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Tor Eriksson
and Jaime Ortega

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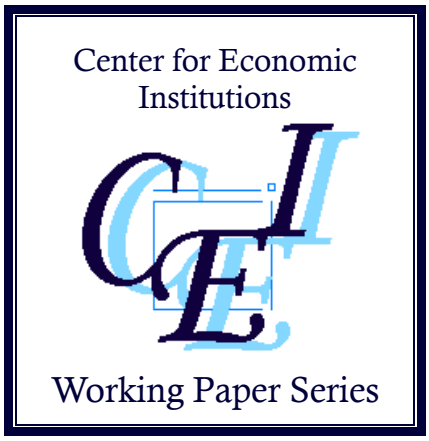

Institute of Economic Research
Hitotsubashi University
2-1 Naka, Kunitachi, Tokyo, 186-8603 JAPAN
http://cei.ier.hit-u.ac.jp/English/index.html
Tel:+81-42-580-8405/Fax:+81-42-580-8333

Organizational Structure and Firms' Demand for HRM Practices

January 2014

Tor Eriksson, Aarhus University, Aarhus

Jaime Ortega, University of Carlos III, Madrid

Abstract: A question largely left unanswered in previous studies of firms' use of HRM practices, and the consequences thereof, is why some firms adopt these practices while others do not. We examine empirically the determinants of firms' demand for HRM pay, work and training practices with a special focus on the role of differences in the organizational structure of firms. For this purpose we merge data from a detailed questionnaire study of Danish private sector firms' use of HRM practices with workforce information from linked employer-employee data. We find that firms with a Multi-divisional or a Hybrid structure have a greater demand for (incentive) pay practices and new work practices than companies with a Unitary (functional) form. Moreover, M- and H-firms train more of their employees than the U-firms do, suggesting that employer provided training is linked to the adoption of pay and work practices.

Keywords: Organizational structure, Firm choice, Pay and work practices

JEL Codes: D22, L22, M51, M52

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1 Introduction and Motivation

One of the major puzzles in research of corporate performance is the large performance differences between firms observed in a cross-section and the strong persistence in these differences over time (see e.g., Nickell (1995), Geroski (1998)). During the last two decades a relatively large research literature has sprung up analyzing the determinants of the large productivity differences across firms (within countries and within industries); see Syverson (2011) and Bloom and van Reenen (2012) for two recent surveys, the first focusing chiefly on competition and related factors and the latter on Human Resource Management practices.[1]

As for the studies of HRM practices, most (but not all) show a positive effect on productivity of incentive pay and participatory and employee involvement policies. A smaller literature has looked at other firm level outcomes (like worker turnover, absenteeism, innovation (Laursen and Foss (2012)) and worker outcomes (wages, wage dispersion (Black et al. (2003), job satisfaction) and these studies have overall found that also (if not all, at least some) employees gain. In addition to direct effects on productivity operating via greater workers' effort, several studies also demonstrate the importance of sorting and sometimes that bundling of practices is important, too.

However, the question left largely unanswered in many of these studies is: if the new, innovative practices are associated with improved productivity, why do only some firms adopt them while others do not?[2] Another way to put this question is: if current non-adopters implement these practices, can we expect to see the same positive outcomes as for those that have already adopted them? Two recent papers discuss these questions in the context of HRM practices in more detail.[3] Bloom and van Reenen (2012) do this in their survey of the studies of HRM and productivity by distinguishing between two different perspectives, one of which they call the "design perspective" that considers firms' choices of HRM practices as results of optimizing behavior. Because firms face different circumstances, they choose differently. Moreover, they may have different adjustment costs, but one would not expect individual firms to remain persistently

[1] On personnel policies, see also Lazear and Shaw (2011) and Shaw (2012).
[2] Following Osterman (1994), several studies have demonstrated that the firms adopting the new work and pay practices differ markedly from non-adopters with respect to, inter alia, product market strategy and competition and the level of employee skills.
[3] For a discussion in the context of management practices more broadly, see Gibbons and Henderson (2013).

out of equilibrium. The other perspective is called the "management as technology" perspective and here practices are regarded as similar to new technologies the introduction and diffusion of which are slow because of differences in costs and benefits to firms, but also because of different arrival rates of information about the new technologies. The staggered nature of the diffusion process implies that the adoption of a practice in additional firms can have positive impacts on outcomes like productivity. Thus, the two perspectives differ with respect to the role seen for inefficiencies, and consequently, also the predictions concerning implementation of practices in non-adopting firms are likely to differ.[4]

Kaufmann and Miller (2011) compare the different perspectives in the so called Strategic Human Resource Management (SHRM) literature with the traditional personnel economics analysis (which they characterize in the same way as the "design perspective" in Bloom and van Reenen's jargong). For the SHRM studies they identify three different perspectives. One is the universalistic perspective according to which there are certain best practices with universal applicability. Another is the contingency perspective which posits that the best choice is conditional on certain key contextual factors, and finally there is the configurational perspective which emphasizes that the performance effects depend critically on the complementarity of practices (that is, finding the right bundle of practices), and idea which can also be found in the organizational and personnel economics literatures (see e.g., Holmström and Milgrom (1994) and Ichniowski et al. (2003)). Of these, the two first perspectives, which dominate the SHRM research, often explicitly state that many (most) firms have underinvested in good HRM practices.

In this paper, we carry out an empirical study of the determinants of firms' demand for HRM practices using data from a survey using a fairly detailed firm questionnaire which are merged with a linked employer-employee data set. The data come from Denmark, one of the Northern European countries which stand out as having introduced more of the so called new HRM practices (and new management methods in general) than the other European countries, and also at a faster pace; see Employment in Europe (2007).[5]

[4] Bloom and van Reenen (2012) argue that according to the technology perspective there may be practices that are universally good, that is, have positive effects in all firms, irrespective of the environment they are operating in.
[5] The spread of HRM practices in Danish firms during the two previous decades is described in Eriksson (2012).

As mentioned above, studies attempting to understand which firms are adopting different HRM practices, and why, are rather thin on the ground, and they often consider only few potential determinants. Our study differs in at least two ways. First, we exploit a relatively rich data set which allows us to carry out a quite comprehensive analysis accounting for a large number of factors, and second, we are among the first to focus on the organizational structure of the firm as a determinant of firms' choices of HRM practices. We find that firms' use of HRM practices is systematically related to a number of observable firm characteristics implying that unless these linkages are not recognized, results from studies regressing corporate performance variables on measures of HRM practices may be seriously misleading. In particular we find that a firm's demand for HRM practices is influenced by its organizational structure and variables describing the ownership/governance of the firm.

Next, we briefly describe the simple demand for HRM practices framework for our analysis. This is followed by a discussion of firm differences in organizational structures and their implications for personnel policies. Section 4 gives a description of the data sources and variables used and Section 5 contains the estimation results. The sixth section briefly summarizes our findings and their implications.

2 Firms' Demand of HRM Practices

Kaufman and Miller's (2011) model of firms' choice of HRM practices builds on the simple idea to enter HRM practices as an input factor alongside labor (L) and capital (K) in the production function. Labor is considered to be made up (multiplicatively) of the quantity of labor and effective labor (the combined effect of motivation, effort, empowerment, etc.), and the latter is assumed to be a function of the HRM practices adopted by the firm. Denoting effective labor by e, this gives a production function

$$(1)\quad Q = f(e(HRM)\times L, HRM, K)$$

According to (1), HRM has both a direct and an indirect[6] effect on output. If HRM is measured as the level of expenditure on HRM, we can next write the firm's profit maximization problem as

$$(2)\quad \text{Max } \pi = P\, f(e(HRM)\times L, HRM, K) - V\times HRM - W\times L,$$

where P, V and W are the output price, unit cost of HRM and wages, respectively.

Solving for the first order condition and re-arranging we obtain firm i's demand function for HRM:

$$(3)\quad HRM_i = g(Q_i, W_i, V_i, Z_i)$$

in which Z includes a number of other determinants (shift factors[7]), one of which is the organizational structure of the firm, which is in focus in the following analysis.

In order to estimate (3) one would ideally like to have data not only on a host of RHS variables but also on firms' HRM expenditures. Like most other studies of firms' use of HRM practices, we do not unfortunately have that. However, in addition to simple "practice count" measures, we can also exploit information about the proportion of employees covered by each practice[8]. Consequently, we can construct a measure of HRM adoption which accounts for both the number of practices as well as the proportion of the workforce covered; see below. Assuming that the expenditures for each practice are (roughly) proportional to the share of employees covered by them and that the expenditures are increasing in the number of practices implemented, our measure can be considered as a crude proxy for the firm's HRM expenditures.

[6] By direct effects we mean increases in output for given labor input, due to for example more expenditure on hiring and screening new employees. Indirect effects are changes in output due to changes in the amount of effective labor thanks to improved motivation, greater effort and employee involvement.

[7] Examples of these are firm size, production technology, industry, workforce characteristics, and market conditions. See Kaufman and Miller (2011) for a further discussion.

[8] For the payment practices, we have also information about the each payment form's share of a typical employee's total wage income.

3 Organizational Structure and Its Implications for HRM Policies

Following Chandler's (1962) influential case studies, the key message of which was that it does indeed matter how firms organize themselves – summarized in the three words "structure follows strategy" – one of the classic themes in the study of firms has been the relationship between firms' strategies and the way they are organized. Chandler and others described the development of the first large companies, which arose in industries like railroads, tobacco, steel and oil, and how the challenges managing them were solved by the invention of the unitary form building on functional units headed by functional managers reporting to the CEO. Further growth of the large companies and the experiences of the unitary form led to the development of the multi-divisional firm where the company is divided into divisions. These are by and large organized as autonomous unitary forms the heads of which are reporting to the headquarters. The terms U and M forms were introduced by Willamson (1975) to describe these two basic forms of organizing firms.

A multidivisional structure can be organized by product, related business units, the technologies employed and by market segment (geography or customer type). A key prediction from the research on organizational structure in the nineties was that owing to the substantial decrease in information costs, there will be a move from the former standard organization of the firm, the U-form, to the more efficient and flexible M-form (Milgrom and Roberts (1990), (1992), Roberts, 2004). In addition to these two forms a third form has emerged which combines elements of both. This hybrid organization, henceforth called the H-form, is often referred to as the matrix organization; see Galbraith (1971) for an early discussion. The rationale for adopting the H-form is frequently said to be that one wants to exploit synergies by coordinating activities across multiple business units. In practice this is implemented by using corporate level functional managers.[9] A key disadvantage of H- (and matrix) organizations is that employees can find themselves caught between intersecting lines of authority, which may give rise to hard problems when conflicts arise. This is not the only additional organizational form of firms.[10] A relatively new and hence quite rare

[9] A recent paper by Guadalupe et al. (2013) shows that executive teams in large U.S. firms have increased (that is, the number of executives reporting to the CEO has grown) and the increase is chiefly due a growth in functional managers. The study examines whether the increased functional centralism is due to less diversification induced by global competition or the decline in costs of using information technologies.

[10] As stressed by e.g., Roberts (2004), there are, however, remarkably few organizational forms.

form is the Network organization; see e.g., Nohria and Eccles (1992). The sources of its use are the inspiration provided by the Japanese *keiretsu* structure and the dramatic fall in the costs of information and communication technologies.

Chandler's insights gave rise to a voluminous literature on appropriate structures to provide employees with information, coordination of activities, and incentives needed to implement a chosen strategy. The research literature on the firm's organizational form is mainly theoretical and the empirical evidence is predominantly of the anecdotal or case studies variety. Thus, for instance, the recent survey by Roberts and Saloner (2013) does not present nor discuss evidence based on systematically collected and analyzed data.[11]

The main differences between the U and the M forms of organization are typically summarized as follows. The U-form organization possesses some of the great virtues in economics: it allows for increased specialization (Becker and Murphy, 1992), exploits economies of scale in monitoring performance and critical decision-making is centralized. Unitary organizations are thought to be associated with well-developed internal labor markets and well-defined promotion paths, which will reduce the costs and efforts of HRM for attracting and retaining good employees.

The primary disadvantages with the U-form organization are that while it promotes performance within a functional unit, it makes coordination between units difficult. As a consequence, it cannot handle complexity well, and oftentimes decisions in the headquarters have to be made in the absence of objective measures to assess performance in each function.

The M form is more flexible, promotes innovation (or reform) and encourages changes through experimentation. It enables monitoring of performance using both objective and subjective measures. Decentralization of decisions makes better use of local information. However, broader authority should also be accompanied with stronger incentives. The M-form facilitates diversification as it makes it easier to manage diversification. A key disadvantages of the multidivisional structure is that it adds additional levels to the corporate hierarchy, which gives rise to opportunistic behaviors and information distortion problems, and can lead to competition between divisions at the expense of cooperation.

[11] This is also true for the treatment of the subject in the two widely used textbooks by Milgrom and Roberts (1992) and Besanko et al. (2009).

An advantage of for the H-form, relative to the U-form, is that it induces a stronger focus on the overall business and not the main function specialties. Consequently, H-organizations are likely to have a stronger focus on team output, organize work in teams, and to make use of team compensation schemes. As mentioned earlier, a potential weakness is that employees can have several direct superiors.

Potential agency problems are tackled differently in U- structures and M- or H-structures. U-organizations count on centralization and performance monitoring to ensure that the decisions of the different employees are consistent with organizational goals, whereas in M- and H-organizations decisions are more decentralized. To use Lazear's (1986) classical distinction between salaries and piece rates, it is useful to think of U- organizations as organizations that invest in monitoring labor inputs, supervising employees' actions to ensure that a minimum effort is supplied, whereas M- and H-organizations are best thought of as structures that leave more discretion and then monitor *outputs*. Along similar lines, the literature on delegation has suggested that more decentralized firms will have a stronger need to provide monetary incentives, to ensure that employees' and organizational goals are aligned (see Baker 1992 and Prendergast 2002). This also suggests that M- and H-organizations will use more explicit incentives, i.e. bonuses based on individual, group, or firm performance, than U- organizations.

The literature also suggests that it is generally easier to provide explicit incentives in M-organizations than in U-organizations. Williamson (1975) argued that this was the case because in M-forms divisions are business units and profits can therefore be used as measures of divisional performance, whereas in U-forms the performance of a function cannot be so easily measured. Besanko et al. (2005) provide a formal analysis of this. They propose a multi-task model in which M- form managers pay is tied to the performance of their respective divisions, whereas (to elicit effort on all tasks) U- form managers pay has to be tied to the performance of all business units. They show that divisional managers will bear more risk and explicit incentives will be more costly in a U- form than in an M-form, except in particularly asymmetric cases in which one function is much more important than the others.

For similar reasons, we also expect some differences between M- and H-organizations with regards to explicit incentives. As pointed out, M-organizations are particularly suited to the

introduction of monetary incentives, as each division is a business unit in charge of specific products and/or segments, but in H-organizations the task of providing incentives is more complex because different lines of authority intersect and for some lines performance measures cannot be easily constructed. For example, a typical matrix organization will have responsibilities divided along both products and functions. Product managers can be given incentives in much the same way as they would in an M-organization, but in an H-form their decisions are potentially constrained by the oversight of functional managers, which may reduce the effectiveness of monetary incentives. In addition, it is hard to find objective performance measures that are suitable for functional managers. For these reasons, we expect that H-organizations will use explicit incentives to a lesser extent than M-organizations.

In summary, our hypotheses with regards to explicit incentive schemes are:

Hypothesis 1a: M- and H-organizations will have a greater demand for explicit incentive pay systems than U- organizations.

Hypothesis 1b: M- organizations will have a greater demand for explicit incentive pay systems than H- organizations.

Explicit incentive contracts are not the only way to tie compensation to performance. Firms that pay fixed salaries can provide incentives if salaries are revised on a regular basis according to the individual performance of each employee or to the performance of groups of employees. One advantage of this is that performance can be subjectively assessed, via formal performance appraisals, and this gives such compensation policies greater applicability than those based on explicit bonuses. For example, a firm can reward a functional division based on the subjective assessment that a given increase in firm performance has been mostly due to work conducted in this particular functional area, even though there might not be any objective measure to prove so. More generally, even if there is no objective measure to assess functional performance, employees can still be rewarded via a salary increase. Since M- and H- organizations are more decentralized and have a greater need to provide monetary incentives, we expect these organizations to make greater use of performance evaluations to revise employees' salaries.

When individual performance is the main determinant of employee pay, either because there are explicit bonuses or because salaries are updated on a regular basis according to performance, we expect to observe larger within-firm wage variation, particularly as time goes by, than when pay is set according to other criteria, such as seniority or educational level. When pay is primarily based on seniority employees belonging to the same cohort will have very similar salaries, but when individual performance is taken into account, greater pay differences will be observed even within cohorts. When firms pay according to educational level salaries we also expect pay dispersion to be lower, and to be relatively more stable across time, than when individual performance is the main pay determinant. Since M- and H-organizations have a greater need to align the incentives of employees to organizational goals, we expect these organizations to give more importance to performance when reviewing employees' salaries; and consequently we expect to find more within-firm salary dispersion in these organizations compared to U-organizations. We also expect such dispersion to increase across time in M- and H-organizations and to be relatively more stable in U- organizations. Thus we hypothesize that:

Hypothesis 2a: Within-firm wage dispersion will be greater in M- and H-organizations than in U-organizations.

Hypothesis 2b: Within-firm wage dispersion will increase more across time in M- and H-organizations than in U-organizations.

Since companies with M- and H- structures are more decentralized, they can benefit more from work practices that promote employee involvement. TQM, self-managed work teams and quality circles are example of practices which, at different degrees, encourage knowledge-sharing and shared decision making, thus making employees more capable of taking informed decisions. Job rotation also improves knowledge sharing, as employees who rotate are exposed to different experiences across the organization, thus enabling them to understand the consequences of alternative decisions. In organizations with a U-structure, the more hierarchical division of responsibilities implies that managers and supervisors process the information coming from lower levels and use it to make decisions. However, in M- and H-organizations, the higher degree of decentralization implies that horizontal communication (i.e., communication within a certain hierarchical level) plays a more important role for coordination purposes. For similar reasons, M-

and H-firms will have a stronger need to train their employees so that they are able to take on the (greater) responsibilities that are expected in more decentralized organizations. We therefore hypothesize that:

Hypothesis 3a: M- and H-firms will have a higher demand than U-firms for (new) work practices that give authority to lower levels and rely on employee involvement.

Hypothesis 3b: M- and H-organizations will need to train their employees more than firms with a U-structure.

Organizational structure also influences divisions' incentives to cooperate. Williamson (1975) saw competition between divisions as one of the advantages of the M-structure, and the corporate finance literature has placed great emphasis on the internal power struggles that arise when divisions compete in internal capital markets (Rajan et al. 2000). De Motta and Ortega (2013) show that cooperation among divisional managers is higher in U- forms than in M-forms. In an M-form, managers are less willing to cooperate because this increases the profitability of other divisions and may lower their chances to increase their own division's funding. However, since all functions are needed in every product line, functional managers do not have such strong preferences about how internal resources are allocated across products. Consequently, in a U-form managers will be more willing to cooperate as cooperation does not weaken their chances to get internal funding and helps the firm attract more external funding. Since excessive competition is seen as a problem in M-organizations, we expect these firms to be more interested in the introduction of work practices that promote cooperation, such as teams. Marino and Zábojník (2004) make a different argument, showing that when divisions compete this improves the incentives of intra-divisional teams. Their analysis suggests that there is a complementarity between interdivisional competition and intradivisional cooperation. According to this, we would expect M-firms to rely more on intra-divisional teams. Thus, we hypothesize that:

Hypothesis 4: M- forms will have a stronger demand for work practices promoting cooperation.

To the best of our knowledge only two earlier studies have looked at whether the firm's choice of HRM practices depends on its product market strategy.[12] Both examine firms within specific industries. The first, Bartel et al. (2007), looks at firms in the valve industry and their adoption of new information technologies. The study finds that firms producing customized products are more likely to make use of the new IT than companies producing standard commodities. Introduction of new IT is followed by implementation of new HRM practices and more resources spent on training the employees.[13]

The second study, Andersson et al. (2009), analyzes firms in the software industry. These can differ considerably with respect to the potential upside gains of innovations. Products like video games are associated with a few big winners and hence highly skewed potential gains to innovation, whereas products like mainframe software for big firms aim at marginal improvements and consequently are associated with smaller upside gains. The authors show that these differences indeed also show up in their compensations policies: firms with large potential upside gains not only pay higher levels of pay but also higher incentive pay to all their employees, irrespective of whether the firm is successful or not.

4 Data Description

The data used in the next sections come from two sources. The first and the main source is a survey carried out in 2009 which was directed at Danish private sector firms with more than 20 employees and contains a host of questions regarding the firms' work, compensation and other HR practices like internal training and employee performance evaluations. For the work practices, the firms were asked to differentiate between salaried employees and production workers. Correspondingly, for the pay practices respondents were asked to distinguish between four categories of employees: top managers, middle management, salaried employees and production workers.

[12] We are aware of only one study that considers aspects of HRM and organizational structure. In Kato and Owan's (2011) investigation of Japanese firms' use of self-managed and cross-functional teams they include a dummy for whether the firm has a multidivisional structure among their regressors. This turned out to be completely insignificant, however.

[13] The same pattern is observed in a series of studies of the American steel mill industry, see e.g., Ichniowski et al. (1997).

The survey was administered by Statistics Denmark and was sent to 3,940 firms in April-May in 2009. The questionnaire was sent out to the most relevant HR representative in each firm, according to a list maintained in Statistics Denmark. The firms were chosen from a random sample, stratified according to size (as measured by the number of full time employees) and industry. The survey over-sampled large and medium-sized firms; all firms with 50 employees or more were included, and 35 per cent of the firms in the 20-49 employees range.[14] The response rate was 49.4 per cent, which is quite satisfactory given the rather long and detailed questionnaire that was used.[15] In the current paper we have excluded all responding firms with less than 50 employees and incomplete answers on the key questions of the analysis (that is, use of HRM practices and the firm's organizational form). This gives us a sample consisting of 2,552 firms.

The questions regarding the firm's use of work and pay practices have a common structure. The respondents are given a list of practices (including definitions of key concepts) and asked whether the firm has implemented them, and if so, when. The firms are also asked about the proportion of employees covered by each practice, and in the case of the pay practices, they are furthermore asked about the typical share of an employee's total compensation that is due to the pay practice in question. The pay practices asked about were: individual bonus, team bonus, stock options or warrants, stock or employee stock ownership plan, profit sharing (and for production workers, piece rates). The work practices included were: self-managed teams, job rotation schemes, total quality management (TQM), quality circles, benchmarking programs, and knowledge sharing schemes.

From this information we have computed measures of firms' use of HRM by adding the answers (0/1) to each question and employee category weighted by the proportion of employees in each category covered by the practice in question. We have computed one measure for the firm's use

[14] A partly similar survey was also carried in 1999. Making use of this, the sample for the 2009 survey actually consists of two parts. One is the 1,605 firms that had answered the survey ten years earlier, of which Statistics Denmark succeeded in identifying 1,144, but had to exclude 260 firms because of lacking data or because the firms no longer matched the sample restrictions. The other part is a supplementary sample of 2,791 firms chosen in order to have a data structure corresponding to the one in 1999. The total sample in 2009 is larger; about 700 more firms than in 1999 are included. Another difference is that in 2009 the firms were first asked to answer the questionnaire on the internet – 65 per cent of the respondents did so – and the remaining 35 per cent of the respondents were interviewed using telephone. For a detailed description of the results from both surveys, see Eriksson (2012).

[15] The response rates for firm size and one-digit industry cells vary only little; between 45 and 53 percent. Thus, representativeness of the sample is of no major concern. For the retrospective questions (going up to ten years back in time) it should, of course, be noticed that responding firms come from the population of surviving firms.

of work practices, another for its use of pay practices, and finally, created a summary measure of HRM use by simply adding the work and pay practices measures.

This gives us measures of HRM use which vary between 0 and 21, 0 and 12, and 0 and 33, for the pay practices, work practices and total HRM practices, respectively. The distributions of these measures are displayed in *Figures 1* to *3*. Two prominent features stand out from the figures. First, over half of the firms do not use any of the listed practices. Second, for the firms that do, the spread in the use of the practices is quite large. The average value for the use of pay, work and total HRM practices are 0.57, 0.77, and 1.34 respectively when the non-users are included, and 1.69, 2.23 and 3.08 when only firms with positive values are included.

Turning next to our measures of firms' organizational structures, these are simple dummy variables created from answers in the questionnaire. More specifically, the firms were asked how their organizational structure looked like, whether it was organized "according to functions (the so called U-form)", "in divisions (the M-form)", "as a matrix-organization (a combination of U and M forms)", "as a network structure", or "in another way".[16] The frequency distribution of the answers for all firms and the sample we are using in the subsequent analysis is given in *Table 1*. From this it can be seen that a little over half of the firms that answered the question are organized as a unitary functional structure. The second most common organizational form is the hybrid of U and M forms (matrix) which accounts for a quarter of the answers. The multidivisional firms make up a little more than a tenth, whereas network structures are quite rare: around two per cent of the firms in the samples. About seven per cent chose the answer "other".

As can be seen from the table, restricting the sample to include only firms with at least fifty employees (that is, our estimation sample), leads to marginal changes in the distribution. This reflects the fact that smaller firms are more likely to have network and other forms while U, M and H forms are more common in larger companies. The differences in the distributions are not large, though.

The other data source we use in the subsequent analysis is the linked employer-employee panel data set called IDA which is kept by Statistics Denmark and built from several administrative

[16] 11.7 per cent did not answer the question.

registers using unique individual and workplace identifiers. The workplace information has been aggregated to the firm level by Statistics Denmark. IDA includes all firms and their employees in Denmark and contains detailed information about employees' individual characteristics, their wage income, and labor market histories. For this paper we have merged information from IDA with the 2009 survey. The IDA is utilized to construct measures characterizing of the firms' workforces but also to compute the log average monthly wage of the firm and the annual separation rates (at the firm level). These variables are primarily includes as control variables in our regressions.

The sign of the (log of) firm average (monthly) wage in the demand function depends on whether wages are substitutes or complements to the HRM practices. The efficiency wage models imply that they are substitutes because when a firm pays higher wages it has less need (if any) to implement pay and work practices to induced desired behavior from their employees. Especially introduction of work practices requiring the employees to increase their involvement in how work is performed, to work in teams, to acquire new and broader skills and to take more responsibility can be expected to make it necessary to reward workers for these extra efforts (although some, but hardly all, of them may be intrinsically valued by the employees). Adoption of incentive schemes typically implies that the employee will carry some additionally risk for which she has to be compensated. The same arguments also lead us to expect employers with a higher proportion of employees with higher education to use of more pay and work practices as more educated employees are likely more able to broaden their skills, to perform in diverse teams and to contribute through their higher involvement.

The remaining explanatory and control are taken from the 2009 firm survey and describe the size of the firm (employment), industry (five categories; default: manufacturing), ownership (domestic, Danish multi-national firms, foreign owned multi-national firms) and ownership type (stock company, family owned firm, other), whether the firm is engaged in exporting or not, has an R&D department and whether the majority of the employees make use of computers in their daily work.

As HRM practices are considered here as a productive factor, their impact on output in all likelihood differs across industries, just as the impact of labor and capital does. Hence, we expect to observe industry differences in firms' demand for HRM.

An important strategy decision of many firms is whether or not to aim for selling outside the (local or) domestic market, that is, to become an exporter. Recent advances in the analysis of international trade build on the so called Melitz (2003) hypothesis which states that because exporting firms have to cover additional costs of exporting to non-domestic markets, they have to be more productive than non-exporters, that is they are located in the right tail of the productivity distribution; see e.g., Bernard et al. (2007) for a discussion and evidence on how exporters differ from non-exporters. The theory and most of the subsequent work on firms and trade are silent as to why they are more productive.[17] A possibility is that successful exports-orientated strategies include use of HRM practices which contribute to improved productivity. The same reasoning applies to multi-national firms too, although it should be noticed that the superior performance of multi-nationals is often attributed to the higher quality of their employees. Multi-national firms may be able to recruit higher quality employees because they pay them better than local employers or because they use payment schemes which attract more productive workers.

Ownership type influences the extent of agency problems in the firm. Stock companies with a more dispersed ownership are likely to face a higher degree of misalignment of the owners' and the employed managers' interests and therefore need to adopt incentive schemes to mitigate the agency problems. A specific form of firm ownership which has attracted a lot attention in the literature is the family owned firm. It is frequently claimed that these are poorly managed and although there is some evidence supporting these notions, there are also studies showing family firms managed by founders or professional executives outperform non-family firms. Our data do not allow us to distinguish between different types of family-owned firms.

In highly developed economies like Denmark an important goal for firms is to be innovative both with respect to the products sold and how these are produced. In our sample, 9.3 per cent of the firms have an R&D department with its own budget.[18] In the literature on corporate R&D one can find both arguments in favor and against use of incentive pay schemes. Performance related pay is said to create incentives for managers and other employees to move away from pet projects and to take more risks (be more innovative). Arguments against use of incentive pay are that it creates

[17] There is considerable evidence showing that firms do not become much more productive from the experience of exporting, so it is not the outcome of a learning process.

[18] This is presumably a lower bound estimate of R&D activities in the sample firms. On a separate question regarding the R&D expenditures, 13.6 per cent of the respondents reported non-zero expenditures.

multi-tasking problems and that it leads to exploitation of only well-known approaches and avoidance of unexplored ones.[19]

5 Empirical Analysis

5.1 Descriptive information

As both differences in key features of firms with different organizational structures and the use of HRM practices by organizational structure of firms has not been studied much before, we present some descriptive information on this matter before discussing our empirical estimations of firms' demand for HRM functions. We start out with *Table 2* which shows that the firms with unitary functional structure have the highest share of manufacturing firms. As U is the most common organizational form in our sample, it also means that a large fraction of manufacturing firms still have a U-structure. The pure M-form companies and the hybrid firms are more likely to be in the service industry, they are on average larger than companies with other organizational forms, and more likely to be a foreign or Danish owned multi-national firm and an exporter. The firms organized as Networks share some traits with them, but are for instance less likely to be multi-nationals. As for ownership type, we may note that firms belonging to the category "other organizational structures" are more likely to have one of the other ownership forms than stock company or family firms.[20]

Next, we turn to look at some descriptive statistics of how work and pay practices vary by organizational form. This information is collected in *Tables 3-6,* below. Beginning with work organization and practices (Table 3), we may note that M- and H-organizations use more teams, job rotation schemes, TQM, benchmarking and knowledge sharing arrangements for their salaried employees than U-firms. However, for production workers these practices are used more often by U-form firms than multi-divisional firms (and relative to hybrid organizations no systematical pattern can be seen). With the exception of quality circles and benchmarking, network organizations use all the mentioned work practices more frequently than other firms.

[19] For a relatively recent study using firm level data, see Lerner and Wulf (2007).
[20] These other ownership forms are co-operatives and limited liability firms (APS firms in Danish).

As can be seen from *Table 4*, M-form and Hybrid firms use individual incentive pay schemes (individual bonuses, stock, and stock options) more often than the U-form firms. The same pattern can also be observed for team bonus schemes, although it is less pronounced. The category "other organizational form" seems to be using less of all the payment schemes for all of their employees except top managers.

In *Table 5* the proportions of employees that during the previous year received training provided by their employer are shown for the different organizational forms. The overall high proportions are as expected as Danish firms spend internationally speaking large sums of money on training their employees. The differences between differently organized firms are not big, but for salaried employees the proportions are clearly higher for M- and H-form companies.

Most of the firms in our sample report that they are evaluating their employees regularly (at least every three years, annually or more often). Thus, only 15, 11, 11, and 22 per cent of the firms do not carry out evaluations of top executives, middle management, salaried employees and production workers, respectively, and in this regard there are only small differences between firms with different organizational structures. In the survey, the firms that regularly evaluate their employees were furthermore asked whether they made use of objective standards (that is quantitative measures, fulfillment of goals, etc.), subjective standards (qualitative information), or both type of standards in their evaluations. The distributions of answers by category of employees and organizational structure of firm are given in *Table 6*.

This shows that the majority of firms in each organizational type make use of both objective and subjective standards for all categories of employees. The only notable difference in the use of standards between the three most common organizational forms, U, M and H, is in the proportion of firms using exclusively subjective standards. We would expect U- (and to some extent also H-) organizations to have less access to objective standards, and consequently they have to use subjective (both) standards more (less) often than M-firms. This is indeed also what we observe in Table 6, although the differences are not large.

Finally, we briefly look at the hierarchical structure of the firms. In the questionnaire we asked the firms about the number of job levels for three categories of employees/jobs. Unfortunately, a non-trivial share (50.7 per cent) of the respondents did not answer the question, and so, the numbers

in *Table 7* are not directly comparable to those shown above. Nevertheless, it is worth noting that the average number of layers in the hierarchy is, as expected, higher in the M-organizations that in the firms organized in other ways.

Summing up, as compared to the Unitary form companies, M- and H-form firms are more likely found outside manufacturing (especially in the services sector), are larger and more likely to be multi-nationals and engaged in exporting. In accordance with our a priori expectations based on organizational economics theory more H- and M-firms make use of incentive pay schemes (for all categories of employees) and new work practices for their salaried employees. Also in line with expectations, we note that more U-firms make use of subjective standards in their employee evaluations and that Multi-divisional firms are characterized by a higher number of job levels than the other organizational forms. Next, we will examine these differences in a more formal regression analysis in which we include a host of control variables.

5.2 Econometric estimation results

We now turn to look at the results of the estimations of firms' demand for HRM practices functions as described earlier. In the sequel we will present estimates from simple linear models. As the dependent variable is bounded, that is, its lowest value is zero and there are also upper bounds owing to the construction of the measures of HRM demand, we have also estimated the models as Tobit models in order to account for these features of the dependent variables. The Tobit estimates are showing the same results – that is, the sign, significance and marginal effects are very similar to those obtained from the linear model estimations.[21] Consequently, we present the latter for their ease of interpretation.

As a benchmark, we first show estimates from a very simple model which only includes indicators for the organizational structure of the firm. These are displayed in *Table 8a*, from which we can see that relative to the U-form, the omitted category, all the other organizational forms have a greater demand for both pay and work practices, and hence also for HRM practices in toal. Recognizing standard errors there are no differences between M-, H-, and Network firms' demand

[21] The same is true for taking the log of the dependent variables. The only difference in this case is that we obtain better fit in terms of higher R^2 values.

for pay practices, whereas the residual category "other forms" has a lower demand for them. For work practices M-, H- and "others" have similar levels of demand for them, whereas Networks clearly make more use of them than the other organizational forms.

The "raw" differences between the U-form and the other organizational forms shown by the regressions are consistent with our broad hypotheses that the Multidivisional and Hybrid organizations will demand more incentive pay practices and more of the new high performance work practices. Moreover, the differences are sizable. The M-, H- and Network firms have on average 0.8-1.1 higher demand for pay practices which is large considering that the mean demand for the sample is 0.57. The corresponding mean for work practices demand is 0.77.[22] Of course, not too much should be concluded from these averages, as firms with different organizational structure are likely to differ in several other respects and as a consequence, the organization dummies may be proxying for firm characteristics like size, industry, ownership or workforce traits.

Table 8b contains estimates from models which in addition to the organizational structure indicators include several firm and workforce characteristics[23] plus some additional controls. For all three models we may note that many of the added explanatory variables attach significant coefficient estimates and contribute to a substantial increase in the models' explanatory power. Starting with the demand for pay practices, a first thing to note is that the estimates to the organizational dummies are now considerably smaller. The estimates for the M-form and H-form are reduced by about 80 and 6o per cent, respectively. However, in both cases the coefficients remain significantly different from zero and large relative to mean demand. The estimates for Networks and "other forms" also decrease and no longer differ from zero.

Similarly, there are large drops in the estimates in the demand for work practices by organizational structure; about 70 per cent for M- and H-form and 30 per cent for Networks. But their statistical significance remains. The changes in the estimates for demand for total HRM practices

[22] Furthermore, for both pay and work practices median demands are 0.

[23] It should be pointed out that the main differences between tables 8a and 8b in the estimates for the organizational structure dummies are due to the inclusion of firm characteristics and considerably less to the addition of workforce traits. In fact, the broad tone of the results is the same if we omit the workforce characteristics from the estimations. This is of some importance as some of the workforce characteristics could be picking up the fact that firms with different organizational form may differ in their demand for specific types of labor.

unsurprisingly mirror those for pay and work practices. Thus the conclusion we can extract from Table 8b is that the organizational structure does influence the firm's demand for HRM policies.

Let us begin with our discussion of the estimates to the other firm characteristics with industry affiliations. The default here is manufacturing, and so, the first column tells us that firms in trade and services industries have a higher demand for pay practices than in manufacturing whereas in the second column we can see the same two industries plus transports have a lower demand for the new work practices. The pattern with opposite signs is interesting as it is commonly believed that the new work practices and incentive pay systems are complementary, that is, that you cannot introduce one (individual bonuses, say) without changing work practices (allowing employees more influence on their work performance).

Another perhaps also somewhat surprising finding is that firms that have a separate research and development department have a lower demand for pay practices as well as for new work practices. As was mentioned earlier, innovation can be adversely affected by monetary incentives. The lower demand for work practices (like teams, job rotation, benchmarking, knowledge sharing) is more difficult to understand, however.

Ownership variables have quantitatively very large impacts on the firms' demand for HRM practices. Demand for pay as well as work practices is considerably higher in multinational firms than in firms with exclusively domestic operations and in stock and family owned firms as compared to cooperatives and limited liability firms which make up the default category. Notably, the differences between stock companies and family owned firms are insignificant. Even after controlling for all these traits of the firms, is being an exporter associated with a higher demand for HRM (both pay and work) practices. The only firm characteristic that surprisingly enough did not turn out to shift firms' HRM demand is firm size.[24] One reason for why firm size could be important is that in smaller firms coordination and incentive problems can more easily be solved informally, while in larger firms you have to make use of organizational structure. Consequently, you would expect organizational form to play a bigger role in larger firms. Changing the size restriction for being included in the sample from at least 50 to at least 100 employees, we find

[24] This is admittedly very crudely measured in the current version of the paper. In next versions we will use a continuous measure like sales or number of employees.

some support for this conjecture; see Table A-1 in the Appendix. The estimates for M-form generally increases in magnitude and for work practices and total HRM practices M-firms' demand now exceed that of H-firms.

As for the workforce traits, two are quantitatively important. The first is the log firm average wage which carries a fairly large (statistically significant) and positively signed coefficient, indicating complementarity between pay and work as well pay practices. Thus, paying higher wages is not an alternative to HRM policies but rather a consequence thereof. Naturally, the positive relationship can also reflect a higher quality of employees (besides education which is already controlled for) in firms using incentive pay and new work practices. Second, the proportion of employees with a college education or higher is positively associated with the firm's demand for pay and work practices. The other variables have the expected signs but only contribute little to shifts in the demand curves.

A factor which is frequently suggested to facilitate the adoption of new pay and work practices is the firm's use of information and communication technologies. We do not find any support of this conjecture; as can be seen from the bottom of the table, firms, in which the majority of employees work daily with computers do not demand more HRM practices than other firms.[25]

The estimates in Table 8 refer to fairly aggregated measures of the HRM practices. In the following we will go beyond these estimates firstly by considering demand for pay practices by category of employees, and secondly by looking at demand for self-managed teams and team bonus schemes, respectively.

The estimates for different categories of employees in *Table 9* uncover some differences that were masked by the earlier aggregate analysis. One is that the demand differences between firms with different characteristics, including organizational structure, are much smaller for production workers. Another feature worth pointing out is that the use of pay practices for managers (top executives as well as middle managers) does not differ between U- and M-firms. The difference observed in Table 8 above appears to be predominantly driven by differences for salaried employees and production workers. Differences between H- and U-organizations are, however,

[25] The survey actually allows us to use different thresholds for the daily use of IT in the firm. We have tried several alternatives obtaining the same result as the 50 per cent measure shown in the table.

statistically significant for all employee categories. The motivation for the estimations in Table 9 is to shed light on the hypothesis that in order to overcome moral hazard problems and having better access to well-defined (objective) performance measures, M- and H-organizations will make more use of incentive pay systems than U-firms. We do find some evidence of this, but perhaps not for those groups you would expect it to be most pronounced, top and middle managers (and not for M-organizations).

Furthermore, we could expect that it is more difficult for Hybrid organizations to implement performance pay schemes because of their multi-dimensional character, that is, attempts to provide incentives in more than one dimension may lead to multi-tasking problems. However, the estimates in Table 9 indicate that there are no differences between M- and H-organizations in their demand for pay practices for salaried and production workers, and for managerial employees, the use of pay practices is actually larger in the firms with a Hybrid organizational structure.

Two other things revealed by the estimates in Table 9 is first that the impact of firm traits on demand for pay practices seems to be largest for top executives, followed by middle managers and salaried employees. Second, distinguishing between employee categories gives rise to a change in the coefficients to IT use in the workplace; the coefficients for mid-level managers and salaried employees now become positive, albeit significant at the ten per cent level only.[26]

Tables 10a and *10b* contain estimations of demand for self-managed teams and team bonuses, respectively. The hypothesis we want to test here is whether M- and H-firms, where there is less inherent internal competition and consequently less need for policies to foster cooperation between different parts and employees in the firm, demand more cooperation promoting practices than the U-organizations. As can be seen from the tables, there is indeed a stronger demand for self-managed teams in M- and H-firms than in the U-organizations for salaried workers. (As a matter of fact, there is even more demand for teams in Networks and the category

[26] Note that the variable for computer refers to the whole firm and not to the respective employee categories. Thus, it is not surprising that the coefficient for production workers is negative and significant.

"other forms" for both salaried employees and production workers.) Furthermore, there is also more demand for team bonus schemes in M-firms (for non-managerial employees) and H-firms.[27]

The results in Tables 8b and 9 above indicate that hybrid organizations have a stronger demand for pay practices than M-firms. This is not entirely as expected as it should be easier for M-form organizations to have performance measures (by product line, geography, etc.) which can be used in the design of pay schemes and moreover, H-organizations are associated with a higher likelihood of multi-task agency problems. To look into this in somewhat more detail we have estimated demand functions for individualized pay (that is, individual bonus and stock option schemes) and for individual bonuses on three different samples: firms with 50+ employees, 100+ employees, and stock companies.

The estimates are given in *Table 11* and they show a lower demand in M- than in H-firms for the sample of firms with at least 50 employees, and estimates that do not differ between M- and H-forms for the sample with larger firms and the sample containing stock companies only. In no case do we observe a stronger demand for M-firms. Although not according to expectations, the results are maybe not so surprising in view of the rather small differences in firms' use of objective, subjective and both performance standards in evaluating their employees.

The last aspect of HRM we look at is not included in our demand for HRM measures examined above, namely firm provided training. This is measured by the proportion of employees (salaried and production workers, separately) covered during the previous year. Thus, this measure varies between zero and 1. The hypothesis we aim at shedding light on here is that M- and H-organizations need to train their employees more than U-form firms. There are at least two reasons for this. First, decentralized decision-making and the associated need to coordinate, and hence understand, activities in M- an H-organization mean that they are likely to have a higher demand for training of their employees than the U-organizations. On the other hand, U-firms built around functions will also demand training of their employees to improve their specialization skills. Our measure of training, the proportion of employees trained, is more likely to capture the

[27] Networks seem to use self-managed teams more than other organizational forms, but curiously enough not team compensation schemes like team bonuses.

broadening of employee skills than specialization because the latter would be more restricted to specific categories of employees.

Second, as we have already seen, the M- and H-firms demand more new work practices. Modern work practices imply that employees are expected to take more responsibility and decisions and to have broader job designs. In many cases, employees have to be trained to carry out their jobs successfully in these work organizations. In addition, implementation of incentive pay, which is also demanded more by M- and H-firms, implies that if employees do not have the necessary skills the incentive pay systems will not have the intended impact on performance and are for the same reason also less attractive from the employees' point of view.

So, what do the regression analysis results in *Table 12* tell us? Two findings are of note. M-, H- (and N-) firms train more of their salaried employees than U-firms do, and the differences are not small. The average portion of salaried employees trained is 0.22 (and 0.53 for firms that provide training) and the estimated differences hover around 0.1. The estimated differences are also positive for production workers, but smaller in magnitude and statistically significant only for the H-organizations. Several of the other regressors are statistically significant and some attach large estimates. The pattern in these is the same as in the demand for pay and work practices functions suggesting that differences in how much firms train their employees is related to differences in their pay and work practices. Thus, we have for instance seen that multi-nationals and exporters have a higher demand for pay and work practices, and the estimates in Table 12 show that these types of firms also train more of their employees than domestic and non-exporting firms.

6 Conclusions

This paper adds to a relatively small literature trying to enhance our understanding of why firms choose different HRM policies. More specifically, we focus on the link between the firm's product market strategy and HRM, where we assume the former is reflected in the firm's choice of organizational structure. Relative to the weight of theory on the organizational structure of firms, there is in general little empirical work in this area, and in particular about the relation between organizational form and HRM practices. As far we know this is the first paper dealing with this topic.

We estimate a simple demand for HRM practices model, where pay and work practices are conceived of as productive factors and we introduce indicators for the firm's organizational form as demand shifters. The data set is constructed from a survey of Danish private sector firms' HRM practices which is merged with linked employer-employee data. A notable feature of these data is the fairly large differences in the firms' use of pay and work practices. The main point which emerges from our empirical analysis is that relative to companies with a unitary (functional) form, firms with a multi-divisional structure or a hybrid structure (combining elements of both U- and M-forms) have a greater demand for (incentive) pay practices and new work practices (focusing on involvement, decentralization of authority and broader job designs). This result is robust to inclusion of a host of firm and workforce characteristics as additional explanatory variables. A more specific analysis of the demand for team work organizations and team bonuses revealed a higher demand for them especially for salaried employees in M- and H-form firms. Moreover, we find that M- and H-firms train more of their employees than the U-firms, suggesting training is linked to the adoption of pay and work practices.

In addition to the firm's organizational form, other factors that explain the position of firms in the HRM practices distribution are firm ownership (foreign versus domestic; type of ownership), exporting status, industry and the firms' average wage and the proportion of the firm's employees with a higher education.

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Figure 1. Distribution of firms' demand for pay practices

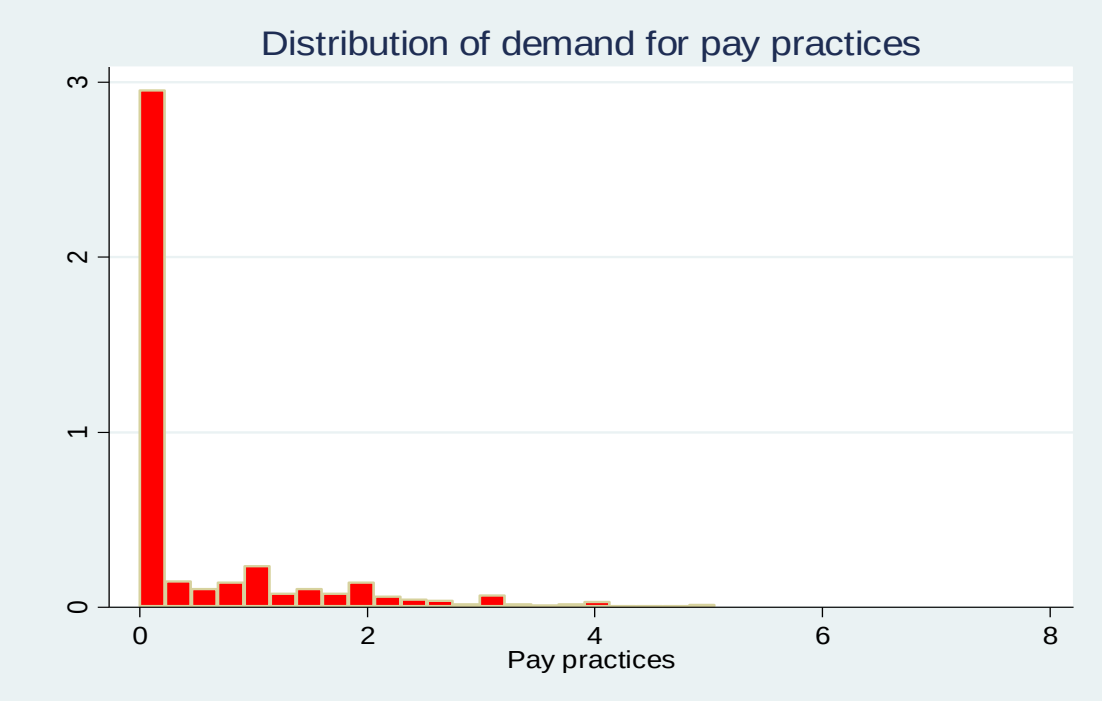

Figure 2. Distribution of firms' demand for work practices

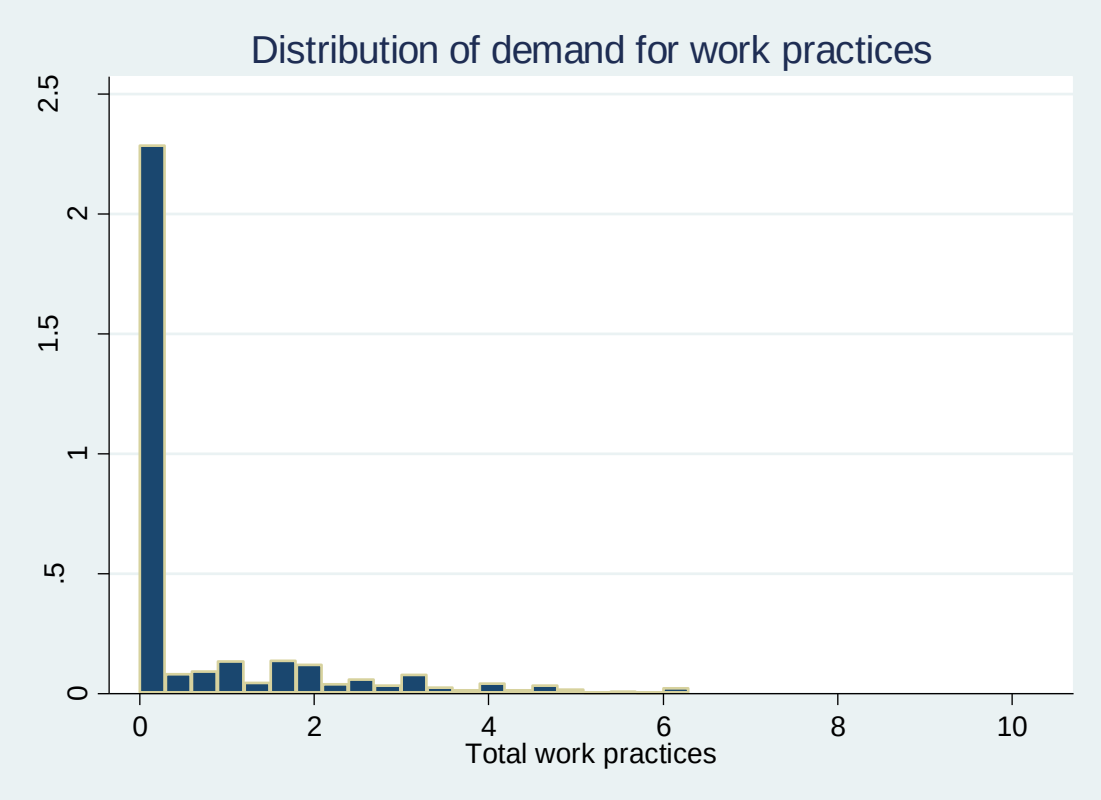

Figure 3. Distribution of firms' demand for HRM practices

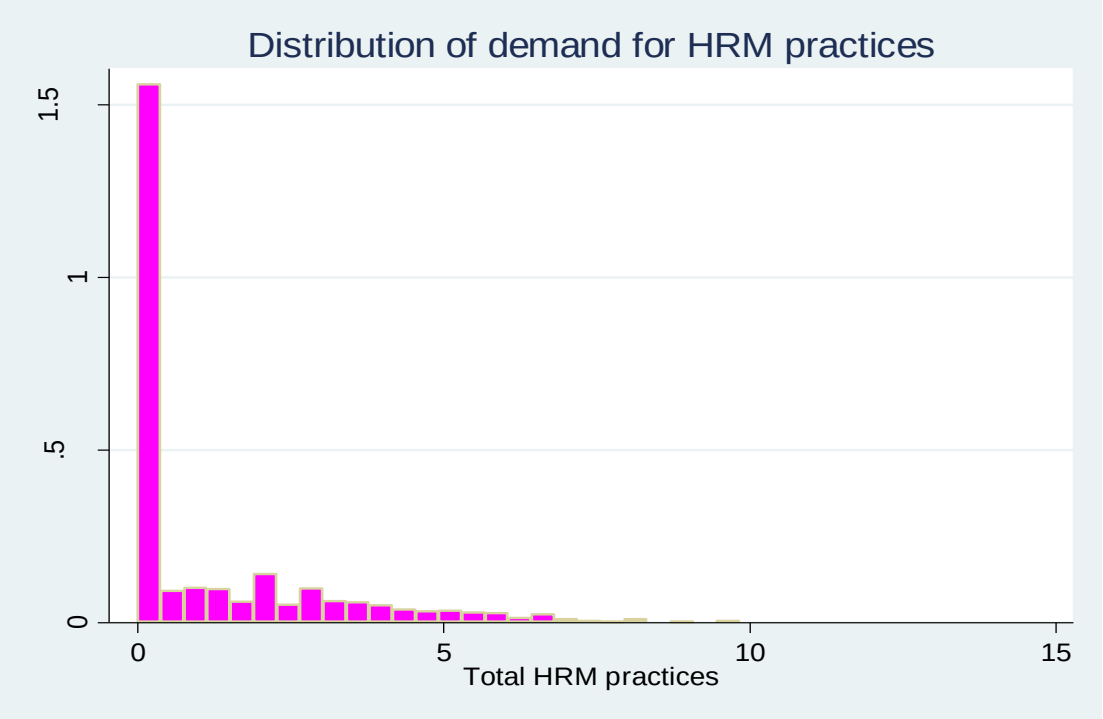

Table 1. Proportion of firms with different organizational forms (%)

Organizational form	**Whole sample**	**Estimation sample**
U-form	53.6	52.6
M-form	11.2	13.7
Hybrid	23.3	25.3
Network structure	2.3	1.6
Other	9.6	6.8

Table 2. Characteristics of firms with different organizational forms (%)

	U-form	**M-form**	**Hybrid**	**Networks**	**Other**
*Industry (% shar*e):					
Manufacturing	40.3	29.3	33.1	27.8	37.2
Construction	9.3	8.9	7.2	16.7	9.0
Trade	21.0	20.4	21.0	11.1	11.5
Transports	8.0	9.6	5.9	0.0	10.3
Services	21.4	31.8	32.8	44.4	32.0
Size (%):					
50-99 employees	48.9	27.4	34.1	50.0	51.3
100+ employees	51.1	72.6	65.9	50.0	48.7
O*wnership (%)*:					
Domestic	61.5	45.9	44.3	72.2	67.9
Danish MNF	16.6	22.9	23.5	22.2	15.4
Foreign MNF	21.9	31.2	32.2	5.6	16.7
Stock company	83.7	82.8	83.0	66.7	67.9
Family owned	3.2	9.6	5.9	5.6	10.3
Other ownership form	13.1	7.6	11.1	27.8	21.8
Exporting firm (%)	38.5	54.1	55.9	33.3	52.6

Table 3. Use of different work practices for salaried and production workers, separately (% of firms in each category)

	U-form	**M-form**	**Hybrid**	**Networks**	**Other**
Salaried employees:					
Self-managed teams	30.0	35.0	34.8	66.7	44.9
Job rotation	10.0	15.3	15.5	27.8	14.1
TQM	7.8	11.5	10.3	16.7	5.1
Quality circles	6.1	5.7	5.5	5.6	5.1
Benchmarking	18.6	26.8	25.5	22.2	10.3
Knowledge sharing	44.4	55.4	54.5	72.2	41.0
Production workers:					
Self-managed teams	25.4	20.4	23.4	44.4	28.2
Job rotation	27.0	18.5	23.4	33.3	25.6
TQM	6.6	8.3	7.6	11.1	2.6
Quality circles	6.3	3.8	5.5	0.0	7.7
Benchmarking	14.3	12.7	18.6	16.7	6.4
Knowledge sharing	31.2	28.0	35.9	38.9	25.6

Table 4. Use of different pay practices, four different categories of employees (% of firms in each category)

	U-form	M-form	Hybrid	Networks	Other
Top executives:					
Individual bonus	44.8	58.0	57.6	33.3	34.6
Team bonus	9.3	9.6	13.4	11.1	7.7
Stock options, warrants	7.8	16.6	12.8	11.1	7.7
Stock, ESOP	10.8	14.0	15.5	16.7	7.7
Middle management:					
Individual bonus	32.5	49.0	52.1	44.4	28.2
Team bonus	8.2	10.2	10.7	22.2	5.1
Stock options, warrants	1.7	6.4	4.1	5.6	3.8
Stock, ESOP	5.8	9.6	9.7	11.1	6.4
Salaried employees:					
Individual bonus	18.2	26.1	29.7	16.3	11.5
Team bonus	8.0	12.1	12.8	11.1	5.1
Stock options, warrants	1.2	3.2	3.1	0.0	0.0
Stock, ESOP	5.3	10.2	8.3	11.1	5.1
Profit sharing	9.3	3.1	7.9	11.1	5.1
Production workers:					
Individual bonus	6.5	10.2	9.0	0.0	6.4
Team bonus	9.1	8.3	14.1	0.0	6.4
Stock, ESOP	2.7	5.1	4.5	5.6	2.6
Profit sharing	6.1	0.1	4.5	0.0	2.6

Table 5. Proportion of employees receiving firm provided training (in per cent)

	U-form	M-form	Hybrid	Networks	Other
Salaried employees	43.5	52.4	48.7	43.8	39.9
Production workers	29.0	27.2	29.5	26.0	22.8

Table 6. For employees evaluated, standards used (% of firms in each category)

	U-form	M-form	Hybrid	Networks	Other
Top executives:					
Objective standards	12.9	14.7	14.2	17.6	15.4
Subjective standards	20.0	12.4	18.5	23.6	9.6
Both standards	67.1	72.9	67.3	58.8	75.0
Middle management:					
Objective standards	13.5	14.1	13.6	25.0	20.0
Subjective standards	20.7	16.3	21.5	18.8	15.0
Both standards	65.8	69.6	64.9	56.2	65.0
Salaried employees:					
Objective standards	14.4	14.1	15.0	40.0	18.0
Subjective standards	22.9	15.6	21.5	30.0	18.0
Both standards	62.7	70.4	63.5	30.0	64.0
Production workers:					
Objective standards	17.6	12.5	16.7	25.0	15.7
Subjective standards	22.7	18.3	21.9	16.7	23.5
Both standards	59.7	69.2	61.4	58.3	60.8

Table 7. Number of job levels in firms with different organizational forms

	U-form	M-form	Hybrid	Networks	Other
For top executives	1.73	1.88	1.73	1.60	1.57
For middle management	1.66	1.91	1.78	1.45	1.60
For other employees	1.23	1.78	1.15	1.11	1.44

Table 8a. Estimates of firms' demand for HRM practices

	Pay practices	**Work practices**	**HRM practices**
Organization structure: (default: Unitary)			
M(ultidivisional)	0.916***	1.190***	2.107***
	(0.082)	(0.117)	(0.159)
H(ybrid)	1.118***	1.226***	2.345***
	(0.062)	(0.089)	(0.121)
Networks	0.779***	2.250***	3.029***
	(0.235)	(0.335)	(0.455)
Other forms	0.476***	0.860***	1.337***
	(0.114)	(0.163)	(0.222)
R^2 adj.	0.141	0.110	0.178
N of obs.	2,552	2,552	2,552

Table 8b. Estimates of firms' demand for HRM practices

	Pay practices	**Work practices**	**HRM practices**
Organization structure:			
M(ultidivisional)	0.167**	0.356***	0.522***
	(0.077)	(0.115)	(0.145)
H(ybrid)	0.402***	0.439***	0.841***
	(0.061)	(0.090)	(0.113)
Network	0.335	1.674***	2.009***
	(0.208)	(0.308)	(0.387)
Other forms	-0.033	0.196	0.163
	(0.103)	(0.153)	(0.192)
Firm traits:			
Size (above 100)	0.028	0.058	0.085
	(0.036)	(0.053)	(0.067)
R&D department	-0.173***	-0.283***	-0.456***
	(0.059)	(0.087)	(0.109)
Foreign owned	0.529***	0.286***	0.815***
	(0.062)	(0.091)	(0.115)
Danish MNF	0.534***	0.599***	1.134***
	(0.069)	(0.102)	(0.128)
Exporter	0.138**	0.162**	0.300***
	(0.055)	(0.081)	(0.102)
Industry:			
Construction	0.012	-0.132	-0.120
	(0.068)	(0.101)	(0.127)
Trade	0.117**	-0.351***	-0.239***
	(0.050)	(0.074)	(0.092)
Transports	0.015	-0.230**	-0.215*
	(0.066)	(0.098)	(0.122)
Services	0.119**	-0.315***	-0.195**
	(0.049)	(0.073)	(0.091)
Ownership:			
Stock company	0.662***	0.769***	1.431***
	(0.061)	(0.090)	(0.113)
Family owned	0.616***	0.931***	1.547***
	(0.106)	(0.156)	(0.196)
Workforce traits:			
Log average wage	0.432***	0.234**	0.396***
	(0.098)	(0.111)	(0.144)
Prop age below 30	-0.945***	0.245	-0.636**
	(0.382)	(0.197)	(0.321)
Prop age above 50	0.141	-0.090	-0.127
	(0.218)	(0.143)	(0.190)

Prop females	0.388***	0.198*	0.275**
	(0.113)	(0.112)	(0.132)
Prop college education	0.358***	0.259***	0.301***
	(0.075)	(0.081)	(0.101)
Separations rate	0.090	-0.168**	-0.120*
	(0.132)	(0.070)	(0.065)
Over 50% work daily	0.086	-0.024	0.062
with computers	(0.056)	(0.083)	(0.104)
R^2 adj.	0.378	0.285	0.456
N of obs.	2,552	2,552	2,552

*Table 9. Estimates of firms' demand for pay practices by categories of employees**

	Pay practices Top managers	**Pay practices Middle management**	**Pay practices Salaried employees**	**Pay practices Production Workers**
Organization structure:				
M(ultidivisional)	-0.023	0.043	0.093***	0.054***
	(0.035)	(0.031)	(0.028)	(0.018)
H(ybrid)	0.116***	0.128***	0.099***	0.060***
	(0.027)	(0.024)	(0.022)	(0.014)
Networks	0.149	0.143*	0.065	-0.022
	(0.094)	(0.083)	(0.074)	(0.049)
Other forms	-0.022	0.010	-0.041	0.019
	(0.046)	(0.041)	(0.037)	(0.024)
Firm traits:				
Size (above 100)	-0.008	0.024	0.005	0.007
	(0.016)	(0.014)	(0.013)	(0.008)
R&D department	-0.075***	-0.041	-0.039*	-0.017
	(0.026)	(0.031)	(0.021)	(0.014)
Foreign owned	0.193***	0.184***	0.148***	0.004
	(0.028)	(0.025)	(0.025)	(0.014)
Danish MNF	0.177***	0.196***	0.147***	0.014
	(0.027)	(0.028)	(0.025)	(0.016)
Exporter	0.062**	0.049**	0.050***	-0.024*
	(0.025)	(0.022)	(0.020)	(0.013)
Industry:				
Construction	-0.005	0.008	0.004	0.005
	(0.031)	(0.027)	(0.024)	(0.016)
Trade	0.015	0.063***	0.051***	-0.011
	(0.022)	(0.020)	(0.018)	(0.012)
Transports	0.002	0.025	-0.002	-0.010
	(0.030)	(0.026)	(0.023)	(0.015)
Services	0.032	0.049**	0.051***	-0.013
	(0.022)	(0.020)	(0.018)	(0.012)
Ownership:				
Stock company	0.257***	0.204***	0.123***	0.078***
	(0.027)	(0.024)	(0.020)	(0.014)
Family owned	0.266***	0.216***	0.099***	0.034
	(0.047)	(0.042)	(0.021)	(0.025)
Over 50% work daily with computers	0.034	0.043*	0.039*	-0.030**
	(0.025)	(0.022)	(0.021)	(0.013)

R^2 adj.	0.281	0.265	0.197	0.092
N of obs.	2,552	2,552	2,552	2,552

*Workforce characteristics are included but not reported

*Table 10a. Estimates of firms' demand for self-managed teams**

	Salaried employees	**Production workers**
Organization structure:		
M(ultidivisional)	0.065***	-0.021
	(0.023)	(0.020)
H(ybrid)	0.055**	0.019
	(0.018)	(0.015)
Networks	0.386***	0.220***
	(0.062)	(0.053)
Other forms	0.164***	0.057**
	(0.031)	(0.026)
Firm traits:		
Size (above 100)	-0.007	0.001
	(0.011)	(0.009)
R&D department	-0.097***	0.012
	(0.017)	(0.014)
Foreign owned	-0.051***	0.012
	(0.018)	(0.016)
Danish MNF	0.034*	0.077***
	(0.020)	(0.018)
Exporter	0.052***	-0.008
	(0.016)	(0.014)
Industry:		
Construction	0.023	0.026
	(0.020)	(0.017)
Trade	-0.035**	-0.067***
	(0.015)	(0.013)
Transports	-0.020	-0.070***
	(0.020)	(0.017)
Services	-0.011	-0.071***
	(0.015)	(0.012)
Ownership:		
Stock company	0.093***	0.120***
	(0.018)	(0.015)
Family owned	0.058*	0.116***
	(0.031)	(0.027)
Over 50% work daily	0.020	-0.041***
with computers	(0.017)	(0.014)
R^2 adj.	0.164	0.147
N of obs.	2,552	2,552

*Workforce characteristics are included but not reported

*Table 10b. Estimates of firms' demand for team bonus schemes by categories of employees**

	Top managers	**Middle man-agement**	**Salaried employees**	**Production workers**
Organization structure:				
M(ultidivisional)	-0.015	0.013	0.041***	0.023**
	(0.010)	(0.011)	(0.012)	(0.010)
H(ybrid)	0.017**	0.016**	0.036***	0.040***
	(0.008)	(0.008)	(0.010)	(0.008)
Networks	0.000	0.029	0.027	-0.024
	(0.027)	(0.028)	(0.033)	(0.027)
Other forms	0.018	0.007	-0.003	0.019
	(0.013)	(0.014)	(0.016)	(0.014)
Firm traits:				
Size (above	0.005	0.003	0.006	0.011**
100)	(0.005)	(0.005)	(0.006)	(0.005)
	-0.014*	0.003	-0.014	-0.004
R&D	(0.007)	(0.008)	(0.009)	(0.008)
department				
	0.020**	0.025***	0.036***	0.012
Foreign owned	(0.008)	(0.008)	(0.010)	(0.008)
	0.010	0.037***	0.027**	-0.006
Danish MNF	(0.009)	(0.009)	(0.011)	(0.009)
	0.009	0.030***	0.021**	-0.012*
Exporter	(0.007)	(0.007)	(0.009)	(0.007)
Industry:	0.001	-0.013	-0.002	-0.001
Construction	(0.009)	(0.009)	(0.011)	(0.009)
	-0.001	0.005	0.018**	-0.011*
Trade	(0.008)	(0.007)	(0.008)	(0.006)
	0.007	-0.003	0.011	-0.000
Transports	(0.008)	(0.009)	(0.011)	(0.009)
	-0.006	-0.001	0.002	-0.012*
Services	(0.006)	(0.007)	(0.008)	(0.006)
Ownership:	0.029***	0.015*	0.016	0.029***
Stock company	(0.008)	(0.008)	(0.010)	(0.008)
	0.038***	0.001	-0.006	0.018
Family owned	(0.013)	(0.014)	(0.017)	(0.014)
Over 50% work	0.024***	-0.003	0.013	-0.018**
daily	(0.007)	(0.008)	(0.009)	(0.007)
with computers				

R^2 adj.	0.064	0.063	0.081	0.070
N of obs.	2,552	2,552	2,552	2,552

*Workforce characteristics are included but not reported

Table 11. Demand for individualized pay systems for different samples[a]

	Individualized pay[b], 50+ firms	**Individualized pay, 100+ firms**	**Individual bonuses 50+ firms**	**Individual bonuses 100+ firms**	**Individualized pay, stock companies, 100+ firms**
M(ultidivisional)	0.133***	0.226***	0.098**	0.173***	0.203**
	(0.052)	(0.063)	(0.047)	(0.057)	(0.097)
H(ybrid)	0.250***	0.283***	0.219***	0.249***	0.254***
	(0.041)	(0.052)	(0.037)	(0.047)	(0.079)
Networks	0.022	-0.171	0.019	-0.198	-0.533*
	(0.141)	(0.197)	(0.127)	(0.178)	(0.324)
Other forms	-0.019	-0.067	-0.052	-0.155	-0.037
	(0.070)	(0.098)	(0.062)	(0.089)	(0.145)
R^2 adj.	0.336	0.375	0.334	0.356	0.068
N of obs.	2,552	1,497	2,552	1,497	665

a. Other explanatory variables are the same as in Table 8b

b. Individualized pay: individual bonuses + stock options or warrants

Table12. Determinants of firms' provision of employee training.

Dependent variable: proportion of employees trained[1]

	Salaried employees	**Production workers**
Organization structure:		
M(ultidivisional)	0.108***	0.022
	(0.022)	(0.021)
H(ybrid)	0.092***	0.050***
	(0.017)	(0.016)
Network	0.124**	0.038
	(0.058)	(0.055)
Other forms	0.043	-0.004
	(0.029)	(0.027)
Firm traits:		
Size (above 100)	-0.005	0.017*
	(0.010)	(0.009)
R&D department	-0.111***	-0.044***
	(0.016)	(0.016)
Foreign owned	0.126***	0.047***
	(0.017)	(0.016)
Danish MNF	0.093***	0.060***
	(0.019)	(0.018)
Exporter	0.169***	-0.013
	(0.015)	(0.014)
Industry:		
Construction	-0.021	0.020
	(0.019)	(0.018)
Trade	-0.003	-0.039***
	(0.013)	(0.013)
Transports	-0.023	-0.033*
	(0.018)	(0.017)
Services	0.029**	-0.070***
	(0.014)	(0.013)
Ownership:		
Stock company	0.187***	0.176***
	(0.017)	(0.016)
Family owned	0.179***	0.158***
	(0.029)	(0.028)
Workforce traits:		
Log average wage	0.102**	0.098*
	(0.050)	(0.050)
Prop age below 30	-0.072	-0.066
	(0.050)	(0.058)
Prop age above 50	-0.088*	-0.064

	(0.043)	(0.056)
Prop females	0.100***	0.066**
	(0.041)	(0.031)
Prop college education	0.234***	0.020
	(0.087)	(0.043)
Separations rate	0.048	0.065*
	(0.054)	(0.033)
Over 50% work daily	0.064***	-0.104***
with computers	(0.016)	(0.015)
R^2 adj.	0.497	0.307
N of obs.	2,552	2,552

1. Corresponding estimations with the log of (1+) the proportion receiving yielded very similar results.

Table A-1 (Table 8b for sample with 100+firms) *Estimates of firms' demand for HRM practices*[a]

	Pay practices	**Work practices**	**HRM practices**
Organization structure:			
M(ultidivisional)	0.291***	0.455***	0.746***
	(0.092)	(0.145)	(0.179)
H(ybrid)	0.364***	0.273**	0.636***
	(0.076)	(0.120)	(0.148)
Network	-0.005	1.988***	1.983***
	(0.290)	(0.456)	(0.564)
Other forms	-0.098	0.161	0.063
	(0.145)	(0.228)	(0.282)
R^2 adj.	0.405	0.318	0.477
N of obs.	1,497	1,497	1,497

a. Other explanatory variables are the same as in Table 8b.