HUMAN RESOURCE MANAGEMENT AND ORGANIZATIONAL PERFORMANCE: EVIDENCE FROM RETAIL BANKING

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Studies of the relationship between human resource management and establishment performance have heretofore focused on the manufacturing sector. Using a unique longitudinal dataset collected through site visits to branch operations of a large bank, the author extends that research to the service sector. Because branch managers had considerable discretion in managing their operations and employees, the HRM environment could vary greatly across branches and over time. Site visits provided specific examples of managerial practices that affected branch performance. An analysis of responses to the bank's employee attitude survey that controls for unobserved branch and manager characteristics shows a positive relationship between branch performance and employees' satisfaction with the quality of performance evaluation, feedback, and recognition at the branch—the "incentives" dimension of a high-performance work system. In some fixed effects specifications, satisfaction with the quality of communications at the branch was also important.

A growing body of research, including both industry-specific studies and cross-industry studies, investigates the impact of human resource management (HRM) on firm performance.[1] However, with few exceptions, the prior industry studies focus only on the manufacturing sector, despite the fact that most employees work in service-producing industries. The HRM environment can be an even more important determinant of productivity in the service sector than in the manufacturing sector, given the much larger share of total production costs accounted for by employment, and the much more extensive direct contact between employees and customers, in services.

This paper extends the analysis of the relationship between the human resource management environment and establishment performance to the service sector by examining the branch operations of a large Canadian bank. Previous studies of pro-

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Because the data used in this study are proprietary and were obtained only by signing a confidentiality agreement, the author is unable to release them.

[1]For a review of studies on HRM and manufacturing productivity, see Ichniowski, Kochan, Levine, Olson, and Strauss (1996).

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ductivity in the banking industry indicate the importance of getting "inside the black box" (Berger and Mester 1997), which can only be done through detailed analysis at the plant level, that is, the branch. To develop convincing estimates of the effect of HRM on performance, I collected a unique branch-level data set through site visits to the bank's headquarters and its branches.

Several features of the data used for this study help make estimates of the effects of HRM on performance especially convincing. First, since the branches are producing the same products using the same production process, it is possible to estimate the impact of the human resource management environment while greatly limiting the confounding impact of unmeasured attributes of the production process, a problem that plagues cross-industry studies. Second, I collected performance and HRM data for two different time periods in each branch, which allows for fixed effects estimation to control completely for any unmeasured branch-specific effects that may be correlated with the HRM environment. Third, the most likely time-varying factor that may be correlated with HRM and thereby bias estimated effects of HRM is "manager quality" or "manager style." I have collected data on the identities of all branch managers in both time periods and have estimated models that control for this potentially important time-varying factor. Fourth, branch managers are given considerable discretion in how to manage their branches and their employees, so the HRM environment can vary considerably across branches and over time.

To describe the human resource management environment at each work site, I use employee perceptions of human resource policies and work practices. This approach has two advantages over that used by most previous studies of human resource management and organizational performance. First, an employee survey provides information directly from the individuals working at a site, rather than a manager's description of what he or she perceives as the environment, or, worse still, an idealized description of the environment. The higher the level of the manager who completes the survey, the more limited his or her knowledge of what is actually happening at the workplace. Second, since an employee survey fields many responses from each worksite, one person's idiosyncratic opinion or interpretation of the questions is less likely to distort the results.

Prior Literature

Economic Literature on Productivity in the Banking Industry

The economic literature on productivity in the banking industry has focused mainly on how scale affects bank or branch efficiency. These studies typically use the value-added or production approach, which views banks as "producing" demand deposits, time and savings deposits, commercial loans, real estate loans, and installment loans, using capital, labor, and materials to do so.[2] The best example of a branch-level productivity study is Berger, Leusner, and Mingo (1997).[3] Using data on 760 branches in a

[2]There is also a literature on branch productivity that uses data envelopment analysis (DEA). DEA compares each branch with all of the other branches in the observation set and identifies the relatively efficient (best practice) subset of branches and the subset of branches that are relatively inefficient. In these studies, output is measured as the number of transactions (for example, new accounts, closed accounts, loan applications, checks cashed, travelers' checks sold) processed by the branch, and inputs are number of employees, office space, and supplies. Many studies that use DEA use a small number of observations (for example, Sherman and Gold [1985] used 14 branches, and Parkan [1987] used 35 branches) relative to the number of inputs and outputs and are therefore predisposed to find that most branches are efficient. An exception is the work by Schaffnit, Rosen, and Paradi (1997), who studied 291 Ontario-based branches of a large Canadian bank and found that about 50% of the branches were technically efficient.

[3]Other examples of parametric branch-level productivity studies are Murphy and Orgler (1982), which estimated a Cobb-Douglas cost function for one year (1976) on 127 branches of an anonymous bank in a small country; Doukas and Switzer (1991), which

large U.S. commercial bank for the time period 1989–91, the authors found that most branches fell considerably short of the optimally efficient size but their average cost curves were relatively flat. Only one paper by economists has considered other correlates of efficiency, and it was conducted at the bank (company) level, not the branch level. Berger and Mester (1997) used data from 6,000 U.S. commercial banks to estimate the performance effects of bank size, bank age, organizational form and governance, market characteristics, and state geographic restrictions on competition. They found that most of the variance in measured efficiency remained unexplained, and they attributed this to unmeasured factors such as differences in managerial ability; they concluded that the sources of the variation in bank efficiency remain a "black box."

Human Resource Management and Organizational Performance

The "black box" in the banking industry may indeed be the human resource management policies and practices used by managers. A large body of research has documented the link between human resource management and organizational performance, primarily in the manufacturing sector. These studies typically fall into one of two categories: (1) national cross-industry studies (Black and Lynch 2001; Bresnahan, Brynolfsson, and Hitt 2002; Cappelli and Neumark 2001; Huselid 1995); or (2) intra-industry studies (Kleiner, Leonard, and Pilarski 2002; Batt 1999, 2002; Boning, Ichniowski, and Shaw 2001; Appelbaum et al. 2000; Ichniowski, Shaw, and Prennushi 1997; Kelley 1996; Delery and Doty 1996; Youndt et al. 1996; Dunlop and Weil 1996; MacDuffie 1995).

In their reviews of this literature, Becker and Gerhart (1996) and Delery (1998) cautioned researchers to develop a theoretical basis for the human resource management constructs they use in their empirical analysis. The widely accepted theoretical basis for the relationship between human resource management and organizational performance is the high-performance work system framework provided by Appelbaum et al. (2000). At the core of a high-performance work system, according to Appelbaum et al., is an organization that enables non-managerial employees to participate in substantive decisions. The high-performance work system also requires supportive human resource practices that enhance worker skills and that provide incentives for workers to use their skills and participate in decisions. Appelbaum et al. (2000) showed how these three elements of a high-performance work system—opportunity to participate, skills, and incentives—contributed to productivity in three manufacturing industries.

The Service Sector Setting

With the exception of Batt (1999, 2002), Banker et al. (1996), and Delery and Doty (1996), all of the prior research on human resource management and organizational performance has focused on the manufacturing sector, despite the fact that today most employees work in service sector industries. Services differ from goods in three important ways: they are intangible, they tend to be produced and consumed simultaneously, and they tend to involve the consumer in their production and delivery (Bowen and Schneider 1988). The simultaneous delivery and receipt of services in the face-to-face service sector brings employees and customers close together, blurring the boundary between the two groups (Parkington and Schneider 1979). The direct contact that exists between the employee and the customer in the service sector suggests that human resource management may be even more important in the

estimated a translog cost function using one calendar quarter of data (October 31, 1985, to January 31, 1986) on 563 branches of an anonymous Canadian bank; and Zardkoohi and Kolari (1994), which estimated a translog cost function using 1988 data on 615 branches of 43 Finnish savings banks.

service sector than in the manufacturing sector.

In her study of telecommunications call centers, Batt (2002) argued that the high-performance work system is likely to have an important impact on organizational performance in customer service settings because "high involvement practices help employees develop the kind of firm-specific human capital—knowledge of the firm's products, customers, and work processes—that enables them to interact effectively with customers." Indeed, organizations that compete in sales and service delivery often use a "relationship management" strategy in which they seek to build long-term relationships with customers by providing high-quality service.[4] Heskett et al. (1997) provided evidence in support of what they called a "service profit chain." Using data on six companies, they found that companies providing high-quality service have satisfied and loyal customers and satisfied and loyal employees; they argued that satisfied customers lead to satisfied employees and vice versa. Further, they found that companies whose customers are satisfied with service quality exhibit revenue growth—hence the "service profit chain." A key link in the "service profit chain" is a high-performance work system (Batt 1999).

Human Resource Management in the Banking Industry

A few scholars have studied the impact of human resource management on performance in the banking industry, but these studies have important methodological limitations. Delery and Doty (1996) conducted a survey of senior human resource executives in U.S. banks in order to obtain information on the human resource policies used by the banks for their loan officers.[5] Using a cross-sectional framework that ignored the role of bank fixed effects, they found a positive correlation between the bank's returns on assets and equity and the existence of profit-sharing and employment security for loan officers, controlling for the size and age of the bank. Frei, Harker, and Hunter (2000) have shown that X-efficiency, or how well management aligns technology, human resources, and other assets to produce a given level of output, plays an important role in the banking industry. It is important to note that both of these studies used cross-sectional data, and the possibility thus remains open that a longitudinal study controlling for bank-specific fixed effects would produce different results. The use of cross-sectional data also characterizes the other work that has been done on the impact of human resource management in the service sector (for example, Batt 1999, 2002; Banker et al. 1996).

A second limitation of the two banking studies is that the analysis was done at the level of the bank. While the ability of the bank's managers at the firm or headquarters level can certainly affect the bank's performance, much of a bank's activities occur at the branch level. In retail banking, customers have idiosyncratic needs, and the interactions between these customers and bank employees take place at the branch level. Hence, the role that the manager might play in creating a high-performance work environment that will contribute to performance is best studied at the branch level.

One study that used branch-level data is Schneider and Bowen (1985), which analyzed data from employees and customers in 28 branches of a U.S. bank and tested the hypothesis that branch employees' perceptions of organizational human resources practices are positively correlated with

[4]Keltner (1995) found that a strategy of relationship banking coupled with cultivation of highly skilled and trained employees was a statistically significant factor explaining why German banks outperformed U.S. banks in the 1980s.

[5]Their survey had a response rate of 11%, resulting in a sample of 216 banks.

branch customers' attitudes about service. Schneider and Bowen argued that the positive correlation would exist because employees who perceive their organization as one that facilitates performance, enhances career opportunities, and provides positive supervision will be free to do the organization's main work of serving customers. The study's main finding was that customers' attitudes about overall service quality at the branch were positively correlated with employees' ratings of the branch on the quality of supervision, work facilitation, and career facilitation. While this study had the virtue of being conducted at the branch level, its data were only cross-sectional, and the results could disappear in a longitudinal analysis that includes branch-specific fixed effects. Another limitation of the study is that it did not examine the impact of the employee perceptions on the actual performance of the branch; the only "performance" measure that was used was the customers' intentions to leave the branch. Hence, to date no study has used longitudinal data to analyze the impact of the human resource management environment on branch-level performance in the banking industry. The current paper fills this gap.

Getting Inside the "Black Box": How HR Practices Affect Performance in Retail Bank Branches

The New Environment in Banking

Although there are only five banks in the Canadian banking industry, Canada has the highest ratio of full-banking branches to population of all the major industrialized nations (Canadian Bankers Association 1994). The availability of numerous retail branches, coupled with reforms that have allowed banks to expand their product lines, has resulted in a very competitive environment in which much attention is paid to opportunities to increase the profitability of retail banking. In addition, technological change has resulted in a major organizational redesign in the Canadian banking industry. Many paper-processing tasks typically performed by branch personnel have been moved offsite to "centralized accounting units," thereby radically changing the tasks performed by branch personnel.[6] For example, in the past, tellers simply processed customers' transactions. Today, they are evaluated on the basis of their ability to sell various financial products or make referrals to the proper sales personnel. In the words of the executive vice-president of human resources at the bank used for this study, "Sales is now the name of the game in this industry." In the new sales-oriented environment, branches are evaluated based on their sales of products.

Insights from Branch Visits

Although the bank under study has a formal set of human resource policies regarding job descriptions, salaries for particular jobs, performance appraisals, and feedback, the actual implementation of these policies differs across branch managers. In my interviews with executives at the bank's headquarters, I learned that some branches were considered to have excellent HRM environments (in the sense of positively affecting branch performance) whereas others were viewed less favorably. In order to understand how a branch manager might create a human resource management environment that could affect branch-level performance, I gathered data directly from managers and employees in ten branches during the fall of 1995 and the winter of 1996. I asked the bank headquarters to select branches that represented the range of HRM environments as perceived by headquarters. One day was spent in each branch, meeting first with the manager and then individually with five or six employees in different positions (tellers,

[6]See Autor, Levy, and Murnane (2000) and Hunter, Bernhardt, Hughes, and Skuratowicz (2000) for a discussion of the various ways in which technological change has affected job content and earnings at a number of U.S. retail banks.

personal banking officers, customer service representatives, accounting clerks, and so on). These interviews proved to be an invaluable component of the research agenda, as they provided specific examples of how managers could create a high-performance work environment that could contribute to the branch's performance.

The interviews clarified the process by which branches make sales. The observed sales of a branch during time period t are a function of the amount of contact the staff has with customers and the probability that a given interaction with a customer leads to a sale. Customer contact depends on the volume of customer traffic at the branch as well as the number of contacts personal bankers have (both in person and by telephone) with existing and potential customers. The probability of a sale given contact depends both on the characteristics of the customer (for example wealth and age) and on the ability of the branch employee to make a sale. The latter in turn is dependent on the employees' experience at the branch (more branch-specific experience leads to stronger relationships with customers) as well as their product knowledge and motivation to sell.

Below, I describe visits to two branches that show how the three dimensions of a high-performance work system postulated by Appelbaum et al. (2000) contribute to the productivity of branch employees. I selected these two branches because they provide interesting contrasts in the way the bank's formal HRM policies are implemented, thereby creating different human resource management environments at the branch level.

Branch #1. As of the date of the branch visit in January 1996, the branch manager had been at the branch for almost two years. During the time I spent at the branch, the manager rarely left his office to monitor activities in the branch or to interact with his employees. The manager complained that the employees were apathetic and that the branch was not operating at potential.

The interviews with the employees confirmed much of what the manager discussed, and employees blamed him for the unsatisfactory work environment and the mediocre performance of the branch. Specifically, the employees complained about the process of receiving feedback and the reward and recognition system. For example, at least two of the employees complained about the manager's tendency to give negative feedback in front of customers and his encouraging employees to "snitch" on other employees. Some of them also complained that the manager did not provide real recognition of employees who performed well. One teller discussed how she worked through her lunch hour to generate a referral for a mortgage but received no recognition. There was a general sense that the employees were not cooperating with each other; for example, one employee recalled a recent occasion in which there was a long line and only one teller was working, but no one bothered to pitch in. This branch clearly lacked the attributes of a high-performance work system.

Branch #2. Like the manager in Branch #1, the manager in Branch #2 had been with the branch for almost two years as of the date of the branch visit (November 1995). Headquarters selected this branch because they felt this manager was a model to which other managers should aspire. Interviews with the manager and with several branch employees as well as general observations confirmed that the human resource management environment in this branch was a high-performance work system.

One of the dimensions of a high-performance work system is the "opportunity to participate," and a key element of Appelbaum et al.'s (2000) "opportunity to participate" scale is the extent of communications with peers and with supervisors. In this branch, the manager held regular staff meetings to encourage communications between peers and between employees at different levels or in different functions in the branch. At these meetings, the employees were encouraged to identify areas for improvement and to make suggestions for

change. The employees commented positively about the weekly staff meetings. As one employee put it, "We now know what is going on in all departments." Communications between the staff and the manager were described by the employees as excellent. "You can talk to her [the manager] … she's one of us," commented an employee.

The second dimension of a high-performance work system—skills—was also evident in this branch. Unlike the manager in Branch #1, this manager appeared genuinely interested in ensuring that her employees had the proper skills to do their jobs. In order to influence the actual skills of her employees, at the staff meetings she would teach her employees about new products and how to sell them. She often used games to teach the employees about a new product, and this approach appealed to the employees, who commented positively about the party atmosphere at the meetings.

Also evident at this branch was the third dimension of a high-performance work system—incentives. For example, the manager held contests with small monetary prizes to motivate her employees. The employees commented favorably on the performance feedback and reward system at the branch. "She keeps me posted on how I am doing," said one employee.[7] Unlike the employees in Branch #1, the Branch #2 employees felt that the manager recognized when they did a good job and rewarded them, even if only with a gift certificate or a half-day off. The manager in Branch #2 also motivated her employees to use their skills and to provide service to the customers by being a hands-on manager who rarely sat in her office. While I was at the branch, she was frequently at the tellers' platform, either assisting the tellers with questions or actually pitching in as a teller when the lines got long. Her example was more effective at getting others to pitch in than was any formal directive or policy issued by the manager at Branch #1. Finally, the personal bankers who were responsible for generating new loan business reported how they stayed after hours to cold-call potential clients; by contrast, in Branch #1, personal bankers worked "by the book," leaving as soon as the regular business day ended.

Implications for the Impact of High-Performance Work Practices on Branch Performance

These interviews indicated that although the company has a set of formal human resource policies for its branches, branch managers have discretion in their application of these policies. Some branches have human resource management environments that can be characterized as high-performance work systems, while others have more traditional systems.[8] The branch visits demonstrated how branch-level performance can be influenced by the three dimensions of a high-performance work system. Branch performance is measured by the sales of deposit and loan products, and, as in Heskett et al.'s (1997) service profit chain, branches will make more sales if customers are satisfied with the quality of service at the branch. The branch visits demonstrated that service quality will be higher in a high-performance work system.

First, customer needs are more likely to be satisfactorily addressed if employees have the proper skills. Employees need a thorough understanding of the attributes of the bank's various products, and they also need branch-level experience in order to under-

[7]This is a good example of an employee receiving feedback from the supervisor. See Hollenbeck et al. (1998) on the impact of feedback on team performance.

[8]Given that the human resource management environment varies across branches, a study of the impact of human resource management on performance in the banking industry must be done at the branch level, not at the bank level. Table 2 (below, in the "Results" section) documents the variation in the human resource management environment that exists across the branches in the bank under study.

stand the specific needs of their customers.

Second, an environment in which employees can easily communicate with coworkers or managers will enable them to use their skills more effectively. Ease of communication as well as a more cooperative work environment will enable customer-contact employees such as bank branch employees to respond more quickly and more effectively to customer demands.

Third, employees need to have an incentive to devote effort to meeting customer needs. They are more likely to make an effort if they feel that their performance is evaluated accurately and that their efforts are recognized and rewarded.

These three observable components of the HRM environments in the two branches—skills, or specifically, product knowledge; quality of communications; and recognition and reward—are very similar to the three dimensions of a high-performance work system described by Appelbaum et al. (2000). Recall that Appelbaum et al.'s three dimensions are skills, opportunity to participate in substantive decisions, and incentives to use skills and participate in decisions. The first and third factors I identified are very close matches to the corresponding Appelbaum et al. factors, and my second item is closely related to Appelbaum et al.'s second item because a key element of Appelbaum et al.'s "opportunity to participate" scale is the extent of communications with peers and with supervisors. Hence, we would expect to see positive relationships between the three observable components of the branch-level HRM regimes and branch-level performance.

Methodology

Recent reviews of the literature on human resource management and organizational performance (Becker and Gerhart 1996; and Delery 1998) have identified four methodological issues that researchers in this area need to consider: (1) the appropriate measure of organizational performance given the context of the study; (2) whether human resource management practices should be measured at the firm level or, instead, at the business unit or facility level; (3) possible omitted variables that could bias the estimated relationship between human resource management and organizational performance; and (4) the extent to which the estimated coefficients on the human resource variables can be interpreted as showing a causal relationship between human resource management and organizational performance. In this section, I describe my empirical methodology and indicate how my approach addresses each of the four concerns.

Defining Branch Output

The interviews I conducted with numerous branch managers and finance and accounting managers at headquarters indicated that, in the new sales-oriented environment, branches are evaluated based on their sales of products. In other words, a good branch is one that shows growth of deposits and loans.[9] This is because the largest component of a branch's income is its "spread" income.[10] Each financial product a branch offers has a certain "spread" factor that equals the profit margin on the product.[11] According to the managers in-

[9]When the performance of an entire bank is being measured, a metric known as the efficiency ratio is often used. This is defined as Non-interest expense/(Interest income + Non-interest income – Interest expense). It is misleading to use the efficiency ratio to compare performance across individual branches of the bank, because when, as often happens, customers open accounts at one branch but use other branches to conduct subsequent business, the branch that opens the account gets credit for the spread income even though the other branches incur the expenses. Focusing on sales and the spread income derived from sales focuses on the income that branches derive for the bank.

[10]The other components of a branch's income are liability fees, such as fees from stop payments, bounced checks, low balances, wire transfers, and so on; asset fees, such as fees from loan applications, loan processing, and late payments; transactional fees, such as fees for travelers' checks, safe deposit boxes, and ATM transactions; and brokerage commissions.

[11]Branch managers have no discretion in setting the spread; the interest rates on the bank's products are set at headquarters.

terviewed, branches are evaluated based on their sales of financial products because growth in deposits and loans on a branch's balance sheet translates into an increase in spread income and, thereby, a larger financial contribution to the bank's performance.[12]

Specification of the Branch Output Equation

Branch-level sales of deposit and loan products are a function of capital and labor inputs, the characteristics of the neighborhood in which the branch is located and of the individuals who live there, the branch manager's knowledge of the neighborhood, and the human resource management environment in the branch. The specific equation that will be estimated is

$$\begin{aligned}(1)\qquad \text{SALES}_{it} &= \alpha + \beta \ln K_{it} + \gamma \ln L_{it} \\ &+ \gamma\lambda \text{HRM}_{it} + \eta \text{MKT}_{i} + \delta \text{MGRTENURE}_{ijt} \\ &+ \text{YEAR} + b_i + m_j + \mu_{it},\end{aligned}$$

where SALES_{it} is the annual percentage change in deposit or loan balances in branch i at time period t, K_{it} is a measure of the branch's capital stock at time period t, L_{it} is the number of employees at the branch at time period t, HRM_{it} is a vector describing the human resource management environment at the branch at time period t, MKT_{i} is a vector of characteristics describing the neighborhood in which the branch is located, MGRTENURE_{ijt} is the tenure of branch manager j in branch i at time t, and YEAR is a vector of time dummies that measure time-varying effects that are common to all branches.[13] With the exception of MKT_{i}, all the variables in equation (1) vary over time.

Since the dataset provides manager identities, I am able to include two fixed effects in equation (1); the first, b_i, is a branch fixed effect, and the second, m_j, is a manager fixed effect. This specification allows for the existence of permanent, unmeasured branch characteristics that may affect performance, as well as permanent, unmeasured characteristics of individual managers that may be correlated with performance. The random, unobserved error component is denoted as μ_{it}. Note that the specification in equation (1) deals with the two remaining methodological concerns. First, omitted variable bias is unlikely to be a problem, because the specification is based on discussions with professionals in the banking industry. Second, inclusion of branch fixed effects and manager fixed effects means that the coefficients on the HRM variables can be interpreted as estimates of the causal effect of HRM on organizational performance.

Finally, interviews with senior management at the bank indicated that bank management was emphasizing loan product sales over deposit product sales for two reasons. First, loan products have bigger spreads. Second, a lending relationship with a customer provides a natural opportunity to discuss the sale of additional products. Indeed, the importance of loan business in the banking industry is supported by case studies of bank mergers that occurred in the United States in the 1990s.[14] This suggests that the human resource ac-

[12]Hunter and Hitt (2001) used a sample of 235 branches from 101 different banks. Since their sample was not restricted to one bank, their choice of measures of branch-level performance was dictated by the need for comparability across banks. The measures they chose were the number of checking accounts and the number of financial products held per customer. In order to avoid the comparability problem, the analysis of performance is best done across branches within one bank.

[13]This specification is derived from the Cobb-Douglas production function $Q = AK^{\beta}EL^{\gamma}$, where Q is the dollar value of sales; K is the capital stock and EL is effective labor, with $EL = L(1 + \lambda \text{ HRM})$; L is the number of employees; and HRM is the HRM environment. HRM transforms employees into effective labor.

[14]Calomiris and Karceski (1998) discussed how opportunities for loan and mortgage originations influenced banks' selection of acquisition targets.

tivities undertaken by the branch manager are likely to be targeted more at influencing those employee activities that are correlated with the sale of loan products than at influencing deposit products. Hence, equation (1) will be estimated separately for deposits and loans.

Sample

The sample that is used to estimate equation (1) was constructed as follows. In 1995, 333 branches were in operation in the province of Ontario. These branches operate in very different environments, which can affect their ability to sell their products. For example, some branches operate in downtown business areas and many of their customers are large businesses. Even within the group of branches that operate in residential areas, important differences in customers' age and wealth can affect performance.

Based on my conversations with managers in the bank's marketing department, I eliminated branches that function as large commercial banking centers[15] as well as branches in rural areas, resulting in a sample restricted to branches in metropolitan areas.[16] Second, a branch was excluded if it had not been in operation for at least one year prior to the start of the 1995 fiscal year. Third, in order to estimate the fixed effects model, data from the employee opinion survey had to be available for at least two years (either 1995 and 1996, 1995 and 1997, 1996 and 1997, or 1995, 1996, and 1997). Hence, branches for which only one year of employee opinion survey data were available were excluded. The resulting sample consists of 160 branches, 150 of which have two years of data and 10 of which have three years of data, for a total of 330 observations.[17]

Definitions of Variables

Sales. A branch's annual sales are calculated as either the percentage growth in deposits or the percentage growth in loans from the last day (October 31) of the previous fiscal year to the last day (October 31) of the current fiscal year. Table 1 shows that net sales of both deposits and loans were declining over the 1995–97 time period, which the bank managers attributed to increased competitiveness in the industry. Year dummies are included in equation (1) to control for this phenomenon.

Capital stock (K). The branch's capital stock is measured by the value of its property and premises in each fiscal year.

Number of employees (L). The branch's labor input is measured by the numbers of full-time and part-time employees in each fiscal year. As shown in Table 1, the average number of employees in a branch is approximately 18.

Characteristics of the branch's market (MKT). For each of the branches in my sample, I was able to obtain detailed information about the branch's location. In particular, the bank defines a branch's "market" as the area within a 2.5-kilometer radius of the branch, and it gathers data on the population residing within that circle. Five variables were provided for each branch's market: total population, average dwelling value, education, household turnover, and a "lifestyles" vector that describes the type of people living in the area. There are ten lifestyle categories—affluent, empty nesters, ethnic, low-income, middle-class, upscale, working-class, young singles, young couples, and old/retired—and the most common of these population "types" in the branch's market is identified. All of these market characteristics are measured in

[15]Doukas and Switzer (1991) found that the production technologies of retail and commercial branches are quite distinct.

[16]The metropolitan areas are the cities of Toronto, Ottawa, London, Windsor, Hamilton, Kitchener, Niagara Falls, and Peterborough, together with their surrounding communities.

[17]Among the 150 branches with two years of data, 102 have data for 1995 and 1997, 25 have data for 1995 and 1996, and 23 have data for 1996 and 1997.

Table 1. Summary Statistics.

	1995		*1996*		*1997*	
Variable	*Mean*	*Std. Dev.*	*Mean*	*Std. Dev.*	*Mean*	*Std. Dev.*
Annual Growth Rate of Deposits	0.12	0.12	0.10	0.11	0.08	0.10
Annual Growth Rate of Loans	0.19	0.13	0.10	0.08	0.05	0.10
Average Dwelling Value	192,148	63,843	179,432	55,432	194,338	64,897
Total Population	45,013	35,312	45,605	34,428	46,897	35,320
Proportion with Post-Secondary Education	0.50	0.10	0.48	0.10	0.50	0.10
HH Turnover Rate	0.06	0.02	0.06	0.02	0.06	0.02
Affluent	0.03	0.17	0.02	0.13	0.03	0.17
Empty Nesters	0.15	0.35	0.16	0.37	0.14	0.35
Ethnic	0.07	0.25	0.10	0.31	0.07	0.26
Low	0.06	0.23	0	0	0.06	0.23
Middle	0.15	0.36	0.17	0.38	0.16	0.37
Upscale	0.28	0.45	0.26	0.44	0.30	0.46
Work	0.10	0.30	0.12	0.33	0.10	0.30
Located in Mall	0.09	0.28	0.17	0.38	0.12	0.32
Age of Branch (in years)	34.55	24.38	37.68	24.71	36.46	24.53
Manager's Tenure in Branch	4.02	3.61	4.46	3.76	4.32	3.64
Number of Full-Time Employees	8.94	4.22	10.77	4.92	9.94	4.18
Number of Part-Time Employees	8.58	5.74	9.74	5.17	7.51	4.27
Value of Property and Premises	131,017	91,809	142,322	81,656	143,175	93,881
Average Education (Employees)	12.71	0.57	12.82	0.53	13.01	0.55
Average Tenure (Employees)	4.64	2.30	4.55	2.22	4.43	2.13
N	137		58		135	

1991. In addition to these variables, I created a dummy variable to indicate if the branch is located in a shopping mall,[18] and I also control for the age of the branch.[19] The mean age of branches in the sample is approximately 35 years.

Manager tenure (MgrTenure). This is the length of time the current branch manager has been managing this branch as of the end of the fiscal year. Table 1 shows that the average tenure of a branch manager is four years.

Human resource management environment (HRM). As shown above ("Getting Inside the 'Black Box'"), the three dimensions of a high-performance work system (high skills; opportunity to participate, or, specifically, communications; and effective incentives) were observed in some of the branches I visited, but not in others. One way to empirically measure these dimensions for all the branches would be to conduct interviews of employees and managers at each of the branches. The size of the sample, however, makes that approach infeasible. An alternative approach, which I follow here, is to use data from the employee attitude survey.

Non-managerial employees (both full-time and part-time) in each branch complete a survey once every year or two that measures their assessment of a number of dimensions of the human resource environment at their branch. The mean response rate on the employee survey was

[18]Executives at the bank suggested that these branches were likely to have high sales because of the large concentration of potential customers.

[19]It was impossible to obtain accurate information about the number of competitors in each branch's market area. The bank's data source on number of competitors automatically includes any credit union that is located within the defined market area; hence many branches are shown to have twenty or more competitors.

Table 2. Human Resources Attitude Survey Questions.[a]

Variable Name	*Definition*	*1995*		*1996*		*1997*	
		Mean	*Std. Dev.*	*Mean*	*Std. Dev.*	*Mean*	*Std. Dev.*
(A) Overall							
1. Overall Rating	Overall, how would you rate the bank as a place to work?	3.49	0.29	3.56	0.25	3.58	0.30
(B) Communication							
2. Communications from Peers	Rating of communications to you from others on same level.	5.05	0.64	5.22	0.51	5.68	0.45
3. Communication Upward	Rating of opportunities to communicate upward.	5.10	0.49	5.10	0.46	5.24	0.51
4. Communications from Superiors	Rating of communications to you from superiors.	4.88	0.65	4.92	0.56	5.81	0.56
5. Overall Communications	Overall ratings of communications.	4.91	0.61	4.98	0.47	5.52	0.59
(C) Performance and Reward							
6. Understand Perf. Evaluation	I have a clear understanding of how my performance is evaluated.	3.79	0.34	3.90	0.26	4.06	0.30
7. Contributions Recognized	When things go well in your job, how often are your contributions recognized?	3.27	0.46	3.39	0.40	3.85	0.43
8. Frequency of Feedback	How would you rate your supervisor on letting you know how you are doing your job on a regular basis?	3.99	0.37	3.89	0.37	3.43	0.47
(D) Climate							
9. Express Views	I feel comfortable expressing my views/suggestions at branch meetings.	3.71	0.43	3.76	0.42	4.02	0.35
10. Morale	Morale is high in my department.	3.23	0.46	3.18	0.48	3.74	0.44
11. Cooperation	How would you rate your branch on cooperation among employees?	2.91	0.51	3.08	0.49	3.46	0.50
12. Supervisor Accessible	How would you rate your supervisor on being easy to see when you have a problem?	3.60	0.54	3.64	0.51	3.89	0.46
(E) Skill							
13. Understand Products	I have a good understanding of the bank's products and services that I am expected to promote/sell.	4.16	0.25	4.18	0.18	3.62	0.58

[a]Responses are scored from 7 (extremely good) to 1 (extremely poor) for questions 2–5; all other questions are scored 5 (strongly agree, very good, or always) to 1 (strongly disagree, very poor, or never).

80% and the mean number of responses (per branch) was 14 in each of the three fiscal years under study. The bank provided me with the responses to 13 of the 68 questions on the employee attitude survey; the excluded questions concerned satisfaction with employee benefits, training programs, job security, and physical conditions in the branch. The included questions, listed in Table 2, focused on the employee's assessment of performance and recognition at the branch, the nature of communication flows between the manager and staff and between co-workers, morale, the level of cooperation, and accessibility of the supervisor.

The responses to the employee survey measure the workers' perceptions of various dimensions of the human resource management environment at the branch, rather than the incidence of specific HR practices.[20] For example, the questions on "Communications" ask the employees to evaluate the quality of communications at the branch, rather than to indicate the number of times they speak with their manager or co-workers during the week. As I show above (in the Results section), the numeric responses to the employee survey are consistent with the observations made during the branch visits, suggesting that there is a close relationship between the responses to the employee attitude survey and actual practices at the branches.

The responses to the employee survey were used to construct four measures (see Table 2) to proxy the three dimensions of Appelbaum et al.'s (2000) high-performance work system. The first constructed measure, *Communication,* is an index based on four communications-related questions from the employee survey (communications from peers, communication upward, communications from superiors, and overall communications).[21] Recall that communication is a key element of Appelbaum et al.'s (2000) "opportunity to participate" scale, one of the dimensions of a high-performance work system. To create the index, I transformed the 1–7 Likert response format for each question (where 7 is the best) to a 0–100 scale, and calculated the mean value of the four variables.

A second constructed index, *Climate,* is used to measure the extent to which the environment in the branch encourages participation. *Climate* is an index based on answers to four questions, concerning comfort in expressing views/suggestions, level of morale, degree of cooperation among employees, and accessibility of the supervisor.[22] To create this index, I transformed the 1–5 Likert response format for each question (where 5 is the best) to a 0–100 scale, and calculated the mean value of the four variables.

In order to measure the "incentives" dimension of a high-performance work system, an index called *Performance and Reward* is created. *Performance and Reward* is based on three questions from the employee survey concerning, respectively, understanding of how performance is evaluated, how often contributions are recognized, and frequency of feedback from the supervisor. The procedure for constructing this index is identical to that used for *Climate.*[23]

Finally, the last dimension of a high-performance work system, namely high relative skill requirements, is proxied by an index called *Skill* that uses the response to a question on the employee survey regard-

[20]This approach is superior to using the sole source manager survey response used in most previous research. An example of a prior study that used employee survey responses is Schneider and Bowen (1985), which studied the correlation between branch employees' perceptions of HR practices and branch customers' attitudes about service.

[21]Cronbach's alpha is .92 in 1995, .88 in 1996, and .90 in 1997.

[22]Cronbach's alpha is .67 in 1995, .72 in 1996, and .75 in 1997. Accessibility of supervisor appears to belong in this index, not in the *Performance and Reward* index. When it was included in the *Performance and Reward* index, the Cronbach alphas were lower.

[23]Cronbach's alpha for *Performance and Reward* is .72 in 1995, .62 in 1996, and .32 in 1997.

Table 3. Pairwise Correlations of Employee Attitude Survey Questions.

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*
1 Overall	1.0000																
2 Perf./Reward	0.5346	1.0000															
3 Climate	0.5508	0.6017	1.0000														
4 Communication	0.4259	0.6645	0.7472	1.0000													
5 Skill	0.2121	0.1620	0.1390	0.0542	1.0000												
6 Recog.	0.3579	0.7291	0.5900	0.7483	–0.0305	1.0000											
7 Perf. Eval.	0.4637	0.7089	0.5125	0.5439	0.1940	0.5012	1.0000										
8 Freq. Feedback	0.2535	0.5199	0.0948	0.0180	0.1864	–0.1031	0.0443	1.0000									
9 Express	0.4018	0.5234	0.7550	0.7180	0.0670	0.5567	0.4058	0.0641	1.0000								
10 Coop.	0.4587	0.4286	0.8185	0.5205	0.1799	0.3984	0.3743	0.0841	0.4680	1.0000							
11 Sup. Access	0.3509	0.3003	0.7040	0.3350	0.0846	0.2423	0.3010	0.0712	0.3158	0.4713	1.0000						
12 Morale	0.4911	0.6287	0.8198	0.7764	0.0868	0.6566	0.5127	0.0724	0.6490	0.5429	0.3606	1.0000					
13 Comm. Peer	0.4366	0.5834	0.7214	0.8899	0.0417	0.6664	0.4860	–0.0000	0.6651	0.5538	0.3429	0.6978	1.0000				
14 Comm. Up	0.3898	0.6735	0.6047	0.8189	0.0957	0.5599	0.4369	0.3056	0.5983	0.3894	0.2840	0.6356	0.6254	1.0000			
15 Comm. Down	0.3303	0.5282	0.6644	0.9213	0.0001	0.7373	0.4866	–0.1729	0.6670	0.4441	0.2669	0.7182	0.7852	0.6254	1.0000		
16 Overall Comm.	0.3832	0.6262	0.6769	0.9334	0.0753	0.6828	0.5289	0.0292	0.6307	0.4685	0.3110	0.7149	0.7513	0.7605	0.8163	1.0000	
17 Products	0.1920	0.1114	–0.0346	–0.2059	0.4648	–0.3602	–0.0917	0.6394	–0.0809	0.0653	0.0553	–0.1636	–0.1690	0.0550	–0.3860	–0.1491	1.0000

Key: **Performance and Reward** is based on Recog., Perf. Eval., and Freq. Feedback; **Climate** is based on Express, Coop., Sup. Access, and Morale; **Communication** is based on Comm. Peer, Comm. Up, Comm. Down, and Overall Comm.; **Skill** is based on Products and employee tenure and education. See text.

ing the employee's assessment of how well he or she understands the bank's products, and information on the average education level and average branch tenure of the employees in the branch in the particular year. Table 1 shows that the average tenure of a branch employee was about 4-1/2 years and the average educational attainment was about 13 years. The product knowledge response and the tenure and education variables were each transformed to a z score, and the mean value of the three z-scores was calculated to create the index.

Table 2 shows that for the most part, employee opinions of the human resource activities of their managers improved between 1995 and 1997. This is likely due to the fact that during this time period senior management at the bank put much greater emphasis on the importance of human resource management and tried to address the serious deficiencies in some branches that had been revealed by the employee opinion surveys. Including year dummies in equation (1) enables me to control for this change. Table 3 shows the pairwise correlations of the thirteen individual items from the employee opinion survey (each converted to a 0–100 scale) and the four constructed measures of the HRM environment.

Results

OLS Estimates

Equation (1) was first estimated excluding the branch and manager fixed effects. The results are shown in Tables 4 and 5.[24] These OLS specifications were obtained with the HRM variables first excluded (Table 4) and then included (Table 5).[25]

The non-HRM variables. Table 4 shows that together these variables explain 23% of the variance across branches in their sales of deposit products and 43% of the cross-branch variation in loan sales. Both market size and the rate of household turnover have statistically significant positive relationships with sales of deposits and loans. Another market predictor of the sale of loans is whether the branch operates in a market where the residents are identified as affluent or upscale.

Size of the branch is statistically significant only when measured by the number of part-time employees in the loans equation. An alternative specification of equation (1) includes the lagged value of deposits or loans in order to better control for the size of the branch. When the lagged value is included, the coefficients on the numbers of full-time and part-time employees are both positive and statistically significant in both equations, and the full-time elasticities are larger than the part-time elasticities.[26]

The HRM variables. Table 2, which reports the means and standard deviations of the employee attitude variables, shows that there is variation across branches in the employee responses to the survey questions.[27] Responses pertaining to perceptions of specific human resource practices have more variability than responses to question 1, which solicits an overall rating of the bank. Question 1 is similar to questions of the type that are typically used in studies of employee attitudes.[28]

It was argued in the previous section that the responses to the employee attitude sur-

[24]In order to be included in the sample, the branch had to have two years of employee survey responses.

[25]The coefficients on the non-HRM variables shown in Table 2 were largely unaffected by the inclusion of the HRM variables.

[26]The number of employees and lagged balances are positively correlated. Since the lagged value has a negative coefficient, the coefficients on number of employees were reduced when the lagged value was excluded.

[27]It is possible that part of the variation across branches is due to branch-level variation in employee characteristics. Since I include education and tenure of the branch employees in the regressions (through the index *Skill*), I argue that the variation in the responses to the employee attitude questions is capturing the branch effect, unless there is substantial cross-branch variation in unmeasured employee characteristics.

[28]For a recent review of the literature on employee attitudes and performance, see Judge et al. (2001). With the exception of Ostroff (1992), which used organizational-level data, virtually the entire literature used individual-level data.

Table 4. Determinants of Branch-Level Productivity (OLS).[a]

	Growth Rate of Deposits		*Growth Rate of Loans*	
Independent Variables	*b*	*t*	*b*	*t*
Market Characteristics				
Ln (Avg. Dwelling Value)	0.026	(0.56)	0.003	(0.06)
Ln (Total Population)	0.017	(1.70)*	0.031	(3.37)***
% Post–High School Education	–0.002	(–1.46)	–0.002	(–1.73)*
Household Turnover	0.011	(2.60)***	0.017	(4.15)***
Affluent	0.042	(0.97)	.100	(2.47)***
Empty Nesters	–0.045	(–1.80)*	–0.016	(–0.67)
Ethnic	–0.043	(–1.27)	–0.006	(–0.18)
Low	–0.015	(–0.45)	0.051	(1.59)
Middle	–.022	(–0.78)	0.017	(0.67)
Upscale	0.015	(0.61)	0.046	(1.99)**
Working	–0.014	(–0.50)	0.023	(0.87)
Branch Characteristics				
Located in Mall	–0.017	(–0.78)	–0.017	(–0.85)
Age of Branch	–0.020	(–2.56)***	–0.001	(–0.12)
Manager Tenure	–0.0001	(–0.56)	0.0001	(0.47)
Ln (No. Full-Time Employees)	–0.01	(–0.49)	–0.028	(–1.40)
Ln (No. Part-Time Employees)	0.012	(0.80)	.023	(1.68)*
Ln (Property and Premises)	0.009	(0.63)	–0.026	(–2.02)**
Year Dummies				
1995	.034	(2.63)***	.132	(10.84)***
1996	.017	(1.01)	.055	(3.47)***
N	330		330	
R^2	0.225		0.428	

[a]Regressions include city dummy variables. Each observation is a branch-year, where year is either 1995, 1996, or 1997.

*Significant at the .10 level; **at the .05 level; ***at the .01 level.

vey can be used as proxies for the dimensions of a high-performance work system. This is borne out by a comparison of the values of the HRM indices for Branch #1 and Branch #2. Recall from the discussion of the branch visits that, in contrast to the manager at Branch #1, the manager at Branch #2 was observed to undertake activities that were consistent with a high-performance work system. The 1995 responses to the employee attitude surveys for these two branches support the claim that the HRM environments at these branches differ in a way that is consistent with my observations.[29]

For example, at Branch #2, the calculated value for the index *Communication* is 76, while at Branch #1 it is 57, and across all branches the mean for the index is 66. Employees at Branch #2 rate communications at their branch as being significantly better than the communications ratings given by employees at Branch #1 ($p < .05$). Similarly, at Branch #2, the calculated value for the index *Performance and Reward* is 71, while at Branch #1 it is 53, and across all branches the mean for the index is 67. On this dimension, employees at Branch #2 rate their branch as being significantly better than the ratings given by Branch #1 employees ($p < .01$). For the index *Climate*, the value for Branch #2 is 68, the value for Branch #1 is 45, and the overall mean is 59; the Branch #2 rating is significantly higher than the Branch #1 rating ($p < .01$). Finally, the *Skill* index, which by construction has a

[29]Since I visited the branches at the end of 1995 and the beginning of 1996, the responses to the 1995 employee attitude survey would most closely match the environment I observed.

Table 5. Effects of HR Indices on Branch Performance (OLS).[a]

	Growth Rate of Deposits			*Growth Rate of Loans*		
Index	*b*	*t*	R^2	*b*	*t*	R^2
Each HR Index Entered Separately						
1. Overall	0.000	(0.01)	.225	0.020	(2.55)***	.441
2. Skill	–0.062	(–0.50)	.226	0.070	(0.61)	.429
3. Performance and Reward	0.013	(1.55)	.231	0.028	(3.45)***	.450
4. Climate	0.002	(0.24)	.225	0.005	(0.78)	.430
5. Communication	0.003	(0.41)	.226	0.023	(3.13)***	.447
HR Indices Entered Simultaneously			.237			.466
6. Overall	–0.007	(–0.63)		0.016	(1.61)	
7. Skill	–0.093	(–0.72)		0.014	(0.13)	
8. Performance and Reward	0.023	(1.87)*		0.021	(1.83)*	
9. Climate	–0.002	(–0.20)		–0.025	(–2.60)**	
10. Communication	–0.007	(–0.63)		0.021	(1.96)**	

[a]These are coefficients and t-values from complete regressions as specified in Table 4.
*Significant at the .10 level; **at the .05 level; ***at the .01 level.

zero mean across all branches, has a value of .07 for Branch #2 and a value of –0.42 for Branch #1, a statistically significant difference ($p < .05$). Hence, all four indices show a significantly higher branch rating by Branch #2 employees than by Branch #1 employees.

The top panel of Table 5 shows that the *Overall* rating of the bank as well as the *Performance and Reward* and the *Communication* indices have positive and statistically significant effects on the branch's loan growth rate. In the bottom panel of Table 5, all four indices and the *Overall* rating are included in the regression together. The fact that the *Performance and Reward* and *Communication* indices are statistically significant even when we control for the *Overall* rating indicates that the employees' perceptions of specific HRM activities contain important information quite distinct from their overall assessment of the bank.[30] Note further that, as expected, the HRM variables have weaker effects in the deposits equation, with only *Performance and Reward* being statistically significant. The magnitudes of the statistically significant HRM indices are rather large. A one standard deviation improvement in either the *Performance and Reward* index or the *Communication* index corresponds to a 2 point increase in the loan growth rate, or 18% of the average annual loan growth rate of 11.4 percentage points. The statistical insignificance of the *Skill* index is consistent with Batt's (1999) finding that skill level did not affect the sales productivity of customer service workers in a telecommunications company.[31]

Estimates with Branch and Manager Fixed Effects

The correlations in Table 3 show that the *Overall* rating and the *Performance and Reward, Climate,* and *Communication* indices are highly correlated, with correlations ranging from .4 to .7. Positive correlations

[30]When the indices are used together, the coefficient on *Climate* actually has the wrong sign. Some possible explanations for this finding are discussed in connection with the specification that includes the branch and manager fixed effects.

[31]The individual items in the *Skill* index were statistically insignificant when entered as separate variables.

Table 6. Effects of HR Indices on Branch Performance.[a]
(Includes Branch and Manager Fixed Effects)

	Growth Rate of Deposits			*Growth Rate of Loans*		
Index	*b*	*t*	R^2	*b*	*t*	R^2
Each HR Index Entered Separately						
1. Overall	–0.002	(–0.15)	.220	0.022	(1.91)*	.489
2. Skill	–0.282	(–1.33)	.228	0.189	(0.97)	.481
3. Performance and Reward	0.014	(1.19)	.226	0.033	(3.21)***	.510
4. Climate	–0.006	(–0.57)	.221	–0.011	(–1.14)	.482
5. Communication	0.004	(0.34)	.220	0.017	(1.72)*	.487
HR Indices Entered Simultaneously			.245			.560
6. Overall	–0.007	(–0.45)		0.016	(1.23)	
7. Skill	–0.261	(–1.20)		0.243	(1.31)	
8. Performance and Reward	0.028	(1.67)*		0.043	(3.00)***	
9. Climate	–0.013	(–0.94)		–0.047	(–4.03)***	
10. Communication	–0.002	(–0.16)		0.014	(1.14)	

[a]These are coefficients and t-values from complete regressions as specified in Table 4, with the exclusion of market characteristics, location in mall, age of branch, and ln(property and premises), all of which do not vary over time for a given branch.

*Significant at the .10 level; **at the .05 level; ***at the .01 level.

among the HRM characteristics could be due either to some other factor that simultaneously results in employees evaluating all of the dimensions highly, or, to the extent that the attitudes measure HRM practices, to complementarities in the use of various HRM practices, as suggested by Ichniowski, Shaw, and Prennushi (1997).

It is possible, therefore, that the results in Table 5 simply reflect the effect of some omitted branch-specific or manager-specific factor that leads to high levels of sales and more favorable employee attitudes about the branch's HRM environment, rather than a true improvement in performance that is stimulated by better communications and employee recognition and performance feedback. To test this competing explanation, I re-estimated equation (1) including branch dummy variables and manager dummy variables.[32]

The results, shown in Table 6, indicate that, controlling for fixed unobserved branch and manager characteristics and the *Overall* rating, the indices *Performance and Reward* and *Communication* are still positive and statistically significant when entered separately in the loan equation. The fact that these two HRM dimensions remain statistically significant even when branch dummy variables and manager dummy variables are included indicates that the effects of the HRM variables that were observed in the OLS specification were not due to unobserved branch characteristics or unobserved fixed characteristics of particular managers (charisma, for example). Rather, the evidence presented here is consistent with the argument that, over time, managers experiment with different HRM activities that create different HRM environments, and some of these activities positively affect branch performance. The branch visits provided concrete evidence of these productive managerial activities that contribute to the creation of a high-performance work system at the branch level.

An important question, of course, is why all managers do not engage in these pro-

[32]I deleted the value of the branch's property and premises from this specification because the only non-zero year-to-year changes in this variable that did exist were very small in magnitude. Equation (1) was also estimated with the branch dummy variables only. The results were virtually the same as those reported in Table 6.

ductive activities. While this question is beyond the scope of this paper, one speculative explanation is that some managers lack sufficient training in how to implement the formal human resource policies so as to effectively create a high-performance work system.

The bottom panel of Table 6 shows the results of including all of the HR indices in the equations at the same time. *Performance and Reward* is the only index that remains positive and statistically significant in the loans equation, and it is even statistically significant in the deposits equation. This indicates that the "incentives" dimension of a high-performance work system is the most important predictor of performance in the banking industry.

One surprising finding is the negative and statistically significant effect of the *Climate* index when it is included in the regression with all of the other indices. By itself, *Climate* was statistically insignificant because it was capturing the positive effects of the *Performance and Reward* and *Communication* indices. It is possible that the wrong sign on *Climate* in the bottom panel of Table 6 occurs because the *Climate* index is not a good measure of the "opportunity to participate." Therefore, I estimated fixed effects regressions that eliminated *Climate* and used *Communication* alone to proxy "opportunity to participate." The coefficient on *Performance and Reward* was robust with respect to this change; branches that rank high on the incentives dimension are better performers.[33]

Alternatively, if we accept the *Climate* index as valid and the specification in the bottom panel of Table 6 as correct, then the results imply that performance is enhanced when employees take a favorable view of the incentives they are provided but an unfavorable view of morale, cooperation, employee expression, and supervisor accessibility in their workplace. Although such a pattern would contradict the predictions of the high-performance work system framework, it is not inconceivable in a highly competitive industry in which employees are encouraged to use their time to sell products.

While the inherent problem in OLS that an omitted variable may be correlated with both performance and the HRM environment is not relevant to the fixed effects estimates shown in Table 6, the latter estimates are not without their own potential problems. One is that they may be inconsistent if a branch's improvement in its HRM environment is correlated with its performance in a period prior to the change in HRM. This could happen if, for example, senior management decides to replace a poorly performing branch manager or urges the existing branch manager to improve his or her human resource management environment.

There is indeed evidence of some such influence at the bank under study. In a regression of the change in survey responses controlling for the branch's performance in the initial year as well as the vectors of market and branch characteristics, I find that branches with low sales of loans in the initial year showed subsequent improvements in employees' assessment of communications from superiors and overall communications at the branch. Note that this finding is exactly the opposite of Becker and Gerhart's (1996) description of the reverse causation problem in the literature on human resource management and organizational performance. Those authors worried that a positive correlation between a human resource management practice and organizational performance could result from better performance making the organization more likely to implement the HR practice.

In any event, my finding that there is a relationship between initial performance and subsequent changes in the HRM environment indicates that prior performance of the branch could be an important variable omitted from the specification in equation (1). I therefore re-estimated equation (1) with the lagged growth rate of deposits

[33]Instead of deleting *Climate* entirely, I also tried eliminating some branches that appeared to be outliers on the *Climate* dimension. The results were unaffected.

Table 7. Effects of HR Indices on Branch Performance.[a]
(Includes Branch and Manager Fixed Effects and Lagged Performance)

	Growth Rate of Deposits			*Growth Rate of Loans*		
Index	*b*	*t*	R^2	*b*	*t*	R^2
Each HR Index Entered Separately						
1. Overall	–0.005	(–0.46)	.346	0.020	(1.81)*	.499
2. Skill	–0.326	(–1.68)*	.357	0.127	(0.64)	.489
3. Performance/ Reward	0.005	(0.47)	.347	0.033	(3.16)***	.519
4. Climate	–0.010	(–1.02)	.350	–0.011	(–1.16)	.492
5. Communication	–0.003	(–0.35)	.346	0.016	(1.66)*	.497
HR Indices Entered Simultaneously			.367			.565
6. Overall	–0.004	(–0.32)		0.015	(1.17)	
7. Skill	–0.300	(–1.52)		0.019	(1.02)	
8. Performance/Reward	0.019	(1.29)		0.043	(3.01)***	
9. Climate	–0.011	(–0.85)		–0.047	(–3.92)***	
10. Communication	–0.007	(–0.48)		0.013	(1.07)	

[a]These are coefficients and t-values from complete regressions as specified in Table 4, with the exclusions of market characteristics, location in mall, age of branch, and ln(property and premises), all of which do not vary over time for a given branch.

*Significant at the .10 level; **at the .05 level; ***at the .01 level.

or loans added to the equation. The results, shown in Table 7,[34] are virtually identical to those shown in Table 6, indicating that the omission of prior performance was not biasing the results.

A further consideration is that the fixed effects specification assumes that the unobservable attributes of the employees and the market environment, as well as any unmeasured employee attitudes, are fixed over the 1995–97 time period. It is possible that the unobservable attributes of employees changed over time within branches and that these changes are correlated with the changes in the responses to the employee survey. But given the fact that the observed employee characteristics (incorporated in the *Skill* index) were statistically insignificant, it is unlikely that time-varying unobservable employee characteristics are biasing the results.

The fixed effects specification also ignores time-varying changes in the branch's market environment (for example, the influx or outflux of residents or businesses). If important changes did take place over the sample period, this could bias the results if these changes are correlated with changes in the responses to the employee survey. Unfortunately, the data do not enable me to rule out the possible role of time-varying market factors.

Finally, there may be unmeasured attitudinal variables that co-vary with attitudes toward communications, performance evaluation, and recognition. The evidence from the branch visits, however, would seem to indicate that communications, performance evaluation, feedback, and recognition are the critical factors that contribute to performance.

Conclusions

Empirical research on the relationship between human resource management and establishment performance has focused on blue-collar workers in manufacturing. This paper extends the analysis to the service sector—where, in fact, most employees

[34]For fiscal year 1995, the lagged value (1994) only refers to the last six months of fiscal 1994. The bank was unwilling to release data for an earlier time period.

work—by examining the retail branch operations of a large Canadian bank. A unique longitudinal data set collected through site visits was used to estimate the determinants of branch-level performance and specifically to consider if the dimensions of a high-performance work system contribute to performance. Previous studies of branch performance have largely focused on the role played by scale in determining the efficiency of a bank branch, leaving most of the variance in measured efficiency unexplained.

Interviews with managers and employees were used to guide the specification of the branch-level production function. Following the lead of Appelbaum et al. (2000), I used three dimensions of a high-performance work system to characterize the human resource management environment at the branch: opportunity to participate, skills, and incentives. To measure these dimensions, I used data from the bank's employee attitude survey—an improvement over the sole source manager survey responses on which other studies have relied.

The econometric analysis showed that, controlling for the characteristics of the market in which the branch is located, as well as unobserved fixed branch and manager characteristics, employees' perceptions of the performance feedback and recognition system at their branch—that is, the incentives dimension of a high-performance work system—had a positive and statistically significant relationship with branch performance, as measured by its sales of loans, that was robust under alternative specifications. Some of the fixed effects results showed a positive effect of the quality of communications between the manager and the staff and among staff members, a component of the "opportunity to participate" dimension of a high-performance work system. The fact that the HRM variables remained statistically significant even when manager dummy variables were included in the regressions indicates that the results are not due to unobserved personality characteristics of particular managers. The results were also unaffected by the inclusion of a variable measuring the branch's performance prior to any change in its human resource management environment.

How confident should we be in interpreting these results as evidence that a high-performance work system can influence performance in the banking sector? Ideally, in order to answer this question, we would want to have an experimental design in which human resource management practices are randomly assigned across the branches. In this way, the treatment and control groups would not differ in terms of other organizational characteristics that affect performance. As Ichniowski et al. (1996) observed in their review of the literature on the effects of management practices on organizational performance, experimental designs in this arena are typically infeasible. The alternative approach, which is used here, is to control for variables that affect performance and that are likely to be correlated with a high-performance work system. Specifically, controls for worker quality (education and tenure), manager quality (tenure), market characteristics, prior performance of the branch, and fixed unobserved branch and manager characteristics were used here. One remaining caveat is that unobserved time-varying market attributes could play a role.

The results from the econometric analysis should not be viewed in isolation. An important component of this research is the branch visits, which provided concrete evidence of specific actions taken by managers that created real differences in the human resource management environments at the branches that, in turn, resulted in variation in performance across branches. Observations made during the branch visits lend credence to the data obtained from the employee surveys. The combination of the branch visits and the econometric results supports the notion that branch-level performance in the banking industry can be influenced by specific human resource management–related actions.

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