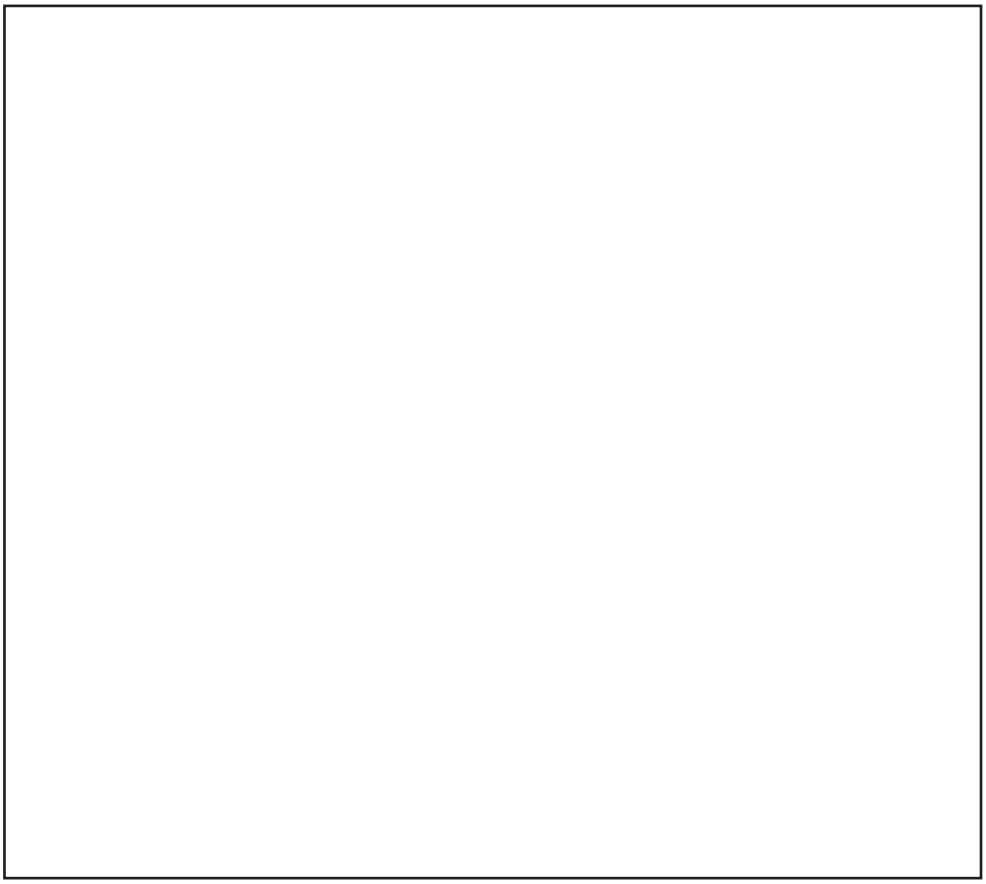
Eurofound

HRM practices and establishment performance: an analysis using the European Company Survey 2009



Wyattville Road, Loughlinstown, Dublin 18, Ireland. - Tel: (+353 1) 204 31 00 - Fax: 282 42 09 / 282 64 56
email: information@eurofound.europa.eu - website: www.eurofound.europa.eu

Authors: Jean-Marie Jungblut and Donald Storrie

Research projects: Second European Company Survey and Links between quality of work and performance.

Contents

Executive summay 1

1. Introduction 3

2. Theoretical foundations for the HRM-performance link 5

3. Methodological shortcomings in previous research 7

4. The European Company Survey 2009 9

5. Summary and conclusions 19

References 21

Appendix 29

Country codes

EU27

AT	Austria	**LV**	Latvia
BE	Belgium	**LT**	Lithuania
BG	Bulgaria	**LU**	Luxembourg
CY	Cyprus	**MT**	Malta
CZ	Czech Republic	**NL**	Netherlands
DK	Denmark	**PL**	Poland
EE	Estonia	**PT**	Portugal
FI	Finland	**RO**	Romania
FR	France	**SK**	Slovakia
DE	Germany	**SI**	Slovenia
EL	Greece	**ES**	Spain
HU	Hungary	**SE**	Sweden
IE	Ireland	**UK**	United Kingdom
IT	Italy		

Other countries

HR	Croatia	**MK**	Macedonia
TR	Turkey		

Executive summary

Introduction

The way an enterprise is managed has been proven to impact on the performance of companies. It is generally assumed that less rigid forms of work organisation are required to cope with more dynamic market conditions and product developments. To a greater extent than before they are intended to accommodate the requirements of a more knowledge-intensive and learning workforce. These practices have been introduced primarily to improve performance and thus mirror the move from personnel to human resource management.

More recently, they have been closely related to the concept of high performance workplaces and the use of innovative workplace practices, often abbreviated as HRM (human resource management) policies, have been researched since the beginning of the 1990s. These multidimensional policies are introduced in order to make companies more efficient, by introducing new recruitment procedures, training opportunities for the workers, giving them more responsibility over the production process and also the possibility to participate in the success of operations via financial incentives. If companies are successfully managed, they can lower turnover rates, boost satisfaction of their staff which motivates them to work better and harder and align their pay with the company's success. It also increases the quality of products in line with customer's expectations using new modes of product development, design and innovations. This is a win-win situation for workers as well as for companies. HRM practices certainly improve the competitiveness of companies on their product markets and, by analogy, labour productivity for whole national economies.

However, many countries in Europe still do not make enough use of HRM policies. A more comprehensive introduction of such innovations would render Europe more competitive and strengthen the position of the EU in the world economy.

Policy context

The policy context is firmly rooted in the Europe 2020 strategy for smart, sustainable and inclusive growth. While public policy provides the framework for the realisation of these goals, it is at company level that the success in developing an economy based on knowledge and innovation will be determined. Not least, for the promotion of skills throughout the life cycle individual companies play a crucial role. It is also in the work place itself that the full potential of the problem-solving potential of social dialogue can be realized and turned into a win-win situation.

Key findings

The report provides an overview of the literature on innovative work practices and starts with an inventory of the many practices have been identified as innovative. The analytical part of the paper is based on Eurofound's own European Company Survey (ECS). The dataset covers 27,160 establishments in 30 countries, probably making it the most extensive dataset ever used for this purpose and the only cross-national attempt. The four performance indicators are used: work climate, the lack of HR problems, labour productivity (compared with competitors) and the economic situation in the establishment. A similar approach is used to measure the five aspects of innovative work practices with only quite sophisticated practices being coded as innovative. The five sets of practices are flexible working time, financial incentives (for a large proportion of the workforce), training, autonomous teams and employee voice. Key outcomes of the investigation are:

- The positive impact of employee voice on having both a good work climate and the absence of HR problems;
- The importance of training for the economic situation and productivity level of the establishment;
- The economic situation and productivity measures of performance are also positively associated with performance-related pay;

- Team autonomy showed relatively strong effects for the work climate and productivity;
- The weakest results are found for working time flexibility for all performance variables.

Furthermore, no evidence was found that various combinations (bundles) of the innovative practices were more conducive to high performance, though some correlation between training checks and working in autonomous teams was observed. There is some reason to believe that some causal relationships are present here. The very strong effects of employee voice on work climate and lack of HR problems are eminently plausible. Similarly it would be difficult to believe that it is in fact the performance indicators that 'cause' some of the innovative practices. For example, it is unlikely that just because firms have a high productivity that they then adopt a high level of team autonomy.

Thus an overall conclusion is that the innovative work practices as identified in the ECS do appear to have a positive effect on various dimensions of performance. Labour productivity is not only about new technologies and increased capital investment. Work organisation in general, and these practices in particular, also play a vital part in meeting the challenges facing Europe in the increasingly global competitive environment.

Introduction 1

In a competitive global economy, and in a European Union with a shrinking labour force, the preservation and further improvement of living standards will only be possible with increased productivity. Indeed the outcome of the Europe 2020 strategy crucially depends on a significant boost in productive capacity. Productivity can be enhanced by increasing capital investment, through the incorporation of new technologies into the production process or by a more productive use of labour. Labour productivity depends on many factors on many levels, ranging from the education and health of the labour force, and which are primarily the domain of public policy, to the company or establishment level. At the latter level, technical innovations, strategic reorientations but also innovative human resource practices can help to increase labour productivity. These latter practices are the focus of interest in this report.

Barney (1991) lists the many means by which companies can improve their economic performance. After marketing strategies, logistics and R&D comes human resource management as the most important means of improving performance as Crook, Ketchen, Combs and Todd (2008) can show in their meta-analysis of 125 studies. For over 20 years, the term human resource management (HRM) has been the concept on how to manage employees. One of the first to try to define HRM was Guest (1987) who contrasts HRM with traditional personnel management, but without drawing firm conclusions on which policy is better. Huselid (1995) was one of the first attempts to investigate the relationship between HRM practices and company performance. Other major contributors to the debate were Arthur (1992, 1994), Becker and Huselid (1998), Black and Lynch (2004), Ichniowski et al. (1995, 1997), Macduffie (1995a), Pil and Macduffie (1996). Recent overviews (Boselie et al., 2005, Wood and Wall, 2007) come to the conclusion that HRM practices do matter for performance even applied as single innovations. In a recent overview, Paauwe states: '... that in the course of ten years the evidence has mounted that HR practices, be it individually or bundled in a system, are at least weakly related to firm performance. Undoubtedly, though, there still exist significant methodological and theoretical challenges with regard to furthering our understanding of this relationship.'

The next section provides an overview of the theoretical foundations of the HRM-performance link. We will then describe the data used for the current study and present our results.

2 Theoretical foundations for the HRM-performance link

Hirschman's exit-voice-loyalty model (1970) has had a major impact on the literature of innovative workplace practice. Applying this model to industrial relations, Freeman and Medoff (1985) proposed that, by giving employees 'voice', unions produced positive benefits for organisations. The model predicted that, by offering this resort to 'voice' rather than 'exit', employers would benefit through reduced turnover, learning about problems more quickly, and gaining more specific information to address the issues. Thus enabling workers to have a say in the company they work for would reduce hiring and firing costs, costs that would occur if workers would opt for the exit strategy, when voice is impossible (see Nickell (1986) for an overview of the nature and extent of these turnover costs).

Moreover, employee involvement provides employees with opportunities to make decisions about the conduct of their jobs and to participate in the business as a whole (Lawler and Benson 2003, p. 156). Job-level involvement means increasing the say that people have in their work and can lead to work enrichment or role empowerment. Lawler also couples high involvement management with Total Quality Management [1] (TQM), and views their integration as the core of a high performance organisation. Moreover, in his empirical work, job enrichment and power-sharing practices are dominated by team-working and idea capturing [2], both of which are associated with TQM. In addition, Lawler includes collective forms of performance-related pay in his high involvement rewards measure (Lawler and Mohrman, 1995, p.20). In so doing he takes the focus further away from work enrichment, with its association to the fulfilment of intrinsic motivational drives. High-commitment work practices are seen as distinct from high-involvement practices and can be associated with the work of Walton. Walton (1985) differentiates between a traditional model based on control from a model based on commitment. Walton and others advocate that practices that yield high commitment should be used in concert with each other, implying that it is through the combined effects of these practices that management can hope to achieve the most benefits.

The ideas behind the HRM-performance link, although dating back to the early 20th century (see Kaufman, 2010, for a review), is that non-technical aspects of work, such as recruitment, evaluation, remuneration, training and promotion could render work more efficient, save costs and thereby increase company performance. The main motivation for introducing new methods of recruiting, motivating and skilling workers is that in a more and more dynamic environment, enhanced competition under internationalising markets, modern workplace practices can render work arrangements more flexible, more efficient, innovative and help reduce costs related to a bad work climate such as high turnover rates, absenteeism or shirking. Macky and Boxall (2007) for example found that HR practices normatively associated with high-performance work systems have an additive, positive association with employees' work attitudes and that these employees report higher job satisfaction, a higher degree of trust in management and a stronger psychological identification with their employing organisation. Jones et al. (2010) used panel data for all units of a retail firm that included measures of the operating environment, important dimensions of core inputs, and information on HRM environments, and output is measured as value added. They estimated augmented production functions, including both

[1] TQM is a systematic approach and a management philosophy fostering the improvement of product quality and production processes. Everyone involved in the production of goods and services should be involved in this process of continuous innovation and improvement of companies' products. This goes as far as involving customers in this process.
(See **http://de.wikipedia.org/wiki/TQM**).

[2] Power-sharing is a strategy that gives employees the opportunity to exercise more judgement on the job and is de facto often cited by advocates of empowering employees. It is a move away from an employee-control approach to an employee-involvement approach. Idea capturing is more or less a systematic method for capturing employees' suggestions and ideas to improve work processes.

establishment and manager fixed effects. When employees had opportunities to participate, and received appropriate information and feedback from their supervisors, productivity was enhanced. Thus, even in settings where employees did simple tasks and were relatively low-skilled, participatory work environments can enhance business performance. It must be emphasised, however, that it is not the case that there is a simple positive relationship between innovative high-performance related HR practices and worker satisfaction. For example, autonomy or team working has been found to increase stress (Boxall and Macky, 2009)

A further theoretical strain, the so-called resource-based approach, stresses that technology can be copied or imitated and does not represent a competitive advantage to the firm, but that the practice of human resource management is unique to each company. Each company employs a particular mix of human capital, skills, training, worker participation policies and other workplace practices which aim to improve labour productivity. This mix can very well be a genuine and non-transferable competitive advantage to a company vis-à-vis its competitors. This mix represents a genuine asset without much of a danger of imitation by other companies and as such represents a genuine competitive advantage for a company. In this sense, it is the human and social capital held by the organisation's workforce that matters: 'The role that HR practices may play is that of building the human capital pool and stimulating the kinds of human behaviour that actually constitute an advantage' (Guest, 1999).

3 Methodological shortcomings in previous research

The existing literature reviewed raises many methodological issues. Many of the publications have tried to deal with some of these shortcomings, alas not always successfully. Some of the shortcomings are related to the data, others are related to the measurement of practices and outcomes and still others are related to modelling strategies used. One of the most often raised shortcomings related to data is the fact that many of the studies only cover a very restricted group of companies, sometimes fewer than 100 observations. Moreover, this is often due to low response rates, sometimes even below 10%. In many surveys, companies operating in a single sector of activity are often selected (e.g. Arthur, 1992, only analyses a series of steel finishing mills, while other analyses focus on a hotel chain (see for example McPhail and Fisher, 2008) which prevents us from drawing more general conclusions. Most of the papers focusing on labour productivity analyse manufacturing sector companies in one single country only: Vlachos (2008, N=71 companies in Greece and response rate, R.R.=19%); Datta et al. (2005, N=132 US companies and a R.R. of 15%); and Flood et al. (2008, N=132 companies from Ireland with a R.R. of 13.2%) are a few recent examples. The obvious reason being that productivity is easier to measure in manufacturing than in service sectors. Studies in the field of service industries typically use human resource outcomes like absenteeism, turnover and motivational problems to measure performance: e.g. McPhail and Fischer (2008) use a single-company survey of a multinational hotel chain and focus on worker satisfaction and intention to quit. Kuvaas (2006) focuses on financial and insurance activities companies in Norway (N=593, R.R.=39%) and uses reported work performance, affective organisational commitment and turnover as dependent variables. These circumstances jeopardise the extent to which results of these surveys can be generalised as the representativeness of such studies is highly questionable.

Another problem inherent in using cross-sectional data is the problem of causal interpretation. It is in many cases not clear if successful companies have introduced innovative work practices or if these practices have led to company success. Another reported shortcoming is that the introduction of HRM practices takes some time to work out and have an impact on performance. The impact on performance is thus negatively biased for companies that have implemented innovative workplace practices only recently. This is further complicated by the fact that some companies, at least, introduce innovative workplace practices such as flexible working time only to adapt to technical slack in times of economic difficulties. This can either lead to excessive effects (upward bias) when the unit of observation fares much better in the aftermath of such temporary economic difficulties, or, worse, underestimating the effect if the company does not recover at all, even after introducing new workplace practices (downward bias). This would mean that in one case the introduction of HRM would be positively biased due to the low performance level when the measures were introduced, in the other case it would be the contrary, as the too short period to measure the impact would lead to a negative bias. In the advent of the most recent crisis, many companies not only laid off workers but they also introduced short-term working schemes and provided company-sponsored training to their workers in order to adjust to demand shocks. Another bias is introduced due to the fact that companies introducing innovative work practices are not comparable to companies not doing so: this is the heterogeneity problem. For example, when a very dynamic start-up company adopts a new marketing strategy, implements new production techniques, recruits higher-skilled workers and introduces strategic high-performance workplace practices at the same time, the measured impact on performance is certainly overestimated (if the other strategic innovations are not controlled for) and it is therefore hard to generalise the findings about the impact of HRM practices alone.

The ideal design of a survey would thus be to take a number of companies and randomly assign HRM practices to some of them. A significant increase of performance of the test group after the introduction of new workplace practices such as widely applied training, worker participation in strategic decisions, and autonomous team-based work etc., compared to the control group, could reveal a clear unbiased impact of the new work practices on company performance using for example a differences-in-difference design. However, this experimental setting is hard to put into practice. The study by Lalonde (1986) on the impact of training on ex-post earnings, and Lazear's (2000) study on the impact of performance pay on productivity are rare exceptions. Both studies could take advantage of what is called natural experiments, i.e. the

introduction of a new policy at random to a group of workers and measure the impact on some outcome variable. In general, problematic issues like those reported above can only be solved partially when using longitudinal (or panel) datasets. Unfortunately there are only a few panel surveys which can be used here, and only for the United States. One other possible remedy to the above problems would be to use counterfactual models[3] and try to correct at least some of the mentioned biases when using observational cross-sectional studies. This has the advantage of controlling for bias arising from the fact that the treatment and the control groups might be very different leading to an overestimation of the effect of HRM practices on performance as innovative companies might have a combination of characteristics that lead to higher performance in the first place, even without introducing new workplace practices. Introducing as many controls as possible in a regression framework might help to control for these effects, however if unobservable characteristics are of importance and if these are correlated to observables the propensity score matching methodology might help to reduce this bias (see Heckman et al. 1997, 1998, Winship and Morgan 1999).

[3] This strategy consists in simulating a randomized experiment as it was described above. In observational studies, the 'treatment' group often exhibit imbalance which is confounded with treatments: it is therefore difficult to attribute differences in responses to the 'treatment' because the covariates are also believed to influence the response (problem of heterogeneity). The propensity score matching attempts to reduce the confounding effects of covariates, and so allow differences of responses to be attributed to differences of treatments (exposures). For example propensity score matching corrects for simple selection bias in non-experimental settings in which: (i) few units in the non-experimental comparison group are comparable to the treatment units; and (ii) selecting a subset of comparison units similar to the treatment unit is difficult because units must be compared across a high-dimensional set of pre-treatment characteristics (Peikes, Moreno and Orzol 2008, Dehejia and Wahba 2002).

The European Company Survey 2009 4

The data set

To test a series of common hypotheses in the literature discussed above, we use the 2009 edition of the European Company Survey (ECS) which is compiled by the European Foundation for the Improvement of Living and Working Conditions. This dataset covers 27,160 establishments across 30 countries in Europe including all 27 EU Member States and Croatia, Macedonia and Turkey. Interviews were carried out in establishments with 10 or more employees only. The survey covers all sectors of activity, with the exception of agriculture, forestry and fishing, private households, and extraterritorial organisations. In each establishment one management interview was conducted. The respondent was defined as the most senior person responsible for personnel in the chosen establishment. Fieldwork was carried out using computer assisted telephone interviewing (CATI) between 27 January and 5 May 2009. The sampling for the ECS was done on the basis of a country-specific matrix, where the universe was divided into 10 cells defined by five size classes and two main sectors of activity – the 'Industries' sector covering NACE Rev.1.1 codes C to F, and the 'Services' sector covering NACE codes G to O. When setting the targets for the sampling matrix, care was taken to ensure a sufficiently high number of net interviews in each cell. To this end, larger establishments were deliberately overrepresented in the sample. A weighting procedure was then applied to correct this disproportionate sample structure. Response rates in the countries are mostly in line with or above what can be expected according to previous experiences with CATI business-to-business surveys in the countries. The lowest response rate was in Germany (11%) and the highest in Greece (63%). The overall response rate was around 50%, which is above average for this kind of survey (see Chapter 3 above). All the figures in the following will be weighted in order to be representative at the establishment level.

Measuring innovative work practices in the ECS

The ECS has data covering five types of workplace practices that are often used in the literature. Table 1 lists the five innovative workplace practices used in this study and the text of the corresponding items in the ECS questionnaire which are used to measure these concepts. It also shows the percentage of establishments using each practice. For example, 27.9% of establishments allow workers to take full days off for accumulated overtime working but only 5.6% use so-called long-term time accounts where employees can accumulate hours over periods of more than a year.

Table 1: *Measurement of innovative workplace practices in the ECS*

A	**Flexible working time**	**%**
1	Is it possible for employees to use accumulated hours for full days off?	27.9
2	Does your flexible working hours system allow employees to accumulate hours for periods of more than one year on a so-called long-term time account?	5.6
3	Or are part-time arrangements at this workplace a common phenomenon for staff in highly qualified positions or in positions with a supervisory role?	4.7
B	**Financial incentives**	
1	At least 50% of workforce receives specific elements of pay that depend on the performance of a team, working group or department?	10.0
2	Profit-sharing scheme offered to all employees in the establishment?	7.7
3	Share-ownership scheme offered to all employees in the establishment?	2.3
C	**Training**	
1	Whether needs for further training are systematically checked in regular intervals for fixed-term employees	33.7
2	Whether needs for further training are systematically checked in regular intervals for permanent employees in low-skilled or unskilled positions	52.2
D	**Autonomous teams**	
1	Team members decide among themselves how and by whom the tasks are to be performed	22.1

Table 1: *Measurement of innovative workplace practices in the ECS (cont'd)*

E	Employee Voice	Mean [1-5]
1	Employee representation helps us in a constructive manner to find ways to improve workplace performance (strongly agree … strongly disagree)	2.28
2	Involvement of the employee representation often leads to considerable delays in important management decisions	3.50
3	We would prefer to consult directly with our employees	2.47
4	Consulting the employee representation in important changes leads to more commitment of the staff in the implementation of changes	2.24

Note: The items come from the management questionnaire and are grouped together under separate dimensions. Each of the items is dummy-coded and the mean represents the share of establishments using each practice. Only items for Involvement (E) are Lickert scales [strongly agree (1) to strongly -disagree (5)] and the means represent the average value of the scale.

An important criterion for constructing the derived variables is to capture a high level of sophistication of the work practice in question. For the flexible working time variable, for example, simply having overtime compensation or part-time work for employees indicates some flexible working time arrangements, but they could hardly be described as sophisticated or innovative. Part-time work for senior management is much more unusual and the working time account questions do capture innovative working time flexibility. If at least one of these practices is present at the establishment then the flexible working time variable is assigned the value of 1 and 0 otherwise.

Financial incentives (performance-related pay schemes, profit sharing and ownership) are quite well covered in the ECS. The key aspect of the constructed variable is that the financial incentives or rewards are broadly based. It is not uncommon or innovative that senior management receive these rewards but it is quite innovative when they are widespread among the workforce. Again this variable is coded 1 if at least one of these practices is present at the establishment and 0 otherwise.

Training on the other hand is not well captured in the ECS. Only questions on systematic training need checks are included. Training checks for some of the employees do not make an establishment innovative, but regular training checks for fixed-term and older employees could be judged as such. As one may presume, training checks for marginal groups of workers indicate a stronger emphasis on training revealed by establishments. Again the presence of at least one of these two indicators is sufficient for the creation of the training variable.

The autonomous team concept is constructed directly from the straightforward question about the existence of such innovative work practices in the establishment. The employee voice variable is constructed from four questions where the possible responses are all on a five-point ordinal Lickert scale. The item responses are summed for each establishment and only establishments in the highest (unweighted) quartile (25%) of the score are coded 1.

Table 2 shows the percentage of each of these HRM practices among establishments in the ECS sample. Each of the five practice dimensions is implemented by at least 17% (financial incentives) and at most 30% (flexible working time) of the establishments. Obviously these practices are not so widely used and lend some weight to the assumption that the constructed variables are in some respect innovative or sophisticated. This way of coding has the advantage of exploring HRM practices and their associations with outcomes one by one. This would not be possible through computing a single summary scale measuring the total level of HRM practices as it is often done in the literature. Thus we can test the impact of each type of practice separately. Flexible working time is rather common (30%) across establishments, followed by training (26%) and autonomous teams (22%). The most 'sophisticated' practices are financial incentives (17%) and employee voice (18%). We can also observe that it is not so common to implement more than one such practice, e.g. only a fifth of the establishments in Europe use two innovative work practices at the same time, and almost a third of

establishments do not apply any type of sophisticated HRM practices. A tiny minority of fewer than 3% of establishments simultaneously use four or more of the practices we measure.

Table 2: *Innovative workplace practices and their frequency across the sample and their accumulation by establishments. Each of the practices is used as a dummy variable in the models*

Dimension	Workplace practice	%
A	Flexible working time	30.5
B	Financial incentives	17.0
C	Training	26.1
D	Autonomous teams	22.1
E	Employee voice	18.3
Share of establishments with...practices…		**%**
none		32.50
one		35.64
two		20.99
three		8.59
four		2.13
five		0.16

There are also substantial differences between countries in their implementation of sophisticated HRM practices. Table 3 shows how many sophisticated HRM practices establishments use in each country. In Finland for example, only 7% of establishments have none of the five groups of practices implemented, whereas in Greece over 70% of establishments use none of these. A total of 70% of Finish establishments use two or more sophisticated HRM practices, which is the case for only 5% of establishments in Greece. In these terms, Greece and Finland represent the two opposites on a continuum of the usage of sophisticated HRM practices in Europe. It also becomes clear that northern European countries and continental countries are on top of the list while eastern European countries and Mediterranean countries are at the other end of the list.

When correlating the ranks of countries as given in Table 3 with the same countries' labour productivity rank in 2009 (not shown), the correlation coefficient is 0.47 (the level of innovative workplace practices thus explaining 22% of the variance in productivity, but without introducing any further controls), yielding some evidence that on the aggregate level, performance-increasing innovative workplace practices do lead to a higher productivity level (see also Bloom et. al. 2007, Bloom and Van Reenen 2007). There are many other factors that might also determine the level of macroeconomic performance of a country – the level of technological development, infrastructure, level of education of the population etc., which are not considered here. It is notable however that there is such a high correlation between the two variables. To find out about how workplace practices are associated with establishment outcomes, we must however focus on the micro level, i.e. the level of establishments.

Table 3: *Number of implemented sophisticated HRM practices in establishments by country in Europe in 2009*

Country	None	One	Two or more	Total
FI	7%	23%	70%	100%
SE	10%	27%	64%	100%
DK	9%	27%	64%	100%
NL	17%	29%	54%	100%
SI	27%	32%	41%	100%
CZ	24%	38%	38%	100%
DE	24%	38%	38%	100%
BE	30%	33%	37%	100%
UK	27%	37%	37%	100%
FR	28%	37%	35%	100%
PT	31%	36%	33%	100%
IE	31%	37%	32%	100%
LU	34%	34%	32%	100%
PL	30%	39%	31%	100%
MK	27%	43%	30%	100%
ES	35%	36%	30%	100%
SK	31%	39%	29%	100%
AT	33%	39%	28%	100%
BG	38%	36%	26%	100%
RO	38%	37%	25%	100%
LV	36%	40%	24%	100%
EE	39%	38%	23%	100%
HR	40%	37%	23%	100%
LT	46%	36%	18%	100%
IT	51%	32%	17%	100%
HU	45%	38%	17%	100%
CY	49%	35%	16%	100%
MT	56%	32%	12%	100%
TR	53%	35%	12%	100%
EL	72%	23%	5%	100%

Performance indicators measured in the ECS

For this paper we have selected four different outcome variables that were included in the ECS dataset. They can be grouped into two distinct categories: human resource outcomes and economic performance indicators. Both series of indicators are collected, like any other characteristic and the level of innovative workplace practices, from HR managers and therefore represent a subjective assessment, which is not an ideal solution as we have argued earlier. The ECS however offers us the possibility of using both types of measures (human resource and economic outcomes) which is not

very common in the research literature as we have seen above. Table 4 shows the four dependent variables we use in this paper.

Table 4: *Establishment outcomes used to measure the impact of HRM workplace practices*

Variable	Question in the manager questionnaire	Answer category
Work climate	How would you rate the current general work climate in your establishment? Is it very good, quite good, somewhat strained or very strained?	Very good
No HR problems	None of the following: high absenteeism, difficulties retaining staff, low motivation of staff	all coded No
Labour productivity	Compared with other establishments in the same sector of activity, how would you assess the labour productivity in your establishment? Is it a lot better, somewhat better, about average or below average for this sector?	A lot better
Economic situation	How would you rate the economic situation of this establishment? Is it very good, quite good, neither good nor bad, quite bad or very bad?	Very good

One the one hand, very good work climate and the absence of common human resource problems (absenteeism, difficulties or retaining staff and low motivation of staff) are clear indicators of positive human resource outcomes. On the other hand, the rating of the economic situation and the labour productivity as compared to competitors (an indicator used frequently in the HRM literature) are indicators of economic performance. All four indicators thus measure several dimensions of establishment performance: worker satisfaction and low absenteeism and turnover help keep personnel costs down and raise productivity. Economic performance is measured by labour productivity and economic situation of the establishment; both measure the economic success of the business also with reference to its competitors in the market in which it operates.

All the indicators are dummy coded, one for the highest level of achievement (very good, a lot better and no HR problems at all) and otherwise zero. We thus cover the two sides of establishment performance relating to staff (perhaps also indicative of work quality, motivation, dedication and trust into management) and economic performance. All the measures are self-assessed measures by senior managers in each of the establishments. The two HR outcomes could also be considered as intervening variables in the AMO (ability, motivation, opportunity) framework, whereas the other two outcomes, productivity and the economic situation are organisational outcomes and the final outcome variables. This approach has however not been taken in this paper, but could be fruitfully used in subsequent elaborations.

To control for other establishment characteristics in the regressions to follow, we use all available information in the ECS. We are using two dummies for the sector: production, public services with private services being the reference category, 29 dummies for countries with Belgium as a reference country, establishment sizes covered by four dummies, large establishments being the reference. We further include 10 dummies for the sectors of economic activity which reflect the NACE Rev. 1 classification at the first digit and manufacturing as a reference, one dummy for the type of ownership: domestic versus foreign owned. Further we also control for working conditions using two dummies for either the variations of the workload and the predictability of workload, one dummy for establishments with nightshifts, two for overtime work and one dummy if the level of collective bargaining is higher than the establishment level. We finally include a dummy variable if the share of the female workforce is less than 60% and six dummies for different levels of high-skill jobs present at the establishment.

Table 5: *Control variables used to estimate the association of HRM practices with establishment outcomes*

Variables	Transformation	Categories
Sector	2 Dummies	Production, public services (ref. private services)
Country	29 Dummies	DK, DE, EL, ES, FI, FR, IE, IT, LU, NL, AT, PT, SE, UK, BG, CY, CZ, EE, HU, LV, LIT, MT, PL, RO, SK, SI, TR, HR, MK (ref. BE)
Establishment size	4 Dummies	<20, <50, <250 (ref. 500+)
Industry	10 Dummies	C, E, F, G, H, I, J, K, L, M (ref. D, Manufacturing)
Domestic	1 Dummy	domestic owned (ref. foreign owned)
Major variations of the Workload	2 Dummies	daily, weekly (ref. season)
Foreseeable workload	2 Dummies	not foreseeable, equally foreseeable (day, week), (ref. mostly foreseeable)
Night shifts	1 Dummy	Night shift (ref. no night shifts)
Overtime	2 Dummies	cut-offs <3%, <30%
Bargain level	1 Dummy	higher then establishment level
Women	1 Dummy	<60% (ref. 60% or more)
Skill level (% of high skilled jobs)	6 Dummies	<20, <40, <60, <80, <100 (ref. none)
Formal employee representation	1 Dummy	Any type of formal employee representation (e.g. works council) at the establishment (country specific)

All the control dummies help to control for other measured factors that may have an impact on the outcome variables, e.g. the skill level of employees (measured as the share of high-skilled workers) has an impact on the economic performance of establishments so that this effect has to be controlled in order to estimate the 'net' effect of any of the HRM practices.

Estimation strategy

The aim of the empirical part of this paper is to measure the association of HRM practices with establishment outcomes. The standard procedure is to use regression models to estimate the association between innovative workplace practices and performance indicators.

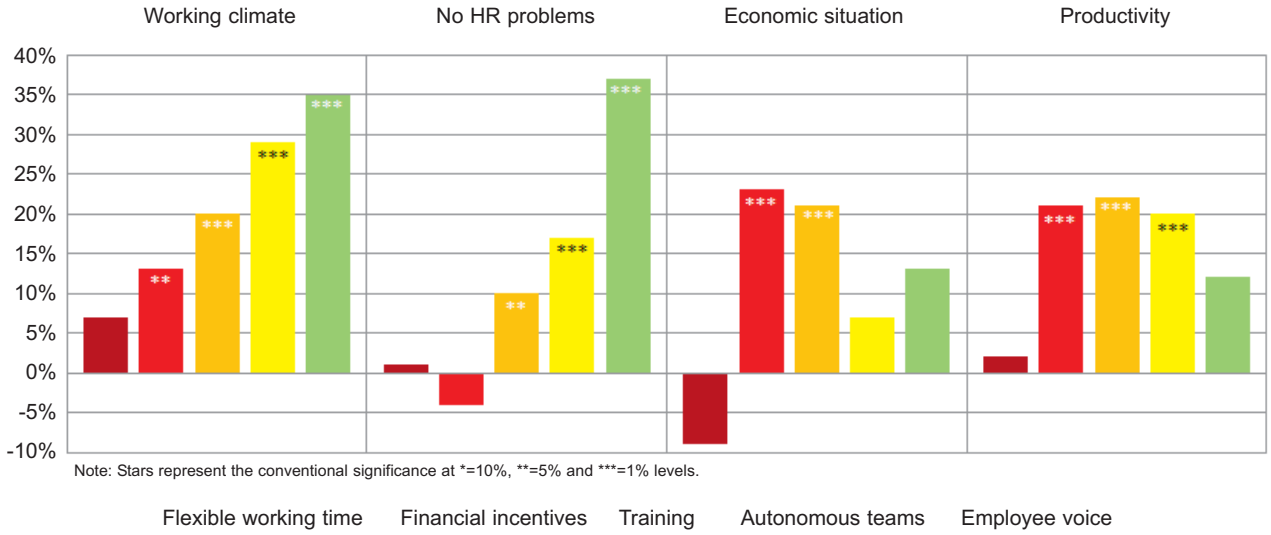
All independent variables and outcome variables are dichotomised (dummy variable taking 1 if a practice is used and 0 if not). The results are to be interpreted in such a way that if an establishment uses a very sophisticated measure, the probability of a very good outcome is increased by an estimate, usually between 0 and 1, while controlling for other independent variables. We test if the presence of the HRM inputs from Table 3 yield positive outcomes on each of the dependent performance variables presented in Table 4. As we have a dichotomous outcome, we need to use an adequate modelling strategy, different from the strategy used in regression metric variables. The model of choice is the logit model, which has the advantage of estimating effects bounded between 0 and 1. We also applied robust sandwich estimation of variance to control for non-independence of observations, which is probably the case, as establishments are possibly introducing HRM strategies to imitate their competitors. We opted for this specification in order to be able to compare the impact or relatively equally sophisticated innovative work practices (see again Table 3) on comparable outcomes, all measured as a high level of performance.

We implicitly assume that there is a latent dimension to each of the work practices, as we do not measure relatively common practices but extremes or 'sophisticated practices'. If any of the independent variables equals 1 for a particular establishment, this can be interpreted as a high level of best practice. There is therefore a succession in the level of practices from 'none at all' to 'very sophisticated': e.g. no training at all, training for highly qualified core worker only, training for all workers even older and finally also for those on fixed-term contracts and the low qualified. All are clearly a succession of practices from suboptimal to excellent and should lead to an increasingly positive impact on the outcome variable. This is the 'latent' dimension in our measurement. The use of each of the dimensions we cover in our models has its own 'impact' on the outcome variable and therefore using this strategy is better than using a summary scale of measures. It is more important for our research to see the nature of association of HRM practices with different outcomes, as this is a very valuable information by itself and can help HRM to implement practices more selectively in order to obtain different types of outcomes. The results will be presented and discussed in the following section.

Results of the estimation of the impact of practices on performance

Table A.1 in the Appendix show the results of the regression analysis for the full set of independent variables and Figure 1 shows the marginal effects as presented in the tables, for the five variables of interest.

Figure 1: *Marginal effects of innovative workplace practices on performance outcomes, %*



Source: *ECS 2009,* author's calculations

The header of each bar chart shows the outcome variable and the bars represent the effects of innovative workplace practices. These effects can be interpreted in the following way: when an establishment uses any of the sophisticated innovative workplace practices, the impact on the outcome dimension, controlling for all other variables, increases the chance to be best-performing by the given percentage on the ordinate. E.g. the implementation of flexible working time has no significant effect on either dimension of establishment performance (see Table A.1 for significance levels) but financial incentives (incentive pay and share ownership) increases, all other things being equal, the chance of an establishment to have a very good work climate by 13%. The result for flexible working time is not in line with other research findings. When looking at association of flexible working time with economic performance, which is negative (albeit not significant), it should be noted that the survey was carried out in the first quarter 2009, at the height of the recession. Many establishments were using short-time working schemes (see Mandl et al, 2010) to adapt to the crisis while seeing their performance indicators depreciating, which could explain the negative result. Another explanation would be that the measures as we use them are not 'sophisticated' enough, as roughly 30% of companies use some type

of flexible working time scheme. In fact, the effects are probably moderate as this measure of flexible working time is widespread practice. However, the effects are not that far from significant level (|t|-value: 1.638) on e.g. work climate (positive). The introduction of financial incentives has a significant association with all dimensions, with the exception of the absence of HR problems which is negative and not significant. Sophisticated financial incentives increase, all other things being equal, the likelihood of an establishment having a very good work climate by 13%, the likelihood of establishments' having a very good economic situation by 23% and the likelihood of labour productivity being a lot better than competitors by 21%. Financial incentives thus seem to have a higher impact on organisational outcomes than on human resource outcomes.

Training has significant positive association with all outcome variables, increasing (all other things being equal) establishments' likelihood of having a very good work climate by 20%, a very good economic situation by 21% and labour productivity to be better than competitors' by 22%. The association with an absence of HR problems is 10%. This double impact can be explained by the fact that, considering the elaborations of human capital theory (Acemoglu and Pischke, 1999, Arulampalam et al., 2003, Becker, 1962), training has an immediate positive impact on worker productivity if the training aims at specific skills as well as on workers' employability and market value, especially those with a low level of skills, when elements of general skills are covered by the training. Indeed, much of in-company, on-the-job and even more so off-site training provides specific as well as general skills, as is now widely accepted (e.g. Stevens, 1996). Thus the association is equally high with HR dimensions as with establishment performance.

Working in autonomous teams, seems to have a higher association with human resource outcomes (work climate and no HR problems like turnover and low worker motivation) than with establishment performance. The likelihood of the work climate being very good is increased by almost 30% when work is organised in autonomous teams, while the likelihood of having no HR problems is increased by 17%. Nevertheless, labour productivity is also a lot better than competitors' by 20%, when autonomous teams are introduced. The highest associations are found with employee voice, e.g. good cooperation between shop floor workers and management (shop floor employee representation), controlling for formal representation. Although the association between this dimension and establishment performance outcomes are weak and only marginally significant, the association with human resource outcomes are substantial and highly significant. The work climate is more likely to be very good by 35% when an establishment has well developed codetermination mechanisms and the likelihood of having no HR-related problems increases by 37%. All in all, the innovative workplace practices in general seem to have a higher correlation with social dimensions of establishment outcomes (work climate and the absence of HR problems) but certain practices such as pay flexibility (incentive pay mechanisms) have a higher association with economic outcomes in the establishments surveyed. In light of the AOM theory, the satisfaction dimension is intermediate between innovative workplace practices and economic outcomes. This has however not been tested here.

We have finally also tried to test for 'bundles' and synergies between practices. However we did not find a single significant result that could support the hypothesis that, e.g. the combined practices of autonomous teams together with training on-the-job has more impact than each of the practices alone. There seems to be a correlation between the use of autonomous teams and training checks in the ECS data, and in the literature (for example, Cappelli and Neumark, 2001) this is reported as a necessity, as workers, in order to better understand the production process and take over 'engineering functions', must be trained. A core hypothesis in the literature is that management should increase employees' skills and knowledge through training in order to stimulate their motivation and provide opportunities for discretionary effort (for example, Appelbaum and Berg, 2000) as well as to establish work norms that support trust and cooperation in the firm. There is only a weak correlation between practices of autonomous teams and training (Pearson's r2=.02) and these two are weakly associated with voice. But in the models, the interaction effect of both practices is not significant when taking the practices into account separately as well. Thus, there seems to be some indication, that bundles do exist but empirical evidence is probably too closely related to the production process (i.e. the type of industry studied) or the type of the establishment, but cannot be a generalisation of the usefulness of specific bundles.

Finally, our results indicate that innovative workplace practices do matter. We find that the more HR-oriented practices such as voice and time flexibility have an impact (even if limited in the cases of time flexibility) on personnel outcomes such as HR problems and work climate. The same holds true for training checks and team autonomy but to a lesser degree. Practices that help boost work efficiency like incentive payments and share ownership (also training checks) have a greater impact on economic outcomes such as labour productivity and economic performance.

Summary and conclusions 5

The report provides an overview of the literature on innovative work practices and starts with an inventory of the many practices that have been viewed as innovative. These include most practices that have been introduced in the move away from the classic Taylorist work organisation. It is generally assumed that less rigid forms of work organisation was required to cope with more dynamic market conditions and product developments. To a greater extent than earlier they were intended to accommodate the requirement of a more knowledge-intensive and learning workforce. These practices have been introduced primarily to improve performance and thus mirror the move from personnel to human resource management and more recently have been closely related to the concept of high-performance workplaces. The literature has examined performance in many dimensions ranging from relatively specific HR measures such as absenteeism and employee turnover to more overarching establishment performance measures such as productivity and profit.

Not surprisingly, it would appear that there is a consensus that human resource practices do have an impact on performance. There is less agreement however on whether there is a general set of performance-enhancing best practices or whether contextual factors, such as sector and institutional setting make the search for absolutes fruitless. There is also little consensus about how different practices interact (in bundles) in order to generate improved performance. Similarly there is little conclusive evidence on how innovative work practices effect working conditions or job satisfaction. Thus it is very difficult to briefly summarise this literature. The first four sections of this report do, however, give an account of the most prominent findings.

The analytical part of the paper attempts to examine how innovative workplace practices affect establishment performance throughout Europe. This is based on Eurofound's own European Company Survey (ECS). One limitation of the ECS for the purpose of the research question is that it is, like in most previous research, based on a cross-sectional survey and thus cannot trace the evolution of work practices and performance over time, which would be helpful in identifying causal relationships. The most interesting aspect of the survey is, as the dataset covers 27,160 establishments in 30 countries, that it is probably the most extensive dataset ever used for this purpose and the only cross-national research attempt.

Four performance indicators are used: work climate, the lack of HR problems, labour productivity (compared with competitors) and the economic situation in the establishment. Like all the ECS variables, these are based on responses from the HR manager. Responses to these questions that indicate very high performance are then coded to indicate high-performing establishments. A similar approach is used to measure the five aspects of innovative work practices with only quite sophisticated practices being coded as innovative. The five sets of practices are: 1. flexible working time, 2. financial incentives (for a large proportion of the workforce), 3. training, 4. autonomous teams and 5. employee voice.

Regression analysis is then used to examine the effect of these practices on performance. Many other variables are used to control for other factors that may influence performance such as sector, country, and other establishment and workforce characteristics.

The two strongest results are the positive impact of employee voice on having both a good work climate and the absence of HR problems and the importance of training for economic situation and productivity level of the establishment. The economic situation and productivity measures of performance are also positively associated with performance pay. Team autonomy showed relatively strong effects for the work climate and productivity. The weakest results are found for working time flexibility for all performance variables. Furthermore, no evidence was found that various combinations (bundles) of the innovative practices were more conducive to high performance, though some correlation between training checks and working in autonomous teams was observed.

It must be stated that the causality problems cannot be statistically solved with the available data and caution must always be expressed for all subjective measures coming from a single source. Nevertheless, there is some reason to believe that some causal relationships are present here. The very strong effects of voice on work climate and lack of HR problems are eminently plausible. Similarly it would be difficult to believe that it is in fact the performance indicators that 'cause' some of the innovative practices. For example, it is unlikely that just because firms have a high productivity that they then adopt a high level of team autonomy. That high levels of team autonomy leads to higher productivity is clearly a more credible explanation of any observed correlation.

Thus an overall conclusion is that this report shows that the innovative work practices as identified in the ECS do appear to have a positive effect on various dimensions of performance. Labour productivity is not only about new technologies and increased capital investment. Work organisation in general, and these practices in particular, also play a vital part in meeting the challenges facing Europe in the ever increasing global competitive environment.

References

Acemoglu, D. and Pischke J.-S. (1999), 'Beyond Becker: Training in imperfect labour markets', *The Economic Journal* 109 (Feb.), pp. F112–F142.

Addison, J. T., Siebert, W. S., Wagner, J. and Wei, X. (2000), 'Worker participation and firm performance: Evidence from Germany and Britain', *British Journal of Industrial Relations* 38 (1), pp.7–48.

Ahmad, S. and Schroeder, R. G. (2003), 'The impact of human resource management practices on operational performance: Recognizing country and industry differences', *Journal of Operations Management* 21, pp.19–43.

Appelbaum, E., Bailey, T., Berg, P. and Kalleberg, A. (2000), *Manufacturing advantage: Why high-performance work systems pay off*, Cornell University Press, Ithaca, NY.

Appelbaum, E. and Berg, P. (2000), *High-performance work systems and labor market structures*, Kluwer Academic/Plenum Publishers, New York.

Arthur, J. B. (1992), 'The link between business strategy and industrial relations systems in American steel minimills', *Industrial and Labor Relations Review* 45 (4), pp. 488–506.

Arthur, J. B. (1994), 'Effects of human resource systems on manufacturing performance and turnover', *The Academy of Management Journal* 37 (3), pp. 670– 687.

Barney, J. (1991), 'Firm resources and sustained competitive advantage', *Journal of Management* 17 (1), pp. 99–120.

Batt, R. (2002, June), 'Managing customer services: Human resource practices, quit rates, and sales growth', *The Academy of Management Journal* 45 (3), 587.

Bauer, T. K. (2004), 'High performance workplace practices and job satisfaction: Evidence from Europe'. IZA Discussion Paper No. 1265, Bonn.

Becker, B. E. and Gerhart, B. (1996), 'The impact of human resource management on organizational performance: progress and prospects'. *Academy of Management Journal* 39, pp. 779–801.

Becker, B. E. and Huselid, M. A. (1998), 'High performance work systems and firm performance: A synthesis of research and managerial implications', *Research in Personnel and Human Resources Management* 16, pp. 53–101.

Becker, B. E., Huselid, M. A., Pickus, P. S. and Spratt, M. F. (1997), 'HR as a source of shareholder value: Research and recommendations', *Human Resource Management* 36 (1), pp. 39–47.

Becker, G. S. (1962), 'Investment in human capital: A theoretical analysis', *The Journal of Political Economy* 70 (5), pp. 9–49.

Benson, G. S. (2006, April), 'Employee development, commitment and intention to turnover: A test of "employability" policies in action', *Human Resource Management Journal* 16 (2), pp. 173–192.

Black, S. E. and Lynch, L. M. (1997), 'How to compete: The impact of workplace practices and information technology on productivity', NBER working paper.

Black, S. E. and Lynch, L. M. (2004, February), 'What's driving the new economy: The benefits of workplace innovation', The Economic Journal 114 (493), pp. F97-F116. Bloom, N., Dorgan, S, Dowdy, J., Van Reenen, J. (2007, July), 'Management practice and productivity: Why they matter', Centre for economic performance / Mc Kinsey & Company.

Bloom, N., Van Reenen, J. (2007), 'Measuring and Explaining Management Practices Across Firms and Nations', Quarterly Journal of Economics 122 (4), pp.1351-1408.

Boselie, P., Dietz, G. and Boone, C. (2005), 'Commonalities and contradictions in HRM and performance research', *Human Resource Management Journal* 15, pp. 367–94.

Boxall, P. and Macky, K. (2009, January), 'Research and theory on high-performance work systems: progressing the high-involvement stream', *Human Resource Management Journal* 19 (1), pp. 3–23.

Brown, A., Forde, C., Spencer, D. and Charlwood, A. (2008, July), 'Changes in HRM and job satisfaction, 1998–2004: evidence from the Workplace Employment Relations Survey', *Human Resource Management Journal* 18 (3), pp. 237–256.

Bryson, A., Forth, J. and Kirby, S. (2005, July), 'High-involvement management practices, trade union representation and workplace performance in Britain', *Scottish Journal of Political Economy* 52 (3), pp. 451–491.

Burda, M. C. and Severgnini, B. (2009), 'TFP growth in old and new Europe', SFB 649 Discussion Papers, Humboldt University, Berlin.

Burns, T. and Stalker, G. (1961), *The management of innovation* (Reprint 20ed.), Oxford University Press, Oxford and New York.

Cappelli, P. and Neumark, D. (1999), 'Do high performance work practices improve establishment-level outcomes?' NBER Working Paper Series, No. 7374.

Cappelli, P. and Neumark, D. (2001), 'Do "high-performance" work practices improve establishment-level outcomes?' *Educational Research* 54 (4), pp. 737–775.

Crook, T. R., Ketchen, D. J., Combs, J. G. and Todd, S. Y. (2008), 'Strategic resources and performance: A meta-analysis', *Strategic Management Journal*, pp. 1141–1154.

Danford, A., Richardson, M., Stewart, P., Tailby, S. and Upchurch, M. (2008), 'Partnership, high performance work systems and quality of working life', *New Technology, Work and Employment* 23(3), pp. 151–166.

Datta, D. K., Guthrie, J. P. and Wright, P. M. (2005), 'Human resource management and labor productivity: does industry matter?' *Academy of Management Journal* 48 (1), pp. 135–145.

Dehejia, R. H. and Wahba, S. (2002), 'Propensity score-matching methods for nonexperimental causal studies', *The Review of Economics and Statistics* 84 (1), pp. 151–161.

Delaney, J. T. and Huselid, M. A. (1996), 'The impact of human resource management practices on perceptions of organizational performance', *Academy of Management Journal* 39 (4), pp. 949–969.

Delaney, J. T., Lewin, D. and Ichniowski, C. (1989), 'Human resource policies and practices in American firms'. Washington, DC: U.S. Department of Labor.

Delery, J. E. and Doty, D. H. (1996a), 'Modes of theorizing in strategic human resource management: tests of universalistic, contingency, and configurational performance predictions', *Academy of Management Journal* 39 (4), pp. 802–835.

Delery, J. E. and Doty, D. H. (1996b), 'Theoretical frameworks in strategic human resource management: Universalistic, contingency, and configurational perspectives', *Academy of Management Journal* 39, pp. 802–35.

Feuille, P. and Delaney, J. T. (1992), 'The individual to suit of organizational justice: Grievance procedures in non-union workplaces', *Research in Personnel and Human Resources Management* 21, pp. 187–232.

Fiorito, J. (2001), 'Human resource management practices and worker desires for union representation', *Journal of Labor Research* 22 (2), pp. 335–354.

Flood, P. C., Guthrie, J. P., Wenchuan, L., Armstrong, C., MacCurtain, S., Mkamwa, T. and O'Regan, C. (2008, December), 'New models of high performance work systems. The business case for strategic HRM, partnership and diversity and equality systems', Equality Authority and the National Centre for Performance and Partnership, Dublin.

Freeman, R. B. (1976), *The overeducated American*, Academic Press, New York.

Freeman, R. B. and Medoff, J. L. (1985), *What do unions do?* Basic Books, New York.

Freeman, R. B., Boxall, P. and Haynes, P. (2007), *What workers say. Employee voice in the Anglo-American workplace*, Cornell University Press, Ithaca, NY.

Freeman, R.B., Kleiner, M.M., Ostroff, C. (2000), 'The anatomy of employee involvement and its effects on firms and workers', NBER Working Paper Series, No. 8050.

Green, K. W., Wu, C., Whitten, D. and Medlin, B. (2006), 'The impact of strategic human resource management on firm performance and HR professionals' work attitude and work performance', *International Journal of Human Resource Management* 17 (4), pp. 559–579.

Guest, D. E. (1987), 'Human resource management and industrial relations', *Journal of Management Studies*, pp. 503–521.

Guest, D. E. (1997), 'Human resource management and performance: a review and research agenda', *International Journal of Human Resource Management* 8, pp. 263–76.

Guest, D. E. (1999), *Human resource management and performance: A review and research agenda*, Blackwell, Oxford and Malden MA, pp.177–190,

Guthrie, J. P. (2001, February), 'High-involvement work practices, turnover, and productivity: Evidence from New Zealand', *The Academy of Management Journal* 44 (1), 180.

Heckman, J.J., Ichimura, H. and Todd, P. (1997), 'Matching as an econometric evaluation estimator: Evidence from evaluating a job training programme', *Review of Economic Studies* 64, pp. 605–654.

Heckman, J.J., Ichimura, H. and Todd, P. (1998), 'Matching as an econometric evaluation estimator', *Review of Economic Studies* 65, pp. 261–294.

Hirschman, A. O. (1970), *Exit, voice and loyalty: Responses to decline in firms, organisations, and states*, Harvard University Press, Cambridge MA.

Horgan, J. and Mühlau, P. (2006), 'Human resource systems and employee performance in Ireland and the Netherlands: A test of the complementarity hypothesis', *International Journal of Human Resource Management* 17 (3), pp. 414–439.

Huselid, M. A. (1995, June), 'The impact of human resource management practices on turnover, productivity, and corporate financial performance', *The Academy of Management Journal* 38 (3), pp. 635–672.

Huselid, M. A. and Becker, B. E. (1996), 'Methodological issues in cross-sectional and panel estimates of the human resource-firm performance link', *Industrial Relations* 35 (3), pp. 400–422.

Ichniowski, C., Kochan, T. A., Levine, D., Olson, C. and Strauss, G. (1996), 'What works at work: Overview and assessment', *Industrial Relations* 35 (3), pp. 299–333.

Ichniowski, C., Shaw, K. and Crandall, R. W. (1995), 'Old dogs and new tricks: Determinants of the adoption of productivity-enhancing work practices', Brookings Papers on Economic Activity. *Microeconomics* 1995, pp. 1–65.

Ichniowski, C., Shaw, K. and Prennushi, G. (1997), 'The effects of human resource management practices on productivity: A study of steel finishing lines', *The American Economic Review* 87 (3), pp. 291–313.

Ichniowski, C., Shaw, K. (1999), 'The Effects of Human Resource Management Systems on Economic Performance: An international comparison of US and Japanese plants', *Management Science* 45 (5), pp. 704–721.

Jayaram, J., Droge, C. and Vickery, S. K. (1999), 'The impact of human resource management practices on manufacturing performance. *Journal of Operations Management* 18 (1), pp. 1–20.

Kalleberg, A. L. and Moody, J. W. (1994), 'Human resource management and organizational performance'. *American Behavioral Scientist* 37 (7), pp. 948–62.

Kalmi, P., Pendleton, A. and Poutsma, E. (2005, November), 'Financial participation and performance in Europe', *Human Resource Management Journal* 15 (4), pp. 54–67.

Kaufman, B. E. (2010, April), 'SHRM theory in the post-Huselid era: Why it is fundamentally misspecified', *Industrial Relations: A Journal of Economy and Society* 49 (2), pp. 286–313.

Kuvaas, B. R. (2006), 'Performance appraisal satisfaction and employee outcomes: mediating and moderating roles of work motivation', I*nternational Journal of Human Resource Management* 17 (3), pp. 504–522.

Lalonde, R. J. (1986), 'Evaluating the econometric evaluations of training programs with experimental data,' *The American Economic Review* 76 (4), pp. 604–620.

Lawler, E. E. (1986), *High involvement management*, Jossey-Bass, San Francisco, CA.

Lawler, E. E., and Benson, G. S. (2003), *Employee involvement: Utilization, impacts, and future prospects*, Wiley, London, pp. 155–173.

Lawler, E. E. and Mohrman, S. A. (1995), *Creating high performance organizations*, Jossey-Bass, San Francisco, CA.

Lawler, E. E., Mohrman, S. A. and Ledford, J. (1998), *Strategies for high performance organizations*, Jossey-Bass, San Francisco, CA.

Lazear, E. P. (2000), 'Performance pay and productivity', *The American Economic Review* 90 (5), pp. 1346–1361.

Lepak, D. P. and Snell, S. A. (2002), 'Examining the human resource architecture: The relationships among human capital, employment, and human resource configurations', *Journal of Management* 28 (4), pp. 517–543.

Macduffie, J. P. (1995a), 'Human resource bundles and manufacturing performance: Organizational logic and flexible production systems in the world auto industry', *Industrial and Labor Relations Review* 48.

Macduffie, J. P. (1995b), 'Human resource bundles and manufacturing performance: Organizational logic and flexible production systems in the world auto industry', *Industrial and Labor Relations Review* 48 (2), pp. 197–221.

Machin, S. and Wood, S. (2005), 'Human resource management as a substitute for trade unions in British workplaces', *Industrial and Labor Relations Review* 58 (2), pp. 201–218.

Macky, K. and Boxall, P. (2007), 'The relationship between "high-performance work practices" and employee attitudes: An investigation of additive and interaction effects', *International Journal of Human Resource Management* 18 (4), pp. 537–567.

Maes, J., Sels, L. and Roodhooft, F. (2005), 'Modelling the link between management practices and financial performance. Evidence from small construction companies', *Small Business Economics* 25 (1), pp. 17–34.

Mandl, I., Storrie, D., Hurley, J., Mascherini, M., Broughton, A., Owczarzak, R., Riso, S. and Salvatore, L. (2010), *Extending flexicurity – The potential of short-time working schemes: ERM Report 2010*. Eurofound, Dublin.

McGrath, R. G. and Koch, M. J. (1996, May), 'Improving labor productivity: Human resource management policies do matter', *Strategic Management Journal* 17 (5), pp. 335–354.

McPhail, R., and Fischer, R. (2008), 'It's more than wages: Analysis of the impact of internal labour markets on the quality of jobs', *The International Journal of Human Resource Management* 19 (3), pp. 461–472.

Michie, J. and Sheehan, M. (2005), 'Business strategy, human resources, labour market flexibility and competitive advantage', *International Journal of Human Resource Management* 16 (3), pp. 455–464.

Michie, J., Zubanov, N. and Sheehan, M. (2008), 'Human resource management practices, organisational outcomes and performance: An analysis of WERS 2004 data', Employment Relations Occasional Paper, URN 08/674, Department for Business, Enterprise and Regulatory Reform, London.

Nickell, S. (1986), 'Dynamic models of labour demand', in Ashenfelter, O. and Layard, R. (ed.) *Handbook of labor economics* (1987), Elsevier Science, Amsterdam, pp. 473–522.

Osterman, P., Kochan, T. A., Locke, R. and Piore, M. J. (2001), *Working in America: A blueprint for the new labor market*, MIT Press, Cambridge, MA.

Paauwe, J. (2009), 'HRM and performance: Achievements, methodological issues and prospects', *Journal of Management Studies*, 46 (1), pp.129–142.

Paauwe, J. and Richardson, R. (1997, May), Introduction, *The International Journal of Human Resource Management* 8 (3), 257–262.

Paauwe, J. and Richardson, R. (2001, November), Editorial introduction: HRM and performance: confronting theory and reality, *International Journal of Human Resource Management* 12 (7), pp.1085–1091.

Peikes, D. N. Moreno, L., Orzol, S.M. (2008), 'Propensity score matching', *The American Statistician* 62 (3), pp.222–231.

Pfeffer, J. (1998), *The human equation: Building profits by putting people first*, Harvard Business School Press.

Pil, F. K. and Macduffie, J. P. (1996), 'The adoption of high-involvement work practices', *Industrial Relations* 35 (3), pp.423–455.

Purcell, J. (1999). The search for "best practice" and "best fit": Chimera or cul-de-sac? *Human Resource Management Journal* 9, pp.326–41.

Purcell, J. (2004), 'Business strategies and human resource management: Uneasy bedfellows or strategic partners?' Working paper presented at the international seminar on HRM: what's next?, organized by the Erasmus University Rotterdam, June 2004.

Ramsay, H., Scholarios, D. and Harley, B. (2000, December), 'Employees and high-performance work systems: Testing inside the black box, *British Journal of Industrial Relations* 38 (4), p.501–531.

Sels, L., Winne, S., Delmotte, J., Maes, J., Faems, D. and Forrier, A. (2006), 'Linking HRM and small business performance: An examination of the impact of HRM intensity on the productivity and financial performance of small businesses', *Small Business Economics* 26 (1), pp.83–101.

Sengupta, S. (2008, May), 'The impact of employee-share-ownership schemes on performance in unionised and non-unionised workplaces', *Industrial Relations Journal* 39 (3), pp. 170–190.

Solow, R. M. (1957), 'Technical change and the aggregate production function', *The Review of Economics and Statistics* 39 (3), pp.312–320.

Stevens, M. (1996), 'Transferable training and poaching externalities', in: Booth, A.L. and Snower D. J., (Ed.), *Acquiring skills: market failures, their symptoms and policy response*. Cambridge University Press, Cambridge.

Van Reenen, J. (2005), 'Policies for raising productivity' (presentation). London. Centre for Economic Performance, London School of Economics.

Vlachos, I. (2008), 'The effect of human resource practices on organizational performance: evidence from Greece', *International Journal of Human Resource Management* 19 (1), pp.74–97.

Walton, R. E. (1985), 'From control to commitment in the workplace', *Harvard Business Review* (March-April), pp. 77–84.

White, M., Hill, S., McGovern, P., Mills, C. and Smeaton, D. (2003, June), '"High-performance" management practices, working hours and work-life balance', *British Journal of Industrial Relations* 41 (2), pp.175–195.

Winship, C. and Morgan, S. L. (1999), 'The estimation of causal effects from observational data', *Annual Review of Sociology* 25, pp. 659–706.

Wood, S. (1996), 'High commitment management and unionization in the UK', *International Journal of Human Resource Management* 7 (1), pp. 41–58.

Wood, S. (1999), 'Human resource management and performance', *International Journal of Management Reviews* 1, pp. 4367–413.

Wood, S., Holman, D. and Stride, C. (2006, March), 'Human resource management and performance in UK call centres', *British Journal of Industrial Relations* 44 (1), pp. 99–124.

Wood, S. J. and Wall, T. D. (2007, July), 'Work enrichment and employee voice in human resource management-performance studies', *The International Journal of Human Resource Management* 18 (7), pp.1335–1372.

Womack, J. P., Jones, D. T., Roos, D. and Sammons Carpenter, D. (1990), *The machine that changed the world*, Rawson Associates, New York.

Appendix

Table A.1: *Marginal effects estimates with estimates for the full model specification*

Independent variables	Climate	HR issues	Economic Situation	Productivity
Time flexibility	0.07 (1.64)	0.01 (.15)	-0.09 (1.64)	0.02 (.46)
Pay flexibility	0.13** (2.8)	-0.04 (1.02)	0.23*** (3.87)	0.21*** (4.02)
Training Checks	0.20*** (4.71)	0.10** (2.69)	0.21*** (3.9)	0.22*** (4.59)
Team Autonomy	0.29*** (6.46)	0.17*** (3.9)	0.07 (1.19)	0.20*** (3.81)
Formal worker representation	-0.53*** (9.58)	-0.32*** (7.14)	-0.32*** (4.44)	-0.36*** (5.66)
Employee Voice (informal)	0.35*** (5.83)	0.37*** (7.68)	0.13 (1.75)	0.12 (1.83)
Production	-0.39*** (3.69)	-0.07 (.68)	-0.65*** (4.94)	-0.45*** (3.85)
Public Services	-0.01 (.08)	0.02 (.2)	0.07 (.45)	0.02 (.11)
Size 10-19	0.49*** (4.47)	0.41*** (4.73)	-0.41** (3.07)	-0.55*** (4.83)
Size 20-49	0.37*** (3.62)	0.38*** (4.77)	-0.23 (1.89)	-0.37*** (3.61)
Size 50-249	0.20* (2.06)	0.26*** (3.51)	-0.13 (1.17)	-0.35*** (3.66)
Size 250-499	0.08 (.75)	0.05 (.65)	-0.01 (.05)	-0.17 (1.57)
<20% C.G.	-0.17*** (3.33)	-0.03 (.78)	-0.12 (1.72)	-0.02 (.29)
20-40% C.G.	-0.07 (1.22)	0.17** (3.09)	-0.02 (.23)	0.05 (.65)
40-60% C.G.	0.14 (1.82)	0.33*** (4.47)	-0.06 (.6)	0.12 (1.27)
60-80% C.G.	0.14 (1.51)	0.43*** (4.88)	0.02 (.13)	0.32** (3.07)
80-99% C.G.	0.35*** (4.02)	0.56*** (6.35)	0.32** (2.83)	0.49*** (4.9)
All C.G.	0.58*** (4.72)	0.50*** (3.72)	0.35* (2.16)	0.37* (2.48)
Overtime 3-29%	-0.16*** (3.36)	-0.18*** (4.29)	-0.07 (1.16)	-0.09 (1.56)
Overtime 30-100%	-0.16*** (3.43)	-0.16*** (3.87)	-0.01 (.15)	0.02 (.28)
Any employees on nightshift	-0.13** (2.85)	-0.17*** (4.32)	-0.08 (1.27)	-0.09 (1.63)
Workload foreseeable	0.14* (2.57)	0.16*** (3.4)	0.04 (.63)	0.05 (.9)

Independent variables	Climate	HR issues	Economic Situation	Productivity
Workload sometimes not foreseeable	0.06 (.57)	-0.03 (.37)	0.1 (.73)	0.18 (1.55)
Workload variations each day	0.06 (1.25)	-0.18*** (4.22)	0.04 (.54)	0.16** (2.9)
Workload variation each week	-0.33*** (6.51)	-0.39*** (8.61)	-0.26*** (3.92)	-0.09 (1.64)
Domestic owned company	0.22*** (3.8)	0.14** (2.98)	0.09 (1.21)	-0.04 (.62)
Women <60%	-0.02 (.34)	0.19*** (4.76)	-0.01 (.2)	-0.17*** (3.3)
Constant	-1.31*** (7.18)	0.29 (1.86)	-1.15*** (5.15)	-1.42*** (6.62)
Pseudo R2	0.10	0.05	0.08	0.06
Log-likelihood	9,636.40	11,747.01	6,238.29	7,623.05
N	19,149	19,270	18,905	17,595

Note: all models also control for countries and sectors of industry NACE Rev. 1.1., 1 digit. Absolute t-values in parentheses. Levels of significance given at the (*) 90%, (**) 95% and (***) 99% level.