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Alternative configurations of firm-level employment systems: evidence from American companies[1]

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Abstract: This paper examines the concept of employment systems, describes alternative models of employment systems, selects one for empirical examination and uses data on HRM practices for several hundred American firms to test the predictions of this model. We find considerable support for the existence of distinct ESs but weaker support for this particular ES model.

Keywords: internal labour markets, employment systems, HRM configurations.

JEL codes: L23, M51, M54.

Introduction

Labour resources are coordinated, allocated and priced in both external labour markets (ELMs) and internal labour markets (ILMs). The idea that ELMs take on different structural forms, such as competitive, monopsony and dual is conventional in labour economics and goes back to at least the 1930's [Robinson 1933]. Not so well known or theoretically developed in economics, however, is the parallel idea that ILMs also exhibit distinct structural forms. These forms have a commonly-used term – *employment systems* (ESs) – and a modest literature on ESs has sprung up since the late 1980's. Examples include Osterman [1987], Marsden [1999], Baron, Burton, and Hannan [1999], Appelbaum et al. [2000], Toh, Morgeson, and Campion [2008], Ross and Bamber [2009], Keefe [2009], and Kaufman [2013]. Little of this literature, however, has so far spilled

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over into organizational economics and personnel economics [see Gibbons and Roberts 2013; Grandori 2013; Lazear and Oyer 2013].

The contributions of this paper to the employment systems research program are several-fold. First, we provide in Section II a multidisciplinary survey of this literature, thus bringing to attention of economists several complementary but frequently overlooked research streams. Second, in Section III we take a detailed look at the ES model that, out of all the studies reviewed, provides the most detailed and explicit set of predictions concerning the shape and features of alternative ES configurations. The third contribution in Section IV is empirical analysis. We take the ES model and parameterize the key structural characteristics of its alternative configurations and then, using detailed data from a survey of HRM practices amongst American firms, determine how well the data match the model's predicted set of employment systems. The data show strong evidence of alternative ES configurations but weaker support for the predictions of this specific model. Section V provides a summary and conclusion.

1. Employment systems: a literature review

Models of employment systems assume that different firms choose different bundles of human resource management (HRM) practices; these studies then endeavor to identify the reasons for this and the configuration of the specific bundles. We searched the literature to find the ES theory that would be most amenable to empirical testing with the idea of using our detailed data set on firm-level HRM practices, along with cluster techniques, to see if the predictions well-matched the data. The model, therefore, preferably needed to (1) delineate a number of separately distinguishable employment systems (rather than just two) and (2) provide specific predictions about the kinds and amounts of HRM practices that are found in each system.

We found a model (described later), but the process was not easy. What we encountered was a diverse and fragmented literature spread across three separate labour fields with little attempt at review and synthesis. We decided, therefore, to modestly expand the literature review section of this paper to provide economists and other interested readers with the first-start of a synthetic overview [also see Kaufman 2013].

A useful place to start this review is with another review article. Short, Payne, and Ketchen [2008] provide a comprehensive review of the literature on *organizational configurations*. The subject of organizational configurations is a general management topic with a long research tradition. This line of research endeavors to identify if firms sort into distinct organizational forms based on strategy, structure, and goals and the factors behind this organizational differentiation. A classic study is Burns and Stalker [1961] who distinguish between "organic" firms and "mechanistic firms."

These authors examine 110 studies published since 1993. They conclude that these studies divide along two principle theoretical axes. The first is models of organizational configuration that make the primary explanatory variable *strategy* or, respectively, *organizational structure*; the second is whether the configurations are *universal* or *contingent* with respect to external and internal environmental variables. The strategy group accounts for about one half of the studies in their sample and the organizational structure group includes the other half. They also note another divide: that is, some studies focus solely on identification of alternative organizational configurations while others go further and endeavor to relate different configurations to measures of organizational performance. In terms of method, the most frequently used empirical technique in configurational research is cluster analysis.

Extant research on employment systems – in labour economics called ILMs [Waldman 2013] and in management HRM architectures [Lepak and Snell 1999] – crosses disciplinary lines and academic fields of study. The three principle locations are industrial/employment relations (IER); labour process – including industrial sociology and critical management studies; and strategic human resource management. Personnel economics is not included in this review for although ILMs and individual HRM practices are much studied [e.g. Lazear and Oyer 2013], employment systems *per se* are not.

We summarize research in each area, going in chronological order of development and with a modest effort to put the entire stream of research in each field in an historical perspective, with the consequent necessity of some large leap-frogging at places. An outline of alternative ES models is given with respect to their main structural features and theoretical orientation; we cannot for reasons of space, however, go into an in-depth discussion of underlying theoretical determinants or empirical issues or applications. The review is focused on firm-level (micro) studies of ESs. A separate national-level (macro) literature, such as in varieties of capitalism, is not included [e.g., Hall and Soskice 2001; Katz and Darbishire 2002; Hendry 2003] is not included.

Industrial/employment relations

The first labour field is industrial/employment relations (IER), a term which also includes the institutional approach to labour economics. The academic founder of the American IER field, institutional labour economist John Commons, is probably the originator of ES typologies. In his book *Industrial Goodwill* [1919] Commons identifies five alternative "theories of labour" – commodity (demand/supply), machinery (scientific management), goodwill (commitment), public utility (a publicly protected resource), and citizenship (industrial democracy) – and discusses how each theory leads to a different model of people management and associated practices. Commons' explanation of these systems is discursive but one finds sprinkled here and there factors that

he points to as determinative. The commodity model, for example, is a good fit for low-skill jobs where the work is standardized and easily monitored; the goodwill model, on the other hand, is good fit where jobs require higher level and more intangible-type skills and where cooperation and good citizenship behavior have particular value. Notably, Commons uses the term "competitive advantage" [p. 74] to describe why it pays firms to invest the extra funds necessary to create and operate a goodwill HRM system.

For the next major ES contributions in industrial/employment relations we fast forward to the 1950's. One comes from economist Clark Kerr and the other from John Dunlop. Kerr [1950, 1954] first divides labour markets into "structured" and "unstructured." The latter is equivalent to Commons' "commodity model" where undifferentiated labour is traded back and forth, turnover is high, demand and supply determine wages and other terms and conditions of employment, and employer HRM practices are very bare-bones. The former correspond to what Kerr calls "institutional" labour markets that are structured by various rules, norms, and organizational features created by employers, unions and/or government. He divides structured labour markets into two generic ES types: "communal ownership" and "private property." The former is exemplified by an occupational labour market or industry organized by a craft union where jobs require well-recognized skills but the skills are general and therefore portable (e.g., in nursing, construction); the latter is exemplified by a factory or company organized by an industrial union where job access is regulated by seniority and skills tend to be company-specific (e.g., in an auto plant). Of the two, the private property model has the more extensively developed internal labour market (ILM) and HRM system since the longevity of the employment relationship makes all aspects of HRM more important to organizational performance.

Dunlop's contribution to the ES literature is the concept of an "industrial relations system." In his well-known book *Industrial Relations Systems* [1958], Dunlop defines an IR system as "the complex of interrelations among managers, workers, and the agencies of government" where "the parts and elements are interdependent and each may affect other elements and outcomes of the system as a whole" [p. 13]. The primary factor Dunlop focuses on as determinative of the shape of ESs is the rules and regulations negotiated by unions and companies through collective bargaining.

IER theorizing on employment systems next moves to the 1970s and 1980s and two more contributions. The first is Doeringer and Piore [1971]. Their contribution is to delineate four factors that create ILMs: skill specificity, on-the-job training, unions, and customary law. Higher levels of these four factors promote more internalization of labour coordination and, hence, a more HRM intensive ES. The second study is by Osterman [1987]. He identifies four dominant ESs: industrial, salaried, craft, and secondary. The nature of these different ESs is evident from their names; what distinguishes Osterman's paper is that he

then links different ES models to different configurations of four HRM practice areas – job classification, deployment (staffing), security, and wage rules – and identifies five factors as the chief determinants of ES selection – goals of the firm (cost minimization, flexibility, predictability), production technology, social technology, labour force characteristics, and government policies.

Our review of the IER stream ends with recent contributions from the 1990's to date. Four contributions merit brief mention [also see Applebaum et al. 2000; Orlitzky and Frenkel 2005]. First is Arthur [1992]. His article is noteworthy because it integrates the IR system idea; the role that strategy plays in shaping ESs; and the popularly-called high performance model of work organization. He looks at steel minimills, differentiates between "cost minimization" and "product differentiation" business strategies [Porter 1980], and then examines if they map into a "command and control" or "high commitment" HRM/IR system. Cluster analysis reveals the ESs in the minimills sort into distinct types in line with the two strategies.

The second contribution is Marsden's *A Theory of Employment Systems* [1999]. The book is almost entirely a work of theory and is based on ideas from institutional economics and, in particular, works by Coase [1937], Simon [1951] and Williamson [1975]. Marsden identifies the constraints on behavior that are necessary for the employment relationship to be a viable economic proposition for both employers and workers; from these constraints he identifies four permutations of job design and skill development in firms' production systems, and in the last section of the book examines specific HRM practices that go with each production system. His theory indicates ILMs and "transformed" (high performance) HRM systems develop when transaction costs are high and knowledge requirements are high and firm-specific – conditions created in turn by factors such as interdependent job tasks, tacit knowledge, learning on the job, and difficulty of monitoring job performance.

A third contribution is Kaufman's [2004, 2010] ES model. It is similar to Marsden in that it uses institutional economic theory and, in particular, the transaction cost (TC) concept. He demonstrates that in a world of very low TC organizations dis-agglomerate into small units and HRM systems are "externalized" and "simple;" in a world of very high TC organizations agglomerate into very large units and employment systems become "internalized" and "HRM intensive." Variation of five variables, in turn, causes different ES permutations between these polar opposites: the degree of bounded decision-making, interdependence in utility functions, interdependence in production functions, indivisibilities and gaps in property rights and legal restrictions on trade by the sovereign.

Finally, note must be taken of a mini-symposium on employment systems in the telecommunication industry featured in the October 2009 issue of *Industrial and Labour Relations Review*. The three papers [Doelgast 2009; Ross and Bamber 2009; Keefe 2009] are primarily empirical; a common theme that

comes out of all three, however, is that theory must pay attention to the issue of complementarity and fit between the external market environment and the internal structure of ILMs. In particular, ESs in telecommunication companies are becoming considerably more decentralized, flexible and open in response to more turbulent markets.

Labour process

The second stream of research on employment systems comes from the labour process (LP) field. It draws from diverse disciplines but is centered in neo-Marxist economics/sociology, industrial and organizational sociology, and critical management studies. The roots of ES research in LP are found in Marx, Weber and (to a lesser extent) Mayo; nonetheless, explicit work on ES models did not begin in earnest until the 1970's. By all accounts [e.g., Wardell, Steiger, and Meiskins 1999], the pioneering LP study was by Harry Braverman in his book *Labour and Monopoly Capital* [1974]. Braverman's perspective was avowedly radical, Marxist and class-based. In the intervening three decades many writers in LP have softened or abandoned all of these three premises; the overall perspective remains, however, critical of neoclassical economics and orthodox management [Thompson and Harley 2007].

The starting point in this line of theorizing is Marx's [1847/1935] distinction between *labour* and *labour power* [Burawoy 1979]. Labour is a commodity input firms rent for a certain amount of money per hour; the labour, however, is in the form of a person and the person only contributes to production and profit by providing labour power – that is, physical, mental and emotional effort. Thus, the goal of the employer is to pay as little as possible for the labour input and then get the most effort possible out of it; the goal of the worker, however, is just the opposite – to get the best compensation and benefits possible at the least cost in terms fatigue, boredom, and other causes of disutility. Employers and workers, in this perspective, are in a constant struggle (or "game") where workers individually and collectively seek to evade, resist or minimize the work demands of employers and employers are continually searching for ways to more effectively extract labour power through more effective motivation, discipline and supervision.

The next key concept in LP is *control* and, in particular, *regimes of control* [Friedman 1977; Edwards 1979], Since workers evade, resist and minimize all the aspects of work that are a source of disutility (not only the tiring/boring aspects of the job itself but also taking orders, reporting on time, providing good customer service, etc.), the task of employers is to build into the production and HR systems a regime of control that maximizes the quantity and quality of labour power provided in the most cost effective way. A "regime of control," however, is just a critical/Marxist term for an "employment system" and, indeed, objectively viewed the two are largely equivalent. Since there is evidently

no single best control regime for all employment situations, researchers in the LP tradition are therefore led to theorize about different control regimes, their constituent parts, and the contextual factors that determine when one regime is better than others.

In the IER literature the most basic distinction in thinking about ESs is between external and internal labour market modes of coordination; in LP the most basic distinction – in keeping with Marx's emphasis on the materialist basis of social relationships – is between Fordist and post-Fordist production systems. The contention is that the nature of the production system is the most important determinant of the complementary HRM system since the latter exists to serve the needs of the former. Thus, differences in production systems map into differences in ESs. Until the early 1980s, the core production system in advanced industrial countries was a Henry Ford-inspired model of *mass production*; surrounding it were other production systems outside manufacturing, in smaller firms and peripheral sectors. Since the early 1980's, the mass production model has given way to a post-Fordist system of *flexible specialization* [Piore and Sabel 1980].

In the Fordist era of mass production, LP researchers identify several distinct control regimes (ESs). They are "simple," "technical" "craft," and "bureaucratic" [Edwards 1979]. Many smaller or less technologically dynamic firms continue to use variants of these today.

In a classic mass production operation, such as an auto plant, employers opt for a technical control system. The technical system gets its name because control and extraction of labour power is predominantly organized and enforced through the technology of production. That is, the assembly line, machine tools, conveyor belts and other parts of a mass production operation effectively control the pace of work while the quality of work is controlled by finely subdividing parts and tasks and putting in place supervisors to act as monitoring agents of management. The HRM system, in turn, complements the technical control system; that is, it tends to be a non-strategic function (except in the union avoidance area) that does large-scale but routinized hiring and placement of blue-collar workers, handles a variety of administrative and transactional personnel activities (e.g., job classification, payroll, benefits), and helps line managers in discipline and discharge.

Other firms use a simple, craft or bureaucratic form of ES. The simple control system is best for small firms where direct coordination and supervision by the owner or manager is possible. The HRM system is mostly informal and covers the basics of payroll, hiring and legal compliance. The craft system arises in areas where occupational or craft skills are strategic to the production system; the bureaucratic system arises where the production system is large-scale but jobs have more autonomy, the tasks require more discretion, and there are well-developed lines of upward progression (e.g., in an insurance company or university). The craft system is primarily controlled by peer monitoring, skill

qualifications and professional norms and HRM practices are formal but largely administrative and transactional; the bureaucratic system is typically associated with long-term employment relationships and a well-develop ILM and, hence, HRM is not only formal but takes on greater strategic importance and invests more on careful selection, training, and employee relations.

The Fordist mass production model dominated the core of industrial economies into the 1970's; after that it was gradually displaced – particularly in manufacturing – by a post-Fordist production model of flexible specialization. Traditional technical and bureaucratic control systems were particularly challenged in industries facing global competition and new production technologies [Rubery and Grimshaw 2003: Thompson and Harley 2007] and in their place was developed an alternative model called a *high performance work system* (HPWS). The HPWS is an alternative control regime that melds parts of the craft system (e.g., employee teams) and technical system (e.g., electronic monitoring of production and quality) with new components derived from a *commitment* form of employment. In effect, control is partly reconstituted so employees internalize management's performance objectives through mutual-gain pay systems, egalitarian organizational cultures, and participation forums. The ES part of the HPWS is distinctive because it is very HRM intensive in the sense of considerable investment in sophisticated selection and placement procedures, extensive training, widespread and formalized employee involvement programs, and considerable attention to maintaining positive employee relations.

Strategic human resource management

A third literature stream on employment systems comes from strategic human resource management (SHRM). It is the latest to be developed, emerging in the 1990's.

SHRM grew out of two important developments. The first was the transition in the late 1970's-early 1980's from the traditional personnel management (PM) model and to a new human resource management (HRM) model. Some writers perceive that HRM is largely a repackaged version of PM [Strauss 2001]; many others, however, regard HRM as a new and different philosophy and method of people management. At the forefront of the "new model" interpretation were a group of Harvard professors, including Michael Beer, Paul Lawrence, D. Quinn Mills, Burt Spector, and Richard Walton. In an interpretation largely parallel with that the of the LP group, Walton [1985] claims that traditional PM and IR (together PIR) rely on a model of command and control while the new HRM relies on a model of employee commitment and involvement. Beer and Spector [1984] worked out the logic of this bifurcation in much greater detail. In their typology, PIR assumes a conflict of interest; is based on a Taylorist production system of narrow and repetitive jobs, top-down man-

agement, and tight supervision; and takes an administrative/reactive approach to people management. HRM, on the other hand, assumes a unity of interest; approaches people management from a proactive perspective; and is based on a more flexible, team-oriented, egalitarian and mutual-gains kind of production/HRM system. Hence, in this popular view HRM covers the generic field of people management but at the same time connotes an orientation toward a human capital, commitment and high involvement approach.

The second stream of influence occurred in the late 1980's-early 1990's and was the emergence of *strategic* human resource management as a subfield of HRM. Pioneered by people such as Fombrun, Tichy, and Devanna [1984] and with some carry-over from the IER literature [e.g., Kochan, Katz, and McKersie 1986], this research brought the strategy concept from general management and applied it to choice of individual HRM practices and entire HRM systems. In particular, the idea is that HRM practices and systems need to align with the organization's business strategy and with its internal structure and capabilities. Further, the HRM practices need to align with each other so they fit together and generate maximum synergies [Bamberger and Meshoulam 2000]. These ideas became known as vertical and horizontal fit.

We have here the beginning of distinct SHRM typologies for employment systems. The most basic distinction in SHRM is between command/control and commitment/involvement people management systems. A command/control strategy relies on a mix of technical and bureaucratic HRM practices (e.g., narrow job classifications, straight-time pay, transactional personnel activities) and a commitment/involvement strategy relies on HPWS-type employment practices (broad and autonomous jobs, pay-for-performance, employee participation).

As SHRM evolved, new ideas and typologies have led to more variegated models of employment systems. For example, Delery and Doty [1996] argue that SHRM models separate into three basic groups: universalistic, contingency and configurational. The universalistic perspective argues that one particular ES is everywhere best practice and this ES is associated with high commitment/high involvement HRM. Strategic choice here is simple because an HPWS-type ES is always the best; usually argued based on propositions from the resource-based view (RBV) of the firm. The contingent perspective argues that the best performing ES is contingent on various internal and external contextual factors, such as firm size, industry, production technology, and state of the economy. Kaufman [2010] distinguishes between "weak" and "strong" contingency cases: weak contingency moderates but does not reverse the positive performance effect of high performance HRM practices; in strong contingency the contextual factors sometimes make an HPWS system the "low performing" option (as in small firms or an economic depression). The configurational perspective looks to see that the bundle of HRM practices in an employment system fit together for maximum complementarity and synergy. Thus, if a firm adopts an

HPWS the performance pay-off is hypothesized to be greater when employee involvement, pay-for-performance and job security are used together; while using the first two but hire-fire methods for the third would greatly reduce the system's performance.

The universalistic perspective in SHRM thus argues that HRM practices should be converging to an HPWS-type employment system; the weak contingency perspective argues that an HPWS employment system is dominant but will take different second-order shapes and configurations depending on contextual factors; and the strong contingency case suggests employment systems will sort into diverse and perhaps polar opposite configurations.

SHRM theorists taking a strong contingency perspective have endeavored to fill-out alternative ESs that include an HPWS but also different forms. Two influential examples are Delery and Doty [1996] and Lepak and Snell [1999]. Delery and Doty contrast two polar opposite employment systems that correspond closely to those found in industrial/employment relations; that is, a "market-type" and "internal" ES. The former uses primarily market-based pay, features hire and fire staffing methods and provides little formal employee voice, while the latter provides forms of organizational gain-sharing, employment security, and formal voice mechanisms. Lepak and Snell [1999] develop a model of employment systems called HRM architectures. They identify two central attributes that distinguish human capital across firms, "value" and "uniqueness" and based on transaction cost and RBV considerations derive a four-fold typology of ESs: Commitment, Market-based, Compliance, and Collabourative. The first three ESs correspond to versions already encountered (e.g., commitment = HPWS; compliance = technical/bureaucratic; market-based = simple/external labour market); the "Collabourative" ES is a hybrid ES where firms hire the human capital in the form of products or services produced by employees in network or alliance firms.

A final ES example from the SHRM literature is the recent typology developed by Toh, Morgeson, and Campion [2008; also see Sheppeck and Militello 2000; Youndt and Snell 2004; Bae and Yu 2005; Kinnie, Swart, and Purcell 2005; Tsai 2006]. They identify five ES's: cost minimizers, contingent motivators, competitive motivators, resource makers, and commitment maximizers. They then seek to match each of these ES types to a particular configuration of HRM practices based on four key HR functions: staffing, development, reward and evaluation. Consistent with much of the SHRM literature, these authors identify the goals/strategy of the firm as a key determinant of ES choice. For example, firms that seek competitive advantage through a low cost strategy are led to adopt a minimalist HRM system while those pursuing a high commitment strategy adopt an HRM intensive system. Cost minimizers and commitment maximizers, therefore, anchor the opposite ends of the HRM spectrum. The other three ES models fall between these end points: Contingent motivators, for example, use considerable incentive types of pay; competitive motivators

purchase human capital from the labour market and use pay to elicit work effort; and resource makers invest more in training, development and empowerment. This study, however, is relatively more advanced than many others in the SHRM literature because it then incorporates an additional degree of fit by matching ES systems to other contingent factors, such as organizational structure and organizational values.

Synthesis

This literature review reveals both commonalities and differences in research on employment systems. First are four commonalities.

Looking across fields, one shared characteristic is that researchers in IER, LP, and SHRM all start with a two-way model of employment systems. In each case, these represent polar opposites: external versus internal in IR, mass production versus flexible specialization in LP, and control versus commitment in SHRM.

A second similarity is that researchers then introduce additional contingencies into the theory and derive a more nuanced and complex typology of employment systems, typically broadening the mix to somewhere between three and five distinct ESs. In IER, an important contingency is the goals and structure of labour unions (e.g., craft versus industrial unions); in LP an important contingency is the nature of technology (e.g., tight versus loose control of work pace); and in SHRM a key contingency is organizational structure (e.g., mechanistic versus organic).

Although researchers often use different labels to identify individual employment systems, a third commonality is that behind these labels are often fairly generic models. For example, in IER, LP and SHRM one finds some type of "mechanistic" ES (e.g., "machine" in IR, "technical control" in LP, and "cost minimizer" in SHRM); also prevalent is some kind of "occupational" ES (e.g., "communal ownership" in IR, "craft" in LP, and "collabourative" in SHRM).

A fourth commonality is that at a broad level these different ES models lead to fairly commonly predicted HRM configurations. For example, a market-based system has the fewest and least developed formal HRM practices; a mechanistic/control system has an intermediate range of HRM practices with emphasis on policing, monitoring and administrating (e.g., clearly specified tight job classifications, narrow task-specific training, straight-time pay or incentive piece rates); and a commitment/high performance system uses the largest breadth/depth of HRM practices and a set of practices aimed at building organizational motivation and capabilities (e.g., mutual-gain pay, employee participation, job security).

Now for the differences in ES research. We mention two that seem most important. One is that researchers in each field use a different theoretical construct as the principal tool to differentiate amongst employment systems. That is, in

IER the central construct is the labour market, in LP the central construct is the production regime, and in SHRM it is strategy. Second, researchers differ in the emphasis given to external versus internal determinants of ES structure. IER researchers locate on the external end since they emphasize markets, laws, unions, culture, and other factors in the external environment of firms; SHRM researchers are on the internal end since they emphasize management goals, employee motivations and skills, organizational structure and other factors internal to firms; and LP researchers fall somewhere in the middle.

2. Begin's model of employment systems

This literature review provides a broad-based context for our empirical examination of one particular ES theory. We chose this theory because to the best of our knowledge it is the most fully developed in two important respects. The first is that it delineates *more than two* alternative employment systems and, second, gives the *most detailed and specific predictions* about the bundle of *individual HRM practices* that attaches to each. This ES model is contained in the work of James Begin, particularly his book *Strategic Employment Policy* [1991; also Begin 1993, 1997]. It has been cited and utilized in other more recent studies, such as Verberg, Hartog, and Koopman [2007].

Before getting into the specifics of Begin's model, it is useful to locate it in terms of the models described in the previous literature review. Begins' model has elements of IER, HRM and (most loosely) LP. He conceives of alternative ES structures as alternative *ILM configurations*, as in IER and labour economics; as in HRM he emphasizes that bundles must have good *strategic fit* with internal organizational characteristics and the external environment; and as in LP one of the chief functions of an ES is to coordinate and *control* the internal division of labour in firms. However, these are best viewed as complementary features to what is the main intellectual wellspring of Begin's ES theory – alternative *organizational structures*. Recall from the literature review section that Short, Payne, and Ketchen [2008] surveyed 110 studies of organizational configurations (of which the ES is one component) and found they divided roughly in half in terms of one set emphasized the defining role of strategy and the other emphasized the role of organizational structure. It is the latter wing in which Begin's work is based. In particular, Begin's model is built on the typology of organizational structured developed by well-known management theorist Henry Mintzberg and, specifically, his influential book *Structure in Fives: Designing Effective Organizations* [1983].

Now let's get into the specifics. The starting point for Begin's ES theory are three connected propositions: (1) an ES is a necessary component of every organizational design; (2) firms choose the ES that best fits their organizational architecture so both are well aligned with each other and with effective accom-

plishment of the organization's objectives; and (3) diverse internal and external contingencies across firms lead them to design distinctly different organizational architectures which lead, in turn, to the design of distinctly different employment systems. The remainder of his book is devoted to elabourating and developing these three propositions.

Although Mintzberg [1983] identified six organizational configurations, two are mixtures or hybrids (e.g., a "divisionalized" organization) and Begin therefore drops them, yielding a core of four generic configurations. He argues that these four configurations are the product of two fundamental intersecting forces, one external to the organization and one internal. The first is the degree of volatility in the external market environment facing the organization, the second is the complexity of the technical production system internal to the organization. Mintzberg divides the market volatility dimension into "stable" and "dynamic" and the technical production system into "simple" and "complex," thus yielding a two x two matrix with four cells. Each of these four cells yields a distinct organizational configuration [Begin 1991, Table 2-2; also see Verberg, Hartog, and Koopman 2007, Table 2]. They are:

– *Simple*: simple/low-cost production technology, dynamic/competitive environment, smaller size, direct and often personal control/coordination from the top.
– *Machine*: a larger-scale but relatively routinized and sub-divided production technology, a moderate-to significant stable/planned environment, emphasis on narrow skills and task proficiency, tight top-down coordination through formal rules and supervision.
– *Professional*: a more loosely structured/regulated but larger-scale production technology utilizing complex/intangible skills and knowledge; typically a more stable/predictable environment; greater decentralized and discretionary coordination/control; formal rules complemented by professional/social norms.

Adhocracy: a complex, knowledge intensive, and human-centered production technology, a rapidly changing environment fueled by innovation and learning, competitive advantage based on quality, speed and service, and flatter, looser and decentralized coordination and control.

Begin's next step is to match an appropriate set of HRM practices to each organizational type. Thus, the key question is: for HRM activities, such as job classification, selection, training, compensation, performance appraisal and voice, what particular type of HRM practice best aligns with the organization's structure? He considers a host of external and internal contingencies and contextual factors, including not only the environmental volatility and technical features of production focused on by Mintzberg but also characteristics of the command and control system (e.g., formal versus informal, horizontal versus vertical), the nature of jobs (e.g., narrow versus broad; simple versus complex), and numerous other factors. The end-product is four distinct configurations

of HRM practices that form, respectively, a *simple* ES, *machine* ES, *professional* ES, and *adhocracy* ES.

Table 1 shows the four different ES types across the top and a group of nine HRM practices and organizational characteristics on the left-hand side, as taken from Begin [1991].[4] It is the bundle of these nine HRM practices and characteristics (P&C) that collectively define each ES. Note that the nine P&C's include many of the core sub-areas of the personnel/HRM function; also note that Begin's model includes several other practices, such as job design, that are more engineering and less HRM oriented, leading us to therefore omit them from further consideration. Lastly, observe that the predicted HRM practices are for *core* employees of the organization.

Table 1. Begin's four employment systems and predicted HRM characteristics

HRM Characteristic/ES	Simple	Machine	Professional	Adhocracy
Recruiting/Staffing	LI	LF	LI	EF
Training/Development	LI	LI	LI	EF
Benefits/Rewards	LI	EF	EI	EF
Performance Management	N/LI	LF	LF	EF
Participation/Voice Mechanisms	Few	Few	Moderate	Many
Work Force Size	Small	Large	Varies	Varies
Unionization	No	Yes	No	Yes/No
Strategic Involvement	N	N/LI	N	EF
Degree of Formalization	Little	Much	Intermediate	Intermediate

N – none, LI – limited (informal), LF – limited (formal), EI – extensive (informal), EF – extensive (formal).

Source: Table 2-2 and Chapter 5 of [Begin 1991].

As indicated earlier, one reason we chose Begin's ES model is because more than other writers he makes predictions about how these specific, measureable types of HRM P&C vary across organization types.[5] Unfortunately, these predictions are not made using a common metric but are a mix of quantitative, qualitative and descriptive measures. These different metrics are displayed in

[4] We coded Degree of Formalization for the Professional and Adhocracy ESs as "Intermediate" since in Table 2-2. Begin lists them as "Little" but then in the Chapter 5 discussion of each ES (e.g., p. 108; p. 117) he suggests a much higher degree of formalization, albeit one that in the Adhocracy case exhibits considerable flexibility.

[5] Verburg, den Hartog, and Koopman [2007] considerably expand Begin's list of HRM practices for each ES; we follow Begin here partly to remain true to his original work and partly because our data set does not contain many of these other practices.

the individual cells of Table 1. For example, the level/type of staffing for the four ES's is, respectively LI (little/informal), LF (little/formal), and EF (extensive/formal), while for participation and voice mechanisms the metric is Few, Few, Moderate, Many. These metrics are measuring a mix of *rules* and *activity levels*; that is, "little/informal" means that the activity of staffing and the rules governing it are modest sized, not greatly detailed and offer significant room for discretion. Further, when an activity such as training is marked as "little/informal" this does *not* mean that the employees are not necessarily highly trained; it does mean, however, that the employees have obtained the training elsewhere (e.g., a medical school) and the organization itself provides only modest and loosely structured training.

Before moving further toward empirical analysis, it is useful to examine the nature of the four ESs depicted in Table 1 and offer a brief summary.

The *simple* ES is exemplified by a restaurant, budget hotel or dry cleaners. Begin's model predicts such organizations should fall in the "no/little" and "informal" category for all nine HRM practices. Thus, recruiting/staffing and performance appraisal (development) are little and informal, HRM has no integration with organizational strategy, size of labour force is small and unionization is largely non-existent. These HRM characteristics seem to match with what we know about these kinds of firms.

A *machine* ES, on the other hand, is exemplified by a railroad, traditional auto assembly plant, newspaper, or government administrative agency. The machine ES configuration is similar to the simple ES in two cells (training, participation/voice), close in a third (strategy integration) but different in the other five. A machine ES uses limited and informal staffing methods, extensive and formal benefits, limited and formal training/development, few participation/voice mechanisms, employs a large labour force, and is more likely to be unionized. Again, these HRM practices seem in line with expectation.

The *professional* ES is found in organizations such as hospitals, large law firms, commercial building architects, and universities. Like a simple ES, the staffing/recruitment function for core employees is modest but also more formalized (e.g., selection of new nurses or professors is formalized but not technically complex), formal in-house training also ranges from little-to-modest (an average of values in Begin's Table 2–2 and 5–6) and most professional ES's are not good candidates for unions – at least amongst core employees. The professional ES is different, however, by having extensive benefits and greater employee participation/voice.

The *adhocracy* ES is exemplified by consulting firms, high-tech entrepreneurial firms, software design companies and firms with "high involvement" production systems. This type of ES is the most HRM intensive with respect to dollars spent on human capital although not necessarily in terms of formal HRM programs and practices. Because skills, motivation and creativity are important and the technology of production and tight supervision cannot tightly

regulate the work process, adhocracies find it necessary to invest substantial resources in carefully selecting, developing, rewarding and retaining talent. Often, however, these HRM activities are decentralized, flexible and implemented outside a formal HR department. Adhocracies also provide the most participation/voice mechanisms for core employees, which in turn makes them poor candidates for unions.[6] Because human capital is a major source of competitive advantage, HRM policies/practices are also more tightly and explicitly integrated with organizational strategy.

3. Empirical analysis

A central object of this paper is to offer evidence pro and con on the existence of distinct groupings of firms based on differences in HRM practices. To structure this investigation and provide an opportunity to take the analysis even deeper, we have utilized the detailed theory of ES formation and structure developed by Begin. We now proceed to investigate both issues in a four step process. These four steps involve some complex and perhaps at places tedious manipulations and measurements; we do our best, however, to guide readers through them in an understandable and transparent fashion. Also, we here state and acknowledge an important but inevitable shortcoming of our empirical analysis; that is, in translating Begin's theoretical concepts and predictions into a format capable of testing with data there are necessarily some "slips between the cup and the lip" due to imprecise measurement and dividing-up continuous variables into discrete categories.

Metric conversion

The first step is to transform all the cell entries in Table 1 into a common metric. We start with the first three HRM practices (recruiting, training, benefits).

These three HRM practices are measured on a scale that shows whether the practice is predicted to be non-existent (N), limited/informal (LI), limited/formal (LF), extensive/informal (EI), or extensive/formal (EF). The measures N, LI and EF correspond in a relatively straightforward way to low, moderately low and high usage, respectively. The two remaining categories LF and EI, although less clear-cut, seem reasonably approximated by a ranking of moderate and moderate high.

We next turn these rankings into numerical scores. Each ranking is coded with a score covering a two point range (e.g., 1–2) in recognition that a score such as "low" has some internal variance. With a two point range, the five categories distinguished by Begin sort into a numerical range from 1–6 (6 = high-

[6] Begin, however, gives a Yes score to the union variable for administrative support employees in an adhocracy [p. 117], leading us to put a Yes/No entry in this cell.

est). Accordingly, N is given a score of 1–2, LI gets 2–3, LF gets 3–4, EI gets 4–5 and EF gets 5–6.

Next are the other six HRM P&C in Table 1. Each is again converted into a numerical score using a 1–6 ranking. First, participation and voice mechanisms are ranked in Table 1 as Few, Moderate, or Many. This three-way ranking converts neatly into Few = 1–2, Moderate = 3–4 and Many = 5–6. Next, the size of the work force, the level of unionization and the degree of formalization variables are ranked using binary measures, such as Small or Large, No or Yes, and Little or Much. These variables are, accordingly, assigned a score of 1–3 for Small, No and Little; 4–6 for Large, Yes and Much. A combination of Little/Much ("intermediate") gets 3–4. The two cell entries "Varies" (work force size) in Table 1 are coded 1, 2, 3, 4, 5, 6. The strategic involvement variable uses the N, LI, LF, EI and EF ranking, as with the three HRM practices discussed above, and is similarly converted to the 1–6 scale. Finally, degree of formalization is relatively straightforward: Little is coded 1, 2, 3; Intermediate is 3, 4; and Much is 4, 5, 6. The results of this metric conversion are depicted in Table 2.

Table 2. Quantifying the ES characteristics (1–6 scale)

HRM Characteristic/ES	Simple	Machine	Professional	Adhocracy
Recruiting/staffing	2, 3	3, 4	2, 3	5, 6
Training/development	2, 3	2, 3	2, 3	5, 6
Benefits/rewards	2, 3	5, 6	4, 5	5, 6
Performance management	1, 2, 3	3, 4, 5	3, 4, 5	5, 6
Participation/voice	1, 2	1, 2	3, 4	5, 6
Work force size	1, 2, 3	4, 5, 6	1, 2, 3, 4, 5, 6	1, 2, 3, 4, 5, 6
Unionization	1, 2.3	4, 5, 6	1, 2, 3	2, 3, 4
Strategic involvement	1, 2	1, 2, 3	1, 2	5, 6
Degree of formalization	1, 2, 3	4, 5, 6	3, 4	3, 4

Data set

We use data from the USA provided by the Bureau of National Affairs (BNA) from its 2005 and 2006 reports, *HR Department Benchmarks and Analysis*. These data come from annual surveys of hundreds of American companies in which they are asked a wide range of questions about the structure, organization and strategic involvement of their HR function; the use of and expenditure on a variety of individual HRM practices, and other information such as industry, sector, work force size, and unionization. The BNA surveys provide a particularly detailed and in-depth information source of firm-level HRM

practices; they are also the most recent data source available. These data for the most part come from company administrative records and are not self-reports, thus boosting confidence in their reliability.

The 2005 and 2006 surveys include a total of 641 observations. Some observations are for entire firms, others represent an autonomous business unit (e.g., a division or subsidiary). Only firms (or sub-units) with a minimum employment size of twenty-five are included. We removed all duplicates between the two years and all observations with missing information on the HRM P&C variables in Table 2. The remaining observations are 264. The sample of firms is distributed by industry sector as follows: manufacturing (23%), non-manufacturing (43%), and public and non-profit (34%). Twenty-seven percent had some collective bargaining representation.

A key advantage of the BNA data is that it asks not only about the use of specific HRM practices but also on the *dollar expenditure* on each practice. In particular, the survey instrument asks each respondent to provide "your HR department's 2004 expenditures" and then in the next question asks them to "approximate the percentage" of this expenditure that goes into ten discrete areas of HR practice (training, compensation, etc.).

A problem in other studies is that they only have data on the *presence* of the HRM practice, but not the expenditure level. Two firms may both report they utilize an HRM practice (e.g., employee participation) yet one is simple and bare-bones (a suggestion box) and another is extensive and state-of-the-art (a plant productivity/quality council). A yes/no presence measure gives an equal value to both the bare-bones and advanced systems which, evidently, may be quite misleading. An expenditure measure, on the other hand, is likely to much better capture differences in the depth and formalization of the practice.

Clustering technique

The statistical method used to perform the cluster analysis builds on but improves the technique used by Appelbaum et al. [2000]. They use K-clustering which requires that the number of clusters and their centroids be specified *a priori*. We instead let the data inform the choice of centroids and number of clusters by first using a hierarchical agglomerative clustering method and then apply to these results the K-clustering as a second step.

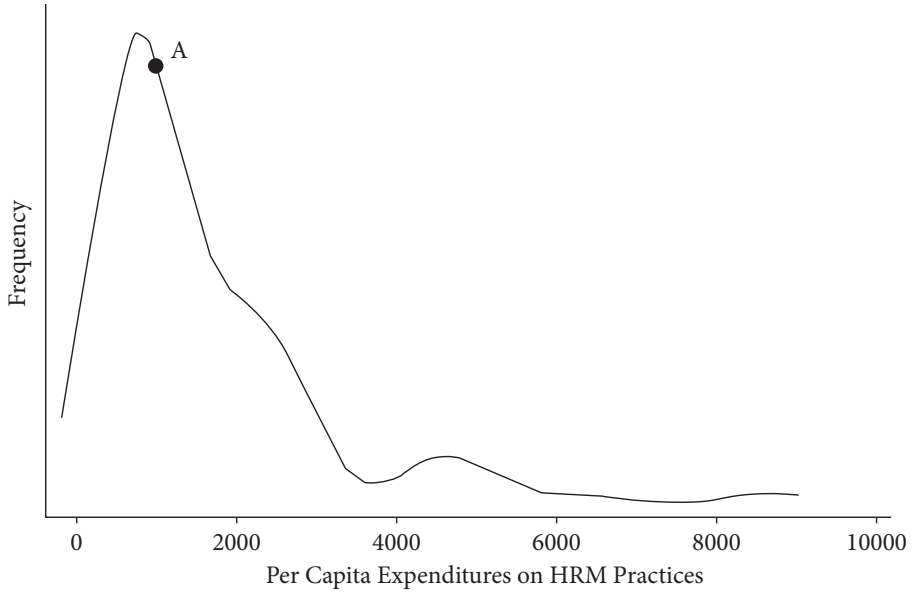
We start with a hierarchical agglomerative clustering technique. Initially, each firm is its own cluster (e.g., the number of clusters g = the n observations). The n clusters are then reduced to n-1 by agglomerating the two least dissimilar clusters and this process continues in an iterative fashion until only one cluster emerges (g = 1). The next step is to use these results to choose the number of clusters (g) that best fit the data. We restrict attention to $g \leq 6$ in order to identify a manageable number of discrete employment systems. Beginning with g = 6 and moving to g = 1, we search through each set of clusterings for what is

known in the literature as the "sharp step" – that is, the value of g where combining one more cluster leads to a substantial change in fit but where moving beyond this leads to a small change.

The problem with agglomerative clustering is that in early stages of the clustering (a high g) certain observations may be placed in a particular cluster but when the number of clusters shrinks to a lower g these observations may achieve a larger reduction in dissimilarity if they are moved to a new cluster. But the technique prevents this, leading to potential mis-classification. At this point, therefore, we introduce K-clustering. As earlier noted, K-clustering requires that the number of clusters g and their centroids be specified a priori. We use the agglomerative results to specify the initial value of g (at the sharp step) and centroid values. Then the K-clustering partitions the observations across the g groups in a manner that minimizes the squared distance of each observation from its centroid. Once the firms have been so grouped, the centroids for the clusters are recalculated and the firms are re-clustered. If any of the firms move from one cluster to another, the centroids are recalculated and the firms are accordingly re-clustered. The K-means clustering method is complete when no firms move between clusters.

Results

To put the clustering analysis into better context, we first plot in Figure the distribution of the 264 organizations by their level of HRM expenditure per



Frequency distribution, HRM expenditures per employee
Source: [Bureau of National Affairs, 2005/2006]

employee. The data generate a bell-shaped frequency distribution with a distinctly skewed right-hand tail.[7] Per capita HRM expenditure ranges from a low of $152 to a high of $8,709; however, roughly half of employers – those in the middle range between the 25th percentile and the 75th percentile – spend between $615 per employee and $2,069 per employee for HR activities.

Figure 1 provides two pieces of information supporting the ES and configurational concepts. The first is the very large variance in total HRM expenditures per employee. The universalistic or best practice SHRM model [Delery and Doty 1996; Pfeffer 1998] renders the concept of ES's mostly moot since it predicts that only *one* set of HRM practices – typically associated with some version of a high involvement or high performance work system (extensive training, mutual-gains pay, employee involvement, etc.) – maximizes performance, suggesting long-run competitive selection pressures should concentrate organizations around this model. Since a best practice ES entails considerable investment in HRM activities and programs [Huselid 1995], the universalistic hypothesis predicts that the HRM frequency distribution should have a relatively concentrated variance centered on a relatively high (but not necessarily highest) level of HRM expenditure. The data clearly do not support this hypothesis, at least in a relatively close interpretation of the best practice model; indeed, a transformed HRM intensive employment system appears to be a distinct minority phenomenon located in the region of right-hand tail. The lack of empirical support for the universalistic hypothesis may be because the hypothesis is false or, alternatively, because competitive selection pressures are weak, obstructed, or erratic. Whatever the case, the existence of a large dispersion in HRM expenditure levels among the organizations in Figure 1 provides *prima facie* evidence that firms sort not into one kind of ES but potentially numerous ones.

A second piece of evidence emerges from a more detailed look at one particular point in the HRM frequency distribution. We found in the BNA data a group of three firms with nearly identical levels of HRM expenditure ($1,010, $1,013 and $1,014). They are marked as Point A in Figure 1. A weaker version of the universalistic model is that ES's may vary over the entire HRM frequency distribution (due to some contingency factor), but that at a point (or range) firms adopt a relatively homogeneous ES. The data also do not support this hypothesis. We show in Table 3 for each of the three firms the level of their HRM expenditures (ranked Low, Medium, High) allotted to each of nine standard HRM practices (not all in the Begin ES typology). A firm is classified as "Medium" if the percentage of its expenditure on the respective HRM practice is within half a standard deviation of the mean for the dataset; those that are greater (less) are classified as High (Low).

[7] A similar but less skewed distribution is obtained when a count of HRM practices is used. A similar looking HRM practice count distribution is shown in Exhibit 5–2 (p. 96) of Freeman and Rogers [1999].

Table 3. HRM practice usage for three firms with similar total expenditure

Type of HRM Practice	Firm 1 ($1,010)	Firm 2 ($1,013)	Firm 3 ($1,014)
Recruitment	High	Medium	Medium
Training	Medium	High	Medium
Compensation	Low	Low	Medium
Benefits	High	Medium	High
Employee Relations	Medium	High	Medium
External Relations	Low	Low	Medium
Performance Management	Low	High	High
OSHA	Medium	Low	Medium
Strategic Planning	Low	Low	Medium

Source: Authors' calculations using data collected from Bureau of National Affairs (2005/2006).

It is clear that all three firms have selected substantially different HRM bundles. For example, Firms 1 and 2 share in common only three practice levels out of nine (Compensation, External Relations, Strategic Planning); Firms 1 and 3 share four (Training, Benefits, Employee Relations, and OSHA); and Firms 2 and 3 share only two (Recruitment and Performance Management). Again, the data provide *prima facie* evidence against the universalistic SHRM model and in favor of distinct ES's.

Figure 1 suggests the organizations in the BNA data set do not sort into only one ES, even as a rough approximation or central tendency; likewise, the data do not show any spike or discernible grouping of firms in the right-hand tail of the distribution that would potentially represent an HPWS node or attraction point. Even if there is no apparent sizable cluster of high performance HRM firms, it is also true on the other hand that the range of possible ES's extends from a low of 2 to a high of 264. Figure 1 also provides no evidence on the merits of Begin's ES typology. It is to these twin matters we now turn.

We proceed through another three steps. The first is to apply the clustering techniques described above to the BNA data in order to identify distinct ES's. The key question from the BNA survey we use is the one earlier cited: "Please approximate the percentage of your HR budget allocated to each area below […]". The answers for nine of the categories (the catch-all tenth category "All other areas" is omitted) are reported in Table 3 for all respondents who gave reasonably complete data.

We used the budget share answers from this question to perform the clustering analysis. The best fit (location of the sharp step) is obtained with *four* clusters (g = 4). Thus, the 264 organizations – using the budget share numbers for the nine HRM practice/activity areas – sort into four distinct groups of

HRM practices. Technically speaking, all that the clustering has demonstrated is the existence of four distinct *patterns of association* in the data; nonetheless, it does not seem to too-large a leap to go further and put forward as an operating hypothesis that the data provide discernible evidence that these firms sort into four distinct *employment systems* – just as models such as Begin's predict.

Table 4 shows the nine major HRM practices listed in the BNA report along the vertical left-hand side, the four cluster groups (Group 1, Group 2, etc.) are arrayed along the top (with number of observations for each), and the individual cells show the average budget share numbers (in percents). The cell entries for each group do not sum to 100.0 because of the omitted "All other areas" category.

Table 4. Clustering of organizations by hrm budget share (nine BNA practices)

HRM Practice/ES	Group 1 (78 obs)	Group 2 (67 obs)	Group 3 (63 obs)	Group 4 (56 obs)	Population average (264 obs)
Employment/Recruiting	15.08	16.68	15.02	15.44	15.55
Training/Development	7.32	10.76	11.07	9.02	9.54
Compensation	23.08	15.62	15.74	13.55	17.00
Benefits	22.71	22.08	21.77	25.51	23.02
Employee Relations	4.74	5.00	5.38	6.40	5.38
External Relations	1.34	1.69	2.46	1.80	1.82
Health and Safety	3.61	3.91	3.60	4.30	3.78
Personnel/HR Records	3.18	3.64	4.24	3.55	3.65
Strategic Planning	2.92	4.47	4.10	3.41	3.97

We now want to transition from the results in Table 4 to a "test" of the Begin model. To do so, we present in Table 5 the nine HRM P&C that Begin explicitly identifies as part of his ES typology. Note there is some divergence between the nine HRM practices in Table 4 and the nine in Table 5. The reason is that Begin does not include in his ES typology certain of the HRM practices/activities listed in the BNA survey's HR budget share question used for the clustering reported in Table 4, while on the other hand he does include other HRM/organizational characteristics (unionization, size, etc.) not in the budget share data but for which data are provided in *other parts* of the BNA survey and which can therefore be used for Table 5. The first four HRM characteristics in Table 5 are measured in terms of expenditures per employee (e.g., recruiting/staffing expenditure per capita). Employment and percent unionized are numerical values taken directly from the BNA survey. Strategic involvement is

measured in the survey on a 1–5 scale (5 = highest) in response to the question: "How would you describe the HR function's strategic involvement in key business decisions made by our organization?;" it is also directly used in Table 5. The characteristic in Begin's typology that has the least explicit counterpart in the BNA data set is "degree of formalization" of the HRM program. Based on the supposition that more formalization requires more HR headcount and expenditures on programs and services, we used from the survey "total HRM expenditures per employee" as a proxy measure.

To proceed, we must next scale the numerical values in Table 4 so they match the 1–6 scale used earlier (Table 2) to delineate the four ES's in the Begin model. This scaling process is relatively straightforward since the results of the cluster analysis are already characterized using an ordinal measure. The scale is determined in the following manner. First, the mean and standard deviation are calculated for each of the nine characteristics for the entire population of firms. These terms are represented by $\boldsymbol{\mu}_j$ and σ_j, respectively, with $j = \{1, 2, \ldots, 9\}$. Then, the mean values of these nine variables are determined for each cluster. These values are given by the term c_{ij} where i represents the cluster (i.e., $i = \{1, 2, 3, 4\}$), and j represents the nine characteristics (i.e., $j = \{1, 2, \ldots, 9\}$). Finally, each c_{ij} is assigned a score of 1–6, referred to as v_{ij} so they are comparable to the predictions shown above. This is done by using μ_j and σ_j to determine the value of c_{ij} relative to the rest of the population of firms in the dataset. The criteria used to determine each v_{ij} is as follows:

if…

$c_{ij} < \mu_j - 0.25^*\sigma_j$, then $v_{ij} = 1$,
$\boldsymbol{\mu}_j - 0.25^*\sigma_j < c_{ij} < \mu_j - 0.1^*\sigma_j$, then $v_{ij} = 2$,
$\boldsymbol{\mu}_j - 0.1^*\sigma_j < c_{ij} < \mu_j$, then $v_{ij} = 3$,
$\boldsymbol{\mu}_j < c_{ij} < \mu_j + 0.1^*\sigma_j$, then $v_{ij} = 4$,
$\boldsymbol{\mu}_j + 0.1^*\sigma_j < c_{ij} < \mu_j + 0.25^*\sigma_j$, then $v_{ij} = 5$,
$c_{ij} > \mu_j + 0.25^*\sigma_j$, then $v_{ij} = 6$.

Therefore a value of $v_{ij} = 1$ implies that the per employee expenditures on recruitment practices for a particular group of firms are less than 0.25 standard deviations from the population average. Similarly, a value of $v_{ij} = 2$ indicates that the group's average level of per employee expenditures on recruitment practices is between 0.10 and 0.25 standard deviations from the population mean. The reason that a difference of 0.1 and 0.25 standard deviations from the population mean are used as the threshold values is because they create the best differentiation in outcomes. Although a data-driven choice, the results change little using other proximate values (e.g., 1.0 and 0.5).

Table 5 shows the results of the scaling process.

To help make these rankings more concrete and user-friendly, we converted them into numerical values, as shown in Table 6. Each cell entry shows the average numerical value for the indicated HRM P&C for the organizations in that ES group, as calculated from the BNA data. These data show in real life

Table. 5. Scaled values of HRM practices in BNA data, by cluster group

HRM characteristic/ES	Group 1	Group 2	Group 3	Group 4
Recruiting/staffing	2	6	3	5
Training/development	2	3	2	6
Benefits/rewards	3	3	3	5
Performance management	2	5	3	5
Participation/voice	3	4	2	5
Work force size	3	2	6	2
Unionization	4	2	4	4
Strategic involvement	1	2	3	5
Degree of formalization	2	3	4	4

Table 6. Numerical values of HRM practices, by cluster group

HRM characteristic/ES	Simple Group 1	Machine Group 2	Professional Group 3	Adhocracy Group 4	Population Average	Population St. Dev.
Recruiting	223.55	660.53	341.03	513.88	395.43	992.54
Training	119.69	288.55	138.18	530.35	293.37	942.59
Benefits administration	515.96	481.72	521.39	998.71	667.29	2,506.66
Performance management	46.22	126.62	39.06	119.65	84.17	246.58
Employee relations	99.21	154.09	50.09	220.50	138.31	414.20
Employment	1209.57	881.54	3124.59	1566.84	1666.55	5,379.92
Unionization	0.29	0.20	0.27	0.30	0.27	0.44
Strategic involvement	3.24	3.52	3.61	3.92	3.71	1.08
Degree of formalization	1676.05	3349.71	3851.98	6543.09	3572.21	15,193.44

terms the patterns of differentiation among the ES groups and individual HRM P&C, as well as the large diversity that exists across ES groups.

We have identified discrete groups of firms based on different configurations of HRM practices; the remaining question is whether the *specific* HRM components in each configuration match the predicted components in Begin's model. Toward this end, Table 7 shows in parentheses the scaled predictions

from Begin's ES typology (Table 2) and above them in bold type the actual level (scaled) reported for the 264 organizations in the BNA data set (Table 5). The table has 36 cells (9 × 4).

The predicted values of the HRM P&C match the actual values in 24 of the 36 cells – a relatively modest "success rate" of 66.6 percent. The predictive success of the model increases noticeably when applied to the two polar opposite ESs (simple and adhocracy); here it scores 14 out of 18 (78 percent). Further, seven of the "misses" across all four groups are off by only one scaled value. We would label this degree of conformance between theoretical predictions and empirical evidence as "discernible but loose." Several reasons may explain the loose fit. Probably most important is the large number of steps we had to go through to parameterize the model, no doubt introducing some-to-considerable noise and mis-measurement. Another possible reason is that Begin's theoretical model needs recalibration, particularly for the intermediate ES cases (machine and professional), and also because his model was developed for organizations circa the 1980's and possibly organizations' ILMs and ESs have since

Table 7. Begin's predictions (parentheses) and HRM characteristics (bold), by ES

HRM characteristic/ES	Simple Group 1 (78)	Machine Group 2 (67)	Professional Group 3 (63)	Adhocracy Group 4 (56)
Recruiting/ staffing	**2**	6	**3**	**5**
	(2, 3)	(3, 4)	(2, 3)	(5, 6)
Training/ development	**2**	**3**	**2**	**6**
	(2, 3)	(2, 3)	(2, 3)	(5, 6)
Benefits/rewards	**3**	3	3	**5**
	(2, 3)	(5, 6)	(4, 5)	(5, 6)
Performance management	**2**	**5**	**3**	**5**
	(1, 2, 3)	(3, 4, 5)	(3, 4, 5)	(5, 6)
Employee relations	3	4	2	**5**
	(1, 2)	(1, 2)	(3, 4)	(5, 6)
Work force size	**3**	2	**6**	**2**
	(1, 2, 3)	(4, 5, 6)	(1, 2, 3, 4, 5, 6)	(1, 2, 3, 4, 5, 6)
Unionization	4	2	4	**4**
	(1, 2, 3)	(4, 5, 6)	(1, 2, 3)	(2, 3, 4)
Strategic involvement	**1**	**2**	3	**5**
	(1, 2)	(1, 2, 3)	(1, 2)	(5, 6)
Degree of formalization	**2**	3	**4**	**4**
	(1, 2, 3)	(4, 5, 6)	(3–4)	(3–4)

then changed considerably. Finally, the data set is also not ideal in all respects, particularly because it includes observations that span different organizational levels (e.g., plant, division, firm).

Although Begin's model perhaps gets no more than a modest passing grade from the data analysis, the evidence that firms cluster into distinct groups of HRM practices gains stronger support and the evidence that no quantitatively large group of HPWS-type firms exists is stronger still [also see Blasi and Kruse 2006]. These results bear, therefore, on the continuing debate about the relative merits of a universalistic, contingency, and configurational approach in SHRM [Becker and Huselid 2006; Boxall and Purcell 2008]. In particular, our study appears to provide additional reasons to be cautious about a relatively straight-forward version of the universalistic "one best ES" model for the data in Tables 6 and 7 show that HRM practices and characteristics across these 264 organizations exhibit considerable diversity both across and within groups.

Second, although little evidence supports the existence of a dominant HPWS-type employment system, it is also the case that firms' bundle of HRM expenditures and practices do not appear haphazardly chosen or randomly distributed. Rather, a cluster analysis reveals that firms appear to sort into a few relatively well-defined employment systems and that these systems form along lines predicted in broad outline by Begin and other ES theorists. Theory at this stage does not provide a foolproof guide to constructing a real life employment system; nonetheless, it is our judgment that extant theory has made a first step toward identifying useful first principles with regard to the forces that create and structure ESs across organizations. As a concrete illustration, if firms' environmental volatility increases (e.g., from globalization) then a prediction is that the organizational structure needs to become more flexible, implying in a complex technology environment a move toward an Adhocracy ES and in a simple technology environment a move toward a Simple ES.

Having stated these implications, we must also emphasize their contingent nature due to various limitations of this study. In addition to issues pointed out above, five concerns merit further comment. The first is that cluster analysis inherently contains a subjective data-driven element (e.g., choice of centroids). A second shortcoming is that our empirical methods provide evidence on correlation and patterns of association but do not reveal how tight the degree of association is; likewise, these methods do not permit causal inferences and direct statistical tests of hypotheses. Third, we are unable to empirically test for a relationship between ES configurations and organizational performance due to lack of performance data. Fourth, the Begin model gives only secondary attention to the role of alternative business strategies as a determinant of ES configurations; further, while our empirical analysis incorporates a measure of alternative HRM strategies a more detailed and construct validated measure would certainly be desirable. And, fifth, our results may well not generalize beyond the USA. Given all of these limitations, caution must be

attached to specific results and interpretations. Nonetheless, on the other side are various pluses – the study presents an innovative and never-before-used empirical strategy for studying ESs, the empirical analysis clearly supports the idea that ILMs sort into distinct structural forms/architectures, and the Begin model can be said to have captured and explained at least some of the important features of real life employment systems.

Conclusions

Recent research in organizational economics, industrial/employment relations, and human resource management takes a strategic perspective and looks at HRM practices in terms of synergistic bundles that align with and support organizational goals. These bundles and associated organizational characteristics have become known as *employment systems*. A variety of theoretical models of employment systems have been advanced and researchers have made exploratory progress in empirically identifying the existence and structure of alternative ESs.

This paper advances this line of research along several fronts. First, we survey the ES literature and highlight common ideas and findings. Second, we draw attention to the ES theory developed by James Begin and its implications regarding the link between the structure of organizations and the structure of HRM systems. Third, we test the predictions of the Begin ES model using an innovative mapping technique, improved clustering methods and a unique and highly detailed data set on HRM practices. Fourth, our empirical analysis reveals that these organizations sort into four distinct sets of HRM practices and characteristics, thus giving relatively strong support for the existence of distinct employment systems and modest but arguably discernible support for Begin's particular theory of ESs. Evidently further theory development and integration across alternative models are obvious next steps in the ES research program; so too is further investigation of the relationship between alternative employment systems and firm performance.

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