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The Firm's Choice of HRM Practices: Economics Meets Strategic Human Resource Management

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Abstract

The authors compare and contrast two theoretical approaches to explaining a firm's choice of human resource management (HRM) practices—one from strategic human resource management (SHRM) and the other from economics. They present HRM frequency distributions depicting key empirical patterns that both theories must explain and then review and apply SHRM theory to explain these patterns. Since no economic model has thus far explicitly considered firms' choice of HRM practices, the authors develop one based on standard microeconomic production theory. The model yields a new theoretical construct, the HRM demand curve, and a new empirical estimating tool, the HRM demand function. Together, these provide an alternative explanation of HRM frequency distributions, new insights on the limitations of SHRM theory, and the first alternative to the standard "Huselid-type" regression model. Using recent survey data on HRM practices at several hundred American firms, the authors estimate representative HRM demand functions to illustrate the empirical implementation of the model. They find that although both theoretical approaches have value, the economic model seems superior in terms of generality, logical coherence, predictive ability, and congruence with empirical data.

THE FIRM'S CHOICE OF HRM PRACTICES: ECONOMICS MEETS STRATEGIC HUMAN RESOURCE MANAGEMENT

BRUCE E. KAUFMAN AND BENJAMIN I. MILLER*

The authors compare and contrast two theoretical approaches to explaining a firm's choice of human resource management (HRM) practices—one from strategic human resource management (SHRM) and the other from economics. They present HRM frequency distributions depicting key empirical patterns that both theories must explain and then review and apply SHRM theory to explain these patterns. Since no economic model has thus far explicitly considered firms' choice of HRM practices, the authors develop one based on standard microeconomic production theory. The model yields a new theoretical construct, the *HRM demand curve*, and a new empirical estimating tool, the *HRM demand function*. Together, these provide an alternative explanation of HRM frequency distributions, new insights on the limitations of SHRM theory, and the first alternative to the standard "Huselid-type" regression model. Using recent survey data on HRM practices at several hundred American firms, the authors estimate representative HRM demand functions to illustrate the empirical implementation of the model. They find that although both theoretical approaches have value, the economic model seems superior in terms of generality, logical coherence, predictive ability, and congruence with empirical data.

Researchers in both economics and management departments study human resource management (HRM), but they use quite different theories, methods, and tools. As a result, the intellectual exchange and interaction between the two academic realms remains limited despite the fact that potential gains from trade are large (Mitchell 2001).[1] Economists pride themselves on having strong theory and typically regard the management HRM literature as light on substance and heavy on description and prescription; management researchers, however, view economists' models as far too simplistic

[1] For example, in Lazear and Shaw's (2007) review article on Personnel Economics, only 2% (2 out of 81) of their citations are to management journals (*California Management Review, Management Science*); the figure is 4% if one includes Lazear's (1986) article in the *Journal of Business*. Conversely, in Lepak and Shaw's (2008) review article on Strategic Human Resource Management, only 3% (2 out of 72) of the citations are to economics journals (the *American Economic Review*). The point of intersection for economics and management is principally industrial relations journals, albeit modestly so (six citations in the former case, five in the latter).

and abstract to capture much of reality and pride themselves on developing theories that, even if less formalistic and mathematically expressed, nonetheless succeed at better explaining how and why HRM performs in real-world organizations.[2]

Industrial relations (IR) was born in the 1920s in the United States partly as an attempt to bridge and where possible integrate the economics and management fields since both are clearly central to a study of the employment relationship—the IR field's core subject area (Kaufman 1993, 2010a). Through the 1950s, the IR field in the United States (much less so elsewhere) was successful in performing this bridging and integrating role, evidenced by the roster of well-known labor economists/IR scholars who were also leading researchers in personnel/HRM. Examples include E. Wight Bakke, Herbert Heneman, Charles Myers, Sumner Slichter, George Strauss, and Dale Yoder (Kaufman 2002). In the 1960s, however, labor economics and management began to drift apart—and industrial relations to hollow out—and by the 1980s contact and interchange between the two became minimal.

Labor economics and human resource management continue in most respects to proceed as the two proverbial ships in the night, with one particular exception: the study of high performance work systems (HPWS) and, in particular, the relationship between HRM practices and firm performance. New ideas and innovations in management and the behavioral sciences associated with high involvement work practices, such as self-managed teams, cross-training, employee participation, and gain-sharing forms of pay, spurred research interest in these topics, as did contemporaneous events in the economy, such as a productivity slowdown, heightened global competition, and the success of Japanese management methods. As a result, scholars in economics, industrial relations, and management published numerous books and articles from the mid-1980s onward concerning HPWS and the potential of an HPWS-type human resource configuration to boost productivity and provide firms with sustained competitive advantage (Kochan, Katz, and McKersie 1986; Kleiner et al. 1987; Huselid 1995; Black and Lynch 2001; Boxall and Macky 2009).

On the management side, these developments played a central role in defining and energizing the new subfield of strategic human resource management (SHRM). Within SHRM *the* subject of research quickly became the linkage between HRM practices and firm performance and, most particularly, the oft-hypothesized positive relationship between the use of "advanced" HRM practices and the achievement of higher profitability and other related organizational performance outcomes (Combs et al. 2006; Boxall and Purcell 2008).

By wide agreement, a pioneering contribution to this research stream is Huselid's (1995) *Academy of Management Journal* paper, "The Impact of Human Resource Management Practices on Turnover, Productivity, and Corporate Financial Performance." The centerpiece of the article is a regression model that explains variation in company-level productivity, turnover, and financial performance as a function of two HRM composite variables—"employee skills and organizational structures" built out of nine separate HRM factors, and "employee motivation," built out of four HRM factors. The conclusion Huselid reaches is that "the magnitude of the returns for investments in High Performance Work Practices [HPWP] is substantial" (p. 667) and that this positive "main effect" persisted (if perhaps attenuated) even when different control and contingent factors are introduced.

Huselid's article solidified the basic proposition that has anchored subsequent SHRM research—that an identifiable subset of HRM practices, typically associated with a high involvement and human capital

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[2] This bifurcation of approach and opinion goes back many decades. Frank Stockton, dean of the business school at the University of Kansas, observed in the early 1930s, "Labor economics men . . . disdain personnel further because of its apparent lack of theory. The personnel instructor, on the other hand, thinks that at least he is working in terms of reality, and may be inclined to dislike the fault-finding tone of labor economics and to belittle the socioeconomic approach to industrial questions" (Stockton 1932: 224).

employment model, contributes, on aver-
age, to higher firm performance. Thus, the
testable hypothesis that lies at the center of
SHRM empirical research is, "more HPWP
→ higher firm performance."[3] This proposi-
tion, however, is often generalized to apply
to *all* types of investment in HRM (e.g.,
Wright et al. 2005). This expansive statement
of the central hypothesis of the field in part
emanates from the very definition of "HRM."
That is, a number of writers (e.g., Beer and
Spector 1984; Dulebohn, Ferris, and Stodd
1995) have claimed that the HRM field that
emerged in the 1980s is distinct from the
earlier personnel administration and indus-
trial relations fields because it is based on
both an alternative view of employees (capi-
tal assets rather than expenses) and a differ-
ent approach to management (involvement
rather than control). Hence, this view posits,
at least as a first order approximation, HRM
≈HPWP and one may therefore write the
central proposition of the field as "more
HRM → higher firm performance." Finding
definitive empirical and theoretical evidence
for this proposition has been called the
"Holy Grail" of the field (Boselie, Dietz, and
Boon 2005: 67) because it demonstrates that
"HRM matters" (Gerhart 2005: 175).

Some labor economists have also used a
Huselid-type HRM-firm performance regres-
sion model in their empirical work but in
general they have chosen not to cross disci-
plinary boundaries and directly engage and
interact with SHRM researchers and the
SHRM literature (e.g., see Black and Lynch
2001; Bartel 2004; a partial exception is
Cappelli and Neumark 2001). We seek to do
otherwise in this paper, partly because we be-
lieve there are indeed large gains to be real-
ized from the exchange between economics
and management and partly to help
strengthen the IR field as the intellectual
bridge and integrating link between the
two.[4]

In particular, we re-examine the central
question that underlies SHRM research—
what is the firm's optimal (performance
maximizing) choice of HRM practices?—
and endeavor to seriously engage the SHRM
literature on this topic. At the same time, we
bring to this matter a theoretical and empiri-
cal approach solidly grounded in econom-
ics. Relative to management research, the
model is indeed simple and abstract; none-
theless, we believe it deserves attention be-
cause it yields a number of important insights
and implications. In particular, it suggests
that the standard HRM-firm performance
regression model used in management is
most likely mis-specified; the predicted ef-
fect of "more HRM" on firm performance is
not reliably positive and, indeed, should be
zero in a situation of long-run competitive
equilibrium; and that a better-specified em-
pirical tool for SHRM research is what we
call an *HRM demand function*. We then pro-
ceed to estimate the parameters of an HRM
demand function using cross-section data
for several hundred American firms. Al-
though the theoretical model, data set, and
regression equations can be validly criticized
on various grounds, the end-product is dis-
tinctly new and charts a considerably differ-
ent direction for research on firms' choice
of HRM practices. At the same time, we ab-
jure "economic imperialism" and in the spirit
of industrial relations attempt to inform the
theoretical and regression models with in-
sights and findings from management.

Framing the Research Question

The personnel/HRM field up to the early
1990s was heavily descriptive and technique-
oriented; in the last one to two decades,
however, management scholars have made a
substantial effort to put the field on a firmer
theoretical foundation. Boxall, Purcell, and
Wright (2007: 4) called the new approach
"analytical HRM" and explained that its cen-
tral mission is "not to propagate perceptions
of 'best practice' in 'excellent companies'
but primarily to identify and explain what

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[3] Combs et al. (2006) reviewed the literature since
Huselid (1995) and performed a meta-analysis of 92
empirical HRM-firm performance studies. They framed
the central hypothesis as, "the use of HPWPs is positively
related to organizational performance" (p. 504).
[4] Other recent IR contributions include Appelbaum
et al. (2000); Delaney and Godard (2001); Gunderson

(2001); Batt (2002); Godard (2004); Kochan (2007);
and Grimshaw and Rubery (2007).

Figure 1. Frequency Distribution of HRM Practices and HRM Expenditures Per Capita
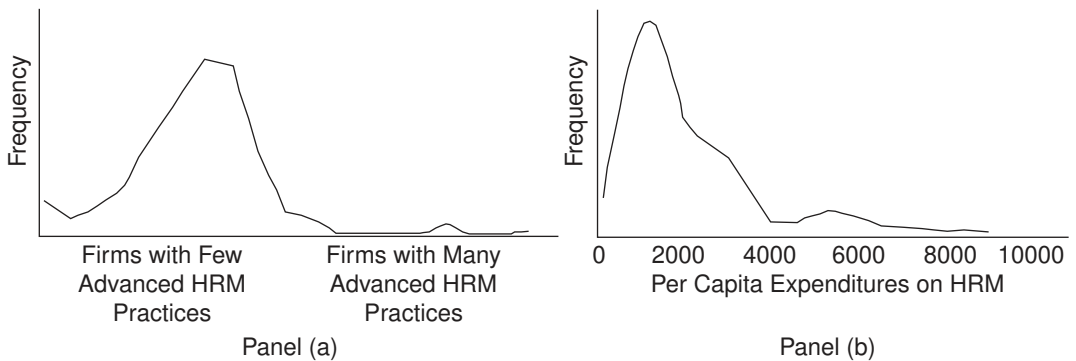
Source: Freeman and Rogers (1999: 124)

Source: Bureau of National Affairs (2006)

happens in practice." These authors identified "what happens in practice" as the observed outcomes and behaviors associated with the practice of HRM; the purpose of HRM research, in turn, is to develop explanatory theory of these empirical practices.

The practice of HRM covers a very wide range of topics, methods, techniques, and situations, so many outcomes are available for study. Is there, however, one outcome, or set of outcomes, that arguably represent *the* major research issue in the field? One answer is provided by Boselie, Dietz and Boon (2005: 67) who explained that "the study of HRM is, in its broadest sense, concerned with the selections that organizations make from the myriad policies, practices, and structures for managing employees." There may be other and perhaps superior ways to represent this statement analytically, but one illuminating approach is represented in Figure 1.

Figure 1 shows two representative *HRM frequency distributions.* An HRM frequency distribution shows firms ranked from low to high based on the breadth and depth of their HRM programs, as measured by some metric such as a count of practices or dollars of expenditure. The HRM frequency distribution in Panel (a) comes from data collected in a 1994 national survey of several thousand employees and managers (Freeman and Rogers 1999). These people were asked to indicate whether their organization had each of ten different HRM prac-

tices, some of which were simple whereas others were of increasingly greater complexity or sophistication. Example practices included a personnel/HR department, an open-door dispute resolution policy, and an employee involvement program. The authors combined the ten items into a scale they called "advanced human resource practices," which is the variable measured on the horizontal axis; it is also the type of explanatory variable typically used as the measure of HRM practices in a Huselid-type regression model. The data reveal a bell-shaped curve but with a significantly skewed right-hand tail. The minority of firms in the left-hand tail employed few if any formal or tangible HRM practices (e.g., 30% of the respondents said their firm had *no* personnel/HR department); conversely, the minority of firms in the right-hand tail employed many. The bulk of firms are located somewhere in the middle.

This pattern of HRM adoption is apparently broadly representative, since an alternative data set, plotted in Panel (b), yields much the same picture.[5] Rather than a count of specific practices, these data show the annual expenditure per employee on HRM. These data were collected for the years

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[5] Using WERS data, Bryson, Gomez and Kretschmer (2005) found a broadly similar bell-shaped distribution of HRM practices among British firms, although skewed considerably less so in the right-hand tail.

2004–2005 by the Bureau of National Affairs (BNA, 2006) from several hundred American companies. They show the same inverse U-shaped distribution, again with the right-hand tail distinctly skewed to the right. In this sample, the annual HRM expenditure ranged from a low of $36 to a high of $7,392 per employee; approximately one-half of the firms spent between $475 and $1,842. The median was $932.

These frequency distributions help frame the mission and objectives of HRM theory, particularly in the case of SHRM. Consistent with Boselie, Dietz, and Boon's (2005) definition quoted above, the goal of HRM theory is to explain why individual firms choose a particular expenditure level and package of HRM practices. It follows as matter of logic, then, that the firm's choice regarding HRM practice and expenditure becomes the central explanandum in theoretical models and the task of these models is (or should be) to identify the set of independent variables that influence the firm's choice of HRM. Looked at in terms of the frequency distributions in Figure 1, the core mission of HRM theory can be interpreted as predicting and explaining where individual firms are located in these distributions—that is, at a low, medium, or high HRM level—along with corollary but more complicated issues of coverage, quality, and implementation of these HRM practices. Other relevant questions include the shape of the HRM distribution at a point in time; changes over time in this distribution; variation in distributions across industries, nations, and other groupings; and the composition of the firm's HRM bundle at any particular point in the distribution.

Review of Management Theory and Empirical Modeling

The HRM frequency distributions help frame the problem of choice that firms confront when they consider investing in people management practices; in doing so, these distributions also handily summarize the research issue facing HRM scholars at both the theory and empirical level. Although these distributions have not been utilized in the SHRM literature, they nevertheless highlight

its central research question: what level and mix of HRM practices maximizes firm performance, and why? In this section we provide a brief review of the dominant stream of theorizing and empirical modeling in management on these matters as they are principally developed in the SHRM literature. This section also helps puts in context our alternative theory and empirical model.

Researchers from economics are confronted with certain challenges when engaging the theoretical literature in management on HRM (and vice versa). According to Lazear and Shaw (2007: 110), personnel economics draws largely from microeconomic theory and models in the finance field. In management, however, the most important disciplinary influence is psychology and its business school offshoot organizational behavior (OB) (Weber and Kabst 2004; Gerhart 2007)—*terra incognita* to most economists. Accompanying psychology is also a focus on individual differences in psychological variables (e.g., motivation, cognition) that are abstracted (or ignored) in the standard economic model of the rational actor (*homo economicus*). Further, most theoretical work in personnel economics employs considerable mathematics; in management research on HRM, however, mathematics is conspicuously absent—even discouraged.[6] Management research is also considerably more trans-disciplinary than economic research and contains numerous diverse theoretical perspectives. Schuler and Jackson (2001), for example, listed thirteen sources of theoretical contribution in HRM research (e.g., cybernetics, population ecology, behavioral, organizational, business strategy) and Subramony (2006) discussed four different theoretical perspectives regarding choice among HRM practices. Adding further complexity is the fact that even the definition of

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[6] We originally submitted this article to a leading American management journal. The associate editor in charge of the paper declined to send it out for review. Among other reasons, the editor wrote, "the majority of your arguments are based on equations. . . . While it is certainly acceptable to model one's ideas via equations, it is not an approach that fits well with *Journal X.*" In the realm of economics, the equations used in this paper are considered both few and elementary.

HRM is diverse and unsettled; Pauuwe and Boselie (2005: 69) observed, for example, that "there appears to be no consensus on the nature of HRM."

With due regard given to these hurdles and pitfalls, we believe the following highly condensed and synthetic account provides a reasonable summary statement of the main-line of management theorizing on firms' choice of HRM practices.[7] For considerably more detailed reviews, see American authors such as Becker and Huselid (2006); Allen and Wright (2007); and Lepak and Shaw (2008); and international authors such as Boselie, Dietz, and Boon (2005); Wall and Wood (2005); Grimshaw and Rubery (2007); and Boxall and Purcell (2008).

Theorizing on firms' choice of HRM practices usually proceeds in the context of the three-way typology developed by Delery and Doty (1996). They distinguished three groups of theoretical perspectives: *universalistic*, *contingency*, and *configurational*.[8] The universalistic perspective posits that there are certain "best practices" that are always a profitable choice because they universally improve organizational performance. Pfeffer (1998), for example, listed seven: employment security, selective hiring of new personnel, self-managed teams/decentralized decision-making, pay-for-performance, extensive training, reduced status differentials, and extensive information sharing. These practices are often associated in economics and industrial relations with a well-developed internal labor market (ILM)-type employment system. Boselie, Dietz, and Boon (2005: 73) described this selection of HRM variables as a "highly management-centric standpoint." Other SHRM authors have proposed different lists; in general, however, the universalistic perspective shares two propositions. The first is that the profit pay-off to these HRM practices is greater if they are implemented as a package; the second is that on average, more investment in careful selection, training, and empowerment of employees (core functions of "advanced" HRM practices) increases companies' performance.

The contingency perspective argues that best choice among HRM practices is conditional on important contextual factors (Lepak and Snell 1999). The optimal set of HRM practices for one firm may be quite different for another, thus implying a firm's optimal choice of HRM should follow a "best fit" rule in which HRM practices are chosen so they best align with variables such as organizational size, industry, production technology, workforce/job skills, and state of the labor market (Datta, Guthrie, and Wright 2005). Several contingent factors receive particular emphasis. An "external" contingency factor is the firm's business strategy, meaning that different strategies for competitive advantage in the product market (e.g., low cost versus superior service) require different HRM strategies and sets of practices (an idea often labeled "vertical fit"). An "internal" contingency factor is the human capital requirements of the firm's production process, meaning that optimal HRM practices will differ considerably between companies employing, respectively, workers with low and generic skills versus high and specialized skills. In line with a contingency perspective, Lepak and Snell (1999) used permutations of human capital "value" and "uniqueness" to derive four different typologies of best performing HRM practices (called "HRM architectures"); similarly, Arthur (1994) argued that firms pursuing a low cost strategy are more likely to adopt a command and control system of HRM

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[7] Two caveats are required. First, the SHRM literature we summarize has largely American roots and is mostly developed in American management journals; some non-USA researchers have also embraced it, but many others have argued that the literature does not generalize to other countries (Brewster 2004; Boxall and Macky 2009). Second, mainline HRM research largely omits reference to more radical (Edwards 2009) and heterodox perspectives, including critical management studies (Fleetwood and Hesketh 2008) and the labor process paradigm (see Edwards 1979; Thompson and Harley 2007). Labor economics does much the same.

[8] Some studies identify a fourth perspective, the *contextual*, in which HRM strategies and practices adapt to fit different national-level cultural, social, and political contexts. These can be thought of as additional contingencies. In practice, most SHRM writers make the configurational perspective a component part of the universalistic and contingency perspectives, thus reducing the framework to a two-way typology (Proctor 2008).

practices whereas those pursuing a differentiation strategy are more likely to adopt a commitment system.[9]

The configurational perspective emphasizes the roles of complementarity, congruence, and synergy as important influences on a firm's optimal HRM choice. Although to varying degrees implicit or explicit in the other two perspectives, the central hypothesis here is that the performance effect of HRM practices depends critically on assembling the right combination or *system* of practices such that all the separate HRM elements (e.g., selection, compensation, training, benefits, and employee relations) fit together, support each other, and develop the maximum attainable synergy (an idea often called "horizontal fit"). Here, the potential performance effects of HRM choice are multiplicative rather than additive, implying low returns if all but one or two of the HRM elements fit together, but high returns if all are successfully implemented as complete package. Part of the competitive advantage of an HPWS is widely attributed to the fact it is a complete package that captures the full range of complementarities and synergies—a subject that has attracted researchers not only in management but also in economics (Ichniowski, Shaw, and Prennushi 1997; Black and Lynch 2001; Laursen and Foss 2003) and industrial relations (McDuffie 1995; Appelbaum et al. 2000). Another close affiliate of the configurational idea is the large literature on *employment systems* (Osterman 1987; Begin 1991; Marsden 1999; Barton, Burton, and Hannan 1999).

The mainline of management theorizing in SHRM has moved toward a synthesis and integration of these three perspectives (Boselie, Dietz, and Boon 2005; Becker and Huselid 2006), stimulated in part by growing skepticism of a "universalistic-only" position (Boxall and Macky 2009). Following Huselid (1995), this integrative approach maintains that there is a core of "best practice" HRM techniques and policies, typically associated with an HPWS-type employment system, which in most to nearly all organizations results in improved performance. The exact specification, delineation, and organizational level of both the performance and HRM variables remain unsettled, however. For example, the specific set of HRM practices varies considerably across studies, although in general they are intended to include "advanced," "sophisticated," or "high-performance" practices. In some cases they are measured at the establishment level, but more often they are measured at the company level. In the large majority of studies, these practices are included as a count measure (yes if present, no if not); in some cases, a practice coverage or practice intensity measure is used (e.g., see Guest et al. 2003). With regard to performance, both financial outcome variables, such as rate of return on assets and Tobin's q, and intermediate organizational outcomes, such as turnover, productivity, and quit rates, are used. Some authors have argued, however, that broader and sometimes subjective measures of organizational effectiveness should also be included, such as stakeholders' perceptions of the firm's performance or factors that measure satisfaction of employees' interests (Godard 2004; Purcell and Kinnie 2007).

The presence and magnitude of these variables are hypothesized to have a positive effect on firm performance. Huselid (1995: 668) called this channel of the HRM-firm performance relationship the "main effect." A major area of SHRM research, in turn, has been to identify the causal linkages in the transmission mechanism that runs from advanced HRM practices to higher firm performance (often called in the SHRM literature the "black box"). The majority of studies

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[9] Practically every one of these ideas (e.g., strategy, commitment, competitive advantage, high road versus low road) was recognized and discussed in the early literature of industrial relations (Kaufman 2001, 2008). Further, Commons (1919) laid out the basic theoretical rationale for the high performance employment model, stating that winning employee commitment through high involvement practices "is valuable because it brings larger profits and lifts the employer somewhat above the level of competing employers by giving him a more productive labor force than theirs in proportion to the wages paid" (p. 26). These antecedents and contributions have been widely ignored in the SHRM literature, in part because researchers often inaccurately characterize IR as dealing only with unions and collective bargaining (e.g., Scarpello 2008).

draw on an amalgam of arguments from the resource-based view of the firm (RBV), "abilities, motivation, opportunities" theory (AMO), and human capital theory to support the hypothesized positive main effect.[10] The contention is that advanced HRM practices are performance enhancing because they (1) increase employees' knowledge, skills, and abilities; (2) empower employees to act; and (3) motivate employees to act (Combs et al. 2006: 503).

In the integrative SHRM model, the positive main effect is then amplified or attenuated by contingent and configurational factors. Contingent factors include external and internal variables, such as business strategy, industry, production technology, and workforce characteristics. These contingent variables can have either an additive or multiplicative effect but, typically, this effect is presumed not so great as to completely offset the positive main effect (Kaufman 2010b). The positive main effect is also influenced by the degree to which the various HRM practices are implemented in a synergistic package. This description of the integrative model is highly consistent with the results found in a recent meta-analysis of 92 empirical HRM-firm performance studies by Combs et al. (2006). The authors found a statistically significant positive main effect between HRM practices and firm performance; calculated that a one-standard-deviation increase in the use of HPWPs translates, on average, to a 4.6 percentage-point increase in gross return-on-assets (ROA)—from 5.1% to 9.7%; and found evidence of significant contingency and configurational effects. For example, HPWPs are nearly twice as performance

enhancing in manufacturing relative to service industries and HPWPs implemented as a system have twice the performance effect as individual practices.

In terms of the HRM frequency distributions in Figure 1, SHRM researchers who emphasize the universalistic perspective predict that most firms should be in the right-hand tail of the distribution or should be moving in that direction. The minority who take a "strong contingency" perspective predict that firms will locate across the HRM frequency distribution from "low" to "high," depending on whether their external and internal "fit" variables make employees a commodity-like "hired hand" or a valuable "human resource" capital asset (Lewin 2001; Orlitzky and Frenkel 2005). The middle and arguably dominant position in SHRM is a blend of the universalistic and contingency perspectives ("weak contingency"), with the configurational perspective common to both.[11] That is, the middle ground holds that theory indicates most firms have under-invested in HRM practices and should therefore move further toward the right-hand tail of the HRM frequency distribution, coupled with recognition that a full-blown HPWS is not well suited for every organization. Hence, some modest-to-significant differentiation in HRM systems is required and a portion of firms can therefore be expected to locate closer to the middle or, possibly, even the left-hand part of the distribution (Huselid and Becker 2006).[12]

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[10] RBV argues that HRM practices add value by helping transform the employees into "valuable, rare, inimitable, and non-substitutable" resources, thus giving firms a sustainable source of competitive advantage (Barney 1991: 105; Allen and Wright 2007: 89). AMO theory argues that HRM practices add value by expanding employees' skills and knowledge, incenting employees to use these for valued organizational outcomes, and giving employees greater opportunities to participate (Appelbaum et al. 2000; Boxall and Purcell 2008). Allen and Wright (2007: 90) claimed that "the resource-based view has become the guiding paradigm on which virtually all strategic HRM research is based."

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[11] The distinction between strong and weak contingency comes from Kaufman (2010b).

[12] The hypothesized positive effect of (advanced) HRM practices on firm performance also comes from normative concerns among SHRM researchers. It is widely acknowledged that both the HRM field in universities and the HRM function in industry have long been regarded as marginal, low status players; a major motive in SHRM research, therefore, is to change this perception by demonstrating that HRM is a large and under-appreciated contributor to firm success. Wright et al. (2005: 409–10) remarked, for example, "In response to these longstanding and repeated criticisms that HR does not add value to organizations, the past 10 [sic] years has seen a burgeoning of research attempting to demonstrate that progressive HR practices result in higher organizational performance." One must worry, therefore, that SHRM theory and empirical

These predictions are tested in a single equation regression model pioneered by Huselid (1995), typically using cross-sectional data. The regression model takes the form:

$$(1) \qquad Perf_i = \beta_0 + \beta_1 HRM_i + \beta_2 X_i + \varepsilon_i$$

where $Perf_i$ is a measure of financial or organizational performance at the ith firm, HRM_i is a vector or composite index of HRM practices at this firm, X_i is a vector of contingent and control variables, and ε_i is a randomly distributed error term. The maintained hypothesis in most of the SHRM literature is $\beta_1 > 0$ (more HRM → higher performance), although moderated in a positive or negative direction by one or more of the contingent variables in the vector X.[13] Some studies also use equation (1) to test for the configurational perspective, typically by including interaction terms between separate HRM practices in the vector HRM_i, with a hypothesized positive interactive effect between them (e.g., see MacDuffie 1995; Delery and Doty 1996).

SHRM researchers have discussed at length numerous problematic or difficult-to-solve theoretical and empirical issues with this regression model (Wright et al. 2005; Wall and Wood 2005; Gerhart 2007; Purcell and Kinnie 2007). Alternative specifications of the performance and HRM variables have already been mentioned; other problems include direction of causality (simultaneous or, alternatively, higher performance → more HRM), omitted variables, and construct validity of certain contingent and control variables (e.g., measurement and specification of alternative business strategies). Nonetheless, the meta-analysis results of Combs et al. (2006)—finding a statistically significant positive main effect— provides seemingly powerful evidence of the importance of HRM methods in firm performance.[14] In particular, these results

seem to offer a sobering but tantalizing verdict on firms' optimal choice of HRM practices.

The sobering part of the message is that it appears many American firms are seriously under-investing in HRM; the tantalizing part is that firms could substantially improve their financial and operational performance by upgrading and expanding their people management systems. In terms of economic theory and the HRM frequency distributions in Figure 1, many, and perhaps most, firms are (apparently) substantially "out of equilibrium" (away from the optimal level of HRM) or, alternatively, in an equilibrium that for some market failure reason is significantly less than socially optimal. In either case, these firms are leaving a huge amount of money "on the table" and the economy is operating considerably inside its efficiency frontier.[15] The implication is that these firms should spend more on HRM and thereby migrate further toward the right-hand tail of the distribution, leading to a gradual shrinkage of the left-hand side and to a parallel increase in national productivity and economic performance.

These findings, it must be noted, pose a potentially significant challenge to economic theory, or at least to its competitive core. Economists (e.g., Lazear 2000) are predisposed to think that market failures are typically small-to-modest and firms and markets typically adjust fairly quickly to incentives, certainly so in the case of extra-large incentives such as those suggested in the HRM literature (e.g., a potential near-doubling in ROA). Yet extreme dispersion in HRM practices is evident not only for contemporary firms, as illustrated in Figure 1, but also for firms going back fifty and even one hundred years (Baron, Jennings, and Dobbin 1988; Kaufman 2008; 2010c).

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results are systematically biased by the career, identity, and status concerns of the researchers.

[13] Equation (1) depicts the contingent variables X_i in an additive specification; a multiplicative specification would include an interactive variable $HRM_i \cdot X_i$.

[14] Further evidence is provided by Becker and Huselid (2006: 907), who concluded after an empirical study

with data on more than 3,200 firms that "the effect of a one-standard-deviation change in the HR system is 10–20% of a firm's market value."

[15] In this spirit, Huselid (1995: 668, emphasis added) remarked, "the substantial variation in HRM practices adopted by domestic firms [relative to an HPWS configuration] . . . suggests that, at least in the near term, such [above competitive] returns are *available for the taking*."

One possibility is that economists are wrong and a large market failure or persistent disequilibrium in fact blocks optimal HRM investment. If such is the case, the skepticism that management writers express toward economic models appears well grounded. A different and largely opposite possibility is that the large number of "low HRM" firms in the left-hand side of the distribution is an approximate efficient equilibrium outcome and these managers have correctly gauged the optimal level of HRM—even if it is lamentably "not much." If this is the case, it suggests SHRM theory and empirical methods considerably over-estimate the profit pay-off to more HRM; it also suggests that the slow and partial uptake of advanced HRM practices by many companies is not the fault of the managers who do not appreciate and act on the evidence provided in modern SHRM research (Rynes, Giluk and Brown 2007); rather, it reflects the misspecified models and normative biases of the HRM academics.

In the tradition of industrial relations, we hazard the prediction that both sides probably capture important elements of truth and thus reality is probably somewhere in the middle. A long-standing IR principle, after all, is that markets, and particularly labor markets, are prone to numerous frictions, failures, and imperfections (Dunlop 1994); indeed, from a Coasean/institutional economics perspective the very existence of multi-person firms with an employment relationship represents a form of market failure (Kaufman 2010a). Nevertheless, for the purposes of this paper we put on our "economists' hats" and critically examine SHRM theory and empirical methods from the perspective of economic theory. Rather than engage purely in criticism, however, in what follows we also present an alternative model, an alternative estimating equation, and new empirical evidence on the factors that shape observed HRM frequency distributions.

Modeling the Firm's Demand for HRM Practices

We seek to explain the individual firm's decision regarding the extent of investment in HRM practices. Though the analytical approach utilized here is entirely standard in economics, it has surprisingly not been earlier developed by researchers in the economics of personnel (for reviews, see Gunderson 2001; Lazear and Shaw 2007).

For purposes of modeling, we assume the firm has choice over a range of possible HRM practices; the portion that is mandated by government—larger in some countries than in others—enters our model later as an exogenous "shift factor." We further assume that the firm's short-run objective is maximum financial return, which for simplicity's sake we treat as maximum profit. In economics, this assumption is completely standard to the point that it is considered a "given"; in management, however, objections immediately surface. For example, what about other firm goals and other performance outcomes (Guest et al. 2003)? Likewise, researchers outside of economics point to the interests of other stakeholders, such as employees and communities, and issues concerning the social legitimacy of business and profit-making (Godard 2004; Boxall 2007).

Economists' responses to these objections are two-fold. First, the variable "profit" can be broadly interpreted to subsume the dollar value of all those intangible or subjective factors that influence the bottom-line worth of an enterprise, at least as long as they are in principle fungible into a dollars and cents equivalent (e.g., the stock price should reflect how much shareholders value the extra "social legitimacy" created by improved HRM). Where this is not possible, or the exercise unduly strains credulity, then economists will argue that abstracting from these other goals is usually a good trade-off since doing so promotes more analytical modeling (which HRM scholars say they want more of, as quoted above) and most likely does not alter major predictions and hypotheses. Regarding other intermediate organizational outcome variables, a virtue of the theory developed here is that it makes intermediate goals such as turnover reduction and productivity increase an explicit function of the quest for maximum profit; a corollary benefit is that it also demonstrates that some SHRM studies have indeed mis-specified the

performance relationship between HRM and these variables (explained below). Finally, we also note that the profit-maximization assumption formally limits our model to private sector for-profit firms, although we would not be surprised if many of the implications and predictions of the model also apply to non-profit organizations.

The key analytical innovation is that we treat HRM practices as a factor input in production. That is, the firm's output is assumed produced by capital, labor, and HRM practices. HRM is used, therefore, because it boosts productivity; however, it also carries a cost since HRM must itself be internally produced (e.g., by an HR department) or bought in external markets (e.g., HR consultants or vendors). Thus, the firm's optimal expenditure on HRM is determined by the same marginal-type decision rule found throughout microeconomics: to maximize profit, keep investing in more HRM as long as the marginal revenue gained exceeds the marginal cost incurred and stop when the two become equal. This basic insight is not new. In the HRM literature, Jones and Wright (1992) discussed an economics-based approach along this line and Kaufman (2004; 2010d) has further developed it. Our contribution is to take the model to the next level.

To do so, we begin with the firm's expanded production function:

$$(2) \qquad Q = f(K, L, HRM),$$

where Q is output, K is capital, L is labor, and HRM is HRM practices. Since the model is intended to explain firms' investment in HRM practices, we must be clear on how the HRM construct is defined in equation (2). The definition of "HRM practice" given by Wright, Dunford and Snell (2001: 703) is "those HRM tools used to manage the human capital pool." We follow this definition in one respect but diverge from it in two others. We follow it in that we equate HRM practices with formal, tangible, and measureable activities, policies, methods, or tools specifically created and used to manage people in organizations. We diverge from it in the first instance by including in the variable HRM the *entire range* of practices—from "simple"

to "advanced" and "sweatshop" to "HPWS"— and make no *a priori* categorization, as many SHRM studies do, as to what is likely low-performing versus high-performing. We diverge from it in the second instance because to maintain logical consistency in the model the HRM practices must be converted to a common unit of measurement for the production function. Mirroring the standard treatment of the capital (K) input variable—a heterogeneous collection of buildings, machines, and tools typically aggregated by converting them into a dollar amount—we similarly aggregate the diverse HRM practices into dollars of expenditure. In the model, therefore, explicit/tangible HRM practices and activities, often but not always performed by a personnel/HRM department, are represented by the HRM expenditure variable. This variable, in turn, becomes the dependent variable in our regression model. Other means of informal or unstructured labor coordination, typically performed as a general part of management by employers and line managers, is subsumed as part of total work hours devoted to production (L).[16]

The model indicates that firms adopt HRM because it helps produce more output and profit. But how does HRM do this? This subject is the much debated "black box" issue in the literature (Becker and Huselid 2006; Boxall and Purcell 2008). We suggest the following approach, which is not only analytically tractable and insightful but also inclusive of the three links in the causal chain identified by SHRM writers (knowledge, skills, abilities; empowered to act; motivated to act).

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[16] A large portion of the SHRM literature equates *formal* HRM practices and procedures with the *activity* of HRM, giving the subject a distinctly functional perspective (mirrored in HRM textbooks). In reality, HRM is a generic "people management" function (Boxall and Purcell 2008) that can be conducted with zero formal practices and no HRM department, as takes place today when an employer personally and informally conducts labor management in a small firm (Marlow 2006) or when a foreman in a large firm a century ago handled most aspects of personnel on an entirely informal basis (Kaufman 2008, 2010c). Our two-part specification of the HRM variable captures both aspects.

The first revision of equation (2) is to expand the labor term from L to $L \cdot e$. This effectively transforms labor from a commodity input (like a machine or lump of coal) to a human input. The L term is the number of persons/hours of labor; the term e represents what Appelbaum et al. (2000) referred to as "effective labor." It is broadly defined to include the combined effect of more motivation, effort, empowerment, and skill/knowledge acquisition. If $e = 0$ (e.g., workers sleep all day on the job or have zero skills for the job), then $L \cdot e = 0$ and no output is forthcoming from the production function; the higher e is, conversely, the more effective labor the organization gets from each worker and the more output is produced.

The second revision makes the amount of effective labor, $L \cdot e$, a function of the level of HRM expenditure; that is, $L \cdot e(HRM)$. The idea is that more HRM practices may contribute to increased effective labor either by boosting motivation, effort, and opportunities for action (e.g., through an employee involvement program or gain-sharing compensation plan) or by increasing workers' skills, knowledge and abilities (e.g., through more training or an information sharing program).

These revisions lead to the expanded production function in equation (3).

(3) $Q = f[K, e(HRM) \bullet L, HRM]$.

Here arises an important insight regarding the causal transmission mechanism between HRM and firm performance. Our model suggests that HRM influences firm performance through *two* distinct channels. The first, which we label the *direct HRM effect*, represents the independent contribution that more units of an HRM practice (represented by the right-hand term in the production function) have on output, holding constant the amount of labor and capital services. For example, more expenditure on employee selection, such as greater investment in hiring tests, personal interviews, and psychological assessment, increase output independent of any change in the quantity of labor (by better matching of people to jobs, and so on). Alternatively, extra expenditure on workplace safety may increase Q by reducing workplace accidents and production downtime. The direct effect is independent of the "human" aspect of labor.

The second channel by which additional inputs of HRM influence production is the *indirect HRM effect* (the middle term). The indirect effect captures the influence that more HRM practices have on output as they indirectly change the *effective amount of labor*, through factors such as improved motivation, greater work effort, better citizenship behavior, and skills upgrading.[17] This causal link occurs when labor becomes a unique "human" factor input; it is also where this model incorporates the "value creation" insights from RBV, AMO and human capital theories.[18]

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[17] In the early years of the personnel/IR field, employer-employee *cooperation* and *unity of interest* were viewed as universal contributors to more "effective labor" (Kaufman 2003a, 2008), albeit attainable through alternative HRM configurations rather than one "best practice" set as in some versions of modern SHRM theory. The early personnel/IR view held, in turn, that cooperation and unity of interest depend critically on using HRM to achieve *high morale* and *fair treatment* (the former being impossible without the latter). Regarding morale, Hall (1925: 35) remarked, "morale is to the individual what temper is to steel." The modern HRM-firm performance literature has repackaged morale into a more expansive and amorphous concept of motivation/commitment whereas fairness in SHRM models and the scholarly conversation has slipped to a duly-noted but modest-to-peripheral role. SHRM thus mirrors its opposite—neoclassical labor economics—in that both slight equity and fairness as determinants of efficient production. Also similar is their preoccupation with maximizing firm performance and returns to shareholders (capital) while giving little to no attention, importance, and counter-balancing consideration to the independent and sometimes conflicting interests of employees (labor). By way of contrast, early IR—including its prominent management wing—strongly emphasized that fairness is crucial to economic performance; fairness, in turn, requires that all competing interests get voice, due process, and reasonable outcomes. This is a stakeholder (not shareholder) model of the firm and employment relationship.

[18] If there is indeed systematic underinvestment in HRM as SHRM theory implies, a principal reason is probably that the value created by HRM is often largely intangible (e.g., morale), difficult to measure, and only realized in future years, thus causing it to be under-capitalized in the firm's profit maximization calculation (Slichter 1919; Kaufman 2008: 240–41).

The choice problem for the firm is to select the level of HRM practices that best achieves its profit objective. Given this, the firm's challenge is to solve equation (4):

$$(4) \qquad \Pi = P \bullet f[K, e(HRM) \bullet L, HRM] - V \bullet HRM - W \bullet L.$$

Equation 4 demonstrates that profit (Π) is the difference between revenue and cost. Revenue is $P \cdot Q$, with the production function in equation (3) substituted for Q. Assuming capital is fixed in the short-run, there are two elements of variable cost: labor cost and the cost of HRM practices. Assuming the cost of labor per unit is the wage W (for all employees, including managers, and including benefits and other such costs), total labor cost is $W \cdot L$. The HRM practices also have an explicit cost, denoted by V, since they are themselves produced with capital and labor. The total cost of HRM is, therefore, $V \cdot HRM$. Although the wage W is generically viewed as a component of a firm's HRM package, the choice problem considered here is the optimal level of management "manufactured" HRM, so W and V are separately distinguished. Just as the price of labor (W) is assumed a "given" for this exercise (set by the market), so too is the cost of purchasing/producing extra HRM practices (V). This simplification makes the model far more tractable, does not materially affect the results, and broadly accords with reality (e.g., a firm can obtain additional trainers, job evaluations, payroll processing, and so on, at a going market price).

The optimal level of HRM is determined by differentiating equation (4) with respect to HRM and solving for the first order condition. This is done in equation (5):

$$(5) \qquad \frac{\partial \Pi}{\partial HRM} = P \left[\left(\frac{\partial Q}{\partial e} \frac{de}{dHRM} \right) \cdot L + \frac{\partial Q}{\partial HRM} \right] = V$$

The left-hand side of the first-order condition (the bracketed term) is the marginal revenue product (MRP) of HRM practices. It is composed of two parts: the second term captures the *direct HRM effect* (the effect of more *HRM* on Q, holding constant L) and the first term captures the *indirect HRM effect* (the effect of more *HRM* on Q as it creates more effective labor). If labor were a commodity (i.e., inanimate factor input), the term $d(e)/d(HRM)$ becomes a constant and falls out of the first order condition, leaving only the direct effect. If only the direct effect were present, human resource management would not be substantively different from operations management or from an early version of scientific management.

The right-hand side of equation (5) is the unit price of HRM services, V. In other words, equation (5) shows the marginal decision-rule earlier cited: the firm should keep investing additional money in HRM practices as long as the extra revenue created exceeds the extra cost; when the two become equal the optimal level of HRM practices has been reached.[19] Importantly, when profit is maximized further HRM investment necessarily leads to *lower performance*—not higher.

Our contention is that this model is not simply an exercise in empty formalization but, rather, is a vehicle that yields a number of new and useful insights.[20] Consider the

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[19] This model is extended in several ways in Kaufman (2010d); for example, the composite HRM variable is disaggregated into i individual HRM practices (i = staffing, training, compensation, etc.), the profit-maximizing configuration of HRM practices is derived (horizontal fit), complementarities among HRM practices are introduced, and the horizontal fit dimension of HRM strategy is modeled.

[20] For example, an oft-cited definition of SHRM is "the pattern of human resource deployments and activities intended to enable an organization to achieve its goals" (Wright and McMahan 1992: 298). Our model reveals this is simply a verbal re-statement of the standard profit maximization equation in economics, illustrated by equations (4) and (5). This is a surface insight; a deeper insight emerges by then asking what separates the two fields (i.e., labor economics and SHRM) if they share the same objective function and choice problem? One answer (Kaufman 2010a) is that the fields are two branches of a larger umbrella field called industrial/employment relations (aka: institutional labor economics) in which the former branch theorizes allocation and coordination of labor resources via markets and prices and the latter theorizes the same thing but through organizations and command/administration with Commons/Coase transaction cost theory determining the boundary. (Modern personnel

following. Figure 1 illustrates that some firms invest little in HRM practices whereas others invest in an intermediate level and others in a high level. Our model explains this variation thus: the management of each firm, using equation (5), compares the extra productivity and revenue generated by using an additional unit of HRM practice in production with the extra cost incurred. Some firms, given their size, technology of production, skill, demographic characteristics of the workforce, and other such factors (spelled out in more detail below), find that profits are maximized with near-zero HRM expenditure. This might be an "externalized" or "market"-type employment system, as described by Delery and Doty (1996, Table 1), in which demand and supply set pay rates, motivate employees (through threat of unemployment), and provide new recruits and training opportunities. Others find that profits are maximized with an intermediate level, and yet others find, given their size, technology of production, and other internal and external characteristics, that a high level of HRM practices maximizes profit. Examples include an HPWS, high involvement, and internal employment system (again see Delery and Doty 1996, Table 1).

economics does not theorize a dual coordination economy in a substantive sense, nor does it give management coordination autonomous status, since market forces of competition and the Invisible Hand still determine management choices and HRM practices/structures (Lazear 2000).) Illustrative of this duality, through the 1950s personnel/HRM was widely regarded as "applied labor economics" and subsumed with human relations as the management wing of industrial relations (Kaufman 2000). Our model implies that management is one side of the economics coin; history does as well. Bossard and Dewhurst (1931) state that for business subjects like management, "economics . . . is the foundation or basic subject to be studied" (p. 325) and many management historians (e.g., Holbert 1976: 31) consider Henry Towne's article, "The Engineer as Economist" (1886), to have founded the field of management (the first professional managers were often engineers by training). As the IR and personnel/HRM fields began to separate after the 1960s, behavioral scientists replaced economists and SHRM replaced IR regarding the external/strategic dimension of employment relations. Not surprisingly, modern HRM education is mostly "applied psychology/OB" and noticeably slights the role and contribution of economics (Scarpello 2008).

One implication of this model, accordingly, is the following: each firm's place in the HRM frequency distribution is determined by a comparison of benefits versus costs of additional investment in HRM practices. For some firms, this calculation yields a zero level of investment in HRM practices whereas for others it yields an HPWS. Although the mainline of the HRM-firm performance literature predicts that "more HRM is better" for profitability, our model suggests that this is unlikely to be true outside an unrealistic scenario where all (or most) firms realize continuous marginal gains in profitability from further investment in HRM (Kaufman 2010b).

A second implication concerns the definition of "best practice" HRM. In this framework, one cannot make a universalistic statement that best practice HRM is composed of some particular set of HRM practices, or that best practice is represented by an HRM-intensive employment system located toward the right-hand tail of the frequency distribution, such as an HPWS. Rather, in this framework "best practice" has only one meaning and metric—that is, the HRM practice (or set of practices) that leads to the *most profit* (highest financial performance) and greatest probability of *long-run survival* for the company. Thus, in some situations an HPWS may be best practice whereas in others a low-road sweatshop employment system may be best practice (Lewin 2001). One hundred years ago in America, "best practice" meant next-to-zero formal HRM practices, just as it does in many parts of less-developed countries today (Kaufman 2008; 2010c; Tessema and Soeters 2006).

A third revisionist implication concerns the predicted effect of more HRM on firm performance. Taking profitability as the performance measure, most SHRM studies predict a positive effect. If it is positive, however, this means that firms can increase profit by investing in more HRM, which is to say they have not yet reached the optimal equilibrium level of HRM predicted by equation (5). Economic theory suggests, therefore, that unless market failure is large and persistent, the positive sign hypothesized in SHRM—if it empirically exists—is most likely

a short-run relationship that tends to diminish and even disappear over time as competition and share-holder pressure lead firms to capture the unexploited profit opportunity contained in HPWS practices.[21] Competition thus implies that extra economic profit from HRM investment should decline and ultimately go to zero. Marginal reasoning and the law of diminishing returns implies the same. In other words, firms invest in more HRM as long as the marginal revenue gain outweighs the marginal cost, but due to diminishing returns the marginal gain falls (e.g., consider the marginal return from sending employees to more and more training classes) and the marginal cost rises until a point of zero marginal profit gain is reached.[22] A persistent positive HRM effect is not *per se* ruled out but then has to be explained, as noted earlier, by some form of market failure or obstacle to equilibrium. The "one-eighth" rule advanced by Pfeffer (1998) is one approach to this challenge;[23] the most popular explanation, however, rests with RBV theory. The idea here is that HRM helps turn employees into rare, inimitable and valuable human capital assets (akin to a non-contestable form of differentiated product), the benefits of which cannot be easily duplicated and competed away (Allen and Wright 2007). This explanation does rationalize a positive sign on the HRM variable. However, it is not obvious why in practice other firms cannot easily and in short order duplicate ("contest") any particular system of HRM practices of the formal or tangible kind (most HRM practices are neither proprietary nor particularly complicated; otherwise, HRM would be more of a skilled and high-status profession) as used in HRM-firm performance models (Priem and Butler 2001). The positive HRM effect, therefore, may well come from other unobserved or omitted factors, such as a rent to superior management ability (e.g., differential success at *implementing* HRM and *creating/maintaining* positive employment relations). Or, as Cappelli and Neumark (2001) found in a particularly thorough study, it may not exist at all.

A fourth insight of this model is to point out what economic relationship SHRM researchers are estimating with a Huselid-type regression model. The standard HRM-firm performance regression model is, in effect, an attempt to estimate the first-order condition given by equation (5). That is, the regression coefficient β_1 in equation (1) measures $\Delta\Pi/\Delta HRM$, which is exactly what is solved for in the first order condition. We know further that to find the maximum point of the profit function $\Pi = f(HRM)$, which is a slightly different way to look at the first-order condition in equation (5) and

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[21] Huselid (1995) noted this implication of economic theory in a sentence (p. 668) but then dismissed its practical significance on the grounds that the large estimated positive effect of advanced HRM practices on firm performance, coupled with the low level of advanced HRM adoption at many firms, suggests that large profit gains remain available for capture. Becker and Huselid (2006: 905) reiterated this theme but explicitly tied the existence of large quasi-rents to market failure, citing lack of knowledge, lack of managerial competence, and failure to implement. However, SHRM theory seems caught in a contradiction since appeal to substantial market failure is at odds with the emphasis given in study after study to *increased competition* in the economy (and thus the asserted need to adopt high performance HRM practices).

[22] The numerical value of the coefficient β_1 depends on the metric of the performance measure used as the dependent variable and the specification of the regression equation. If the metric is percentage rate of return on capital, in long-run competitive equilibrium with homogeneous firms all firms earn the same "break-even" (normal) rate of return, say 10%. In this case, the HRM variable varies across firms but the dependent variable is constant, causing β_1 to take a value of zero. If the dependent variable is instead (say) dollars of profit, the regression equation should be specified in non-linear terms, such as $Perf_i = \beta_0 + \beta_1 HRM_i + \beta_2 HRM^2 + \beta_3 X_i + \varepsilon_i$, in order to capture the (predicted) parabolic shape in the functional relationship between profit and HRM intensity (profit rises, reaches a peak, and then declines as a function of HRM intensity). In this case, the predicted sign on the coefficient is $\beta_1 > 0$ but $\beta_2 < 0$. One criticism of the SRHM literature, therefore, is that it widely neglects the idea of (eventual) diminishing returns and thus omits the term $\beta_2 HRM^2$ (Kaufman 2010b).

[23] The "one-eighth" rule (Pfeffer 1998: 29) means that one-half of managers do not know that an HPWS increases performance, inertia keeps one-half of these from implementing a HPWS, and one-half of these do not successfully implement it. Thus, 100% of firms benefit from an HPWS but only 12.5% implement it. Also see Pfeffer (2007).

essentially what a Huselid-type regression model represents, requires that one differentiate the function and set the first derivative equal to zero. But the first derivative, $\Delta\Pi/\Delta HRM$, is β_1 and in long-run competitive equilibrium is necessarily zero, as noted above. For β_1 to be an unrestricted positive number, as explicitly or implicitly assumed in many SHRM studies, one must argue that (1) firms do not maximize profits (to a great extent); (2) for some reason, firms are prevented from getting anywhere close to maximum profit (per the large estimated shortfall in ROA); and (3) the marginal revenue gain from more HRM always exceeds the marginal cost.

A fifth insight concerns potential misspecification in SHRM studies of intermediate outcome variables, such as productivity, quits, and turnover. These studies (e.g., Huselid 1995) typically hypothesize that if more HRM leads to lower quits and turnover or higher productivity, then this too represents an improvement in firm performance. Such is not necessarily the case, however, at least if profit is the index of performance. For example, more HRM expenditure may improve productivity, but the cost increase of the additional HRM may far outweigh any resulting efficiency gains, thus reducing profit and performance (Cappelli and Neumark 2001).

The HRM Demand Curve and HRM Demand Function

Extensions of the model yield further insights and implications, as well as a new tool for empirical HRM analysis. The place to start is a derivation of the *HRM demand curve.*

This curve depicts the relationship between the price of HRM (V) and the firm's quantity demanded of HRM practices (expressed in dollars of expenditure), holding all other factors constant. Such a curve is depicted in Figure 2 as D_1. This curve is derived by plotting the marginal revenue product of HRM. In other words, the MRP signifies the extra dollars of revenue gained from investing in one more unit of HRM practices. The MRP schedule could initially have an upward

Figure 2. The HRM Demand Curve
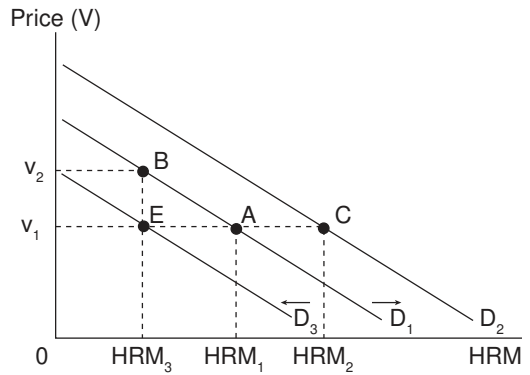
sloping portion (not shown here for simplicity of exposition), but eventually will slope downward, given the operation of the law of diminishing returns. The common sense of the downward slope is that beyond some point, additional investment in HRM practices, such as additional sophistication in selection tests, have a successively smaller positive effect on productivity and revenue.

Assuming the price of HRM practices is a constant V_1, the profit-maximizing level of HRM practices is HRM_1 (point A). It is at this point that the equilibrium condition in equation (5) is satisfied. If this falls anywhere to the left, the MRP of HRM exceeds the marginal cost and the firm adds to profit by expanding expenditure on HRM practices; if it falls anywhere to the right, the opposite holds true.

Figure 2 shows that a firm's use of HRM practices follows the law of demand, just as its use of other factor inputs does. Thus, a rise in the price of an HRM activity from V_1 to V_2 causes a movement up the HRM demand curve D_1 and a decline in quantity demanded from HRM_1 to HRM_3 (point A to point B). A firm's demand for HRM practices is also influenced by all those variables that shift the HRM demand curve. These variables must affect one of the two determinants of the HRM input's marginal revenue product: the marginal physical product (the extra output produced) or the marginal revenue from this extra production (or both). Theory

suggests a number of these shift variables; others are more a matter of common sense observation or empirical determination (described below).

Before proceeding further, it is useful to repackage equation (5) into a more tractable format. This is done in equation (6).

(6) $HRM_i = f(Q_i, W_i, V_i, X_i)$.

Equation (6), in effect, inverts the profit maximization equation in equation (5) and expresses the demand for HRM in the ith firm as a function of the level of the firm's output, the prices of factor inputs, and a host of other independent variables captured in the vector *X*. Equation (6) is called the *HRM demand function*. It parallels the labor demand function, which is a staple of labor economics (Hamermesh 1993). Holding all other variables constant, changing the level of V in equation (6) causes a movement along the HRM demand curve D_1 in Figure 2. Holding V constant and changing one of the other variables in the demand function (e.g., larger scale of output) shifts the HRM demand curve to the right (D_2) or to the left (D_3). At a constant price of V_1, a rightward shift of the firm's demand for HRM practices leads to an increase in expenditure on HRM practices from HRM_1 to HRM_2 (point A to point C); a leftward shift reduces expenditure on HRM practices from HRM_1 to HRM_3 (point A to point E).

The HRM demand curve and demand function model provides an interesting explanation for the shape of the HRM frequency distribution at a point in time and for changes in it over time. At a point in time, each firm has particular values of the variables V, W, and X, and, inserting these into the demand function yields its optimal level of HRM expenditures on specific practices. Plotting these equilibrium values traces out the HRM frequency distribution, as shown in Figure 1. Alternatively, one can plot the position of firms' HRM demand curves in Figure 2 and, for a given price (e.g., V_1), determine the same distribution of equilibrium values of the HRM practice expenditure variable. In effect, the distribution of HRM demand curves maps out an identical

frequency distribution of HRM practices. Thus, the left-hand tail of the HRM frequency distribution is described by the firms that have a zero to small demand for HRM (e.g., demand curves to the left of D_3); the center of the distribution is given by the majority of firms that have intermediate HRM demand curves (in a band around D_1); and the skewed part of the right-hand tail is given by the relatively small number firms that have a very high demand for HRM (demand curves scattered far to the right of D_2).

This model also explains changes in the HRM frequency distribution across time and countries. At the turn of the twentieth century, the HRM frequency distribution was highly compressed and centered very close to the vertical axis (Kaufman 2008, 2010c). For example, in 1902 the world's largest company, the United States Steel Corporation, employed 160,000 people but used practically zero formal HRM practices (e.g., no hiring office, employment application form, or job/wage schedule). The reason is that nearly all firms were using a highly externalized labor management system and thus had near-zero HRM demand curves.[24] Over the ensuing decades, however, the HRM demand curves of many firms shifted successively to the right due to changes in production technology, unionization, legal regulation of employment, and other such factors, causing the mean and variance of the HRM frequency distribution to increase as well. Variation in HRM demand curves also explains different HRM frequency distributions among countries, such as between the United States, France and India.

Shift Factors of HRM Demand

Our model implies that variation in HRM demand curves explains the variation in

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[24] This does *not* mean these firms practiced zero human resource management, since in every multi-person organization then and now a "boss" must in some way coordinate and manage the acquisition and utilization of the labor input. Rather, it means HRM is in this case an undifferentiated part of line management (subsumed in the variable *L*) and involves few if any formal and systematized/scientific personnel methods (the *HRM* variable).

firm-level adoption rates of HRM practices. To give the model greater explanatory content, it is next necessary to identify the specific independent variables (shift factors) in the demand function that cause this variation. The first two we discuss (Q and W) are explicitly identified in equation (6) and come directly out of microeconomic production theory; the remainder are subsumed in the vector X and are suggested by the economics, IR, and HRM literatures. The list that follows is suggestive, not definitive; is tailored to the American context; and is intended to help motivate the specification of the empirical HRM input demand function estimated in the next section of the paper. Certain important determinants of HRM demand, such as employment laws and social/ political institutions, are omitted because they do not significantly vary among firms in a national cross-section and thus do not explain variation in demand curves.[25]

Firm Size. The demand for HRM practices should increase with firm size, measured by level of output (Q) or level of employment (jointly determined by Q and W in equation (6) and therefore not explicitly shown).[26]

This relationship is uniformly found in empirical studies (Boselie, Dietz, and Boon 2005). A theoretical rationale for this relationship is that larger sized organizations entail both more people to manage and greater distance between executives and workers, necessitating use of more staff and resources to coordinate production efficiently. Although *total* HRM rises with firm size, due to economies of scale (arising from spreading fixed investment and set-up cost over a larger employee base) expenditure on HRM *per employee* probably declines on average for many firms (Brewster et al. 2006).

Wage Rate. The second variable in the HRM demand function in equation (6) is the wage rate W. The wage may be either a substitute or complement for HRM practices (Ichniowski, Shaw and Prennushi 1997). In the former case, firms may use a higher W in lieu of formal HRM practices. An example of this is efficiency wage theory, in which an employer pays a higher-than-market wage to employees, who are thus motivated to self-enforce higher work effort. Firms can then reduce direct HRM control devices, such as supervision and time clocks. In this case, a higher wage would shift the HRM demand curve to the left. The opposite would occur in a situation in which W and HRM practices are complements. In high performance work systems, for example, a high wage and high level of HRM go together. One reason is that an HPWS requires a unitarist employment relationship and paying a high wage creates higher employee commitment and loyalty and removes a source of potentially disruptive distributive bargaining (tacit or formal).

Production Technology. Internalization of employment is encouraged by production technologies that are more capital intensive; complex; feature greater worker interdependencies (e.g., team forms of production); and allow greater room for discretionary effort. More capital intensive and complex technologies make employee selection more difficult and important, and turnover more expensive. In addition, more extensive interdependencies in production increase the need to maintain and promote effective employee coordination and cooperation, and

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[25] Another potentially interesting omitted variable is the firm's profit level. A reasonable hypothesis is that firms with above-normal profit invest part of it in more HRM in pursuit of other sub-goals, such as enhanced employee satisfaction and loyalty. We have no data on firm-level profit, however, and so we cannot test this. The issues of simultaneity and reverse causality are examined in Wright et al. (2005). On one hand, our model is not free of simultaneity concerns in empirical estimation (e.g., between the unionism independent variable and HRM expenditure dependent variable); on the other hand, it probably is less widespread or severe than in the standard SHRM regression model (e.g., the dependent performance variable could well be related to most or all of the HRM independent variables as well as some of the exogenous control variables, such as unionism).

[26] The neoclassical production theory utilized for this model assumes as a "given" that firms exist and largely takes market structure and the size distribution of firms as a datum in the analysis, yielding in turn an *a priori* fixed HRM frequency distribution and pattern of employment systems. Institutional economics, utilizing the transaction cost concept of Commons and Coase, endogenizes the number, size, and structure of firms and thereby endogenizes the underlying shape of the HRM frequency distribution and the pattern and structure of employment systems (Kaufman 2010b).

greater room for discretionary work effort heightens the importance of maintaining and promoting employee commitment and morale (Lepak and Snell 1999; Appelbaum et. al. 2000).

Industry and Organizational Characteristics. A variety of industry and organizational characteristics potentially affect the demand for HRM, although the predicted signs are not always clear-cut (Datta, Guthrie, and Wright 2005; Sun, Aryee, and Law 2007). A case in point concerns differences in HRM demand between goods-producing (e.g., manufacturing) and service-producing organizations. Heterogeneity in these broad categories is possibly so large as to preclude a meaningful prediction; alternatively, one could reasonably argue that on average, manufacturing firms use more HRM practices to boost productivity indirectly through devices such as employee involvement, dispute resolution, and training. Likewise, it is reasonable to expect that for-profit organizations may have a different demand for HRM than not-for-profit organizations; government organizations are possibly also a distinct entity. According to Begin (1991), not-for-profit organizations make greater use of cultural and social norms as control and motivational devices, thus suggesting a lower demand for formal HRM practices (other things being equal). Government may be hypothesized to have a greater demand for HRM to the extent that it entails greater bureaucracy and formal procedures; however, formal procedures are not necessarily expensive *per se* and expenditure levels on HRM practices (e.g., training, employee relations) may actually be more intensive in some for-profit firms (Brewster et al. 2006).

Workforce/Training Characteristics. Internalization of employment and demand for HRM practices will also be greater in firms whose production involves greater specific on-the-job training (OJT) (Grimshaw and Rubery 2007). Specific OJT creates a form of asset specificity, thus raising market transaction cost. Work systems that provide more opportunity for workers to develop and apply new knowledge for improvements in processes and products will also have a

greater demand for HRM practices, per the implications of the resource-based view of the firm (Lepak and Snell 1999). This consideration may link certain workforce characteristics to HRM demand. Past research has shown, for example, that white men have greater specific OJT, so one may predict that organizations with more women and minority employees have a smaller demand for HRM practices. Another relevant variable is educational attainment of the firm's workforce. Education is part of company's stock of human capital and SHRM theory predicts that firms with a more educated workforce invest in greater HRM to get higher productivity from this valuable asset (Becker and Huselid 2006).

Economic/Market Conditions. Firms operating in more stable product markets and economic environments have a greater incentive to adopt ILMs and formal HRM practices (Orlitzky and Frenkel 2005; Ordiz and Fernádez 2005). ILMs involve greater employee investment expense, transform labor into a quasi-fixed cost, and introduce greater organizational rigidity. These conditions become progressively less economic in the face of greater volatility of sales and employment and shorter product life-cycles. ILMs and extensive HRM practices are also promoted when labor markets remain at or close to full employment. Not only does full employment increase the pressure to carefully select, develop, and retain employees (due to scarcity of qualified labor in the external market), but it also reduces the ability of firms to use the threat of unemployment as an effective and less costly motivation or discipline device (thus enhancing the indirect HRM effect). HRM demand, therefore, should be positively associated with the employee turnover rate (e.g., necessitating more expenditure on recruitment, selection, and training) and negatively associated with the rate of unemployment.

Unionization. The presence of a union in a firm, or the threat of unionization, can have contradictory effects on HRM demand similarly, the effect may well differ across national industrial relations systems. A union in the American context endeavors to negotiate more formalized, structured, and

standardized employment management practices, thus suggesting a positive relationship (Verma 2007). Similarly, the threat of union organization may motivate firms to upgrade their HRM function. But unions also perform certain HRM functions (recruitment through a hiring hall, dispute resolution through a grievance system), thus relieving the employer of making these expenditures; they also resist certain HRM practices, such as incentive pay and performance appraisal. A negative relationship, therefore, is also possible (Brewster et al. 2006).

Strategic Role of the HRM Function. Firms differ on the degree to which labor and the management of labor is a strategic determinant of profitability. When labor has a small effect on firm performance, management is likely to invest little in HRM; conversely, when labor has a large effect on the bottom line, management is likely to invest considerable resources in HRM. One way HRM investment takes place is creation and staffing of a personnel/HRM function. The more strategically important labor and labor management are, the more likely that the HRM function is included in the formulation and execution of both HRM strategy and the overall business strategy. Firms with strategically involved HRM departments, therefore, should be linked to higher levels of HRM expenditures (Lepak, Bartol, and Erhardt 2005; Brewster et al. 2006).

Employee Relations Philosophy. Company owners and top executives differ in their philosophies and attitudes toward employees and labor management practices. This factor most closely corresponds to the "taste" variable in the traditional microeconomic theory of demand. Quite apart from profit considerations, some owners and executives prefer an employee-oriented approach and invest more in HRM in order to achieve better workforce treatment and *esprit de corps* whereas others view employees as expendable commodities and hence give short-shrift to HRM (Boxall 2007).

Estimating an HRM Demand Function

Our theoretical model offers not only insights and implications regarding inter-firm variation in HRM practices but also a tool for empirically analyzing this issue. Using a unique data source, we proceed to estimate an HRM demand function for a sample of several hundred American firms.

Data Set, Estimating Equation, and Variable Definitions

The majority of the information we use was collected by the Bureau of National Affairs (BNA) for its 2005/2006 *HR Department Benchmarks and Analysis* reports. Earlier years were not available to us and parts of the survey instrument were also different. The breadth and depth of information on firms' HRM activities in the BNA dataset are, to our knowledge, the most extensive available in a public source in America. Nonetheless, the data source also has limitations, particularly compared to data sets available in other countries (e.g., the Workplace Employment Relations Survey (WERS) in the United Kingdom) that are more detailed and longitudinal (see Guest et al. 2003).

These data are useful because they come from a comprehensive survey of HR departments from a diverse group of firms. In addition to providing information on the dependent variable in our model (HRM expenditures), the BNA survey data also include information on many of the independent (shift) variables. Other independent variables were developed from alternative data sources (Bureau of Labor Statistics, Equal Opportunity Commission), matched to the BNA firms through their three-digit (sometimes two-digit) North American Industry Classification System (NAICS) code. The combined data set comprised 614 observations; after deleting observations with missing data the sample was reduced to 381. The data on HRM expenditure reported by BNA come from a mix of organizational levels—sometimes an entire firm and at other times an autonomous sub-division or individual establishment (plant). The single largest industry concentration is Services.

The estimating equation, given in equation (7), is a linear version of the HRM

Table 1. Definition and Predicted Signs of Independent Variables
(Dependent Variable: HRM Expenditure per Employee)

Independent Variables	Theoretical Shift Factor	Predicted Sign	Source
Full-time employees (log)	Firm Size	−	BNA
Annual worker earnings (log)	Wage	?	BNA
Non-labor operating costs per worker (log)	Production Technology	+	BNA
Non-profit private sector organization (dummy variable = 1) [for-profit sector = omitted group]		−	BNA
Government/public sector organization (dummy variable = 1) [for-profit sector = omitted group]	Industry/ Organizational	?	BNA
Service/non-manufacturing industry (dummy variable = 1) [goods producing = omitted group]		−	BNA
HR Department has partial influence on strategy (dummy variable = 1) [Low or Zero influence on strategy = omitted group]			
HR Department has substantial influence on strategy (dummy variable = 1) [Low or Zero influence on strategy = omitted group]	Strategic Role/ Employee Philosophy	+	BNA
HR Department has high influence on strategy (dummy variable = 1) [Low or Zero influence on strategy = omitted group]			
HR department in central corporate office (dummy variable = 1)		+	BNA
Firm's strategic focus is on employee satisfaction and morale (dummy variable = 1)		+	BNA
Unionized percent of workforce	Unionization	?	BNA
Female percent of workforce, by industry and state		−	EEOC
Non-white percent of workforce, by industry and state	Workforce/ Training	−	EEOC
Bachelors degree percent of workforce, by industry		+	BLS
White collar percent of workforce, by industry		+	EEOC
Unemployment rate by state/industry, by state and industry		−	BLS
Cyclical Instability of Employment (log of coefficient of variation employment,1991–2005), by industry and state	Economic/ Market	−	BLS
Separation rate per 100 workers, by industry		+	BLS

demand function in equation (6) but with capital and labor inputs explicitly included:

$$(7) \qquad \frac{HRM_i}{L_i} = \alpha + \beta_1 Q_i + \beta_2 L_i + \beta_3 K_i$$
$$+ \beta_4 W_i + \beta_5 X_i + \varepsilon_i.$$

The dependent variable is the log of HRM expenditures per employee (or "per capita") in firm i. HRM expenditures include "costs of labor, materials and equipment, overhead, and administration incurred by HR in performing its core function and duties" (BNA 2006: 114), where "HR" is defined broadly to include expenditures attributed to both the human resource department *per se* and to other managers and programs associated with the HR function. Deflating total HRM expenditures by the number of employees gives a metric that is far more easily compared across firms and is not so greatly influenced by differences in absolute firm size. Similarly, expressing the dependent variable in log form transforms the coefficients on the independent variables into estimates of marginal percentage change (elasticities).

The use of an expenditure measure of HRM, it should be noted, has an important advantage over the "practice count" specification used in many HRM-firm performance regressions. A measure of HRM usage formed by the addition of discrete practices may contain substantial measurement error; for example, two firms both report usage of

employee involvement methods but one is a low-level suggestion box system while the other is a high-level team system. A "count" specification may well weight both equally whereas an expenditure measure better captures the underling difference in scale and scope of usage across the two firms.[27]

We were able to develop data for nineteen independent variables in the regression model. The variable definitions, hypothesized sign, and source are given in Table 1 (the hypothesized signs come from the discussion of the previous section); summary statistics are given in Table 2. We discuss these variables in more detail in the next section on results. Note here, however, that several variables contained in the theoretical model are not included in the regression equation, such as the cost of capital (r) and cost of HRM practices (V). Data on each are unavailable. Omission of the latter is not critical on the reasonable assumption that the per capita cost of producing/buying HRM practices (e.g., an employee training class, a job evaluation) is most likely relatively uniform across firms, particularly within an industry (and thus captured in the industry dummies). Data for several potentially important control variables are not available in the BNA data set; hence, we constructed measures from other sources, but they are measured at a higher level of aggregation (e.g., by three-digit industry). The positive aspect is that these control variables are less likely to be endogenously related to the firm's HRM expenditures; the negative aspect is greater measurement error. Evidently, there are also other independent variables that one could well think should also go in the estimated HRM demand function; our problem is that they are not attainable from the BNA data set and are difficult to acquire elsewhere. A longitudinal

analysis, of course, would also require additional variables.

The HRM demand function is estimated with ordinary least squares (OLS). Alternative estimation methods were performed but, as we report below, the results did not materially change. We also disaggregate the expenditure data into nine HRM sub-functions, as specified in the BNA survey, and re-estimate the demand function for each. The nine sub-functions are recruitment, training, compensation, benefits administration, employee relations, external relations, personnel management, health and safety activities, and strategic planning. This disaggregation provides insight on the extent to which the independent variables have consistent, stable relationships across different HRM sub-functions.

Empirical Results

Table 3 reports the coefficient estimates and standard errors for all of the model specifications.[28] The first column shows the estimated coefficients for the "total" or "aggregate" HRM demand function (using total firm level HRM expenditures); columns 2–10 show the results for disaggregated HRM demand functions. We initially

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[27] Another large problem in the standard HRM-firm performance regression model is that *effectiveness* of HRM implementation is a significant but largely unobservable variable intervening between practices and performance. Since our model explains HRM expenditure, not firm performance, the issue of effectiveness (or management quality) does not affect the estimated cause-effect relationships.

[28] We explored several alternative specifications and conducted a number of robustness checks (reported in Miller 2008). We re-estimated the equations using quantile regression, for example, to determine whether the size of the coefficients varies over the interval range of the independent variables (for example, if the "threat effect" of unions on HRM expenditure is not linear across different levels of union density). We found little variation. We also tested for division bias (potentially introduced when HRM expenditure is deflated by employment given that employment is also an independent variable) by re-estimating the equations with HRM expenditure as the dependent variable and employment size (ES) and ES-squared as independent variables. The number of statistically significant independent variables is identical both ways. We also tested for simultaneity between employment and HRM expenditure, since in equation (4) the firm is assumed to solve for both together. To do so, we re-estimated the equations using two-stage least squares and instrumented the firm's employment level using the state/industry level of employment. The results did not change. Finally, we also included regional dummies, but these had no discernible effect.

Table 2. Summary Statistics

Dependent Variable	Mean	Std. Dev.	Minimum	Maximum
Total Per Capita HRM Expenditure	1321.37	1217.45	36.00	7392.00
Per Capita HRM Expenditure on Recruitment	204.19	264.04	3.93	1840.00
Per Capita HRM Expenditure on Training	157.73	210.64	1.20	1629.34
Per Capita HRM Expenditure on Compensation	340.97	512.94	1.80	4435.20
Per Capita HRM Expenditure on Benefits Admin.	205.30	277.79	2.00	2179.20
Per Capita HRM Expenditure on Employee Rels.	117.04	155.64	0.40	1272.25
Per Capita HRM Expenditure on External Rels.	48.93	75.23	0.36	693.00
Per Capita HRM Expenditure on Personnel Mgt.	68.05	99.01	0.36	1017.80
Per Capita HRM Expenditure on Health & Safety	86.89	134.59	0.40	1055.00
Per Capita HRM Expenditure on Strategic Plan.	72.33	118.46	1.59	819.65

Independent Variable	Mean	Std. Dev.	Minimum	Maximum
Full-time employees (log)	6.74	1.58	3.78	13.82
Annual earnings or "wage" (log)	10.49	1.35	4.47	15.20
Non-labor operating costs per worker (log)	9.41	2.45	1.35	15.49
Non-profit private sector organization (dummy variable = 1) [for-profit sector = omitted group]	0.04	0.19	0.00	1.00
Government/public sector organization (dummy variable = 1) [for-profit sector = omitted group]	0.35	0.48	0.00	1.00
Service/non-manufacturing industry (dummy variable = 1) [goods producing = omitted group]	0.39	0.49	0.00	1.00
HR Department has partial influence on strategy (dummy variable = 1) [Low or Zero influence on strategy = omitted group]	0.22	0.42	0.00	1.00
HR Department has substantial influence on strategy (dummy variable = 1) [Low or Zero influence on strategy = omitted group]	0.37	0.48	0.00	1.00
HR Department has high influence on strategy (dummy variable = 1) [Low or Zero influence on strategy = omitted group]	0.30	0.46	0.00	1.00
HR department in central corporate office (dummy variable = 1)	0.31	0.14	0.00	1.00
Firm's strategic focus is on employee satisfaction and morale (dummy variable = 1)	0.35	0.48	0.00	1.00
Unionized percent of workforce, by industry	10.02	18.95	0.00	65.00
Female percent of workforce, by industry and state	51.25	17.67	0.54	82.20
Non-white percent of workforce, by industry and state	33.35	9.56	14.50	99.32
Bachelors degree percent of workforce, by industry	19.01	9.19	8.00	33.00
White collar percent of workforce, by industry	62.73	21.46	10.92	99.27
Unemployment rate by state/industry, by industry and state	5.06	1.03	2.70	10.40
Cyclical Instability of Employment (log of coefficient of variation employment, 1991–2005), by industry and state	−2.16	0.50	−4.47	−1.62
Separation rate per 100, by industry	37.35	17.65	15.20	75.50

included a dummy variable in the equations to separate the observations obtained from, respectively, the years 2004 and 2005, but it was statistically insignificant and we therefore dropped it.

All ten regression equations are statistically significant from zero, indicated by the p-values reported in the last row of Table 3. This implies that the estimated demand functions have explanatory power. In addition, a standard Chow test reveals that the coefficient values on the independent variables are statistically different for seven of the nine HRM sub-function regressions. This

Table 3. Results of OLS Specifications

COEFFICIENT	(1) Total Expenditure	(2) Recruitment	(3) Training	(4) Compensation	(5) Benefts Admin.	(6) Employee Relations	(7) External Relations	(8) Personnel Mgt.	(9) Health and Safety	(10) Strategic Planning
Log of Employment	−0.31*** (0.03)	−0.218*** (0.0404)	−0.307*** (0.0340)	−0.360*** (0.0459)	−0.314*** (0.0360)	−0.302*** (0.0423)	−0.304*** (0.0517)	−0.341*** (0.0424)	−0.320*** (0.0465)	−0.259*** (0.0453)
Log of Wage	0.18*** (0.03)	0.259*** (0.0552)	0.221*** (0.0467)	0.161*** (0.0616)	0.223*** (0.0478)	0.242*** (0.0579)	0.254*** (0.0766)	0.168*** (0.0554)	0.234*** (0.0676)	0.271*** (0.0608)
Log of Non-Labor Operating Costs	0.07*** (0.02)	0.0533* (0.0303)	0.0782*** (0.0249)	0.0715** (0.0344)	0.0472* (0.0270)	0.0864*** (0.0314)	0.0621 (0.0378)	0.0585* (0.0303)	0.0938*** (0.0351)	0.0238 (0.0324)
Non-profit Sector	−0.29 (0.27)	0.747* (0.427)	0.0116 (0.353)	−0.842* (0.502)	−0.561 (0.395)	0.631 (0.423)	0.379 (0.581)	0.562 (0.451)	0.303 (0.566)	0.758 (0.506)
Government Sector	−0.35* (0.19)	0.0700 (0.291)	0.0542 (0.246)	−0.129 (0.334)	−0.368 (0.260)	−0.203 (0.300)	0.0459 (0.383)	−0.191 (0.296)	−0.316 (0.342)	0.0849 (0.340)
Service Sector	−0.44** (0.19)	−0.0600 (0.289)	−0.329 (0.248)	−0.960*** (0.336)	−0.732*** (0.258)	0.0136 (0.302)	0.0342 (0.357)	−0.0840 (0.298)	0.0317 (0.351)	−0.0636 (0.319)
Partial HR Strategic Role	0.16 (0.15)	0.0875 (0.228)	0.0173 (0.192)	0.0139 (0.268)	0.0526 (0.208)	0.527** (0.245)	0.0844 (0.300)	0.197 (0.239)	0.0805 (0.288)	0.147 (0.281)
Substantial HR Strategic Role	0.21 (0.14)	0.0123 (0.216)	0.0732 (0.184)	0.0739 (0.254)	0.0149 (0.199)	0.389* (0.233)	0.00225 (0.275)	0.155 (0.227)	−0.109 (0.283)	0.331 (0.270)
High HR Strategic Role	0.14 (0.14)	0.141 (0.219)	0.170 (0.185)	−0.157 (0.257)	−0.205 (0.200)	0.492** (0.233)	0.110 (0.278)	0.201 (0.228)	−0.0688 (0.276)	0.326 (0.268)
Corporate Level HR Function	−0.03 (0.10)	−0.000213 (0.157)	−0.130 (0.131)	−0.200 (0.183)	0.330** (0.143)	−0.144 (0.160)	−0.315 (0.193)	−0.00609 (0.170)	−0.290 (0.185)	−0.196 (0.177)
Moral/Satisfaction Focus	0.22*** (0.08)	0.429*** (0.128)	1.419*** (0.106)	−0.400*** (0.148)	0.0568 (0.116)	0.298** (0.132)	−0.0217 (0.165)	0.224* (0.135)	0.171 (0.153)	0.221 (0.145)

Table 3. Results of OLS Specifications Continued

COEFFICIENT	(1) Total Expenditure	(2) Recruitment	(3) Training	(4) Compensation	(5) Benefits Admin.	(6) Employee Relations	(7) External Relations	(8) Personnel Mgt.	(9) Health and Safety	(10) Strategic Planning
Percent Unionized	−0.00 (0.00)	−0.00274 (0.00356)	0.000799 (0.00299)	−0.00212 (0.00400)	0.00499 (0.00307)	0.00139 (0.00365)	−0.000134 (0.00459)	0.00110 (0.00370)	0.00438 (0.00404)	−0.00388 (0.00441)
Percent Women	0.01** (0.00)	0.00770 (0.00678)	0.00230 (0.00573)	0.000866 (0.00778)	0.0113* (0.00606)	0.00345 (0.00698)	0.00365 (0.00925)	−0.000674 (0.00707)	0.000510 (0.00806)	−0.00308 (0.00769)
Percent Minority	0.00 (0.01)	−0.00122 (0.00878)	0.00286 (0.00722)	0.00982 (0.00994)	0.00350 (0.00775)	0.00266 (0.00894)	−0.00619 (0.0142)	−0.00349 (0.00887)	−0.00674 (0.00955)	0.00332 (0.00988)
Percent College	2.73* (1.43)	−2.140 (2.239)	2.051 (1.878)	9.221*** (2.589)	4.287** (2.001)	−2.281 (2.391)	4.075 (2.932)	−0.154 (2.382)	0.196 (2.694)	0.161 (2.573)
Percent White Collar	0.00 (0.00)	0.0117** (0.00525)	0.00173 (0.00434)	0.00192 (0.00604)	0.00590 (0.00471)	0.00510 (0.00534)	−0.0128 (0.00792)	0.00189 (0.00548)	−0.00622 (0.00609)	0.00213 (0.00575)
Unemployment	−0.03 (0.04)	0.0171 (0.0581)	−0.0374 (0.0477)	−0.0298 (0.0664)	−0.0697 (0.0516)	0.00233 (0.0608)	−0.0585 (0.0739)	−0.0304 (0.0582)	−0.0597 (0.0660)	0.0272 (0.0657)
Log of Coef. of Var. in Employment	−0.17 (0.11)	−0.0493 (0.176)	−0.170 (0.144)	−0.253 (0.208)	−0.270* (0.156)	0.0102 (0.204)	−0.204 (0.295)	−0.0499 (0.198)	−0.0539 (0.259)	0.00395 (0.266)
Log of Rate of Separations	0.28** (0.14)	0.352* (0.208)	0.298* (0.176)	0.756*** (0.246)	0.678*** (0.188)	−0.0143 (0.220)	0.304 (0.295)	−0.148 (0.227)	−0.0996 (0.269)	−0.000527 (0.259)
R^2	0.476	0.302	0.568	0.335	0.395	0.364	0.431	0.321	0.356	0.323
F-Statistic	16.38	7.21	20.55	8.18	10.68	8.30	5.91	6.42	6.31	5.24
Observations	381	354	333	346	348	311	177	293	249	241

Robust standard errors in parentheses

*Statistically significant at the .10 level; **at the .05 level; ***at the .01 level.

indicates that the shift factors of HRM demand have a different size of quantitative effect across sub-functional areas.

Column (1) of Table 3 shows that nine of the nineteen independent variables have statistically significant ($p < .10$ or lower) regression coefficients. Two of these variables—the log of employment and the log of average annual worker earnings (a proxy for the wage)—are found to be statistically significant in all ten of the model specifications. Employment, as measured by the average number of fulltime employees, has a negative relationship with the firms' expenditures on HRM practices. The estimated coefficient indicates that a 1% increase in the size of a firm's work force is associated with an approximate 0.3% decrease (on average) in *per capita* HRM expenditures. The marginal effect is similar across all nine sub-functions. We interpret this finding to indicate that firms realize scale economies (decreasing unit costs) in provision of aggregate and individual HRM services.

The second variable that is statistically significant in all ten equations is annual employee earnings, that is, annual compensation per employee (the firm's total annual payroll divided by employment). The estimated coefficients are positive in all equations, indicating that firms paying higher annual earnings also provide more HRM services, other things being equal. We interpret this finding to indicate that the level of compensation is a *complement* with other aspects of HRM expenditure, suggesting that firms with an HRM-intensive employment system (such as an HPWS) also provide higher pay to create synergy and other productivity advantages.

The next variable represents the capital intensity of the firms' production process, measured by the non-labor operating costs of the firm per employee (i.e., the capital/labor ratio). The coefficients are positive in all equations and statistically significant in all but two. This finding indicates that firms with more capital-intensive production processes utilize, other things being equal, a greater amount of HRM services per capita. This result may be interpreted as revealing that those firms spending large amounts on

capital and other non-labor inputs find it advantageous to "leverage" or "safeguard" this investment by also investing extra in HRM in order to have a high-productivity and high-morale work force (the direct and indirect HRM effects).

A particular virtue of the BNA survey is that it contains three questions that bear on the strategic orientation and involvement of the company's HR function. The first strategy-related question in the survey concerns the *level of strategic involvement* of the HRM function, with five answers ranging from "no involvement" to "high involvement." Following SHRM theory, we hypothesize that a firm with an HR function that is more strategically involved makes greater per capita HRM expenditures, particularly in those firms that cite a high level of involvement. This idea is captured by the three dummy variables that represent, respectively, "partial," "substantial," and "high" involvement of the HRM function. However, contrary to expectations, but congruent with the empirical findings in a number of other studies (discussed in Becker and Huselid 2006), this variable at all levels of involvement is statistically insignificant across nine of the ten equations (the exception is employee relations). One inference is that HRM strategy has no discernible effect on total per capita HRM expenditure, counter to the predictions of most SHRM contingency models. A second possibility is that HRM strategy affects HRM expenditure but that variation in HRM strategy is itself largely captured by variation in the other independent variables, suggesting that strategy is not a true independent variable but more of an intervening variable, itself explained by various variables external and internal to firms (Kaufman 2010d). The fact that the employee relations sub-function equation is the only one with a significant positive sign raises the interesting possibility that employee relations, among all HRM functional practice areas, is the one most at the center of SHRM (suggesting, in turn, the strategic importance of fairness and the indirect effect).

The second strategy-related question concerns the reporting level of the chief HRM

executive. We hypothesize that per capita HRM expenditures are higher in firms whose HRM executive reports directly to the CEO, rather than, say, a vice-president of finance, on the presumption that this indicates that employees are a larger strategic concern. This variable is also not statistically different from zero, with the exception of the benefits administration equation. Again, therefore, strategy—or at least these measures—seems not related to HRM expenditures across firms.

The third strategy-related question concerns the major performance criterion on which the HRM function is evaluated. This variable may also reflect the employee relations philosophy of the firm and its top management. If the performance goal is cost-containment, for example, we hypothesize that less is spent on per capita HRM whereas if it is employee morale and satisfaction, then a larger amount is spent. To test this, we enter a dummy variable for those respondents who chose the criterion goal "employee morale and satisfaction."[29] Our hypothesis is broadly supported. The performance variable has statistical significance of varying degrees in six regressions, including the Total Expenditure equation. Interestingly, the coefficient is negative and significant in the Compensation sub-function regression. This result may be a statistical quirk; alternatively, it is congruent with the prediction of satisfaction/hygiene theory that firms find non-wage measures to be a more effective means to boost morale and satisfaction.

The next variable drawn from the BNA survey is the percentage of employees in the reporting unit represented by a union. It is not statistically different from zero in all ten regressions, indicating that in this data set per capita expenditure on HRM does not show discernible variation with respect to union status.[30] One could well expect that for the Employee Relations and Safety and Health sub-functions this variable would be positive, which it is in both cases, but not significantly so.

The survey also categorized firms into different broad industries/sectors: manufacturing, non-manufacturing or service, government, and non-profit. We treated manufacturing as the excluded category and created dummy variables for the other three. In the aggregate HRM equation, per capita HRM expenditures are lower in services (relative to manufacturing) and, using a ten-percent significance test, also lower in the government sector but not in the non-profit sector. At the sub-function level, per capita expenditure on Compensation and Benefits Administration is lower in Service sector firms and, for Compensation, also lower in non-profit firms ($p < .10$). Recruitment expenditure per employee is higher in non-profit firms ($p < .10$), however.

We also included a number of control variables assembled from other sources and matched them to the BNA data set through either detailed industry or industry/state designations. These results must be viewed as suggestive, given the lack of firm-level data. Of these variables, the one that showed the most frequent and statistically significant relationship to HRM expenditures was the employee turnover rate (separations per 100 workers, by industry). It is positive and significant in the aggregate regression and in four of the sub-function regressions. This result is consistent with the hypothesis that firms with a higher turnover rate spend more on HRM per capita, other things being equal. We would particularly expect this relationship for the Recruitment sub-function, which is the case (for $p < .10$).

A related variable included to capture cyclical volatility in production and sales over time is the log of the coefficient of variation in industry employment (from 1991–2005).

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[29] The question in the BNA survey allows respondents to circle two of the five possible answers; thus using a set of (say) four categorical dummy variables is precluded since some observations take more than one value. The results for all three strategy variables are problematic to the extent that the firm's HRM expenditure level influenced the survey respondent's choice in answering the firm's strategic involvement level.

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[30] We reran the regressions but omitted the industry dummies and also interacted the union and industry variables, but in neither case found a statistically significant effect.

A plausible hypothesis is that industries with unstable sales and production would have less developed internal labor markets and therefore less formal and extensive HRM programs and expenditures. These industries might, however, need to spend more on HRM for recruitment and training. None of the estimated coefficients are statistically significant, with the exception of Benefits Administration ($p < .10$). The unemployment rate, measured at the state/industry level, also has no discernible effect.

The aggregate regression reveals that firms in industries with a greater proportion of female employees and employees with a college education also have a higher per capita HRM expenditure, although the coefficient for college education is only weakly significant and the result for proportion female is counter to our hypothesis. The latter may reflect measurement error. Few significant effects, however, are found in the subfunction regressions. The proportion of the workforce composed of white-collar employees also has no detectable influence, except for the Recruitment function.

Conclusion

In a survey of HRM research written more than a decade ago, Guest (1997: 263) argued that the field still required "a theory about HRM, a theory about performance and a theory about how they are linked." We do not claim to have provided complete answers to these three theoretical challenges; we do claim, however, to have revealed serious weaknesses in the answers provided by SHRM researchers *and* to have advanced an innovative economics-based model that yields new tools and insights for advancing this research program. The theory and empirical strategy have admitted limitations and the model may seem too simplistic or rationally calculative to many SHRM researchers; nonetheless, we believe these shortcomings are more than outweighed by the greater generality of the approach, wide range of behavior explained, and numerous hypotheses generated.

With regard to theory, the paper presents the notion of an HRM frequency distribution as a center of research attention and then develops a formal model capable of explaining this distribution. The model treats HRM as a factor input into production and suggests that firm-level differences in the marginal revenues and costs of HRM practices lead to systematic differences in HRM adoption and expenditure. The transmission mechanism (black box) between HRM and firm performance is also modeled, with direct and indirect effects distinguished. We developed these insights formally in terms of an HRM demand curve and HRM input demand function. None of these concepts and ideas has heretofore been formally presented by other researchers in the management or economics of personnel literatures.

On the empirical side, this paper offers a new HRM estimating equation—the HRM demand function—that expressly makes choice of HRM practices (and expenditures) the dependent variable. It is the first major alternative to the Huselid-type regression model that has for the past fifteen years dominated HRM empirical research. Further, we offer substantive reasons why the conventional HRM–firm performance regression model, and the hypothesized "more HRM → higher performance" prediction, are subject to potentially serious misspecification. Finally, we also obtain a unique data source on HRM practice expenditures at several hundred American companies and use it to estimate an HRM input demand function. The regression results demonstrate that firms' demand for HRM is indeed systematically linked to a variety of economic, technological, organizational, and management characteristics. Examples include firm size, level of wages, female proportion of the workforce, industrial sector, and HRM performance goal. These results, in turn, help explain the position of firms in the HRM frequency distribution and the shape of this distribution.

Our hope is that both the theoretical and empirical innovations open a new door for fruitful work in modern HRM and expand the dialogue between HRM researchers in economics and management. We hope the economics portion of the paper brings to management researchers greater

appreciation for the fruitfulness of formal economic models, important economic concepts such as equilibrium and competition, and the general economic way of thinking. Similarly, we hope our in-depth presentation of SHRM theory and empirical work motivates economists to give more consideration to this extensive literature, a richer model of firms and management, the human and discretionary aspects of labor, and the existence

and causes of potentially large sources of market failure and disequilibrium. The purpose of industrial relations is to bridge and integrate these disparate viewpoints and, in the process, meld theories of markets and theories of organizations into a whole that is greater than the sum of the parts. We hope to have modestly pushed forward this project and, in so doing, leave the HRM field stronger than when we arrived.

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