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The End of National Models in Employment Relations?

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Abstract
The erosion of a number of national systems of employment relations, and the evidence from large scale workplace surveys has brought attention to the considerable diversity of employment systems within major economies. This essay applies the theory of evolutionary games to explain the diffusion of different employment systems within national economies, and how they interact with established sectoral and national level institutions. This also helps to explain potential tipping points in their expansion and retreat. Evidence to support the argument is taken from the British and French workplace employment relations surveys and the European Working Conditions Survey.

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1. Introduction

This essay develops and tests a theory to explain the diversity of employment systems within national economies. National models have long played a central part in our thinking about labour markets, management and employment relations. They have usually involved stylised descriptions. Their potential limitations have become apparent in recent years because of the growing number of large-scale surveys which include institutional data. These provide evidence of considerable diversity of employment systems both within national economies and broad industrial sectors, including those with strongly developed national and sectoral institutions. At the same time, the decline and transformation of some once powerful national models means we can no longer treat them as dominant within their own economies. The most recent case has been Germany since the mid-1990s, but one could equally well take the American, British, Swedish or Japanese models, which have similarly undergone decline and transformation.

The significance of these events stems from the contribution national systems and societal models have made to employment relations theory by highlighting the way labour institutions are mutually interdependent (eg. Dunlop 1958, Katz and Darbishire 2000). They have shown how national training and authority systems influence workplace organisation (Maurice et al. 1982), and have provided the context for analysis of the evolving strategies of national union movements (eg Hyman 2001). The 'varieties of capitalism' theory has shown how individual firms benefit by aligning their business strategies with national systems that integrate employment relations, corporate governance, training and firm-networks (Hall and Soskice, 2001). Such benefits have encouraged employers to participate in the further development of these institutions. Traxler (1995) and others have shown how national and sectoral employment relations institutions are built on coalitions of interests and so will always be subject to an organisational logic which may periodically override economic considerations. This is well-illustrated in Streeck's (2009) analysis of the decline of German 'diversified quality production' (DQP), a key exemplar of the coordinated variety of capitalism. There national institutions had generalised the institutions underpinning DQP across the economy causing the financial difficulties in the many firms for which it was not essential which led them to opt out. National models have also provided the background for analysing the impact of globalisation and deregulation on sectoral employment relations. There the loss of rent sharing opportunities from dominance of large domestic markets, combined with internationalisation of markets, undermined their integration into established national models. The telecom sector and its deregulation would be an example (Doellgast, 2009). A common strand running through these models is the interaction of different system actors, and how they respond to tensions such as those arising from over-reach and external shocks. Intra-national diversity of employment systems is therefore likely to be a source of instability and decline rather than a normal state of affairs.

This essay seeks to contribute to our understanding of national models by showing why they normally coexist with intra-national diversity of employment systems. The core argument is that the diversity of employment systems within national economies reflects the use of different norms of exchange[1] which ensure that the trading of labour services for pay satisfies both parties and delivers the deal that was initially agreed. Employment relationships

[1] Stinchcombe (1986: 231) defines them as follows: 'People enter exchanges in modern economies to get what they want. Consequently norms about exchanges are mainly norms to see to it that they get what they want'. In this essay, 'work system' is used to denote patterns of work organisation, and 'employment system' is used to denote work systems governed by particular norms of exchange, and 'contractual' is taken to cover legal, agreed and customary frameworks.

comprise a 'zone of acceptance', that is a set of duties between which management may direct workers using an authority relationship, without having to renegotiate the initial deal. However, this is never fully codified, and the weaker party is always exposed to the possibility of a hold-up by the stronger one, seeking to extend or restrict this zone. Norms of exchange, as Collins (2006) observes, serve to 'stabilise expectations' and they help identify and sanction potential breaches. As will be seen, exchange norms differ in the degrees of flexibility and scope for joint investments in training they provide. Hence, one influence on their adoption relates to the type of product and its production technology. However, given the technical feasibility of increased output, the parties still need a viable contractual framework to govern their collaboration. Even though both may wish to trade at current prices, a lack of trust could prevent it. The framework's efficacy depends upon the dynamics of individual norms of exchange but it may be enhanced by peer group collective action. Thus the diffusion of different norms of exchange within national economies will be shown to depend upon the production systems used, the nature of employment transactions, and collective action by both labour and employer groups.

The essay opens by illustrating the diversity of work systems within EU member countries using the European Working Conditions Survey (EWCS). It then develops a simple model to explain how the norms of exchange governing employment relationships can emerge and spread by decentralised interaction between firms and workers. It examines evidence from the British and French workplace surveys and the EWCS. It concludes by arguing for an approach to national models that gives more attention to the articulation between exchange norms on the one hand, and production systems and collective action on the other.

2. Intra-National Diversity of Employment Systems

The diversity of employment systems within countries is well-illustrated for the European Union using the EWCS for 1995-2005. Drawing on the recent literature on work systems, Lorenz and Valeyre (2005) identify four ideal types, and assess their extent using the 2000 EWCS.[2] They are 'Learning', 'Lean', 'Taylor', and 'Simple/Traditional'. The distinguishing features of the learning model are employee discretion, problem-solving and on-the-job learning. Those of the lean model include team working, rotation, and some problem-solving but with imposed quality norms, and team and hierarchical constraints. The taylor system is characterised by low job complexity, monotony, hierarchical constraints, and an absence of problem-solving and learning. In contrast, the simple/traditional model scores low on learning but relatively high on autonomy, and freedom from constraints. They noted that it was less well-defined in their data than the other types as it combined feature of both skilled craft and simple unskilled work. Although one might question the validity of their results for 2000 because of the small national samples for the EWCS, and the limited range of questions on which their typology is based similar results are obtained for 1995 and 2005, even when the work system clusters are estimated separately for each annual sample. Figure 1 shows the distribution of the four work systems in each country between 1995 and 2005. All four are present in varying proportions in all member countries. Their distribution appears relatively stable over the period, although allowance must be made for the relatively small sample numbers in each country. The Scandinavian countries, Germany and the Netherlands are well-endowed with the learning model. These inter-country differences are only partly explicable by industrial and occupational composition: the rankings of country shares are very similar

[2] The same typology is used by Holm et al (2010), and the European Commission (2008: Ch. 4).

between industry and services and between blue and white collar occupations, with correlations for most work systems over 0.6. Over a longer period there is evidence of the spread of many practices associated with 'high involvement' work systems shown for example the British WERS surveys between 1984 and 2004 (Wood and Bryson, 2009: 160-161), and of more sophisticated incentive pay systems often associated with these in Britain for 1984-2004 (Pendleton et al. 2009), in France for 1992-2004 (Chaput and Wolff, 2008), and in the US (Osterman, 2000).

3. A Theory of the Diffusion of Exchange Norms and Employment Systems

To understand how national differences in the mix of employment systems arise, this essay now turns to the dynamics of social interactions at the level of individual transactions. Although the model builds up from the individual level, there several ways in which exchange norms benefit from collective action. The core of the argument builds on the work of Maynard Smith (1982) and Bowles (2004) on the emergence of norms of exchange in decentralised environments, and applies it to employment relationships. These norms reduce conflict and improve cooperation in economic interactions. This explains their diffusion. However, it depends on certain key assumptions relating to their enforceability and their fit with production conditions. When these are not met, the norms may lose their coverage. The paper later analyses how different types of exchange norms provide employment relationships with varying qualities of cooperation and their fit with production conditions.

3.1 The diffusion of exchange norms and the employment relationship

To keep the analysis simple, assume that individual agents, workers or employers, meet and decide whether to collaborate in an employment relationship for a single period. They are attracted to this because team production generates a surplus compared with working alone. Assume that a saleable product is available only at the end of the collaboration, and that there is no market for unfinished goods. Materials and equipment have to be paid for in advance. The problem the agents have to solve is how to share the surplus resulting from their joint activity without jeopardising their collaboration. One strategy is to play 'hawk'. Either party may threaten to terminate the relationship in order to boost its share. If the employer successfully threatens dismissal, it may win the whole surplus, but if the worker then quits, it is left with unmarketable goods and the cost of materials. If the employee quits or is dismissed, then he or she faces unemployment and no income until the next period. Thus both parties may play hawk to extract a bigger share, but open conflict brings the risk of severe economic loss.

An alternative strategy is to play 'dove', and concede one's share of the surplus when confronted by hawk behaviour, making do with one's reservation income – what one would have earned by working alone. This avoids the costs of open conflict. When two doves conflict they avoid escalation, and instead wrangle over shares of the surplus. They lose productive time when haggling, but it is considerably less than with open conflict. A good illustration of such protracted low-level conflict can be found in piecework bargaining in British engineering in the 1970s (Brown, 1973).

In Figure 2, the rows show the expected pay-offs to one's own strategy depending on that adopted by the other party (for details see Appendix Box 1). The final column summarises these assuming encounters with each of the other strategies are equally probable. If one plays hawk, as in the top row, the expected pay-off for the contest with another hawk is negative because the likely cost of the contest more than offsets the gain of an increased share. On the other hand, when confronted with a dove, the hawk gains the increased share

and there is no contest to reduce its value. In the middle row, dove-dove contests yield modest rewards to both parties from sharing a pie diminished by haggling.

The third option is the 'bourgeois' strategy. Its key innovation is to adopt a rule, and play hawk when one is the incumbent, and dove when one is not. In Maynard Smith's example, animals play hawk to defend their territory or their mates, but otherwise play dove. An analogous decision rule in the employment field is to agree a contract, formal or customary, to determine entitlements to the surplus in advance. The agent then plays hawk if the other party tries to breach it, but otherwise follows the contract. This avoids both the cost of serious conflict and the lost production associated with prolonged haggling. The pay-offs to the bourgeois strategy exceed those of the hawk because it reduces the number of occasions when conflicts escalate and losses ensue. Its superiority is shown by the higher pay-offs for those adopting it compared with the other two strategies in the right hand column in Figure 2. The two key assumptions generating this result are that bourgeois strategists consistently punish breaches by hawks, and that the cost of conflict exceeds the gain. If these two conditions hold, Maynard Smith shows that playing bourgeois is an evolutionarily stable strategy (ESS) that will diffuse widely and will be resistant to attempts by other agents to play hawk. This is a powerful result, but it also invites reflection on what happens when the two key conditions are not met, or are only partially so, as often occurs in employment relationships. How this affects the diffusion of bourgeois strategies is developed in Figure 3.

The top left panel explores payoffs if the proportion of agents adopting particular strategies varies, in this case, hawk and dove. It may seem paradoxical that doves should prosper amid a population of hawks. The reason is simple: where there are many hawks, a contest with another hawk is very likely. The few doves may always lose out to hawks, but by avoiding such contests they avoid losses, and they still have their reservation income from working on their own account. The downward sloping lines show that the expected pay-offs for each strategy decline as the proportion of hawks in the population increases. When there are few hawks, it is good to be a hawk because they can exploit the doves, but when there are many, attempted exploitation draws retaliation. If the conflict costs exceed gains, then the hawks' losses quickly mount. Beyond the point where the two lines cross, where about two thirds are hawks, it becomes advantageous to play dove, on the basis of the assumed pay-offs in Figure 2. Thus, an equilibrium distribution emerges with a population of two-thirds hawks and one-third doves, and the two patterns of behaviour would coexist in that proportion.

However, as Maynard Smith points out, although representing equilibrium at the level of the population as a whole, this does not help agents select their strategy in any given situation. The bourgeois strategy addresses this problem by providing a clear decision rule: play hawk if your partner tries to cheat, but otherwise cooperate. The top right panel shows how the pay-offs to the bourgeois strategy evolve as the share of hawks in the population increases. Unlike in hawk-dove contests, whatever the percentage of hawks it is always better to play bourgeois, if potential losses exceed potential gains. Provided the bourgeois strategy is played consistently, it will diffuse over the whole population, and will not be driven out by hawk strategies.

The lower panels consider what happens if the two key assumptions are not fulfilled in hawk-bourgeois contests: if bourgeois agents fail to apply their strategy every time; and if the ratio of conflict costs to gains drops below unity. If it were very costly for workers to punish their employers for breaches, perhaps because high unemployment made finding alternative jobs very difficult, then they might retaliate only occasionally. This may also apply to employers when the costs of replacing individual workers who quit or are dismissed are high, especially in smaller firms (Baron and Kreps 1999 Ch. 14). Thus, asymmetry in conflict costs may cause hawk behaviour to be punished only intermittently. The bottom left panel considers what happens if bourgeois agents act upon breaches and engage sanctions in only a

certain percentage of contests, comparing enforcement rates of 100%, 50% and 10%. Below 50%, the absolute superiority of the bourgeois over the hawk strategy is lost, and it becomes advantageous for an increasing share of the population to play hawk. With only 10% enforcement, the population will divide roughly 60:40 between bourgeois and hawk.
The bottom right panel illustrates how the bourgeois strategy loses its dominance if the second condition fails, and conflict costs fall below the corresponding gains. The ratio of conflict costs to gains changes if either the numerator or the denominator changes. Thus, if conflict costs increase, for example, because of laws applying damages for wrongful dismissal or breach of contract, provided they are symmetrical, then the bourgeois strategy will become more attractive. Conversely, if these are removed, the balance tips back towards the hawk strategy. As will be shown shortly, reducing the share of the surplus that can be won in a successful contest also raises conflict costs relative to potential gains, and thus strengthens the bourgeois against the hawk strategy. The panel also raises the question as to whether there are limits to the stability benefits from a high cost of conflict. For example, in Figure 2, if we triple the cost of conflict, the dove strategy emerges as the best, followed by bourgeois and then, a long way behind, by hawk. This point is taken up again at the end of the next section after considering the fit between different types of norms of exchange and production conditions.

3.2 Different forms of bourgeois strategy within employment relationships

Within employment relationships, the bourgeois strategy is manifest in a number of different exchange norms associated with different types of work system. These help to restore bourgeois behaviour if either of its two key conditions are eroded. This can be illustrated by the low and high discretion models identified by Lorenz and Valeyre (2006). Their distinction has a long pedigree: between low and high discretion work roles (Fox, 1974), between control and commitment (Walton, 1985), transactional and relational psychological contracts (Conway and Briner, 2005), and bureaucracy and adhocracy (Lam, 2000). These correspond broadly to two kinds of employment relationships according to whether mutual obligations and the zone of acceptance are specified in terms of *substantive* obligations which emphasise job content, or are kept diffuse but regulated by the need to observe *procedural* obligations (Marsden, 1999). A key difference between the two in the present context is that small breaches in the zone of acceptance can be detected much more easily in the former than in the latter which helps to ensure that the gain from any contest is small relative to the potential losses. These ideas are explored in Figure 4, which considers the impact of conflict costs and their asymmetry simultaneously.

The vertical and horizontal axes show the ratio of conflict costs to the surplus for each party, the conflict cost ratio, CCR. Its derivation is explained in Appendix Box 2. As shown earlier, in hawk-bourgeois contests, a ratio of less than unity favours the hawk strategy, and as the ratio increases above that level, it favours increasingly the bourgeois strategy. As a result, the higher its value, the more confident each party can be that the other will refrain from playing hawk. The vertical axis shows the ratio of costs to surplus for agent w, the worker, and the horizontal one, that for agent f, the firm or employer. The diagonal represents symmetrical, or equal, cost ratios for both parties, which was implicit in the pay-off matrix in Figure 2. When the ratios for both parties are below unity, in the bottom-left corner of Figure 4, neither party will wish to collaborate within an employment relationship because the risk of the other playing hawk is considered too great. If they still wish to trade, they may do so by open-market transactions for completed goods or carefully specified services, as in certain types of self-employment and freelance work. In the region where both ratios are above unity, two types of employment relationship are shown. The first is situated where the CCR exceeds unity, but by a small margin, and there is still a risk of hawkish behaviour, so the parties opt

for relatively codified work roles. The second, located where the CCR is much greater, is built on more flexible diffuse work roles.

The boundary between an open-market exchange and an employment relationship involves the transition from a contract in which mutual obligations are set out and agreed ex ante, at the moment of the initial deal, to one in which the parties agree leave the precise content to be determined later by management. For many agents, this zone may appear problematic because of uncertainty about the true values of each other's CCR. One solution is to opt for employment relationships in which work roles are based on detailed substantive obligations so that breaches can be quickly detected, and if necessary sanctioned. This is essential for the success of the bourgeois strategy. By breaking the transaction up into many separate tasks, one party can ensure that the potential gain from any one breach will be just a fraction of the total. Playing hawk for a small incremental gain when the potential cost of conflict is unchanged shifts the balance in favour of the bourgeois strategy. Thus the type of employment relationship likely most to prosper in this zone is one in which task discretion is low, and work assignments relatively inflexible, but both parties are better protected against hawkish actions by the other: that is, the taylor, and to a lesser degree, the lean model. The same device can be used to help protect one or other party if there is a significant asymmetry in conflict costs. This could help remedy the problem shown in the bottom left panel of Figure 3, where asymmetry causes the disadvantaged party to hold back from punishing hawkish actions, thus undermining the bourgeois strategy. Thus employment relationships built on relatively specific work roles are likely to be popular in this zone, and enable the parties to make the transition from open-market to employment transactions when the gains from collaboration are present, but there remains uncertainty as to how far the other party can be trusted not to play hawk. The same reasoning leads one to expect that agents will seek to limit investments in firm-specific training, thus reinforcing the narrowness of work roles.

Further to the right, the higher values of the CCR for each party represent greater potential losses in the event of conflict. Provided they are symmetrical, they create conditions in which the bourgeois strategy is secure against attempts to play hawk, and diffuse, flexible, employment relationships can flourish. The form taken by the bourgeois strategy in this zone is different. Whereas specific work roles give a more deterministic result in terms of job contents, diffuse work roles are less prescriptive giving only a probabilistic result. Hence, the *procedures* used to decide task allocations need to be clear. A statistical analogy is helpful. We can only judge whether rolling a die is unbiased by making repeated observations, but this is not possible for any singular event. We are therefore dependent upon knowing the procedure by which it is cast, and that it has been followed. A similar point is made in the procedural justice literature (Greenberg and Cropanzano, 2001). Managers have a privileged position in allocating work and assessing performance, but they are also the agents of the employer, and so could bias judgements in their favour. Without fair procedures, employees are likely to suspect that management will exploit diffuse work roles to enlarge the zone of acceptance without their agreement.

Voice mechanisms include procedures to regulate and renegotiate the zone of acceptance. Where substantive obligations are used, they can facilitate cooperation by means of 'common rule' establishing widely recognised sets of tasks and performance measures. For diffuse work roles, voice mechanisms are more diverse and complex. Finer grain communication is needed to ensure that a flexible zone of acceptance operates with goodwill and minimise the need for sanctions. Recent research has highlighted the range of voice mechanisms currently used in workplaces: from long-standing forms of collective union-led voice, through joint consultation and management-led forms of voice, such as meetings and performance appraisals, to individual employee voice (Amossé and Wolff 2008, and Willman et al 2009). Union-led voice has traditionally focused on the common rule, whereas the

management-led forms have had a special role in operating flexible working arrangements, but both studies emphasise that they commonly coexist within the same workplaces. With suitable channels, individual employee voice can play an important part, especially if employees feel they have a strong outside option to back it up (Marsden, 2010). In the present context, the significance of these voice channels is that they broaden the range of alternatives to quits and dismissals available to the parties, and so potentially support variants of bourgeois strategy, and hence favour their diffusion within an economy. The role of collective action in union-led voice is clear, but it may seem less familiar for employer-led voice. Nevertheless, Erickson and Jacoby (2003) and Marsden and Belfield (2010) have shown that flexible work and pay systems which use management-led voice encounter collective action problems that can be mitigated by management involvement in local employer organisations.

Transferable skills, such as those commonly found in professional and craft occupations, introduce an additional dimension to exchange norms. They combine the discretion associated with diffuse roles with the codification associated with specific ones and so lie in between the two. Transferable skills set limits to asymmetry because the existence of an external labour markets reduces both quit and replacement costs. This tends to favour flexible working. On the other hand, transferability requires similar job categories across organisations, which introduces a degree of rigidity in work patterns. Transferability also has implications for collective action as occupational markets need governance structures, for example, for accreditation and certification, and updating skills as conditions change (Kleiner and Krueger, 2009).

Finally, the fit between work systems and production technologies has been a long-standing finding of organisational sociology from Woodward (1958) onwards, and was the reason why Maurice et al (1982) controlled for technology when identifying their societal effect on work organisation in France and Germany. One can therefore expect low discretion work systems to fit best with production methods that emphasise cost minimisation and large batch operations whereas the high discretion ones fit best with small batch work for detailed customer specifications and where uncertainty about the product is greatest. Likewise, firms with similar products and market conditions are likely to experience similar technical influences on their choice of employment systems. A good fit contributes to the potential size of the surplus, although its realisation will depend also on having a suitable contractual framework. Fit raises a second question as to whether the stability that might come from high conflict costs is always beneficial. As production conditions change so may the employment system that is best suited. Too high a CCR could potentially stifle adaptation of employment systems, especially if its incidence is asymmetrical, because the potential loss from provoking conflict is too great. . In the long-run, this diminish the surplus and cause the coverage of an exchange norm to shrink as new entrants opt for a different rule, and existing organisations and their workers switch norms.

As concerns the diffusion of the different types of employment systems, the theory outlined so far suggests six simple hypotheses:

1) the higher the level of conflict costs relative to potential gains, the more readily the parties will adopt employment systems with diffuse work roles;
2) where the incidence of conflict costs is asymmetric the adversely affected party will seek employment systems with specific work obligations;
3) where the parties use employment systems with substantive obligations they will rely more on market-type sanctions such as dismissals and quits;
4) voice mechanisms will assist the development of employment systems with union-led voice based on the common rule where work obligations are specific, and management-led ones more so where they are diffuse.

5) collective action can boost the effectiveness of exchange norms by making them better understood to all the actors and better enforced.
6) technical conditions of production will influence choice of employment system.

4. Data and Key Variables

Data to test the relevance of this theory are taken from the British and French workplace employment relations surveys for 2004 (WERS and Reponse), and the EWCS for 1995-2005. The former two are nationally representative surveys of establishments. For comparability, the analysis is restricted to private establishments with 20 or more employees, the coverage of the French survey. The EWCS is a survey of households in EU member states designed to provide a representative view of working conditions at national level. The data used are confined to employees in private industry and services in establishments with 10 or more employees. Details are provided in the data appendix.

The key theoretical variables identified in the previous section relate to the cost of conflict, symmetry of its incidence, the sanctions associated with different types of work roles, the nature of procedures and voice channels to manage the zone of acceptance, and fit with production technology.

4.1 Conflict costs

A major component of the cost of conflict is the loss of investments in workplace training when the relationship ends in a quit or a dismissal. Thus a partial measure can be obtained from the surveys' data on expenditures of time or money on in-work training over the previous 12 months.[3] None of the surveys provides a suitable measure of the gains from conflict from which a conflict cost ratio may be computed, so the training measures have to be used as proxies. However, there are good reasons to expect them to vary in the same direction as the ratio. Firstly, training investments are amortized over many periods whereas the gain in one party's share is concentrated in the current period. Secondly, the measures are expressed per employee, so that days off work for training of high productivity employees will come at a higher cost to the firm than those of low-productivity ones. Nevertheless, these training measures typically capture only a fraction of the total amount of workplace training, notably omitting informal on-the-job training. The latter can be proxied by length of service, available directly in the EWCS, and in the workplace surveys, indirectly, by how long it takes for new hires to become effective in core jobs. These indicators are supplemented by considering the technical sophistication of the production system, such as in the use of computers and robots, which is likely to require additional training to raise workers' skills to the necessary level. An inverse measure of technical sophistication is provided by the percentage of blue-collar workers in the establishment.

4.2 Symmetry

Symmetry is also hard to measure directly, but asymmetry can be proxied by the degree to which either party is locked into the relationship by the lack of an outside option. On the workers' side, transferable skills and qualifications give outside options, for example if they are general professional skills that are widely recognised, as opposed to many blue collar and junior white collar skills that have been mostly learned on the job. Transferability is also affected by certification of in-work training, such as for apprenticeships and traineeships that

[3] In WERS and EWCS these are measured by days of workplace training per employee, and in REPONSE, by financial expenditures as a percentage of the wage bill (Q5.4a).

lead to recognised occupations in professional and some highly skilled blue collar occupations. The surveys used here do not provide direct measures of transferability, and reliance is placed therefore on professional and technician skills compared with blue collar skills. The state of the labour market, as gauged by national unemployment rates, can be used to supplement the EWCS analysis, although the small number of country and year observations means that it is likely to be collinear with other national level variables. Measures of employee perceptions of their own individual bargaining power exist in both WERS and Reponse in the form of judgements of how well they can look after their own interests when dealing with management without recourse to collective representatives. The validity of such questions is reinforced by their correlation with measures of employees' outside options (Marsden, 2010). For Britain, numbers in the employee sample were large enough to compute mean values for a reasonable sample of establishments, but not so for France.

On the employer's side, asymmetry increases with dependence upon a reliable supply of labour from its employees, such as whether it operates in very competitive markets where it is a price-taker, and whether it competes on price. Another aspect of the employer's outside option is the availability of vocationally educated labour in the external labour market, reflecting the ease with which skilled workers who quit or are dismissed can be replaced. This is captured by the share of young people of the appropriate age in upper secondary vocational education (ISCED3), which was added to the EWCS data. Thus transferability of skills and potential loss of business to competitors respectively capture each party's vulnerability to the threat of sanctions from the other.

4.3 Sanctions

The type of sanctions can indicate whether employment relationships rely upon substantive or procedural regulation. On the workers' side, these may comprise temporary and permanent withdrawals of labour through absenteeism, disputes and quits, and on the employers' side, disciplinary dismissals. It is anticipated that their intensity will be greater for specific than for diffuse work roles. Nevertheless, allowance must be made for employer policies to reduce absence, such as when their production systems are particularly vulnerable to its disruptive effects (Coles et al., 2007). Thus for Britain, a dummy variable was used to capture whether an establishment's absence rate was above the average for its sector. For France, management assessments of whether they experienced absenteeism problems for different occupations were used: blue collar workers were selected as the largest category. On the employers' side, the variable relates to whether the establishment had dismissed any workers over the previous 12 months apart from lay-offs. An alternative measure, available for the EWCS, is whether pay systems reward employee discretionary effort, such as pay for performance, or compensate for specific demands of the job, such as pay for unsocial hours. Whereas the former include pay systems that involve management discretion in appraising performance, the latter relate to codified, objective, aspects of the job. Thus one would expect pay for performance with the high discretion models and pay for job characteristics for the low discretion ones.

Direct measures of the specific or diffuse nature of work roles have already been used for identification of the four types of work systems, and so could not be used for this purpose. Paying 'efficiency wages', that are higher than those paid by their competitors for the same labour, is one way of reinforcing the dismissal threat as workers have more to lose if they are dismissed. It is also possible, as Akerlof (1982) argues, that efficiency wage practices create feelings of positive reciprocity, implying a different sign. These are measured by whether the establishment pays above the average for its industry.

4.4 Voice and procedures

Voice as a procedure for regulating employment relationships can be gauged by the presence of channels which provide alternatives to quit and dismissal threats. The OECD's employment protection legislation index (EPL) provides a national level indicator of the extent and strictness of procedural regulation of dismissals and employment adjustments. It is based upon legal and agreed procedures in force in member countries that regulate terminations of employment relationships by the employer (Venn, 2009). The collective dismissals component is particularly relevant because they provide an opportunity for employers to weed out their less productive employees more cheaply than under normal circumstances (Bewley, 1999). At such times, the dismissal threat to less productive employees is greatest.

Among other procedural mechanisms, one may distinguish those which are joint, involving worker and management representatives, and those which are management-led (Willman et al. 2009). The first include collective voice channels that can be measured by the presence of workplace representatives, works councils and local collective agreements, and by management involvement in local and sectoral employer organisations. The second focus on individual employment relationships, such as in consultation and performance appraisal. Although the surveys provide information on the presence of these practices overall, there is considerable variation in the way they operate in practice. Both surveys contain questions on whether there is consultation and negotiation over major organisational changes, such as would enable workers to gauge managers' good faith. Likewise, appraisals range from subjective performance measurement, following the metaphor of a 'test', to a wider process of goal setting and evaluation of outcomes in which employees are fully engaged, and in which procedural justice is critical (Greenberg and Cropanzano, 2001). The EWCS had limited questions on management-led and joint-union voice for 2000 and 2005, whether employees have discussed work issues with their line manager, and whether they have done so with an employee representative.

Industry controls are used in the regression to take account of the influence of production technologies on the demand for different types of employment systems. One would expect a strong influence of production conditions to show through in similar coefficients for Britain and France given competitive pressures to adopt the best technology for the sector, and for these to be consistent with the EWCS results. Nevertheless, some caution is needed on account of the small number of sectoral categories.

For all three data sets, multinomial logit regressions were used because the dependent variable, the use of one of the four types of work system is discrete, and exclusive: use of one system precludes use of the others. This method is appropriate because adoption of type of work system precludes adoption of the others so that choices are interdependent. The taylor system is set as base category and the coefficients on each variable for the other systems are expressed as deviations from it.

5. Results

The results from the British and French workplace surveys and the EWCS show a high degree of consistency in terms of the impact of key variables on adoption of different work systems. The workplace results are presented first, and then the EWCS is presented to highlight factors relating to inter-country differences.

5.1 Workplace results: Britain and France

(1) Conflict costs: In both Britain and France, learning and lean establishments were characterised by higher rates of workplace training than those characterised by the other two models. In France, because workplace training budgets are administered jointly through the works councils (comités d'entreprise) to which employees have a right in establishments with 50 or more employees, an interaction term for training and establishment size of less than 50 employees. In both countries too, the measures of technical complexity of the production system indicate that the learning and lean models are associated with greater skill investments.

(2) Asymmetry was picked up by whether employees have transferable professional skills or more firm-specific blue collar skills. In Britain and France the learning and lean models appear better endowed with professional skills than the other two models. In both countries too the learning model is less endowed with blue collar skills than the other models. Thus, the employee cooperation in the learning and lean models appears to be underpinned by a stronger outside option. In Britain, this is also reflected in employee assessments of their personal bargaining power which appear weakest in the taylor model. For France, smaller sample numbers for the employee questionnaire in France prevented computation of the same variable.

On the employers' side, the product market influences were weak and not very consistent between the two countries. Competitive product markers were positively associated with the learning and lean models in Britain, but significant only for the learning model, where firms were also less likely to compete on price. In France, in establishments with 200 or more employees the learning model was associated with less competition and the capacity to pay wages above the sectoral average.

(3) In both Britain and France, use of sanctions, notably dismissals and absence, to underpin the exchange was greater for the taylor model than the learning and lean models.

(4) Procedural regulation and employee voice was hypothesised to reinforce employment relationships by providing alternatives to quit and dismissal threats. Coverage by a collective pay agreement is positively associated with the lean model in Britain, whereas in France it is associated with both the lean and the taylor models. It was hypothesised that the emphasis on the common rule is more adapted to the lean and taylorist work systems. The presence of local workplace representatives, shop stewards and personnel delegates appears to have no special relationship with any of the four work systems. In Britain this may be because of their small numbers in the private sector, and in France, because of the universality of rights to representation.

Turning to management-led individual voice channels, in both countries, appraisal and consultation are positively associated with for the lean model, and negatively with the simple model although significance varies. Management engagement in employer local and regional activities, including employer organisations and HR clubs, was positively and significantly associated with the learning and lean models in France, but not Britain. A likely reason for this difference is that employer organisations are considerably stronger in France, and so able to provide a greater degree of practical support at workplace level. Finally, in a separate analysis for Britain, it was found that employee perceptions of individual voice over pay issues were stronger for the discretionary and simple models.

5.2 Employee results: EU countries (EWCS)

The results for the EWCS are shown in Table 2.

(1) Conflict costs: in-work training investments are greatest in the learning system, followed by the lean, and the other two systems. Employee length of service, an indicator of on-the-job training, is also strongest for the learning model.

(2) Symmetry of conflict costs is helped for employees by having a strong outside option. Thus, the learning and lean models appear strongly related to jobs requiring professional and technical qualifications, and negatively to blue collar occupations. An alternative measure, available for 2005 only, is a high level of general education (20 plus years), which is associated with the learning model. Finally, a key factor influencing symmetry is the national level of employment protection (EPL) provides protection against arbitrary dismissal threats. EPL for collective dismissals is strongly associated with the learning model compared with the lean and taylor models.

The employer's outside option, as represented by the general level of vocational education in the economy, is associated with the learning model, but some caution is needed because of limitations of the indicator used.

(3) The specificity or diffuseness of the exchange can be detected by the type of pay systems used. The results show that the learning and lean models are those most associated with performance pay, and the lean model, but not the learning model is associated with compensation for working conditions.

(4) Forms of voice could be measured only for 2000 and 2005 (available on request). Individual voice, with the employee's manager, was strongest in the learning, followed by the lean models, which is consistent with their higher levels of discretion. Collective voice with employee representatives was strongest with the lean model. As a robustness check, results were computed separately for several different measures of employment protection and collective employee voice at the national level, including the OECD's measure of coordination and union density. They could not be included in the same regression because of collinearity. All three measures favoured use of the learning model. Inclusion of country dummies (Table 2) had relatively little effect upon the coefficients of the main organisational variables, although many country coefficients were themselves significant.

5.3 Sectoral influences

The incentive for agents to collaborate stems from the surplus generated by their joint production, and this is driven in part by production technology. Ideally, one should model production functions which include organisational measures (eg Bloom et al 2007 for computer use), but this is not possible here. Nevertheless, if the influence on choice of employment systems is strong, it should appear in strong sectoral coefficients that are consistent across countries as international competition drives firms to adopt the best techniques of their competitors. Although allowance should be made for the limited sectoral breakdowns, in both Britain and France, the picture is mixed. The simple or traditional model is more likely to be found in distribution and transport, and the lean model less likely in business services, statistically significant in both countries, and although not statistically significant, the learning model was more commonly found in distribution, financial and private health and education services in both countries. In France, construction is associated, significantly, with the simple model, but not so in Britain. Considering the overall signs of sector coefficients across employment systems, the French workplace survey results appear slightly closer to those of the EWCS than do those for Britain, although in neither case is the match anywhere near perfect. Thus, while there is some evidence that sectoral production technologies influence choice of employment system, the lack of consistency across countries implies a weak overall effect, or one that is dependent on other factors, notably, the presence of the right kinds of institutional supports.

6. Conclusion

The theory and evidence presented in this essay imply a reconfiguration of some key elements of employment relations theory. Although collective bargaining and workplace representative institutions as well production technologies influence the diffusion of employment systems, they appear to do so as if refracted through the prism of exchange norms. The function of these norms and the reason they spread is that they facilitate productive collaboration by reducing the likelihood of conflict over distribution of the surplus it generates. Two overriding considerations were shown to affect the viability of that collaboration: conflict costs should exceed the likely gains; and their incidence should be symmetrical. Employment systems resolve these difficulties in a number of different ways. Detailed substantive obligations in work roles help to reduce the gains from any particular breach relative to the cost of sanctions, and so help to prevent asymmetry from growing to the point at which hawk strategies once again become attractive. Diffuse work obligations are high risk for both parties because the boundaries of the zone of acceptance are unclear. Much larger breaches may occur because it takes time for them to become apparent, reducing the conflict cost ratio for one or other party. Asymmetry may also arise because of unevenness of investments by one or other party in organisation-specific skills locking them into the relationship. The greater joint investments and higher risks associated with the diffuse model may go some way towards explaining its limited diffusion and the longevity of more robust specific models independently of production technologies and representative institutions.

The procedures regulating the zone of acceptance are important for both types of employment relationships, but in different ways, and involving different types of voice institutions. More traditional use of the common rule through collective bargaining fits well with specific work roles. However, it can easily conflict with the flexibility required of diffuse work roles, hence the importance of management-led voice channels and individual voice. Although management-led channels have grown in recent years, there appear to be important collective learning effects in their operation as highlighted by Erickson and Jacoby's study of the role of employer networks in supporting their operation. Evidence from the present study for France showed that such local employer activities were influential there. Employment protection arrangements have special significance for maintaining symmetry in diffuse work environments. Although giving rights to categories of employees, as does the common rule, they usually establish procedures for dealing with dismissals, and hence limit the degree to which the dismissal threat can be used to coerce employees into enlarging their zone of acceptance. The presence of transferable skills from craft and professional labour markets helps to moderate potential asymmetries in conflict costs although their effect could be measured only indirectly in this study.

Although evidence cited earlier indicates that the discretionary work systems have spread in recent decades, the EWCS data suggest that for the decade of rapid growth between 1995 and 2005, the speed of change has been quite moderate. The sectoral coefficients in the British and French regressions provide only weak evidence that fit with technological conditions influences firms' choice of employment systems, and the coefficients on the product market variables were also weak. Mismatch is consistent with the presence of high switching costs for work systems. This is not surprising because choice of strategies within employment relationships depends on expected gains and losses, and in particular on whether the other party will interpret certain changes as breaches and punish them. In this respect, change cannot be imposed unilaterally by one party, and requires an iterative process in which new patterns of behaviour for both parties gradually embed. Likewise, the data provide evidence that collective action influences the spread of employment systems, but it too is not as consistent between the British and French workplace surveys as one might have expected.

This may be due in part to major differences in the systems of employee representation, and notably a much weaker set of institutions for both employers and employees in Britain than in France (see Appendix Table 1a). However, it may also be due to the wide range of potential forms of collective action that are relevant. In this essay, they have ranged from traditional collective bargaining, through management-led and individual voice to the institutions regulating occupational labour markets. Labour institutions have many other goals than supporting the trading of labour services, not least as a 'sword of justice' (Metcalf et al 2001), however, if they conflict with the trading of labour services then, as Streeck's analysis seems to suggest, then they may wither as employers increasingly opt out.

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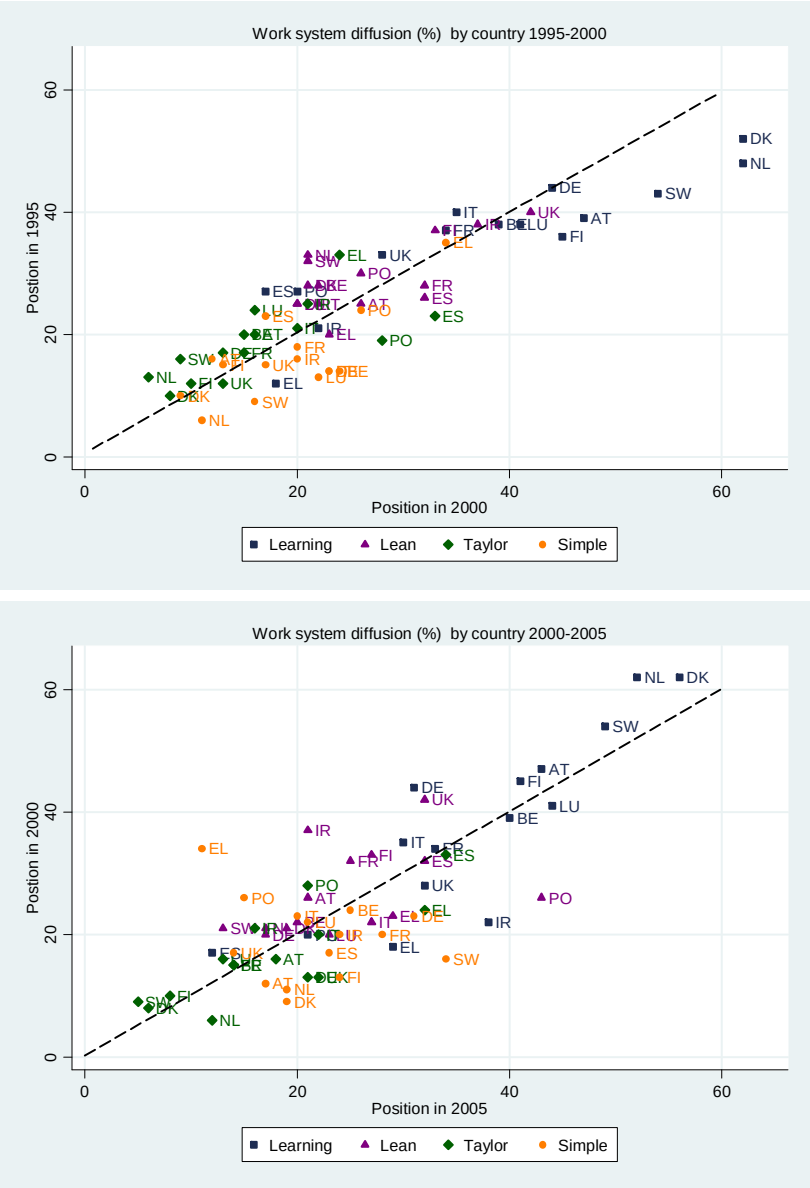
8. Figures

Figure 1. Distribution of work systems by EU country, 1995/2005



Source: EWCS. Employees in establishments with 10 or more employees in industry and services (excluding public administration, education and health).

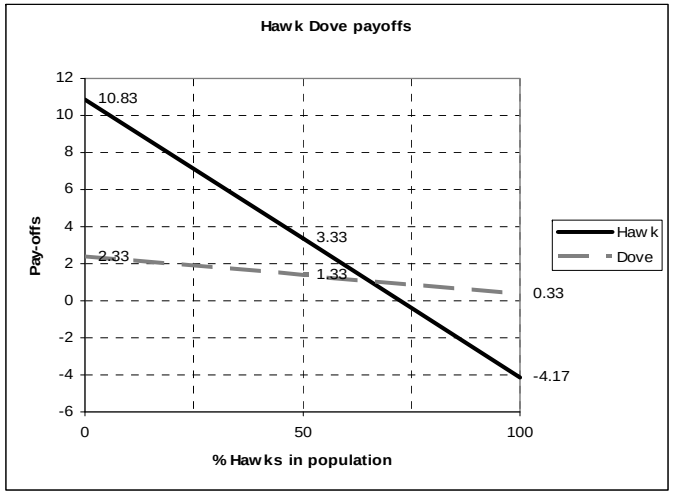
Figure 2. 'Hawk-Dove-Bourgeois' game

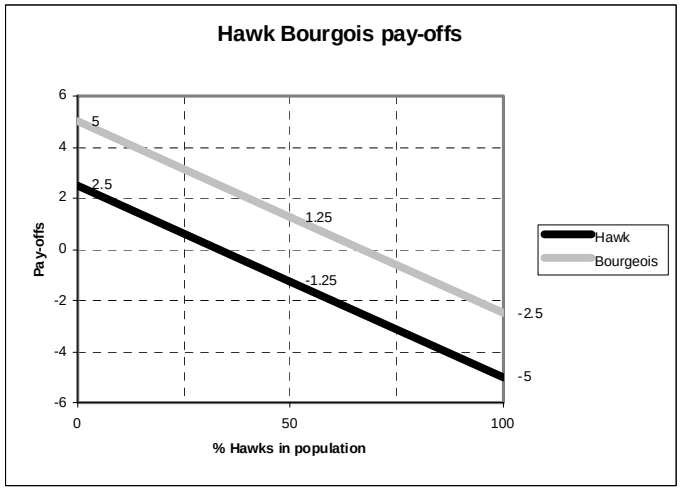
	Other's strategy			Expected pay-offs for own strategy*
	'Hawk'	*'Dove'*	*'Bourgeois'*	
Own strategy	Dismissal threat	Wrangle	Share rule	
Quit threat *'Hawk'*	-5 *(open conflict)*	+10 *(hawk takes all)*	+2.5	+2.50
Wrangle *'Dove'*	0 *(dove gets zero)*	+2 *(protracted conflict)*	+1	+0.33
Share rule *'Bourgeois'*	-2.5 *(negative because bourgeois defends rule against hawk)*	+6 *(B wins on own territory & if interloper plays dove)*	+5 *(procedural conflict)*	+2.83

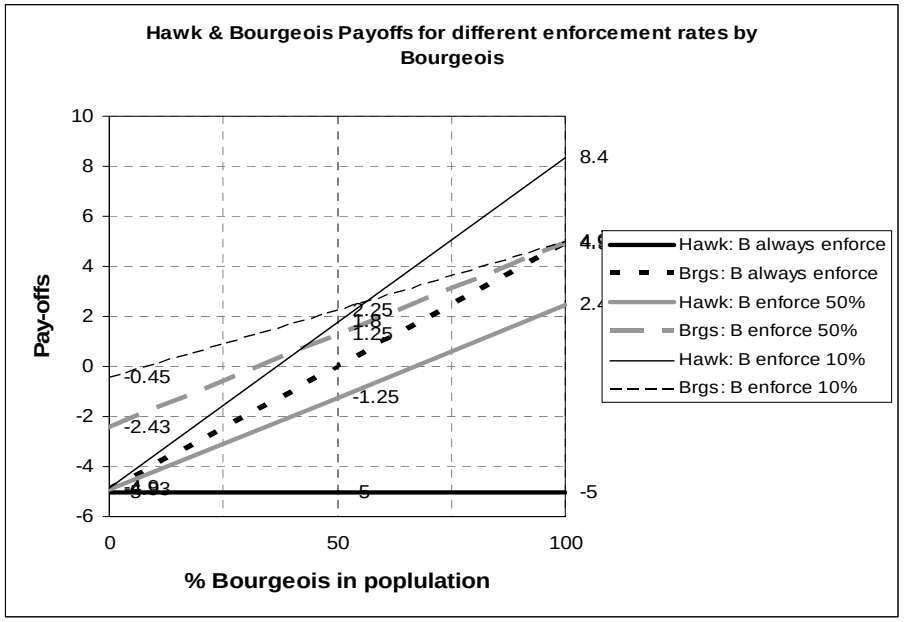
Notes: Pay-offs to 'own strategy' are shown in the rows. They assume the surplus = +10; serious loss = -20; and the cost of a prolonged contest = -3. The probabilities assigned to the opponent's strategies are assumed equal, as are those of serious loss. For details see Appendix Box 1.

* Sum of the row pay-offs divided by 3 for expected (average) values if each of the 'other' strategies is equally probable. Based on Maynard Smith (1982).

Figure 3. Outcomes of the Hawk-Dove-Bourgeois Game for different population compositions and different rules







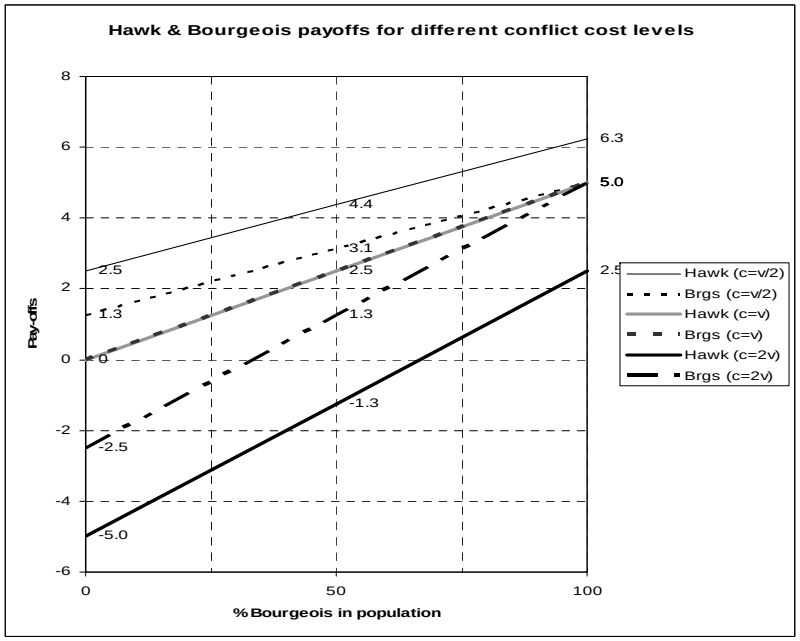
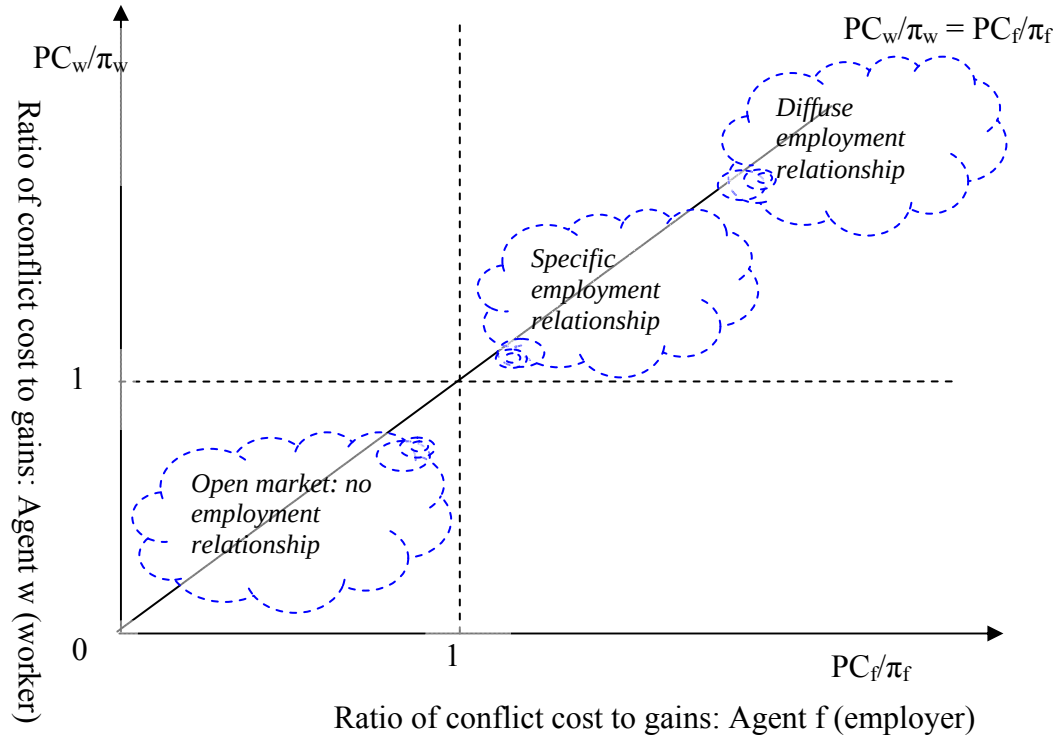


Figure 4. Feasible contract models under different conflict cost conditions



For further explanation of the axes see Appendix Box 2.

9. Tables

Table 1. Factors associated with the adoption of different work systems in Britain and France, 2004

Multinomial logit coefficients (reference category: taylor system).

	Britain						France					
	Learning		Lean		Simple		Learning		Lean		Simple	
	Coef.	Sig	Coef.	Sig	Coef.	Sig	Coef.		Coef.	Sig	Coef.	Sig
In-work training	0.728	****	0.815	****	0.317	-	0.962	**	1.195	***	-0.482	-
Train* estabs<50							-0.674	-	-1.802	**	0.235	-
% manual	-0.868	*	-0.425	-	-0.666	+	-0.899	**	0.859	+	-0.268	-
OJT for main jobs	0.918	+	1.307	*	-1.050	+	0.890	*	0.053	-	0.108	-
Computer use	0.467	-	1.294	**	-0.075	-	1.135	****	1.315	****	0.275	-
% prof & mgrs	1.547	*	3.806	****	1.275	-	2.211	****	1.307	-	1.272	+
Absence>ind ave	-0.222	-	-0.858	**	-0.224	-	-0.953	****	-1.130	****	-0.825	****
Disciplinary dismissals	-0.769	**	-0.731	**	0.227	-	-0.514	**	-0.496	*	-0.542	***
Abs*dismissal	0.700	+	1.118	*	-0.872	+	0.643	+	0.857	**	0.649	*
Use of appraisal	-0.457	-	0.534	+	-0.963	***	-0.271	-	0.724	****	-0.813	****
Consultation	0.384	+	0.886	****	-0.018	-	-0.207	-	0.138	-	-0.605	****
Pay>ind average	0.085	-	-0.151	-	-0.241	-	-0.120	-	0.078	-	-0.006	-
Competitive mkt	0.733	*	0.273	-	0.184	-	-0.220	-	0.064	-	-0.046	-
Compete on price	-0.903	*	0.361	-	0.355	-	-0.262	-	-0.013	-	0.142	-
Local pay agt	-0.222	-	1.025	**	0.241	-	-0.448	***	0.298	-	-0.494	****
Local employer networks	-0.179	-	0.108	-	0.093	-	0.477	***	0.477	**	0.260	+
Shop steward	-0.167	-	0.062	-	-1.039	*	-0.063	-	0.050	-	0.240	-
Estab 20-49 emps	-0.243	-	-1.422	****	1.807	****	0.177	-	0.005	-	0.181	-
Estab 50-99 emps	-0.230	-	-0.406	-	1.400	***	-0.151	-	-0.639	**	0.237	-
Estab 100-199 emps	-0.213	-	-0.647	*	0.650	-	-0.090	-	-0.661	****	0.197	-
Estab 200-499 emps	-0.465	+	-0.431	+	0.344	-	-0.104	-	-0.153	-	0.335	-
Utilities	-2.568	****	-0.755	-	-35.771	****	1.536	+	-1.731	+	2.254	****
Construction	0.383	-	-0.524	-	-0.038	-	-0.055	-	-1.125	***	0.781	****
Distribution	0.107	-	-0.623	+	1.079	**	0.476	+	-0.598	*	0.884	****
Transport & comm.	-0.336	-	-0.678	-	1.911	****	0.729	*	-0.752	+	1.055	****
Business services	-0.174	-	-1.191	***	-0.187	-	0.189	-	-0.966	****	0.966	****
Financial services	0.215	-	-0.556	-	-0.611	-	0.233	-	-1.760	**	1.745	****
Educ, health, welfare	0.110	-	-0.431	-	0.381	-	1.626	****	-0.750	-	1.298	****
Personal services	0.089	-	-0.553	-	0.664	-	0.245	-	-0.840	-	1.333	****
Constant	0.134	-	-2.220	***	-1.233	+	-0.877	-	-1.936	***	0.398	-
N(estabs)	1,219						2,391					
Pseudo R2	0.1603						0.1337					

Notes: Omitted categories: establishments >=500; manufacturing; intermediate white collar employees. Significance levels: <1%, ****, <2%, ***, <5%, **, <10%, *, <15% + (France only). For Britain, coefficients that were significant only when adjusted for the smaller sample numbers to compare with France: + <5%.

Source: WERS and REPONSE 2004, private sector estabs >=20 employees. Estab weights used.

Table 2 Factors associated with the adoption of different work systems in EU countries, 1995-2005 (EWCS)
Multinomial logit coefficients. Reference category: taylor system.

	Clusters computed separately for each year					
	Coef.	sig	Coef.	sig	Coef.	sig
	Learning		Lean		Simple	
Training	1.176	****	0.804	****	0.247	**
Length of service	0.020	****	0.008	*	0.014	****
Pct in Upper Secondary Educn	0.018	**	0.001	-	-0.000	-
Manager	1.134	****	0.699	****	0.029	-
Professional	1.484	****	0.931	****	0.639	**
Technicians	0.731	****	0.564	****	0.100	-
Service workers	-0.244	+	-0.310	**	0.027	-
Agriculture	-0.597	-	-1.171	-	0.201	-
Skilled	-0.531	****	0.153	-	-0.219	-
Semi-skilled	-1.697	****	-0.455	****	-0.464	****
Unskilled	-1.601	****	-0.686	****	-0.371	***
Female	-0.682	****	-0.617	****	-0.173	*
Pay for performance	0.482	****	0.398	****	0.173	-
Pay for conditions	-0.023	-	0.253	****	-0.159	*
EPL (excl coll dismissals)	-0.041	-	-0.071	-	-0.343	***
EPL (collective dismissals)	0.568	****	-0.089	-	0.616	****
Establishment size 50-99	-0.228	*	-0.068	-	-0.085	-
100-499	-0.353	****	-0.174	+	-0.217	*
500+	-0.276	***	-0.048	-	-0.333	****
Utilities	0.839	****	0.459	+	0.721	**
Construction	0.527	****	0.339	**	0.153	-
Distribution	0.089	-	-0.282	**	0.190	+
Hotels & restaurants	0.188	-	0.094	-	-0.109	-
Transport & communication	-0.039	-	-0.331	****	0.117	-
Finance	0.281	-	-0.164	-	0.421	**
Business services	0.671	****	0.121	-	0.651	****
Constant	-2.092	****	0.642	-	-1.209	**
Country & year controls	Yes					
N (employees)	15811					
Pseudo R2	0.1130					

Notes: Manufacturing & Germany omitted categories, Ireland and Luxembourg dropped because of collinearity. Source: EWCS. Significance levels: <1%, ****, <2%, ***, <5%, **, <10%, *, + 15%. Individual employees in establishments with 10 or more employees in industry and service, excluding public administration health, education and social services.

10. Appendix

Box 1: Computation of the pay-offs for Figures 2 and 3.

Let E(H,H) represent the expected payoffs to a hawk-hawk conflict; E(H,D) to hawk-dove, and so on. Expected pay-offs are simply the value of the pay-off multiplied by the probability of its occurrence. 'v' represents the value of the surplus; 'c' the cost of conflict; and 'd' the cost of long-drawn out haggling. 'p' represents the probability, and the subscripts denote: v, victory; c, cost; i, incumbent; h, hawk; d, dove; and b, bourgeois.

$E(H, H) = p_v(v - p_c c) + (1-p_v)(0 - p_c c)$
$E(H, D) = v$
$E(H, B) = p_i (p_v v - (1-p_v) c) + (1- p_i) v$

$E(D, H) = 0$
$E(D, D) = p_v (v-d) + (1-p_v) (-d)$
$E(D, B) = p_i 0 + (1-p_i) \{p_v (v-d) + (1-p_v) (-d)\}$

$E(B, H) = p_i \{p_v(v - p_c c) + (1-p_v)(0 - p_c c)\} + (1- p_i)(0)$
$E(B, D) = p_i (v) + (1- p_i) \{p_v (v-d) + (1-p_v) (-d)\}$
$E(B, B) = p_i(v/2) + (1 - p_i)(v/2)$

Hawk-Dove-Bourgeois
$W(H) = ph\, E(H, H) + p_d\, E(H, D) + (1- ph - p_d)\, E(H, B)$
$W(D) = ph\, E(D, H) + p_d\, E(D, D) + (1- ph - p_d)\, E(D, B)$
$W(B) = ph\, E(B, H) + p_d\, E(B, D) + (1- ph - p_d)\, E(B, B)$
Hawk-Bourgeois only
$W(H) = ph\, E(H, H) + (1- ph)\, E(H, B)$
$W(B) = ph\, E(B, H) + (1- ph)\, E(B, B)$
Dove-Bourgeois only
$W(D) = p_d\, E(D, D) + (1- p_d)\, E(D, B)$
$W(B) = p_d\, E(B, D) + (1- p_d)\, E(B, B)$

In Figures 2 and 3, the following values were assumed: v=10, c=20, d=3, and probabilities, 0.5, unless otherwise modelled.

Box 2. A model of the conflict cost ratio in employment relationships

This simplified model seeks to clarify key relationships in the argument. Agents can work solo and produce output $Q_{solo\ i}$ using their own labour (L_i) and hiring capital (K_i). This constitutes their reservation income. They can also form a team with a collaborator, and pool their labour and capital resources.

$$Q_{solo\ i} = f(L_i, K_i) \quad (1)$$

$$Q_{team} = f(L_1, L_2, K_1, K_2) \quad (2)$$

For team production to be worthwhile, the surplus (π) must be positive

$$Q_{team} = Q_{solo1} + Q_{solo2} + \pi \ ; \quad (\pi > 0) \quad (3)$$

Production costs (PC) comprise capital and labour inputs, where k_i represents the rental of capital equipment and, w_i the agents' necessary living expenses, in each period.

$$PC \equiv k_1 + k_2 + w_1 + w_2 \quad (4)$$

If prices are set competitively, and solo production sets the break-even prices, where each agent just earns w_i, then:

$$PC = Q_{team} - \pi \quad (5)$$

If nothing is produced because of a conflict, then the total conflict cost, CC, equals total losses incurred: the cost of the resources committed in that period and for which there is no saleable output.

$$CC = PC \quad (6)$$

Maynard Smith's result for bourgeois-hawk contests is that the bourgeois is superior to the hawk strategy while the ratio of the cost of conflict to the surplus (the cost of conflict ratio, CCR), is greater than unity: $PC_i/\pi > 1$. In his contests, the winner takes all, and PC_i denotes the hawk's costs.

In the present model, employment relationships, conflict concerns increasing one party's share of the surplus by $\Delta\pi_i$ $(0 < \Delta\pi_i <= \pi)$, thus Maynard Smith's condition becomes:

$$CCR_i = PC_i/\Delta\pi_i > 1 \quad (7)$$

where PC_i and π_i represent agent i's share. The smaller the value of $\Delta\pi_i$ the higher is CCR_i. For narrowly defined tasks $\Delta\pi_i$ is typically smaller than for diffuse tasks.

The effect of asymmetry, $CCR_1 \neq CCR_2$, is to reduce the probability of retaliation by the weaker party. It may be redressed by adopting specific rather than diffuse work roles. In the former case, the value of $\Delta\pi_i$ is small thus raising the CCR for the stronger party.

Investments in firm-specific human capital incur a high cost in the current period, and generate a return spread over many periods. Let TC represent the current period investment in specific skills, and TR the return per period, so the current period surplus becomes π + TR. Quits and dismissals scrap such investments, and cut short the return. Each agent's CCR becomes:

$$CCR_i = (PC_i + TC_i) / \Delta(\pi + TR)_i \qquad (8)$$

If agents equate present values of training costs and returns, then the longer the time horizon for returns, the more TC will exceed TR for the current period, and the more such investments will raise the CCR.

Finally, conflict has been confined to shares of the surplus. This is a convenient simplification, but a fuller treatment would require analysis of what prevents a hawk employer from using dismissal threats to gain not just the whole surplus but also a share of the reservation income from dove employees. In a many period model, such employers would presumably gain a bad reputation so that dove employees would opt for working solo rather than collaborate with them.

Appendix Table 1a. Means and standard deviations of variables: WERS and Reponse

	Britain		France	
	mean	Sdev	mean	Sdev
In-work training	0.236	0.425	0.423	0.232
% manual	0.367	0.354	0.379	0.337
OJT for main jobs	0.672	0.207	0.736	0.218
Computer use	0.493	0.289	0.379	0.311
% prof & mgrs	0.178	0.182	0.134	0.172
Absence>ind ave	0.288	0.453	0.288	0.453
Disciplinary dismissals	0.390	0.488	0.294	0.456
Use of appraisal	0.714	0.414	0.625	0.430
Consultation	0.399	0.490	0.493	0.500
Pay>ind average	0.438	0.496	0.309	0.462
Competitive mkt	0.742	0.312	0.206	0.404
Compete on price	0.612	0.282	0.522	0.279
Local pay agt	0.181	0.367	0.595	0.491
Local employer networks	0.372	0.484	0.391	0.488
Shop steward	0.101	0.301	0.589	0.492
Estab 20-49 emps	0.651	0.477	0.639	0.480
Estab 50-99 emps	0.194	0.396	0.205	0.404
Estab 100-199 emps	0.090	0.287	0.093	0.291
Estab 200-499 emps	0.049	0.217	0.050	0.217
Utilities	0.002	0.049	0.011	0.103
Construction	0.064	0.245	0.086	0.281
Distribution	0.353	0.478	0.204	0.403
Transport & comm	0.060	0.238	0.078	0.268
Business services	0.155	0.362	0.180	0.384
Financial services	0.042	0.200	0.032	0.176
Educ, health, welfare	0.115	0.319	0.085	0.278
Personal services	0.052	0.222	0.072	0.259

All variables have a minimum of 0 and a maximum of 1.

Appendix Table 1b. Means and standard deviations of variables: EWCS 1995-2005

	mean	st dev
Pay for performance	0.21	0.41
Pay for conditions	0.40	0.49
Length of service	10.23	9.76
Training	0.33	0.47
Educn 16-19 yrs	0.53	0.50
Educn 20+ yrs	0.28	0.45
Share of 15-19 in Upper Secondary Educn	0.62	0.14
Female	0.34	0.47
Voice: discuss with boss	0.63	0.48
Voice: discuss with rep	0.25	0.43
Absence	0.27	0.44
EPL (excl coll dismissals)	2.03	1.15
EPL (collective dismissals)	3.30	0.76
Manager	0.08	0.27
Professional	0.10	0.30
Technicians	0.13	0.34
Service workers	0.11	0.31
Agriculture	0.00	0.04
Skilled	0.18	0.39
Semi-skilled	0.13	0.34
Unskilled	0.10	0.29
Establishment size 50-99	0.13	0.34
100-499	0.22	0.41
500+	0.30	0.46
Utilities	0.04	0.19
Construction	0.11	0.31
Distribution	0.18	0.38
Hotels & restaurants	0.04	0.18
Transport & communication	0.12	0.32
Finance	0.07	0.26
Business services	0.09	0.28

All variables take values between 0 and 1 except length of service (0-15) and EPL (0-5).

10.1 Data sources and methods

WERS (Workplace Employment Relations Survey) and REPONSE (Relations Professionnelles et Négociations d'Entreprise) are surveys of representative samples of about 2000 establishments carried out respectively in Great Britain and France. The surveys were carried for the Department for Trade and Industry (DTI), Advisory Conciliation and Arbitration Service (ACAS), the Economic and Social Research Council (ESRC), and the Policy Studies Institute (PSI) in Britain, and the DARES of the Ministry of Labour in France. Establishment weights adjust for sample stratification and a measure of non-response. Further details can be found in Kersley et al (2006) for WERS 2004 and in Amossé et al (2008) for REPONSE.

The European Working Conditions Survey, organised by the European Foundation for the Improvement of Living and Working Conditions, Dublin, is a sample survey of persons aged 15 and over who are normally resident in the EU. The effective sample obtained is about 1,000 individuals for each country. It has been carried out in 1991, 1995, 2000 and 2005, but the richness of questions has increased over time.

The clusters of working practices used STATA's Multiple Correspondence Analysis (MCA) to reduce the data to two dimensions, and applying its Kmeans cluster routine. The MCA analysis generated a plot for the variables used, and Kmeans identified four clusters whose means were located on the plot. The clusters were identified following Lorenz and Valeyre (2005) and Dayan et al (2008). WERS variables were matched to those used by Dayan et al 2008.

EWCS question no.	Survey question
Cluster variables	
q20a_a	Does your job involve short repetitive tasks of less than 1 minute?
q21a	Is your pace of work dependent on the work done by colleagues?
q21c	Is your pace of work dependent on numerical production targets or performance targets?
q21d	Is your pace of work dependent on automatic speed of a machine or movement of a product?
q21e	Is your pace of work dependent on the direct control of your boss?
q23a	Does your main paid job involve: meeting precise quality standards?
q23b	Does your main paid job involve: assessing yourself the quality of your own work?
q23c	Does your main paid job involve: solving unforeseen problems on your own?
q23d	Does your main paid job involve: monotonous tasks?
q23e	Does your main paid job involve: complex tasks?
q23f	Does your main paid job involve: learning new things?
q24b	Are you able to choose or change your methods of work?
q24c	Are you able to choose or change your speed or rate of work?
q26a	Does your job involve rotating tasks between yourself and colleagues?
q26b	Does your job involve doing all or part of your work in a team?
Other variables	
	What does your remuneration include:
ef6b	Piece rate or productivity payments?
ef6c	Payments for additional hours of work/overtime?
ef6d	Extra payments compensating for bad or dangerous working conditions?
ef6e	Extra payments compensating for Sunday work?
ef6g	Payments based on the overall performance of the company where you work?
ef6h	Payments based on the overall performance of a group?
ef6i	Income from shares in the company your work for?
q2b	Years of education : <=15; 16-19, >=20 years.
q28a_1	Have you undergone: Training paid for or provided by your employer, or by yourself if you are self-employed?
q30d	Over the past 12 months have you discussed work work-related problems with your boss?
q30e	Over the past 12 months have you discussed work work-related problems with an employee representative?
q34a_d.	In your main paid job, over the past twelve months, have you been absent for health problems?

Work system cluster variables for WERS and Reponse 2004.

Variable descriptions	WERS Variable names	Reponse Variable names
Procedural autonomy : relating to how work is done	cdesign	ordres=2 & autonom=1
Task autonomy : control over tasks	cdiscret	ordres=1 & autonom=1
Continuous monitoring	control = alot	control=1
Periodic monitoring	control = some	control=2
Occasional monitoring	control = little	control=3
Control by top management	khowmon_	quicont_
Control by middle mgt		quicont_
Control by peers, customers etc	khowmon_	quicont_
Delayering		supniv
% of non-mgrs who supervise	binvmang	
Cooperation across depts		coopr
Teamwork for >20%	cteams	groupau
No teamwork	cteams	groupau
Job rotation for >50%	cothdo	majmob
No job rotation	cothdo	mobil
Quality circles for >50%	qcircles	cqpart
No quality circles		cq04
Workplace meetings (frequent)	dbrief	rapart
No workplace meetings	dbrief	ra04
Just-in-time production (customers)	kjit	jatc
JIT Suppliers		jatf
TQM	kwrkplac	qualtot,

The employment protection legislation index is produced by the OECD. It comprises three measures of employment protection: that for regular employees, that for temporary employees and that relating to collective dismissals. A description of these indexes can be found in Venn (2009). The EPL excluding collective dismissals was computed by subtracting the collective dismissals component using the OECD weights.

National upper secondary education rates were computed using OECD Online data taking annual figures for persons aged 15-19 in upper secondary education (ISCED3) as a percentage of the population in that age group. See http://stats.oecd.org/ .

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