efficiency by rooting out poor practices and detecting low effort by individual workers. The increasing use of staff appraisal, and improvements in appraisal methods,

also raise management's ability to monitor performances over a medium-term horizon. These improvements in monitoring technology imply that, for the same amount of resource devoted to monitoring, work effort can be observed with reduced measurement error. In the context of an efficiency wage model with standard assumptions, the consequence is that workers devote greater work effort (Gintis and Ishikawa, 1987).

But it is not only through the increased ability to monitor work that more control has been exercised by management. The changes in work organization have also afforded greater power to management in determining work flows. Especially in professional labor processes, where trust and autonomy need to be retained at least at some threshold level, the opportunities for Tayloristic methods of control are limited. Yet, given workers' own imperatives for maintaining professional standards, managers can raise the pace of work instead by controlling and speeding up the flow of customers and clients in need of service. This feature is especially prominent in public sector workplaces, where managers' powers have increased in the context of increasingly constrained funding and rising demand (see the cases studies by, for example, Ackroyd and Bolton, 1999; Adams et al, 2000; Sinclair et al, 1996; Foster and Hoggett, 1999).

While the changing power and control structures have been fairly widely discussed in the literature, what may be less appreciated is that many technical innovations and changes in work organization raise efficiency in such a way as to lend themselves to people working harder. My conjecture is that recent innovations have on balance been "effort-biased", that is to say, they increase the potential output of high effort workers, relatively more than that of low effort workers. I refer to this process as "effort-biased technological change" (EBTC), and it can be understood as analogous to the assumption of skill-biased technological change (SBTC) which has been found to be widely prevalent in industrialised countries (e.g. Machin and van Reenen, 1998). Just as SBTC is thought to be an important proximate reason for increased demand for highly educated workers, so EBTC is a potential reason for firms demanding more high effort workers. If this conjecture is verified, in the context of either a competitive or an imperfectly competitive model of the labor market, and with some standard assumptions, one would expect to see an increase in average levels of both skill and effort. Let me therefore attempt to provide some justification for the conjecture.

A central aspect of JIT and TQM production methods is the achievement of more efficient control of flows of materials and of work. JIT is premised upon the minimisation of inventories, and therefore requires close control of work flows as a direct consequence. TQM's efficiency gains are said to come (in part) through the principle of involving the workforce in delivering continuous quality improvements. An important ingredient of these efficiency improvements is a closer matching of available labor to the required workflow.

The consequence is that it becomes possible to make better productive use of workers as long as they supply high effort. The principle of the systematic removal of buffers is extended to the reduction of idle work time. Whereas, before the innovation of JIT and TQM, there were many gaps in the flow of work, this porosity in the working day starts to be reduced with the new managerial techniques. The productivity of those workers who choose to supply low effort is raised much less, or not at all.

Expanding information and communication technologies are an indispensable adjunct to the new techniques.⁴ Not only have they delivered the technical means for improved co-ordination of materials flows and associated work schedules, they have afforded management an immensely enhanced capacity for the efficient allocation of work. This development is epitomised in the rise of the call centre, the so-called "20th century sweatshop" (Wazir, 1999).⁵ Though attention is often given to the ability of call centre managers to monitor work with great accuracy, just as important is the automated supply of work tasks – each call following its predecessor with no gaps.

In addition to aiding the filling up of gaps during normal work time, information and communication technologies also raises the productivity potential of work done outside those hours.⁶ It thereby raises the productivity of high effort workers who take their work away with them. Put another way, information and communication technologies raise the opportunity cost of not working during time away from the usual workplace. The facilities of laptop computers, mobile phones and globally accessible Internet connections have opened the door to more intensive work on trains, planes and at home. This phenomenon has prompted some management writers to comment on the irony of labor-saving technology failing to liberate those who labor (e.g. Roach, 1996) - something that Ricardo and Marx discovered in the 19th century. The resolution, again, appears to be that the productivity of workers who choose to supply relatively low effort

is enhanced to a significantly less extent than that of those who are prepared to work with the more effort-intensive technologies.

Effort-biased technological change might be appropriately called the “amber lights” approach to raising productivity, after a certain Japanese factory which installed a system of lights at workstations on a work flow line (Delbridge *et al*, 1992). While green meant there was time to spare and red stopped the line, amber indicated the worker was bordering on full capacity. The lights were the means for the optimal adjustment of workflow, amber being the line managers’ preferred colour. The story of work intensification in the British clothing industry has a similar aspect. In the context of increasing competition managers at one large workplace introduced a numerically controlled handling system that had the effect of reducing work-in-progress at every production stage, and substantially intensifying work effort through closing up the gaps in the working day that previously existed (Boggis, 2001). Critics suggest that, whatever the ostensive purpose behind TQM or JIT, their effect is to extract greater work effort, through a process of ‘management by stress’ (Oliver, 1991; Sewell and Wilkinson, 1992; Delbridge *et al*, 1992).⁷ There is a growing body of case study evidence linking the modern “transformation” of workplaces with experience of health hazards brought on by work intensification (see the review and formal evidence reported by Fairris and Brenner, 2001).

The ability of management to induce greater productivity from high effort is enhanced by the discovery and diffusion of multi-skilling. The discovery accompanied the progressive dismantling of the settlement that accompanied Taylorism, in which trade unions traded acceptance of management’s prerogatives in rigidly defined task management in return for rising wages and a measure of job security. Multi-skilling has also been facilitated by increases in education levels of the work force. Whatever the ultimate source, the development of workers’ abilities to perform a range of jobs enables workers to be redeployed as necessary. Workers who can perform repair and maintenance tasks do not need to await the arrival of specialists when their workplace machines go down, and they can perform routine maintenance at slack times. They can be redirected to other parts of the workplace when demand switches cause bottlenecks elsewhere. Especially in service sector jobs where workloads often fluctuate with

customer demand, functional flexibility enables management to keep their staff fully occupied during the time that work is paid for.

From the above discussion I deduce a first pair of hypotheses:

H1: Work is more likely to have been intensified at workplaces which experienced technical and/or organizational changes than at workplaces where no such changes have occurred.

H2: Multi-skilling and improved task flexibility has contributed to work intensification.

As yet, there is to my knowledge no existing formal empirical evidence on these hypotheses, though they are informally supported by the case studies cited above. Note also that *H1* does not explicitly distinguish the route through which work intensification is manifested – that is, whether via changed processes of control or via the idea of effort-biased technological change. I do not distinguish them partly because, in the empirical work to follow, there is no possibility to examine these routes separately. The two routes are, in any case, intimately related. For example, the fact that it becomes technically possible to close up some of the porosity in the working day enhances the potential impact of increased managerial power.

2.2 “High Commitment” Human Resource Policies and Work Intensification

Human Resource Management and Work Effort

The gradual growth of human resource management practices may also be having direct and complementary effects on work intensity. Recent decades have seen the development of techniques aimed at engendering greater identification of employees with company objectives. The new techniques include human resource methods such as empowerment, mentoring and employee involvement through consultation meetings and other means of intra-firm communication, as well as paternalistic fringe benefits and training geared to engender commitment (Green, 2000). These practices have also been seen as elements of the psychological contract between employer and employee, in which a certain degree of trust and security is traded for greater commitment. It is either explicit or implicit in the new policies that increased commitment is manifested in increased levels of work effort.

Effort Incentives

Another element of new human resource management practices is the use of explicit economic incentives, whereby pay is linked to productivity. Indeed, firms that deploy TQM and computerised control methods can benefit by being better able to link effort with pay and retention. By offering appropriate rewards (for example, through Performance Related Pay or effort-related promotion or bonus schemes) employers can expect employees to select themselves according to their willingness to supply higher effort levels. Improved measurability thus permits hitherto infeasible contracts for greater effort in return for more pay.⁸ This argument provides further support for *H1*. An additional feature of this argument is that it also predicts both an intensification of effort and a rise in wages, since selecting out some low effort/low wage workers will raise both averages.

These considerations generate two further testable hypotheses:

H3: Work intensification is also partly associated with the spread of HRM techniques designed to engender greater worker involvement.

H4: Increased use of effort incentives has contributed to work intensification.

Most research evidence about the efficacy of high commitment policies has focussed on their impact on organizational performance. Our knowledge of the impact of these policies on workers is relatively thin. Green and McIntosh (1998) give evidence that some types of HRM policy, particularly incentive pay and upward communication channels in the form of employee opinion surveys and active use of suggestion schemes, are associated with high effort levels, while downward communication channels had no association with effort. In their survey of employees in the steel, apparel and medical electronic instruments and imaging industries, Appelbaum et al (2000) looked for and found no evidence that role overload or increased stress accompanied “high-performance work systems”. Similarly, Rosenthal et al (1997) could find no evidence that the use of HRM and TQM in a major retailing company was effective only at the expense of an intensification of workers’ effort. By contrast, Cunningham and Hyman (1999) report a case study where an empowerment programme failed to generate increased commitment, but was accompanied by new management

controls and some evidence of work intensification. Indeed, often attempts to involve workers more come at a time of substantial changes in work organization and are met with cynicism (Heyes, 1996). Although organizational commitment is widely manifest in Britain, there is no evidence that it is substantially increasing (Gallie *et al*, 1998; Gallie *et al*, 2001). As regards effort incentives, there is both formal and much informal evidence of a link with effort. For example, Green and McIntosh (1998) show that effort is positively related to systems of payment-by-results. However, Millward *et al* (2000) could find no evidence that the incidence of incentive pay systems, profit-related pay or employee share ownership schemes expanded during the 1990s.

2.3. Declining Union Power, Rising Job Insecurity and Work Intensification.

In contrast to the above emphasis on the transformation of the labor process as an important source of effort intensification, it is changes in labor market structures that have hitherto received the widest attention in this respect – primarily, the declining power of unions, and associated power shifts in principal-agent relationships at work. The main story, in this framework, is that firms have found themselves under increased pressure to reduce costs and/or raise quality and, with the state’s aid in reducing unions’ legal powers, have forwarded that pressure onto their workforces (Burchell *et al*, 1999). Firms are obliged both to streamline their production processes and to pare their price/cost margins, while shock tactics such as downsizing are deployed to break down traditional effort norms and to reduce payroll costs.⁹ In short, it has become the era of “lean and mean” production.

The pattern of work intensification across the public and private sectors is consistent with this story. Over 1992 to 1997 public sector workers in Britain encountered greater work intensification in the 1990s than private sector workers (Table 1). Over the same period the ratio of public to private sector workers’ average pay declined by around six percentage points. Thus, in *relative* terms wages and effort are moving in opposite directions, consistent with the view that the market and institutional pressure on workers was increasing especially hard in the public sector.

It has also been argued that work intensification is an adjunct of increasing job insecurity (e.g. London Hazards Centre, 1994). Such a prediction could arise in an efficiency wage models from an exogenous increase in the cost of job loss, brought on by a declining benefit/wage replacement ratio. Many countries, Britain included, have experienced declining replacement ratios over the last two decades. In addition there is evidence that the wage loss on returning to work is substantial in both Britain and the United States, and has been increasing in Britain (Nickell *et al*, 1999; Jacobsen *et al*, 1993).¹⁰ A high cost of job loss can easily be interpreted by employees as an indication of insecurity. The supply of effort in Britain would be predicted to have increased as a result. However, even if effort is fully observed, the effect of market uncertainty can be to generate job insecurity. If workers perceive a finite risk of job loss they might devote above-the-norm effort levels, either to help support their employers' business or to move themselves towards the back of the redundancy queue. Workers with temporary job contracts, which by their nature are especially insecure, might devote extra effort if their wish is to be re-employed in subsequent periods. Even though the opposite reaction is also plausible (that insecurity creates demoralisation and hence less commitment), a positive link between insecurity and work effort is frequently asserted in popular, informal, explanations of work intensification.

The above discussion suggests two further hypotheses:

H5: Falling union power has contributed to the intensification of effort.

H6: Increasing job insecurity has contributed to the intensification of work effort.

The existing evidence for *H5* is mixed. In support, Bacon (1999) reports a case study in the steel industry, in which a company which had de-recognised unions pursued a managerial strategy aimed at attitudinal compliance and work intensification. Yet previous formal studies of effort in a variety of contexts do not show any substantial direct link between union power and worker effort. There is evidence only of an indirect association, in that union power reduces the impact of the external economic environment on effort (Green and McIntosh, 1998). There is also evidence of an association at the level of the national economy, in that economies where union power has decreased have higher rates of effort intensification (Green and McIntosh, 2001). The UK is one economy where union density continued to decline during the 1990s.

Existing evidence on *H6*, however, does not provide much support. To begin with, it is by no means clear that insecurity has increased. The aggregate unemployment rate fell by the late 1990s to barely more than half what it was in the mid 1980s, and there has been no major change since 1986 in workers' expectations of job loss (Green, Felstead and Burchell, 2000). For the last two decades there has only been a small fall in average job tenure, mainly for men (Gregg and Wadsworth, 1999). However, one manifestation of insecurity – the temporary work contract – has increased somewhat in Britain. Whereas in 1992 only 5.0 percent were on temporary contracts, by 1999 this had risen to 6.2 percent. If temporary contracts are linked to greater work effort, their rise could be contributing in a small way to work intensification. Nevertheless, there is no evidence as to whether job insecurity does actually generate harder work.

The above six hypotheses are, of course, not independent. It is likely that developments in information and communication technologies and in work organization (*H1*) have, by changing the monitoring technology, raised the ability to measure workplace performance and hence to deploy effort incentives (*H4*). The decline in union power may, in addition to its direct effect (*H5*), have had an indirect effect through permitting the introduction of technologies that are complementary with high work effort (*H1*). Part of the organizational change may involve the expansion of multi-skilling of workers (*H2*), something which may have been restricted by previous union enforcement of job demarcation. Such independencies need to be born in mind when considering findings from a formal single equation model.

3. Data and Specification

The Survey

To test these six hypotheses, I use data drawn from the cross-section component of the 1998 Workplace Employee Relations Survey (WERS98)¹¹. This survey is the latest in a series of high quality representative industrial relations surveys in Britain that have been used extensively in previous research. Earlier surveys took place in 1980, 1984, and 1990.

The cross-section component of WERS98 consisted of three elements: face-to-face interviews with the senior manager with responsibility for employee relations and personnel matters; face-to-face interviews with a worker representative (where present); and a self-completion questionnaire from a sample of employees in each establishment. Here I utilize just the first two elements. The survey was drawn as a random sample of establishments in Britain with at least 10 workers. In total, 2,191 management interviews were successfully carried out, and this gave a response rate of 80%; the worker representative sample was 947 with a response rate of 82%. These response rates represent a comparatively high quality data sample. Full details are given in Cully et al (1999) and at <http://www.niesr.ac.uk/niesr/wers98/>.

Specification

To investigate the sources of effort change, I estimate equations in the form:

$$\Delta E = \alpha \Delta TECH + \beta \Delta HIGHCOMM + \gamma UNIONDOWN + \delta \Delta NONSTANDARD + u \quad (1)$$

where ΔE is effort change (if positive, work intensification). $\Delta TECH$ is a vector representing technological change, including changes in production technology, changes in work organization, and the change in task flexibility. $\Delta HIGHCOMM$ is the change in the use of high-commitment-inducing policies, including both human resource policies designed to raise worker involvement (*H3*) and increased use of effort incentives (*H4*). $UNIONDOWN$ represents indicators of the decline in union power (*H5*), while $\Delta NONSTANDARD$ represents changes in the use of various ‘non-standard’ workers (*H6*). Together, $UNIONDOWN$ and $\Delta NONSTANDARD$ represent the relevant labor market structural changes. Finally, u is a random error term.

This formulation is preferable to estimating an effort-levels equation since, in a cross-section, it is typically hard to be confident that there are no important omitted explanatory variables. By estimating in first differences one can eliminate the fixed effects associated with the perceived effort level in each establishment, and thereby avoid bias in the estimates arising from this unobserved establishment-level heterogeneity. Nevertheless, the possibility remains that unobserved variables are correlated with both effort change and one or more of the explanatory variables.

Measurement of Effort Change and Other Variable Definitions

Work effort is measured, as with other studies of work intensification, through subjective reports of survey respondents. The question asked of management respondents was: “has there been any change in this workplace compared with five years ago in how hard people work here?”, to which a 5-point scale of responses was permitted (gone up a lot/ gone up a little/ stayed the same/ gone down a little/ gone down a lot). Usable responses were obtained for 1934 establishments. In previous studies, subjective reports of effort have been shown to have substantive content validity. In addition, in a small number of studies where this has been possible, subjective physical effort reports have been shown to correlate well with objective physical effort measures (McIntosh, 1997).

Nevertheless, any subjective responses invite careful scrutiny and in this case it might be questioned whether the meaning of “how hard people work” will have been interpreted validly as an indicator of increasing work effort in a variety of settings (as the questionnaire designers intended). To address these issues, it is possible at least to partially evaluate the responses by using some internal and external checks for consistency.¹² I examined the internal consistency of the WERS98 data, as follows.

An identical question was independently asked of the workplace representatives. However, in many establishments there were no workplace representatives interviewed, and a proportion of the representatives did not answer the question. Because usable responses were obtained in only a minority of cases, I prefer to use managers’ responses as the dependent variable in the estimations. Both sets of responses are summarised in Table 2a. In each case there is a very substantial balance of respondents reporting an increase in work effort. Workers’ representatives report the stronger balance in favor of work intensification with 61 percent saying work effort had gone up a lot and only 5 percent reporting a decrease in effort. Amongst managers, 40 percent reported that work effort had gone up a lot, while another 37 percent reported that it had gone up a little.

That there is a difference between managers’ and worker representatives’ perceptions is unsurprising, given their contrasting viewpoints. Nevertheless, confidence in the reliability of the managers’ responses is likely to be the greater if their ranking of establishments is positively correlated with the worker representatives’ ranking, in those cases where both variables are present. In fact the Spearman rank correlation coefficient between the two variables is positive, at 0.101. Although

statistically significant ($p=0.00$) this correlation is not very high. In presenting the results below I therefore carry out a sensitivity check on the main findings, using this inter-rater comparison. There are 117 establishments where the manager's rating differs by two categories from that of the workers, and another 18 where they differ by more than two. For example, there are 81 establishments where the manager reported no change in effort, while the workforce representative reported that effort had gone up a lot. I shall examine how far the findings are sensitive to excluding such cases.

As a further check on the validity of the data, one would expect that estimates of labor productivity change would be positively correlated with estimates of work effort change. Managers were asked (at a different point in the interview) to judge the extent to which labor productivity at the establishment had changed, and replied against the same 5-point scale as used for the effort scale. The Spearman rank correlation coefficient between the managers' perceptions of effort change and of productivity change is 0.405 ($p=0.00$).¹³

To examine the external consistency of the responses, it is possible to compare the distributions of responses against other information on work effort in the 1990s in Britain. As an initial check, the experiences of work intensification implied by both sets of respondents to WERS98 are consistent with the similar findings from independent data sets referred to in the introduction. The earlier studies also show that in the first part of the 1990s Britain's public sector workers experienced a relatively greater intensification than their private sector counterparts. Similarly, as Table 2 shows, effort intensification in Britain is reported at higher levels in the public sector than in the private sector, by both sets of WERS98 respondents. Relatedly, the earlier studies showed greater intensification in the service sector than in the production sector, and greater for women than men. Consistent with this distribution of changes, the proportions of WERS98 management respondents responding that hard work had gone up a lot were 42 percent in the service sector and 30 percent in the production sector; 43 percent where women form a majority of workers in the establishment, 34 percent where women are in a minority. There was a similar pattern for the independent worker representative respondents.

A further external check is available through comparing the industrial distribution of work intensification. I computed the change in mean effort levels

between 1992 and 1997, using the Employment in Britain survey of 1992 and the Skills Survey of 1997 (see Green, 2001) for 12 single-digit industries. I also computed the industry mean response on the effort change variable, (covering 1993 to 1998) from WERS98, using the scale -2 (“gone down a lot”) to $+2$ (“gone up a lot”), for the same industries. The correlation coefficient between the two industry work intensification measures is computed as 0.681 ($p=0.01$).¹⁴ This appears to be a relatively high number, given the independent sources of the data, and the fact that the change periods are not identical. To illustrate this correlation, both sources of data imply that the electrical, financial, public administration and education sectors rank as the top four industries experiencing work intensification, while manufacturing and hotels industries rank in the bottom four according to both sources.

To sum up, both in terms of the overall balance, and in terms of the public/private distribution, and in terms of gender, and in terms of the sectoral and industrial distributions, there is a congruence with independent estimates of work intensification, which provides a useful external check on the reliability of the reported effort change data. Together with the internal consistency checks, and with the usual caveats about subjective data, I proceed therefore on the assumption that the managements’ reports of effort change contain substantive, if noisy, information about the true extent of effort change. Accordingly, equation (1) is estimated with this variable, using a conventional ordered probit specification, which assumes that the error term u is normally distributed.

All of the explanatory variables are measured from questions that ask respondents to report on change over the previous five years. As with effort change, they are, therefore, liable to potential recall error, which could create unknown biases in the estimates.

I capture changes in technology (*ATECH*) using three variables. The first variable is designed to pick up technical changes, and is derived from the questions: “Over the past five years, has management introduced new technology?” and “Over the past five years, has management introduced changes in work techniques or procedures?”. The precise interpretation of these generic questions will differ among workplaces, and I capture technical changes with a dummy variable which is equal to one if the respondent answers yes to both questions. To capture changes in work

organization, I use the responses to the question “Over the past five years, has management introduced changes in work organization?”. For consistency with my theoretical argument, these questions are not perfect because they do not specify the form of new technology, and in particular do not specify whether ICT is involved. Nevertheless, answers to similar questions in WIRS90 confirm that for roughly two-thirds of non-manual employees and for virtually all non-manual employees the new technology included the introduction of microelectronics technology.

The third variable under the heading of technological changes is whether there has been any process of raising the task flexibility of workers. I derive this variable from the question “Has there been any change in this workplace compared with five years ago in your flexibility to move employees from one task to another?”. Respondents could again answer whether their flexibility had changed against a five-point scale, and I coded establishments as 1 if the reply was either “gone up a lot” or “gone up a little”, 0 otherwise. Descriptive statistics for all explanatory variables are shown in Table 2b. It is seen that each of the elements of technological change are present in a majority of establishments.

Increased use of high commitment policies is measured using two questions. Managers were asked “Over the past five years, has management introduced initiatives to involve employees?”, with just a Yes/No response scale. They were also asked: “Has there been any change in this workplace compared with five years ago in the proportion of pay for non-managerial employees which is related to measures of performance?”, with a 5-point response scale. I coded a dummy variable equal to 1 if the response was “gone up a lot” or “gone up a little”, 0 otherwise. As Table 2b shows, an employee involvement policy had been introduced in about a half of establishments, new effort incentives in just under a third.

I capture the relevant work force structural changes by a series of questions about the deployment of labor and the power of unions. Respondents were asked: “compared with five years ago, has the use of workers on fixed term contracts gone up, gone down, or remained about the same?” Identical questions were asked also about temporary agency employees, contractors and part-time employees. I coded 4 dummy variables equal to 1 each for increases in the use of each category, zero otherwise. As

Table 2b shows, each element of increasing labor flexibility had been experienced in a substantial minority of establishments.

To capture the extent of decline over 5 years in the power of unions I used the question: “has the importance of collective bargaining in determining pay (for the largest occupational group in the establishment) increased, stayed the same, or decreased, compared with five years ago?”. Although this question referred to pay rather than effort, it is likely that this question also gave information about the unions’ role in effort bargaining, and accordingly coded a dummy equal to 1 if the importance had decreased, 0 otherwise. According to this indicator, declining union power was not widespread, being confined to 5 percent of establishments (Table 2b), though since these were predominantly larger establishments this amounts to 10 percent of employees. This might seem surprising but it should be remembered that British unions’ power had already been very substantially eroded by 1993.

4. Results

a) Main Findings

All the main findings are shown in Table 3. In columns (1) to (4) I divide the sample into approximately equal sectors according to the size of the establishment, with small establishments being defined as less than 100 workers. The rationale for this division is that it is possible that the means of motivating hard work could be different in larger establishments, where technical and bureaucratic forms of control could be more important. In Columns (5) to (8) I further subdivide the sample according to whether the workplace is in the service or production sector, each by establishment size. Here the rationale is that the interpretation and effects of technical and organizational change could differ between sectors.

In column (1) the first two rows show that technical innovations and changes in work organization each have positive and significant effects on work intensification in small establishments, consistent with hypothesis *H1*. Column (2) also shows a strong link between increases in task flexibility and work intensification, as hypothesised in *H2*. The introduction of the task flexibility measure, however, reduces the magnitude and significance levels of the coefficients on the other change variables. This reduction

reflects a high degree of correlation between task flexibility and the other change variables, so that there is considerable multicollinearity in the estimates.¹⁵ The increases in task flexibility are not themselves the independent cause of work intensification. However, it does appear that a key way in which new work organization and technical innovations impinge on work effort is through re-organization and innovation around increased task flexibility. One could thus say that task flexibility is an important channel through which work is intensified.

In columns (3) and (4), it is seen that the impact of technological change is somewhat different in large establishments. The point estimates of the impact of technical innovation are greater among the larger establishments. By contrast, changes in work organization have no significant independent impact on work intensification in larger establishments. Even so, greater task flexibility remains a strong factor in bringing about work intensification, as shown in column (4).

As shown in columns (5) to (8), within both sectors, the role of changes in work organization are again evident only in small establishments. The impact is greatest in the production sector. The impact of technical innovation in the production sector is similar for both large and small establishments, though only significant in the case of large establishments. In the service sector, technical innovation carries a substantially greater impact in large than in small establishments.

In several cases the introduction of high commitment policies has the predicted effects, consistent to some extent with hypotheses *H3* and *H4*. Worker involvement policies are effective in small establishments, and then significantly so only within the service sector (column(7)); they are not effective in influencing effort in large establishments. The point estimate of the impact of introducing Performance Related Pay on work intensification is also greater in smaller establishments, and indeed in larger production sector establishments has a very small and insignificant link with work intensification.

The decline in the use of collective bargaining has the expected association with work intensification (*H5*). However, perhaps because the variable picks up declining union influence in general, rather than declining influence specifically on working conditions, the impact is not all that well defined. In the sectoral analyses (columns (4) to (8)) the point estimates remain positive but are insignificantly different from zero.

Increased uses of temporary agency employees or of contractors are each significantly associated with work intensification, but the impact varies according to sector and size of establishment. In particular, temporary agency employees are associated with work intensification in large production sector or small service sector establishments. The use of contractors has an association with work intensification in larger establishments and in small production sector establishments, but not in small service sector establishments. By contrast, the increased use of fixed term or part-time workers is not correlated with intensification in either sector. These findings thus provide only weak support for a link between insecurity and hard work (*H6*). The support is weak, not only because fixed term workers do not work any harder than permanent workers, but also because contractors and temporary agency workers (who might be expected to feel insecure) only constitute a small minority of British workers. Nevertheless there does appear to be a small association between the decision to deploy more non-standard workers and the intensification of work.

Work intensification is stronger in public organizations, consistent with the raw data results from WERS98 and other sources shown in Tables 1 and 2a, and also consistent with case studies (Doyle et al, 2000). The only exception is within the production sector, where only 1 percent of organizations are publicly owned. I also included as a control whether a private-sector establishment had been in the public sector five years previously. As expected a privatised establishment had substantially higher levels of work intensification. However, less than a half per cent of establishments fell into this category. Finally, work intensification has been greater in the service sector than in the private sector over this period.

Various alterations to the specifications used in Table 3 were tried. First, other changes of ownership (such as result from merger or take-over) could have been a possible source of intensification, if the new owners were to press for higher effort levels. However, there was no evidence for any such effect in the data. Second, I investigated whether there was any complementarity between the deployment of human resource techniques and changes in technology and work organization. It might be argued that technological change would have a greater impact on effort and on productivity if management were successful in inducing employees to devote higher work effort. Accordingly, I interacted the high commitment variables with the new

technology and new work organization variables. But the interaction effects were small and insignificant. Third, I included a dummy variable indicating whether there had been job reductions in the previous 12 months. Job reductions might be thought of as one route towards job intensification. As expected, this variable carried a positive and significant coefficient, thus showing a positive association between intensification and downsizing. However, this variable is not included in the table of main findings, since it is arguably inappropriate to include an explanatory variable which could be seen as a proxy for the intensification measure. A second reason for not including downsizing is that the measure applies to a shorter period than does the intensification measure. Nevertheless, it is reassuring that all the main findings are robust to these possible alterations to the specification, in that the other coefficients are not sensitive to the inclusion of ownership variables, interaction terms or the downsizing variable.

b) Within-Sample Predictions

Although the above analysis has shown that each hypothesis can be confirmed to some extent by the evidence, we are also interested in the relative importance of each change. For example, technological change has been shown to be a significant determinant of effort intensification. Some 46 percent of management respondents reported that their organization had introduced new technology, new techniques or procedures and changes in work organization. Only 11 percent had introduced none of these changes. By contrast privatisation, although it has a large effect on work intensification, is rare, occurring in only 0.4 percent of cases.

Table 4 quantifies the importance of the various hypotheses in explaining overall intensification, by using within-sample predictions, as follows. Panel (1) gives the average predicted probability across the sample of falling into the category of effort having “gone up a lot”. The second panel gives the same predicted probability, under two alternative scenarios, given by the assumptions that there was either no technological change in any establishment, or that all establishments experienced technological change in full. To illustrate the difference between these two scenarios, the dummy variables for technical innovation, new work organization and greater task flexibility are switched from all zero to all one. For this purpose, the other variables were left unaltered. As can be seen there would be less work intensification in both

small and large establishments if there were no technical change. The predicted probabilities would fall from 40 percent to 23 percent in small establishments, and from 44 percent to 26 percent in large establishments. By contrast, if technological change had been diffused to all establishments, the levels of work intensification would have been substantially higher – 51 percent in small and large establishments.

Subsequent panels carry out the same illustrative exercise for the other sets of factors affecting intensification. Panel (3) shows the role played by high commitment policies – a substantial one in small establishments but only a modest one in large establishments. If establishments had, hypothetically, neither increased their use of performance-related pay nor introduced employee involvement policies, the predicted probability of effort having “gone up a lot” would have fallen from 40 percent to 32 percent in small establishments, and from 44 percent to 43 percent in large establishments. The decline in union power made virtually no difference in either small or large establishments (panel (4)), even though this variable coefficient was significant in Table 3. Had there been a more widespread decline in union power, however, there would have been, according to these estimates, a substantially greater work intensification. The increased use of non-standard workers had some moderate effect in both small and large establishments (panel (5)).

Panel (6) shows the significance of sector. If all establishments were, hypothetically, in the public sector, the extent of work intensification would have been somewhat more in both small and large establishments. Finally, panel (7) shows for good measure the impact of all these factors taken together on intensification by supposing that none of them took place: it suggests that only 12 percent small establishments and 15 percent of large establishments would register that hard work had gone up a lot; by contrast, if all of them took place, the equivalent percentages would have been 82 percent for both types.

The overall conclusion from this exercise is that, while all factors included in the analysis contribute to the intensification of work, the technological changes that have occurred in the sampled establishments constitute the most important set of factors that can be identified as having raised work intensity in these establishments.

c) Respondents' Views

It is informative to compare the statistical findings reported above with the opinions of the survey respondents about some of the same issues. In particular it is possible to examine respondents' own views about the impact of workplace changes. Where managers and worker representatives had named more than one form of change in the previous five years, they were asked to state which had had "the greatest impact on employees" working at that workplace. Table 5 summarises their responses.

It can be seen that, for both types of respondent, the introduction of new technology in their workplace is seen as the main source of change in the greatest proportion of cases. Changes in work organization, and in work techniques and procedures, are ranked second and third respectively. These views are consistent with the findings from the statistical analysis in Tables 2 and 3.

d) Further Robustness Checks

The robustness of the findings could also be examined using information from the alternative measure of effort change, that which is reported by workplace representatives. This measure is only available in a minority of establishments. I re-estimated the specifications reported in Table 3, but restricted the sample to those cases where the manager and the workforce representative differed by no more than one category in their assessments of work intensification. The rationale is that in these cases there should be less error in the dependent variable. The disadvantage of this method is that, if only those cases are included where a comparison of the manager's and the worker representative's assessments can be made, the sample size is very substantially reduced. To overcome that problem, a second variation is to include also those where a manager's but not a worker representative's assessment is available. In either case, a similar pattern of findings is discovered, and in particular hypotheses *H1* and *H2* continue to be supported.¹⁶ For example, using the latter method, technical innovation and introduction of task flexibility both have positive and significant impacts on work intensification in small establishments. As a third variation, I substituted the worker representatives' assessment of effort change as the dependent variable. For independent variables I also substituted the worker representatives' reports of changes in production for the managers' reports. The result of this exercise confirms the impact of technological change on work intensification, in that there is a significant impact associated with their perceptions of the introduction of new work organization in large

establishments, or of task flexibility in small establishments. The exercise also confirms the impact of increases in performance related pay on work intensification in large establishments, and the greater intensification experienced in the public sector.¹⁷

5. Conclusion

If it is accepted that this has been an era of work intensification, it is surely not the first such time in history.¹⁸ In this paper, I have argued that an important source of modern work intensification lies in the nature of technological changes introduced in recent decades. A reading of the case study literature suggests, on the one hand, that technical innovations and new forms of work organization have been associated with greater managerial control over the labor process, and that this improved control is likely to bring higher effort levels. On the other hand, the improvements in technical efficiency that the innovations and new forms of work organization have introduced have tended to be “effort-biased”. By enhancing the ability to deliver work to the worker, these technological changes enable the porosity of the working day to be reduced.

Several complementary explanations have been tentatively supported, on the basis of a British establishment-based data set, the WERS98. First, effort is intensified more in workplaces where technological change has occurred. In every variation examined, effort is raised by one or more of the indicators of technological change. Their relative importance appears to differ somewhat across sectors: changes in work organization are especially important in smaller establishments of less than 100 workers. To a considerable extent new forms of work organization require increases in task flexibility, which itself contributes to work intensification. The impact of these factors is non-trivial, in that within-sample predictions of what would hypothetically happen, if such changes did not occur, imply that work intensification would have been at a substantially lower level. The findings suggest that, if changing technology and work organization continue to be complementary with higher levels, rising work pressure (with attendant welfare implications) will continue to be an issue for some time in many sectors of the economy.

A second possible explanation of work intensification is that the use of high-commitment policies can have a substantive impact on effort. The findings suggest that

high-commitment policies – both employee involvement schemes and effort incentives – appear to engender greater effort. Within the sample managers are reporting increases in both types of policies, and these would be sufficient to predict a noticeable overall work intensification.

Third, the decline in the importance of collective bargaining is found to raise effort, consistent with findings comparing countries across the European Union (Green and McIntosh, 2001), but the magnitude of the effect is small for the period under investigation here (1993 to 1998). Fourth, there is also some impact from increased usage of “non-standard” workers, particularly temporary agency workers and contractors. Finally, effort intensification has been substantially greater in the public sector.

Given the subjective nature of the effort intensification data used for this analysis, these findings should not be regarded as definitive. They await confirmation from other data sets with other measures of effort changes. Other factors may also be involved which have not been empirically evaluated here. It is possible that exogenous shifts on the supply side might have prompted an intensification of work effort. If jobs have become more fulfilling, or if workers' material wants are raised, workers' aversion to high effort jobs could be reduced, and so they might choose higher pay and higher effort jobs than before.¹⁹ A general empirical assessment of the importance of such supply shifts relative to demand shifts could be useful, given their substantively different implications for worker well-being. In principle, an assessment might be gleaned from knowledge about the returns to high effort. However, compounding the difficulty for researchers arising from the comparative scarcity of data on effort, much of the return to current effort will be in the form of future pay rises, and promotions, or beneficial job transitions. Such future returns cannot be properly estimated from individual earnings functions linked to contemporary effort; hence any assessment awaits data that could allow an investigation of the link, if there is one, between wages and past effort.²⁰ A potential avenue for future research could thus be to explore the life-cycle determinants of work intensification.

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Table 1 The Intensification of Work Effort during the 1990s in Britain.

Effort in 1992, 1997 and 2001.

	Private Sector	Public Sector
% who strongly agree that “my job requires me to work very hard”		
1992	31.5	31.9
1997	38.2	44.3
2001	36.7	43.2
% whose job involves working at high speed all or almost all of the time		
1992	19.1	13.8
2001	25.2	26.3
% who strongly agree that “I work under a great deal of tension”		
1992	13.5	18.4
2001	19.5	24.5

Sources: Author’s own calculations using the Employment in Britain survey, the 1997 Skills Survey and the 2001 Skills Survey. For descriptions of these surveys, see Gallie et al (1998), Ashton et al (1999) and Felstead et al (2002) respectively.

Table 2 Descriptive Statistics*a) Dependent Variable: Change Over Previous Five Years In How Hard People Work*

	According to Managers (% of 1934 establishments)			According to Workplace Representatives (% of 823 establishments)		
	All	Private	Public	All	Private	Public
Gone up a lot	39.7	36.3	49.0	60.9	50.8	66.6
Gone up a little	37.4	37.4	37.2	19.9	34.7	11.5
Stayed the same	21.0	23.7	13.4	14.0	10.3	16.2
Gone down a little	1.6	2.1	0.4	4.1	1.9	5.4
Gone down a lot	0.4	0.5	0	1.0	2.3	0.3

b) Independent Variables: Changes Within Previous Five Years

	All (% of establishments)	Small Establishments (<100) (% of establishments)	Large Establishments (>=100) (% of establishments)
<u><i>Technological Change</i></u>			
Both "new technology" and "new techniques or procedures"	55.4	53.9	67.6
New work organization	64.4	63.0	75.2
Greater task flexibility	57.1	55.0	73.4
<u><i>Commitment</i></u>			
Introduction of initiatives to involve employees	52.3	51.0	63.1
Increases in proportion of Performance Related Pay for non-managerial workers (PRP)	31.4	30.9	35.2
<u><i>Workforce Structural Variables</i></u>			
Collective bargaining less important	5.0	4.2	11.1
<u><i>Increases in use of:</i></u>			
Fix-term workers	17.4	16.7	22.9
Temporary workers	12.9	11.9	20.8
Contractors	22.2	21.2	30.0
Part-time workers	33.3	32.3	40.5
<u><i>Ownership</i></u>			
Privatised firm	0.4	0.5	0.4
Public Sector	24.8	24.3	29.2

Note: cases are weighted to take account of stratified random sampling using varying sampling proportions, thereby providing unbiased population estimates. For questions from which variables derived, see text, Section 3.

Table 3 Determinants of Work Intensification, 1993-98

	(1) Small	(2) Small	(3) Large	(4) Large	(5) Product- ion Small	(6) Product- ion Large	(7) Service Small	(8) Service Large
<i><u>Technologic al Change</u></i>								
Technical innovation	0.158* (0.086)	0.113 (0.085)	0.312*** (0.086)	0.272*** (0.087)	0.319 (0.226)	0.312* (0.180)	0.146 (0.092)	0.311*** (0.098)
New work organization	0.289*** (0.091)	0.199** (0.094)	0.101 (0.097)	0.053 (0.100)	0.477* (0.245)	0.012 (0.218)	0.258*** (0.097)	0.143 (0.106)
Greater task flexibility		0.494*** (0.087)		0.401*** (0.090)				
<i><u>High Commitment</u></i>								
Involvement initiatives	0.289*** (0.088)	0.275*** (0.089)	0.018 (0.080)	0.005 (0.081)	0.321 (0.217)	0.118 (0.167)	0.291*** (0.095)	-0.031 (0.092)
More PRP	0.267*** (0.090)	0.196** (0.090)	0.150* (0.080)	0.118 (0.080)	0.620*** (0.204)	0.041 (0.152)	0.228** (0.101)	0.171* (0.094)
<i><u>Workforce Structures</u></i>								
Less bargaining	0.247* (0.146)	0.222 (0.148)	0.211* (0.114)	0.194* (0.113)	0.190 (0.314)	0.266 (0.220)	0.272 (0.173)	0.195 (0.134)
<i><u>Increases in use of:</u></i>								
Fix-term workers	-0.037 (0.109)	-0.011 (0.108)	0.023 (0.089)	0.024 (0.089)	0.062 (0.267)	-0.069 (0.182)	-0.059 (0.116)	0.078 (0.101)
Temporary workers	0.198* (0.116)	0.195* (0.117)	0.189** (0.088)	0.196** (0.089)	-0.205 (0.263)	0.270* (0.163)	0.278** (0.134)	0.162 (0.104)
Contractors	-0.008 (0.093)	-0.039 (0.094)	0.321*** (0.085)	0.309*** (0.086)	0.555* (0.284)	0.312** (0.156)	-0.068 (0.097)	0.313*** (0.101)
Part-time workers	0.062 (0.085)	0.022 (0.085)	0.093 (0.079)	0.101 (0.079)	0.033 (0.243)	0.045 (0.168)	0.103 (0.091)	0.105 (0.088)
<i><u>Other</u></i>								
Privatised firm	0.679 (0.615)	0.809 (0.545)	0.971* (0.522)	0.989** (0.502)				
Public sector	0.389*** (0.099)	0.421*** (0.101)	0.285*** (0.089)	0.303*** (0.089)	0.451 (1.035)	0.212 (0.465)	0.369*** (0.097)	0.259*** (0.091)
Production sector	-0.228** (0.102)	-0.300*** (0.102)	-0.247*** (0.092)	-0.288*** (0.092)				
n	857	856	951	951	127	240	742	726
pseudo-R ²	0.059	0.076	0.049	0.059	0.131	0.035	0.050	0.043
Wald chi2	113.32	143.62	93.85	123.73	31.6	18.7	84.9	62.6

The dependent variable is the manager's estimate in 1998 of the change over previous five years in how hard people work at the establishment. With the exception of the sectoral dummies, all independent variables also refer to changes over five years. For questions from which variables derived, see text, Section 3. Estimation is by ordinal probit; robust standard errors are in parentheses; significance levels, ***=1%, **=5%, *=10%. "Small" establishments have less than 100 employees.

Table 4 Illustrative Predictions of Work Intensification*

		Small Establishments (%)	Large Establishments (%)
(1)	Within Sample	39.6	44.4
	<i>Effect of alternative scenarios: †</i>		
(2)	Technological change		
	None	22.7	25.6
	All	50.7	51.3
(3)	Increase in commitment policies		
	None	31.7	42.6
	All	48.4	47.1
(4)	Fall in union power		
	None	38.8	43.6
	All	46.6	50.7
(5)	Increase in use of non-standard workers		
	None	38.5	36.6
	All	44.3	60.0
(6)	Public sector		
	None	34.7	40.9
	All	49.6	52.1
(7)	(2) to (6) together		
	None	12.2	14.7
	All	81.8	81.6

*Average predictions of the probability that how hard people work has “Gone up a lot”, derived from estimates shown in columns (2) and (4) of Table 2.

† For each scenario, "None" means that in the cases where the relevant explanatory variable(s) equalled one, these variables were recoded to zero, i.e. indicating no change. All other variables were not altered. Then the average prediction was re-calculated. By contrast, in each scenario "All" is the average prediction after all the relevant variables have been re-coded from zero to one.

Table 5 Main Source of Changes on Employees: Respondents' Opinions

<i>Changes in:</i>	According to Managers (% of establishments)	According to Workplace Representatives (% of establishments)
Payment systems	4.5	5.4
New technology	33.5	26.3
Working time arrangements	7.8	17.2
Organization of work	18.6	23.6
Work techniques or procedures	14.2	18.5
Introduction of initiatives to involve employees	11.2	4.1
Introduction of new product or service	10.3	4.8

Note: cases are weighted to take account of stratified random sampling using varying sampling proportions, thereby providing unbiased population estimates.

Notes

¹ Typical examples are ACTU (1998) in Australia, Sherwen (1999) in the U.K.

² This question was originally asked in the US Quality of Work Life question during the 1970s; see Bielby and Bielby (1988). The UK surveys are the Employment In Britain survey of 1992 (EIB), the Skills Surveys of 1997 and 2001. Details can be found, respectively, in Gallie *et al* (1998), Ashton *et al* (1999) and Felstead *et al* (2002). The years 1992, 1997 and 2001 are not ideally placed at similar points of the economic cycle. However, the effects of the cycle on work effort are theoretically ambiguous.

³ An increase in productivity wrought solely by an increase in work effort is thus not an efficiency gain.

⁴ Complementarities between technical change and certain work reorganizations have been examined both theoretically and empirically (Milgrom and Roberts, 1990; Bresnahan *et al*, 1999; Caroli and Van Reenen (1999).

⁵ However, electronic control of work flows predates call centres by some two decades (Barker and Downing, 1980).

⁶ An illustration is given in the slogan of a recent advertisement for a major ICT company. The ad pronounces that "you no longer need to be at work to be working".

⁷ An alternative view of TQM sees it as bearing a *mix* of efficiency gains and work intensification, which is not necessarily disliked by workers if it is accompanied by other changes, such as greater employee involvement (Edwards *et al*, 1998; Ichniowski *et al*, 1996; Wilkinson *et al*, 1997).

⁸ Ironically, this sequence in which high effort workers are identified and idealised through the prize of high pay is reminiscent of the early days of introducing Taylorism.

⁹ Studies of downsizing are consistent in assuming that it raises the workload for remaining workers; but they suggest a mixed impact on financial performance, which may be constrained by low morale and impaired efficiency (e.g. Mishra *et al*, 1998; deVries and Balazs, 1997).

¹⁰ Note, however, that unemployment duration in the US was decreasing in the 1990s.

¹¹ See Department of Trade and Industry (1999).

¹² An additional test of validity would be to subject the data to post-interview cognitive testing; however, no such tests are available in this instance.

¹³ The managers' estimate of productivity change is also positively correlated with the workers' perception of effort change, with a Spearman correlation coefficient of 0.125 ($p=0.00$).

¹⁴ For comparability, all samples used in this calculation are restricted to establishments of 25 or more workers.

¹⁵ The Spearman correlation coefficient between increases in task flexibility and the introduction of new work organization is 0.26 ($p=0.00$); and between the former and the technical innovation is 0.22 ($p=0.00$).

¹⁶ Restricting the sample to where both assessments agree precisely again lowers the sample size, but reproduces the same pattern of findings.

¹⁷ For brevity, these robustness exercises are not shown but are available on request from the author.

¹⁸ For example, the need to accustom people to the discipline of factory labor was a key task for capitalists in the initial stages of the industrial revolution.

¹⁹ This result follows formally from a standard effort model such as Barzel (1973), except effort here is work intensity rather than the length of the working day.

²⁰ Bell and Freeman (2001) show that long-hours working is a significant determinant of pay several years later, in both the United States and Germany.