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OF WORKPLACES ON EMPLOYEE ATTITUDES AND ECONOMIC OUTCOMES

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Can a Work Organization Have an Attitude Problem? The Impact of Workplaces on Employee Attitudes and Economic Outcomes

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ABSTRACT

Using the employee opinion survey responses from several thousand employees working in 193 branches of a major U.S. bank, we consider whether there is a distinctive workplace component to employee attitudes despite the common set of corporate human resource management practices that cover all the branches. Several different empirical tests consistently point to the existence of a systematic branch-specific component to employee attitudes. “Branch effects” can also explain why a significant positive cross-sectional correlation between branch-level employee attitudes and branch sales performance is not observed in longitudinal fixed-effects sales models. The results of our empirical tests concerning the determinants of employee attitudes and the determinants of branch sales are consistent with an interpretation that workplace-specific factors lead to better outcomes for both employees and the bank, and that these factors are more likely to be some aspect of the branches’ internal operations rather than some characteristic of the external market of the branch.

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I. Introduction

Research that examines the productivity of very similar plants and establishments finds that some enterprises persistently operate much more efficiently than others.¹ The role of human resource management practices in explaining persistent productivity differences in seemingly similar enterprises has now received considerable attention in both intra-industry studies and cross-industry studies.² Do productivity outcomes still vary across worksites within a given industry even when they operate under a common set of management practices? If so, what might account for these differences?

In this study, we address these questions by investigating employee responses to attitude surveys and productivity outcomes across worksites in a large multi-establishment commercial bank. Bank branches are well suited to an investigation of how workplaces affect employee attitudes because they are small establishments and the workers do their jobs in sufficiently close proximity to constitute a genuine workplace. A first set of empirical tests investigates whether there is a distinctive workplace component to employee attitudes despite the common set of corporate human resource management practices that cover all the branches.³ Three types of evidence are presented: (1) a comparison of the distribution of branch-level differences in attitudes to a simulated distribution of branch-level attitudes that would occur if workers with

¹ See Gibbons and Henderson (forthcoming) for a summary of evidence and Haltiwanger (2008).

² Intra-industry studies that document large productivity differences include Bandiera, Barankay, and Rasul (2007) in fruit orchards, Bartel, Ichniowski and Shaw (2007) in valve-making, Bloom, Eifert, McKenzie, Maharaji and Roberts (2009) in Indian textile plants, Griffith and Neely (2009) in a large distribution firm, Hamilton, Nickerson, and Owan (2003) in textile production, Ichniowski, Shaw and Prenushi (1997) in steel making, and MacDuffie (1995) in auto assembly. In each study, differences in human resource management practices help explain the productivity differences. For studies of the impact of management practices in firms in many industries, see Black and Lynch (2004, 2001), Bloom and Van Reenen (2007), Bloom, Sadun and Van Reenen (forthcoming), Bresnahan, Brynolfsson and Hitt (2002), and Cappelli and Neumark (2001).

³ While our focus is on the impact of a workplace on an individual's attitude towards his job, previous research on the determinants of individual employees' reported levels of job satisfaction have considered the role of individual characteristics such as wages, education, hours worked, gender and race (Hamermesh, 2001) and business cycles (Clark and Oswald, 1996).

different attitudes were hired randomly into branches; (2) tests of the statistical significance of branch dummy variables for explaining individual attitudes; and (3) an examination of the effects of tenure on attitudes to see whether the attitudes of newly hired workers converge with pre-existing attitudes of longer-tenured workers.

A second set of empirical tests then examines the relationship between employee attitudes and performance outcomes in the branches. These tests address two related questions. Are differences in sales performance of branches related to the differences in attitudes across branches? And if they are related, is the relationship between attitudes and performance independent of other characteristics of the branches that could cause both employee attitudes and sales performance to vary in a branch? This set of empirical tests includes three kinds of evidence: (1) cross-section models of the effects of branch-level employee attitude variables on branch performance; (2) longitudinal models of the effects of changes in employee attitudes on changes in sales performance that control for omitted branch fixed effects; and (3) estimates of the effects of attitudes on branch closings.

The two sets of empirical tests that we conduct – the tests of workplace effects on employee attitudes and the tests of the effects of attitudes on branch productivity – are related. In particular, the first set of empirical models tests for “workplace effects” in the determination of employee attitudes by taking advantage of the worker-level observations in employee attitudes within branches. The second set of models again tests for the importance of “workplace effects” – specifically, whether any cross-section correlation between employee attitudes can be explained by fixed branch characteristics that are correlated with both attitudes in the branches and branch performance.

While we consider a number of different interpretations for the results from each of the empirical models, the results from all of the models in both sets of tests are consistent with the

existence of workplace effects. Results from the first set of tests consistently indicate that there are significant branch-specific components to employee attitudes. Then, in the second set of tests, cross-sectional models reveal that branches with positive (negative) employee attitudes are significantly more likely to have higher (lower) sales performance. This positive relationship between employee attitudes and branch performance in the cross-section models becomes insignificant in the longitudinal fixed effects models, consistent with an interpretation that the observed cross-section relationship between attitudes and performance is due to fixed branch-specific factors that are omitted from the cross-section models but which determine not just employee attitudes but sales performance as well.

If unmeasured branch characteristics are in fact responsible for some branches having both positive (negative) employee attitudes and higher (lower) levels of sales performance, what might such factors be? Two types of branch-specific factors could be at work – one relating to the unobservable characteristics of the neighborhood in which the branch operates and the second relating to the unobserved behaviors of workers and managers inside the branches. We argue that the second hypothesis is more consistent with the full set of patterns in the data but our data are not sufficiently rich to identify the specific behaviors of workers and managers that vary from worksite to worksite that are related to more positive attitudes and higher sales performance.

In the next section, we explain how this study builds on prior research that has examined employee attitudes and workplace productivity. Section III describes our data. Section IV presents empirical tests of the existence of a workplace effect on employee attitudes and Section V presents results of models analyzing the relationship between attitudes and branch productivity and branch closings. Section VI concludes.

II. Distinctive Attitudes of Workplaces and Their Effects on Performance Outcomes

This study's empirical investigation of the relationships among workplaces, employee attitudes, and performance outcomes bridges two different streams of empirical research. First, a large literature has emerged that analyzes the impact of human resource and other management practices on productivity outcomes.⁴ A number of studies from this stream of research find that innovative HRM practices, and particularly sets of complementary practices, lead to large increases in plant- and establishment-level productivity outcomes, even within a single industry.⁵ In the large commercial bank that we study, a common set of human resource policies is employed for all of its branches. Thus, we are investigating whether there are other workplace-specific differences related to the attitudes of employees that can help explain performance outcomes – even among workplaces that share a common set of work practices.

A second stream of research analyzes responses that employees give to attitude or opinion surveys. For example, a large literature studies employees' responses to survey questions aimed at measuring "perceived organizational support" (POS) – an employee's perceptions about the employer's concern for him or her⁶ – and relates an employee's POS score to responses to other survey questions about job satisfaction, commitment to the firm, perceptions about work practices, or to outcomes like turnover.⁷ In many cases, these studies are

⁴ For references, see note 2 *supra*.

⁵ Bloom, Eifert, McKenzie, Mahajari and Roberts (2009) provide particularly compelling evidence that these effects of new management practices are causal. They compare the productivity of textile plants after a set of new management practices are randomly assigned to only some of the plants and show large productivity increases only for the plants that instituted the new practices. For recent reviews of the literature on HRM practices and productivity, see Lazear and Shaw (2007) and Oyer and Schaefer (2011).

⁶ POS is measured by the Survey of Perceived Organizational Support (see Eisenberger et.al.,1986) or by subsets of this survey's questions.

⁷ For reviews of this literature, see Rhoades and Eisenberger (2002) and Cropanzano and Mitchell (2005). In some of this literature, the effect of POS on a supervisor's rating of the employee's performance is studied but this is different than studying the effects of attitudes on branch-level performance. Supervisor evaluations of individual-level performance will not necessarily measure whether one supervisor's subordinates are more productive than another's. More, generally, there are many reasons why unit (or in our case, branch) performance is not simply the sum of the performance evaluations of employees.

at the level of the employee and analyze the relationships among responses of employees to different kinds of questions in a given survey. In our study, because we have survey responses from employees in 193 different worksites, we will test whether employees in the same company who work in different worksites respond differently to the same attitude surveys, and then whether any such differences can help account for observed differences in performance outcomes in these worksites.

The prior research generally does not have sufficient data to address the set of research questions that we consider in this study. Studies of the impacts of management practices on productivity typically do not measure employee attitudes. Studies of employee responses to attitude and opinion surveys like studies of employees' perceptions of organizational support typically do not identify the specific worksites of employee respondents, or sometimes only collect data from a single worksite. Still, results from specific studies from these two different streams of research provide some important evidence about the two basic questions we address in this study.

One of the earliest studies of the impact of quality of work life (QWL) and employee involvement practices on productivity incorporated data on the average responses to an employee job satisfaction question and found that plants in the U.S auto industry that had QWL initiatives had higher reports of employee job satisfaction and higher productivity (Katz, Kochan, and Gobeille, 1983). From the POS research, Allen, Shore and Griffeth (2003) find that employees from a given organization do report very different perceptions about the exact same set of work practices. Thus, the same work practices can be perceived differently by different employees. Furthermore, employees with less favorable perceptions of the organization's work practices also

report lower levels of POS and were more likely to quit their jobs within one year of the survey.⁸ In perhaps the closest comparison from the POS literature to our study, Graafland and Rutten (2004) examine employee responses to POS survey questions in a sample of 46 Dutch construction companies. They find a positive and significant correlation between a company's average POS score and a measure of the company's return on capital.⁹

III. Data

Our study uses the responses to an employee attitude survey for workers employed in the New York metropolitan area branch offices of a large U.S. bank. The survey was administered in 1994 and 1996 and is representative of employee opinion surveys that large firms in the United States use to measure employee sentiment. It asks employees to respond to statements about their attitudes towards their work environment according to a five-point scale, ranging from 1 (the least favorable response) to 5 (the most favorable response). Each survey has over 110 questions, with 106 questions in common in the two years. Appendix A gives examples of several survey questions from each of the six main sections of the survey concerning pride in the bank, values, work environment, quality, personal responsibility, and satisfaction. Because the bank closed many branches during this period, the number of branch locations differs in the two years – 193 branches in 1994 and 143 branches in 1996.

The employee opinion data across the two years contain 3,684 worker-specific surveys. In 1994, 59 percent of all branch employees, or 2,245 workers, completed the survey; and in 1996, 52 percent of employees, or 1,439 workers, filled out the survey. To maintain

⁸ This finding also suggests that organizations will develop more and more homogeneous and distinctive attitudes among their employees. If employees with less favorable attitudes tend to leave the organization, then the attitudes among remaining employees become more homogeneous (and positive) over time.

⁹ Although Graafland and Rutten (2004) do not report results from profitability models that control for company-specific fixed effects, their empirical results consider questions of causality between POS and a profitability measure by examining how lagged values of one variable affect the other.

confidentiality of employees' responses, the surveys do not report the workers' identities. Thus, while any employee with more than two years of tenure could have completed both the 1994 and 1996 surveys, we cannot match workers across the two years and cannot track worker-specific changes in responses over the two years. However, the survey does report the branch location of each respondent, so we are able to create branch-level aggregates for the survey responses for each branch in both years, and therefore can measure changes in branch-level attitude measures between 1994 and 1996. Finally, the survey asks two questions about characteristics of the respondents: tenure and occupation. Tenure is reported in a series of categorical responses: one year or less; more than one but less than two years; between 2 and 5 years; between 5 and 10 years; and more than 10 years. The occupation variables distinguish three grade levels among officers and four grade levels among staff employees.

IV. Is There A Workplace Effect in Employee Attitudes?

This section analyzes the employee attitude survey data to examine whether different branches have distinctive employee attitudes. To address this question, we first examine whether a given employee's responses to 106 different survey items can be summarized meaningfully in a more parsimonious index. Second, we examine whether the distribution of branches' average responses is more varied than what could be attributable to sampling variability alone by comparing the actual distribution of average branch responses to a simulated distribution of average branch responses had employees with different attitudes been assigned to branches randomly. Third, we test whether branch locations are significant determinants of employees' responses to the attitude surveys and compare the extent to which branch identifiers and worker identifiers account for variation in the employee attitudes. Finally, we analyze how attitudes

vary with employees' tenure, and in particular examine whether the attitudes of newly hired workers converge with the pre-existing attitudes of longer-tenured employees.

A. Summarizing the Employees' Responses: The Employee Attitude Index

We first examine whether the survey responses from the individual employees can be fruitfully grouped into a summary indicator of a given employee's overall view of the workplace. Does knowing how an employee answers one question help predict how he or she will answer others, so that a summary index number for the 106 items in a survey provides a good indicator of most responses? Or is there considerable variation across questions in how an employee responds?

Several statistical tests reveal a high level of consistency in survey responses across questions for a given employee. First, the correlation between the responses to any pair of questions is positive and significant. With 106 survey items, there are 5,565 bivariate correlations. In 1994, 97.5 percent of these correlations are positive and significant at the .0001-level and 99.6 percent are positive and significant at the .10-level. In the 1996 survey, 94.3 percent and 99.2 percent of the correlations are positive and significant at the .0001-level and .10-level, respectively. Second, a factor analysis of the responses to the two surveys reveals that, in both years, the first factor accounts for 50 percent of the proportion of the overall variation in employee responses and the ratio of the first to second eigenvalues is over seven times the ratio of the second to third eigenvalues—sufficient for a conclusion of unidimensionality in responses (Lord, 1980).¹⁰ Finally, we computed Cronbach's alpha to measure the consistency of responses

¹⁰ As one illustration of the unidimensionality in survey responses across survey items, and consistent with the high degree of correlation among any pair of items, 98 of the 106 questions have their largest factor loading on the first factor.

to the different survey items. Cronbach's alpha equals 0.98 in both 1994 and 1996, which also indicates that individuals reported consistently across the 106 items.¹¹

Given these patterns, we use the average value of the 106 items as a simple summary index of an employee's attitudes and refer to this statistic as his overall "employee attitude index" (EAI). The worker-level EAI variable has a mean value of 3.71 with a standard deviation of 0.28 in 1994, and a mean value of 3.74 with a standard deviation of 0.29 in 1996.

While the preceding tests reveal strong correlations among the responses from any given employee, we now turn to the central question of this section. If one employee in a branch has a relatively high (low) EAI, are other employees in the same branch also more likely to have relatively favorable (unfavorable) attitudes? This question is central to this study because it ultimately asks if there is a distinct "workplace effect" to employee attitudes.

B. Is the "Branch Effect" in Employee Attitudes Due to Sampling Variability?

Figure 1 shows the distribution of the branches' mean values of the EAI index as a shaded distribution. The distribution has a strong central tendency. The mean of this distribution of branch-specific averages of the EAI variable is 3.72 with a standard deviation of 0.285. While Figure 1 does show that different branches have different average values of EAI, one would not expect the average value of the EAI variable across employees in a branch to be identical across all branches even if there were no causal mechanisms inside the branches that produced more and less favorable attitude responses for their employees. As long as some job applicants are innately more positive than others, some branches would hire more positive individuals just by chance and would end up with higher average EAI values. Branches would still have distinctive employee attitudes.

¹¹ We also calculated the average responses within the six subsections of the surveys, as well as the mean response of employee responses to questions that referred to specific human resource management practices, such as the mean response to questions that mention compensation or teamwork or communication and so on. As the results in the text would suggest, the means for different subsets of questions are all very highly correlated with each other.

The effect of sampling variability on the average value of EAI across different branches would not be an especially convincing explanation for any cross-branch differences if branches all had large numbers of workers. However, the potential impact of sampling variability is of particular concern in this setting because of the relatively small number of employees in many of the bank's branches. Because the branches are small and only about one-half of a branch's employees responded to the survey, the average number of respondents is just 12 employees per branch. Thus, the distribution of the branch-level EAI measure could be substantially affected by sampling variability. If the observed distribution of branch averages in Figure 1 can be attributed to branches randomly hiring workers with different attitudes, it would be erroneous to view differences among branches as reflecting any causal effect of workplace conditions or policies on employee attitudes.

To test how important sampling variability is in generating the differences in the branches' average EAI values, we calculated a "null distribution" of branch-level workplace attitudes under the assumption that branches draw workers randomly with replacement from the distribution of attitudes across all respondents in all branches of the bank.¹² Specifically, we randomly assigned workers to a branch and then calculated a new branch average for the null distribution. Consider, for example, a branch with 10 worker respondents. Using a random number procedure, we drew 10 observations from the firm-wide distribution of employee-specific values of EAI. This simulated ten-respondent branch thus has employee attitudes that would occur had the branch randomly selected its employees from a pool of workers that had the same distribution of attitudes as the distribution of attitudes among all of the respondents to the survey. We then assigned this simulated branch the average EAI score from those 10 randomly drawn observations. Similarly, for a branch that had 8 respondents, we drew 8 observations

¹² Assuming the branches draw samples with replacement implicitly assumes that the bank faces a larger population of potential employees with the same distribution of attitudes as its current employees.

randomly from the underlying firm-level distribution and then calculated its average EAI. Doing this calculation for all of the branches in the sample gives us a “simulated distribution” of mean branch attitudes.

The crosshatched histogram in Figure 1 shows this simulated distribution of average branch EAI scores.¹³ Differences between the actual distribution of average EAI scores in the branches and the simulated distribution are indicative of workplace effects on attitudes. The figure shows that the actual distribution of branch average EAI scores is more dispersed than the null distribution for simulated branches. The actual distribution’s standard deviation of 0.285 is markedly larger than the simulated distribution’s standard deviation of 0.184. A Kolmogorov-Smirnov test shows that the two distributions are significantly different from each other with p -value=0.001. That there are more branches with either high or low values of the employee attitude index in the actual distribution than in the simulated distribution shows that there are branch effects to attitude survey responses that cannot be attributed to random sorting of workers with different innate attitudes. This suggests that the different levels of employee attitudes across branches cannot be attributed just to chance.¹⁴

¹³ Consistent with how we created the histogram for the actual distribution of branch averages for the EAI statistic, we pooled the numbers reporting in each year for the 143 branches for which we had observations in 1994 and in 1996. Thus, we treat the branch as having more reports on its average attitude over the two years than for a single year (i.e., if a branch had 7 people reporting in one year and 8 in the second year, we treated it as having 15 reports on attitudes). This assumption should minimize the difference between the actual and simulated branch average EAIs. For the remaining 50 branches, we used data from 1994.

¹⁴ Another possible explanation for differences in the average values of EAI across branches is that different branches are comprised of workers with different characteristics, and certain worker characteristics might be associated with more or less favorable attitudes. While we have only limited information on employee characteristics, we did estimate a branch-level regression of average age of employees, tenure distribution and the grade-level distribution on the branch’s EAI, and used the residuals from that equation to plot the distribution of average values of EAI for the branches. (The estimates of the regression are shown in Appendix Table B.) The distribution of branch averages for the EAI index is virtually identical to the actual distribution of the average EAI scores for the branches. The standard deviation for the distribution based on the regression residuals is .24 which is only slightly lower than the standard deviation of the actual distribution (.28), which suggests that EAI is only modestly impacted by the observable personal characteristics of the individuals in the branch. Still, it could be the case that unmeasured differences in employee characteristics beyond the age, tenure, and grade variables that we

C. ANOVA Tests of Branch Effects on Employee Attitudes

Figure 1 shows substantial cross-branch variation in the employees' attitudes that is greater than what would occur simply because of sampling variability in hiring. A related question is whether branches are significant determinants of the variation in attitudes. To address this question, we conduct an analysis of variance (ANOVA). In particular, with attitude surveys from two time periods in which multiple respondents answer multiple questions on each survey, we estimate the following ANOVA model:

$$(1) \text{OBS}_{ijqt} = \text{INDIVIDUAL}_i + \text{QUESTION}_q + \text{BRANCH}_j + \text{YEAR}_t + e_{ijqt}$$

where OBS_{ijqt} is the response from the opinion survey for the i th individual in the j th branch to the q th question in year t . This equation compares how much of the variation in employee responses to the various items in the survey can be attributed to each of the following main effects: an individual effect, a question effect, a branch effect, and a year effect. The error term e_{ijqt} captures all omitted interactions among these main effects. We also expand equation (1) in two ways. First, we add characteristics of individual workers available on the survey—their grade in the company occupational hierarchy and their years of tenure at the branch. Second, we examine interaction effects between the main factors—for instance, branch \times question effects.

A limitation of the ANOVA is that the survey data do not identify workers to preserve confidentiality of responses, and thus we cannot identify which survey responses in 1994 and 1996 come from the same employee. Because of this inability to identify workers across years, we treat each worker survey in 1994 and 1996 as coming from completely separate sets of individuals. This method of measuring “person effects” introduces a larger number of worker variables than actually exists, which in turn will magnify the relative importance of these person

can include in the original regression could be responsible for differences in survey responses across branches.

effects.¹⁵ Given this definition of the worker dummy variables, ANOVA estimates the proportion of the variation in the dependent variable in equation (1) that is accounted for by the vector of worker dummy variables relative to the proportions of variation accounted for by other factors in the model such as the branch dummy variables.

Panel A of Table 1 reports the results of the ANOVA analysis using the 106 common questions on the employee attitude survey from the two years. Most important for this study, these results show that the main branch effect is highly significant. While the total sum of squares accounted for by the branch variables is less than the total sum of squares accounted for by the person variables, the mean squares and F-statistic for the branch effects are larger than they are for the person effects due to the much smaller number of branches relative to workers. The results in Panel A of Table 1 also show that the second largest contributor to the sum of squares is variation in responses among questions. Grade contributes to the variation because workers in officer positions in the bank have more positive attitudes than other employees, while tenure contributes because workers with greater tenure at the branch have slightly less favorable attitudes than those with less experience.¹⁶ Finally, the interaction of branch with question is modest, while the interaction of branch and year is more significant. Despite the importance of the effects of these other factors, the results confirm that different workplaces have distinctive employee attitudes and thus provide further evidence that workplaces are important in the determination of measures of employees' attitudes.¹⁷

¹⁵ It is very likely that many workers responded to the survey in both years. By treating those persons as separate people, the number of "worker variables" included in the ANOVA model is much larger than the actual number of employees.

¹⁶ A regression of the EAI of an individual on a dummy for whether they were a bank officer or not and the variables measuring employee tenure in a pooled data set for 1994 and 1996 reveals a positive significant effect of the officer variable and significant negative effects of greater tenure.

¹⁷ For comparison with these ANOVA results, we also estimated two regressions – one in which responses to the survey questions are a function of employee tenure, grade, question dummies, year dummies, and person dummies, and a second regression in which branch dummies replace the person dummies. Consistent with the ANOVA results in panel A of Table 1, the F-statistic for the significance

HLM Tests of Branch Effects in Attitudes. The ANOVA model is a fixed effects model, appropriate for assessing variation in employee attitudes among actual branches in the bank. The question therefore arises as to whether we can generalize from the observed branches to a wider population of branches. To examine this, we augment the fixed effects ANOVA with a random effects model, using a hierarchical linear model (HLM) (Bryk and Raudenbush, 1992). Focusing on our summary measure of worker attitudes (EAI_i), we estimated the following HLM model:

(2) $EAI_{ij} = BRANCH_{0j} + e_{ij}$ as the individual or level-one equation for person i in branch j

(3) $BRANCH_{0j} = \text{intercept} + u_{0j}$ as the branch-level equation, with u_{0j} as the random effects for the branch.

Substituting equation (3) into equation (2), we obtain

(4) $EAI_{ij} = BRANCH_{0j} + e_{ij} + \text{intercept} + u_{0j}$ as the HLM equation.

This is a random effects ANOVA that differs from the fixed effects ANOVA in Panel A because it assumes that the branch effects are drawn randomly from some broader population.¹⁸ The virtue of this model is that it allows us to make inferences to the broader population, where there is greater variation in possible branch effects, rather than limiting inferences to the observed sample. The results of the HLM/random effects model are shown in Panel B of Table 1. Most important for this study, as in Panel A, the branch effects are again highly significant. Expanding on the HLM /random effects ANOVA model in Table 1, we also estimated HLM models with covariates such as grade and tenure, and obtained similar results.¹⁹ We conclude that, regardless of the statistical model, the data show that there are substantial branch-specific differences in employees' responses to the attitude survey questions.

of the branch dummies in the second model is substantially larger than the F-statistic for the significance of the person dummies in the first model (111.42 vs. 50.02).

¹⁸ In the ANOVA in Table 1, we included covariates other than branches as factors, so the statement about equation (4) is true for an ANOVA with just branches as factors, but it generalizes to other cases.

¹⁹ The Z statistic for the branch-level random effect in our model with grade and tenure covariates was 8.81, which is highly significant.

D. Branch Attitudes over Time

A further test of the existence of causal mechanisms within the branch that produce more and less favorable attitudes is whether branch attitudes persist over time. If branches' work practices and organizational routines are reasonably stable over time, then one would expect there to be a positive serial correlation in the attitude measure across years, especially in closely contiguous years. As long as the workplace practices, routines and personnel that one presumes are the factors that might cause differences in attitudes are relatively stable over the 1994-1996 period, then the workplace attitude should persist over this time period as well.²⁰

The correlation between the average value of the EAI index for a branch in 1994 and the average value of EAI in 1996 for the 143 branches that exist in both 1994 and 1996 is positive (0.34) and highly significant. Part of this positive significant correlation is certainly due to the branch having the same (happy or unhappy) employees in the two years. However, the response rates to the opinion survey in 1994 and 1996 of 59 percent and 52 percent, respectively, imply that a large number of respondents in the two years are different workers. To get an estimate of a lower bound on the number of employees who completed surveys in only one year, we combine the data on the numbers of respondents per branch in the two years with information on the number of respondents whose branch tenure was less than two years in 1996. First, if the number of respondents in a branch in 1994 exceeds the number of respondents in 1996, then the additional respondents in 1994 can only be one-time responders. Second, employees who report less than two years of tenure in the 1996 survey can also only be one-time respondents. And third, we identify branches where the number of 1996 respondents with more than two years of

²⁰ We recognize that branches could have distinct workplace attitudes that change substantially over time (for example, if a branch manager who established good relations with workers was replaced by one who established bad relations, attitudes would be inversely correlated over time). But if these kinds of changes that could affect employee attitudes within branches are relatively rare over the 1994 to 1996 period, and if branch effects on attitudes do in fact exist, one would expect a positive significant correlation in the branch-level EAI variable over the two years.

tenure is greater than the number of respondents in the same branch in 1994. The additional number of 1996 respondents in this calculation comprises another group of one-time respondents. Based on these calculations, we estimate a lower bound for the percent of respondents who respond to only one of the two surveys to be 41%. Since this is a lower bound estimate, it is safe to conclude that a sizable portion of the correlation between the average value of EAI in a branch in 1994 and 1996 is due to more than just having the same employees fill out the survey in both years.²¹

A more direct way to make this point would be to eliminate workers from the sample who filled out the surveys in both years, calculate the branch-level EAI variable for 1994 and 1996 just using surveys from employees who completed a survey in only one year, and then calculate the correlation among these branch-level attitude measures. While the absence of employee identifiers precludes such a test, research on test-retest reliability measures of the satisfaction and attitudes of a worker on the same job in two years offers some suggestive evidence on this question. Test-retest reliability measures of job satisfaction on the same job are on the order of 0.80 (Van Sanne, Sluiter, Verbeek, Frings-Dresen, 2003, Table 3). Studies of the attitudes of workers at two periods of time suggest that correlations of attitudes for the same worker over time are on the order of 0.50 to 0.70.²² Assuming that the responses of the workers at the bank branches that may have been included in both surveys had correlations in their EAI scores of these magnitudes, we estimate that the within-branch over-time correlation in EAI just

²¹ While these calculations ignore the cases where a given worker who moved between branches completed a survey in both years, the calculations here are designed to be a simple illustration that at least part of the pattern in which a branch with a favorable (unfavorable) attitude in 1994 is also more likely to have a favorable (unfavorable) attitude in 1996 is due to something more than just having the same workers filling out the survey in the two years.

²² Rode (2004) estimates a correlation of 0.49 for job satisfaction for persons in the first and second waves of the Americans' Changing Lives survey, where the waves were three years apart. Bowling, Beehr and Lepisto (2006) report a correlation of 0.53 on job satisfaction for respondents in the Adult Longitudinal Panel report and correlations ranging from 0.58 to 0.68 for measures of organizational commitment, job involvement, career commitment and career satisfaction. Cote and Morgan (2002) report a correlation of 0.48 for a sample of 111 workers at two points in time separated by four weeks.

among the employees who answered the survey in one year ranges from 0.19 to 0.28 (see Appendix C). These correlations are significant in our data. Therefore, this analysis that attempts to eliminate any persistent person effect on the average EAI in a branch again supports a conclusion that there are branch effects on employee attitudes that are persistent over time.

E. The Effect of Pre-Existing Branch Attitudes on the Attitudes of New Employees

While the data do not report the identities of the employees who filled out the surveys in the different years, we can use the tenure variable in the attitude survey to identify those workers in 1996 whose reported tenure precludes them from completing the 1994 survey, and use data on these “new workers” to conduct a particularly strong and direct test of the effects of pre-existing “branch attitudes” on the attitudes of individual employees. In particular, we now ask: when a new employee joins the branch, does his or her attitude conform to the attitudes of the existing workers? We examine the effect of the 1994 branch-level EAI variable on the attitudes of both new and continuing employees in the branch in 1996. Assuming that new workers have no particular bias in their attitudes prior to joining a branch, any correlation between their attitudes in 1996 and the attitudes of existing workers at their branch in 1994 can be viewed as a reflection of the impact of the existing workplace-level attitude on the new employees.

To test whether attitudes of new employees resemble the pre-existing employee attitudes of the longer tenured employees in their new branch, we regress the EAI of individual employees in 1996 on the mean level of the EAI in their branch in 1994, with dummy variables for whether the respondent had less than two years of tenure (and thus joined the bank after the 1994 survey was completed), and an interaction term between that dummy and the mean level of EAI in the branch in which the individual worked. Column 1 of Table 2 reports results from this model. The regression coefficient on the 1994 branch-level EAI in column 1 shows that it has a substantial impact on the 1996 attitudes of workers, due presumably to the persistence of

workplace conditions and the persistence of worker attitudes among employees. The coefficient on the dummy variable for new entrants is not statistically significant, and neither is the coefficient on the interaction term that picks up any differential effect of the 1994 branch EAI on the 1996 attitudes of the new employees. The implication is that workers who joined the branch after the 1994 survey was completed tend to have attitudes in 1996 that are similar to the average 1994 value of EAI in the branch. The attitude of a new employee is similar to the preexisting positive or negative attitudes in his or her branch.

Columns 2(a)-(b) and 3(a)-(c) probe this result further with separate regressions for subsamples of workers with different amounts of tenure in 1996. First, the results in column 2(a) and column 2(b) compare the effects of the branch EAI variable in separate regressions for the samples of workers who have more than two years of tenure (in column 2a) and less than two years of tenure (in column 2b). In these regressions, the coefficients on the 1994 branch-level EAI variable for the newly hired workers and for the more tenured workers are very similar in magnitude and a t-test shows that the hypothesis of the equality of the coefficients on 1994 branch-level EAI in columns (2a) and (2b) cannot be rejected ($\text{Prob} > F = 0.966$).

Because the subsample of workers in the column (2a) model were members of the branch in the 1994 period while the workers included in the column (2b) model were not, the meaning of the effect of the 1994 branch-level EAI variable on 1996 individual-level attitudes is somewhat different across these two models. For the more senior workers in the column 2(a) model, the effect of 1994 branch-level EAI indicates some regression-to-the-mean in attitudes over the two year period. Workers in branches that had relatively high (low) attitude scores in 1994 again tend to have high (low) scores in 1996 (since the coefficient on the 1994 branch-level EAI variable is positive and significant), but the attitudinal differences of the more senior employees across branches diminishes somewhat over the two years (since the coefficient on the

1994 branch-level EAI variable is less than unity). For the more recently hired workers in the column 2(b) model, the effect of the 1994 branch-level EAI variable indicates that within two years of being hired, new employees' attitudes resemble the attitudes of the longer tenured employees in the branch. If branch employees with less than two years of tenure actually had "average attitudes" similar to the mean value of EAI across all branches, there would have been no effect of the 1994 branch-level EAI variable on the individual-level EAI scores of new employees in the column 2(b) model. Instead, the effect of the 1994 branch-level EAI variable is positive, indicating that the group of low-tenure employees that take jobs in a branch with relatively favorable (unfavorable) attitudes also tend to have favorable (unfavorable) attitudes.

Two types of explanations could account for the effect of the 1994 branch-level EAI variable on attitudes of new employees. First, new workers do not enter their branches with attitudes matching those already working in a branch. Instead, attitudes of new workers in any branch are initially no different from the average attitudes one observes across all of the bank's employees. Then, over the first two years of work in the branch, the attitudes of the group of new hires come to resemble the positive or negative attitudes that already existed in their branches. Conversely, the labor markets that supply new workers to different branches may differ. Local markets in branches with more negative (positive) attitudes are populated with job candidates whose attitudes match those already in the branch as soon as they start their jobs.

The models in columns 3(a)-(c) of Table 2 offer evidence on these competing explanations. Each column presents the coefficient on the 1994 branch-level EAI variable from a separate regression. Column 3(a) replicates the results in the column 2(a) model for workers with more than two years of tenure, while columns 3(b) and (c) separate the group of workers with less than two years of tenure into two further subsamples: workers with less than 1 year of

tenure (in column 3b) and workers with 1 to 2 years of tenure (in column 3c).²³ The pre-existing 1994 attitudes in the branch have no effect on the attitudes of the brand new hires (column 3b). Rather, the impact of the 1994 branch-level EAI is concentrated solely among the group of workers in their second year of service (column 3c). These results are consistent with an interpretation that new hires do not enter the branch right away with the same positive or negative attitudes already observed among the longer tenured employees in their branches, but instead have attitudes that, after they are hired, come to resemble the pre-existing attitudes.²⁴

Two different mechanisms can explain why, as their tenure increases, the attitudes of newly hired employees come to resemble the attitudes of employees already in the branch. First, relationships among co-workers or between branch managers and other employees may be more or less cooperative, which in turn changes the attitudes of the new employees over their first two years. Conversely, employees whose initial attitudes did not match the pre-existing attitudes of employees in the branch might quit. In this case, the attitudes of any new employee would not change, but the selectivity of who stays and leaves the branch after the first year of service is the mechanism that explains how the attitudes of new employees come to resemble the attitudes of the longer tenured employees. While we suspect that both kinds of mechanisms may be at work,²⁵ either mechanism would still be consistent with the effects of a branch-specific factor that determines the attitudes of employees who remain in the branch.

²³ As noted in Section III, the tenure variable is not reported as a continuous variable but as a set of five categorical variables which includes a category for 0-1 years and a category for 1-2 years.

²⁴ If we estimate three separate regressions for subgroups of employees with 2-5 years of tenure, 5-10 years, and > 10 years instead of the single regression shown in column 3(a), the coefficients on the 1994 EAI variable in all three models are positive and significant and one cannot reject the hypothesis that all three coefficients are equal. Also, we note of course that the results in Table 2 pertain to the effects of a tenure variable among a cross-section sample of workers in 1996. A different test not possible with the available data would be to follow a given cohort of workers, and track the longitudinal changes of this cohort's attitudes over their first few years of service.

²⁵ Allen, Shore and Griffeth (2003) find that employees who report less favorable perceptions of the organization's work practices and lower perceived levels of organizational support in employee opinion surveys are more likely to quit their jobs within one year of the survey. If this type of turnover behavior

These results also lend support to the importance of peer effects in the workplace. Recent studies find that high productivity workers increase the productivity of co-workers (Mas and Moretti, 2009; Azoulay, Zivin and Wang, 2010) and also have beneficial effects on the absenteeism of co-workers (Ichino and Maggi, 2000). Here we find peer effects in how attitudes about the workplace are formed, with new employees either taking on the favorable or unfavorable attitudes of their longer-tenured co-workers or leaving the branch when their attitudes do not match those of their peers.

V. Workplace Attitudes and Performance Outcomes of Branches

A. Performance Measures in Retail Banking

The previous section presents evidence of a genuine branch effect on employee attitudes. Differences in the branch-level measures of employee attitudes are too large to be explained by chance alone. Differences in EAI scores across branches are highly significant. Moreover, the attitudes of new employees come to resemble the favorable or unfavorable attitudes of their longer-tenured co-workers. In this section we consider whether differences in employee attitudes can also help explain differences in the performance of the branches. To answer this question we relate our branch-level EAI variable to three performance outcomes of the branches: net sales, growth of net sales, and branch closings. Importantly, we estimate fixed effects performance models that explicitly test for whether attitude variables affect performance outcomes after controlling for any branch-level fixed-effects that may cause systematic differences in attitudes and performance. Because the empirical results of the previous section consistently find evidence of branch-specific effects on employee attitudes, these fixed effects performance models will be

occurred in all branches in our study's sample, it would help account for increasing homogeneity of attitudes of employees who join branches with positive attitudes, but would run counter to the pattern we observe between tenure and attitudes in branches that have more negative attitudes in the initial period.

important for seeing whether any observed cross-sectional correlation between attitudes in the branch and performance outcomes are independent of the impacts of any branch fixed effects.

According to branch managers, net sales is an especially important measure of a branch's financial performance.²⁶ The largest component of a branch's income is its "spread" income. Each financial product that a branch offers has a certain spread factor that equals the profit margin on the product. Spread income is the product of this spread factor and the total value of the sales of the product. While the spread factors will vary across different deposit or loan products, total spread income will be higher when total deposits and loans are higher. The sum of the branch's deposits and loans—referred to as a branch's "footings"—is reported on the branch's balance sheet. Because growth in footings on a branch's balance sheet translates into more spread income,²⁷ the bank evaluates branches on growth in balance sheet footings. We therefore use the annual growth in this measure—the change in deposit and loans on a branch's balance sheet from the beginning to the end of the year—as the chief indicator of branch financial performance in that year. This annual net sales variable varies considerably in the sample. In 1994, deposits and loans in a branch grew at an average rate of 5.8 percent across all branches. It ranged from $-.33$ to $.53$ with a standard deviation of $.08$ in 1994. The data show similar variation in 1996.²⁸

²⁶ Studies of bank productivity indicate that a "production approach" is preferable for studying the relative efficiency of branches within a given bank. Berger and Humphrey (1992) compare the production approach for measuring bank efficiency with methods such as the asset or user cost approaches.

²⁷ Branches also derive income from liability fees such as fees from stop payments, bounced checks, low balances, wire transfers, etc.; asset fees from loan applications, loan processing, late payments; transaction fees for travelers' checks, safe deposit boxes, ATM transactions; and brokerage commissions.

²⁸ The net sales measure does not deduct branch expenses from sales. Managers reported that many branch expenses are tied to customer activity at the branches regardless of where the account was opened and housed. If we subtracted expenses from sales, we would penalize branches that were busy service centers that process large numbers of transactions on previously opened accounts. The branch closings created an additional problem in 1996 because accounts of closed branches were assigned to a nearby branch that remained open. Over time, some of these transferred accounts, called "rollups," migrated to other branches. We dealt with this issue in two ways: by excluding accounts from the rollups and by including rollups as part of the dependent variable but with an independent variable for the level of

Because the branches in the sample operate in different parts of the New York metropolitan area, the characteristics of the local population and business activity are also likely to affect branch performance. Accordingly, we obtained data on the following characteristics of the zip code in which a branch is located: population, number of households, per capita income, average household wealth, number of owner-occupied households, median value of housing, median years of schooling, the unemployment rate, number of employees in all establishments, and total sales of all establishments.²⁹ The variables measuring the 1994 and 1996 sales in each branch come from the bank's own financial reporting system, while the bank's personnel files provide data on the average age of branch employees and total number of employees for each branch.³⁰ In addition, we used information on employees' tenure and their "grade" level (which corresponds roughly to occupations) from the employee attitude survey, which we also use as controls in the performance equations. Appendix D reports means and standard deviations for the demographic characteristics of the branches' zip code areas and for the characteristics of the branches' workforces in 1994.

B. Cross-Section Estimates

To examine the relationship between branches' employee attitudes and the net sales measure of performance, we first estimate the following cross-section branch-level net sales equation:

$$(5) \text{Ln (Net Sales)}_{bt} = a + b_1 L_{bt} + b_2 \text{EAI}_{bt} + b_3 \mathbf{X}_{bt} + u_{bt},$$

rollups on the right-hand side of the net sales equations. The coefficient on the originally rolled-up footings would be less than one if these accounts drift to other branches over time. The two analyses gave similar results; we report those obtained by excluding rollups.

²⁹ These zip-code specific variables are from the Claritas data service for the bank and are derived from the 1995 census establishment survey and have no time variation.

³⁰ These two variables are calculated from bank personnel records and are available for both 1994 and 1996. Since the survey does not include employee identification numbers, data from personnel records on the age of employees still cannot be linked directly to attitude survey responses of individual employees. This explains why employee age was not included in the ANOVA model in Part IV.

where L_{bt} is the number of employees in the branch in time period t , EAI_{bt} is the branch-level employee attitude index in time period t , and the vector \mathbf{X}_{bt} includes covariates measuring characteristics of each branch, its workforce, and its market.

Column (1) of Table 3 records the coefficient on the branch-specific EAI index in a least squares estimate of equation (5) for the 193 branches in 1994. The estimate shows that workplaces with more positive employee attitudes are associated with higher sales during the year on the order of 5 percent. A one standard deviation increase in the EAI variable (0.28 units) is associated with an increase in net sales of about 1.4 percentage points (or roughly 24 percent of the mean level of net sales in 1994 and 17 percent of the standard deviation of net sales). Column (2) of the table records the coefficient on the branch-specific EAI index for the 143 branches in existence in 1996. The estimated coefficient on the 1996 branch-level EAI is modestly higher than that in 1994 (0.061) but not statistically different from the EAI coefficient in the 1994 model.

The results of these cross-sectional net sales equations reveal that branches with favorable employee attitudes have higher net sales. There are two broad classes of explanations that can account for these cross-sectional patterns. First, the partial correlation between the branch-level EAI measure and net sales may reflect a causal mechanism between better employee attitudes and sales performance. Whenever attitudes become more positive, employees will more likely be selling more financial products and earning more income for the bank. This relationship will exist for any improvements in employee attitudes, regardless of the cause.

Conversely, this partial correlation may reflect an omitted branch-specific effect that causes both attitudes and net sales to be high. This explanation may be especially compelling in light of the empirical results of the previous section that documented a significant and persistent branch-specific effect in employee attitudes. If the same workplace-specific factors and dynamics that lead to more positive attitudes in some branches also promote good sales behaviors in those

branches, then the positive partial correlation between the branch-level EAI measure and net sales in the cross-section equations of columns (1) and (2) of Table 3 would reflect the effect of these branch-level factors. Under this explanation where the same “workplace effects” that produce distinctive attitudes in the branches also affect the sales in the branch, one would predict that the coefficient on the EAI measure that was significant in the columns (1) and (2) cross-section sales models would become insignificant in models that control for such branch-specific effects as long as those omitted branch-specific factors tend to be unchanged over the 1994-1996 period.

C. Longitudinal Fixed Effects Estimates

Since data are available on employee attitudes and sales performance in two periods of time, we can estimate a fixed effects net sales model that eliminates the effects of time-invariant branch-level factors. In particular, if $u_{bt} = \theta_b + \varepsilon_{bt}$ in the equation (5) cross-section model, where θ_b is the unmeasured branch fixed effect and ε_{bt} is the random error term, and θ_b is also correlated with EAI_{bt} in equation (5), then the estimated effect of the EAI attitude variable in cross-section sales regressions will be biased. Because the evidence in section IV already documents strong branch effects on employee attitudes that persist over the two time periods, this interpretation is of particular interest. Differencing the 1996 cross-section net sales equation from the 1994 cross-section net sales equation eliminates the influence of any branch-specific fixed effects that might determine the levels of both EAI and net sales, and yields:

$$(6) \quad \text{Ln (Net Sales)}_{bt1} - \text{Ln (Net Sales)}_{bt0} = a + b_1(L_{bt1} - L_{bt0}) + b_2(EAI_{bt1} - EAI_{bt0}) + b_3(X_{bt1} - X_{bt0}) + \varepsilon_{bt1} - \varepsilon_{bt0}$$

θ_b , the branch fixed effect, is differenced out. In the fixed effects model, the dependent variable is the change between the 1994 and 1996 net sales figures and the key independent variable is the change in the branch-level EAI variable between 1994 and 1996.³¹

The results obtained from estimating the equation (6) model are reported in column (3) of Table 3. The coefficient on the variable measuring the change in EAI in this model is insignificant.³² The column (4) model includes a control for the 1994 level of net sales under the hypothesis that there could be regression to the mean level of sales. The coefficient on the change in EAI variable is again insignificant. The results of this two-period fixed effects model of the effect of changes in EAI on changes in net sales cannot entirely rule out the idea of a causal effect of attitudes on sales performance. For example, the positive significant relationship between EAI and net sales in the columns (1) and (2) cross-section models could reflect a real causal effect of attitudes on sales, while the effect of the EAI variable in the column (3) fixed effect model could be biased toward zero due to an increased importance of errors in measuring the variables in the first-difference models.³³

Still, the drop in the significance of the coefficient on EAI between the cross-section models in columns (1) and (2) and the fixed effects models in columns (3) and (4) is also

³¹ The change in net sales over the two periods exhibits substantial variation. The mean growth in net sales for the 143 branches is .095, with a standard deviation of .116. The range is from -.475 to .493. The change in EAI also exhibits considerable variation. It ranges from -.918 to .895 with a standard deviation of 0.325.

³² We also estimated all the models in Table 3 using the first factor from the factor analysis in place of EAI. The results are the same, with the first factor significant in both cross sections but insignificant in the fixed effect models.

³³ Increased importance of measurement error in first-difference models relative to cross-section models tends to bias coefficient estimates in first-difference models toward zero. Longer time series of data, especially for periods without branch closings, would offer richer longitudinal tests of causality in the EAI–net sales relationship, but we lack such data. As reported in note 31 *supra*, we do observe considerable variation in the change in EAI measure over this period, though the mean change in EAI between 1994 and 1996 is only 0.02. This pattern could be consistent with a high noise to signal ratio. Also, it is important to remember that the bank closed 50 branches between 1994 and 1996, and so we cannot track the changes in EAI and performance for all 193 branches in the sample. If the bank closed branches whose performance and attitudes were both likely to deteriorate, the loss of the 50 branches would bias the estimated coefficient on the change in EAI variable toward zero.

consistent with an interpretation that the cross-section relation between workplace attitudes and performance reflects the effect of some omitted workplace factor that affects both employee attitudes and performance. Under this interpretation, only certain kinds of changes in branch-level attitudes would impact sales performance. In particular, if we were able to observe these branches over a longer period of time in which the omitted branch factors actually changed, then these changes in the omitted factors would generate changes in both employee attitudes and net sales. However, because these factors are fixed over the two-year period in our sample, we do not observe these particular kinds of changes in attitudes that do affect sales. What the evidence does show is that those changes in employee attitudes that are independent of the effects of omitted branch-specific fixed factors do not produce changes in performance.

This conclusion is especially interesting when coupled with the findings in Section IV of a significant branch-specific component to employee attitudes which is not explained by sampling variability and which persists over time even after new employees are hired into the branches. Together the results in Section IV and those in Table 3 are all consistent with an interpretation that branch-specific factors are important in the determination of both employee attitudes and economic performance. Moreover, not only are the effects of these branch-specific factors beneficial for both employees (more favorable attitudes about the workplace) and the company (higher sales performance), but these effects exist even within a single company that uses a consistent set of HRM policies for all of its branches.

What might this omitted branch-specific factor be? One hypothesis is that the omitted factor reflects unmeasured attributes of the branch's local market. Under this explanation, the innate attitudes of the employees hired by branches in poor or declining neighborhoods where branch performance is also declining are simply less favorable than the innate attitudes of employees hired by branches in richer neighborhoods that have better performing branches.

Conversely, the omitted factor could reflect unmeasured attributes of activities and dynamics of the branches' internal operations.

While we do not have direct information on additional branch-specific factors, two aspects of the preceding analyses seem to favor the latter explanation. First, recall that we define a branch's local market based on the zip code in which the branch is located. Since the bank operates in a very densely populated metropolitan area, zip codes correspond to neighborhoods that typically span only twenty or thirty city blocks. Hence, the zip-code level variables that we include in the cross-section models are fairly precise controls for the commercial activity in the neighborhood as well as the economic and personal attributes of the local residents and workers. Second, also recall that the analysis of the determinants of individual employee attitudes reported in columns 3(a)-3(c) of Table 2 above showed that newly hired employees with less than one year of tenure in their branches do not have attitudes that mimic the attitudes of employees already working in their branch.³⁴ Thus, the omitted branch-specific factor does not impact the innate attitudes of the employees at the time they enter their branches. Rather, the effect of pre-existing branch-level values of EAI on individual worker EAI is first observed for employees with more than one year of tenure in their branch. While we must remain guarded about the conclusion because the data do not include direct information on additional branch-specific factors, these patterns in the data are at least suggestive that it is more likely that the omitted branch-specific factor that leads to both more (less) favorable employee attitudes and higher (lower) sales outcomes is related to the internal operations of the branches.

Finally, we examine one additional issue in the longitudinal net sales models of Table 3. Column (5) of Table 3 extends the longitudinal net sales analysis by incorporating the 1994

³⁴ To illustrate this point further, we divided the branches into those that had above average and below average employee attitudes in 1994. The mean 1996 attitudes for the just-hired employees (those who have less than one year of tenure) is 3.97 and 3.81 in the above average EAI and below average EAI branches, respectively, a difference that is not significantly different from zero.

value of the branch-level EAI measure as another possible determinant of the change in net sales between 1994 and 1996. This model examines whether the prevailing attitudes in a branch are related to future growth in sales. These estimates in column (5) of Table 3 show that the 1994 level of the EAI variable has a significant positive relationship with the growth rate in net sales between 1994 and 1996. Thus, the prevailing employee attitudes in a branch are positively related both with the current levels of net sales (Table 3, column 1) and with the future growth in net sales (Table 3, column 5). A branch with unfavorable (favorable) employee attitudes can expect to have poor (good) sales growth as well as poor (good) contemporaneous net sales performance.

D. Branch Closings

As noted, the bank closed fifty branches between 1994 and 1996. On the one hand, this makes it more difficult to draw strong conclusions from longitudinal fixed effects models of the relationship between EAI and sales performance because the bank may have closed those branches whose performance and attitudes were likely to deteriorate. At the same time, this also provides an opportunity to examine the effects of employee attitudes on performance in a way that goes beyond earlier studies—by assessing their impact on branch closures. If management viewed branches where workers had negative attitudes as likely to have low sales in future periods and relatively low sales growth (consistent with the empirical results in column 5 of Table 3), we would expect the bank to disproportionately close branches with low values of EAI.

To investigate the possibility of this kind of selectivity in branch closings, we estimate linear probability models in which the dependent variable equals one if the branch closed between 1994 and 1996 and the key independent variables are 1994 net sales and the branch's 1994 EAI variable. The sample size for these models is the 193 branches that were open in 1994.

Fifty of these branches were closed by 1996.³⁵ All of the branch closings occurred in the first months of 1996 prior to the date of the 1996 employee surveys. We therefore include the 1994 values of the net sales and EAI variables as independent variables in the branch closing models since these variables predate the closings. Column 1 of Table 4 shows that the bank closed branches with low levels of net sales in 1994 (the only explanatory variable in this model). When we add zip-code area characteristics to the regression (column 2 of Table 4), however, the coefficient on 1994 net sales becomes insignificant. Coefficients from the column 2 model show that the variable for average household wealth has a large negative significant effect on branch closings. The results of the columns 1 and 2 models taken together reveal that the poor performing branches were more likely to be closed and that these poor performing branches were located in less affluent neighborhoods.

Columns 3 and 4 examine the effect of the branch-level EAI variable on the closure decision. In column 3, the coefficient on EAI is significant and negative even after controlling for zip-code characteristics, indicating that the bank was less likely to close branches with more positive employee attitudes as reflected by higher values of EAI. In column 4 we add a control for the branch's 1994 performance level. Even with controls for 1994 performance levels and zip-code characteristics, the column (4) results show that lower values of the branch-level EAI variable in 1994 significantly increase the probability of a branch closing by 1996. The bank closed branches with more negative employee attitudes.

One possible interpretation of this empirical pattern is that the effect of the more negative attitudes is causal. For example, the bank's managers could believe that negative attitudes themselves drive away customers and future business, and so they close branches in response to

³⁵During the 1990s, the U.S. banking industry faced increased competition and technological change. Autor et.al. (2001) and Hunter et.al. (2002) discuss how these changes affected job content and earnings at U.S. retail banks.

the negative attitudes. In fact, the prior results in column (5) of Table 3 do show that, among the sample of 143 branches that remained open through 1996, branches with more negative employee attitudes did experience lower sales growth than other branches. Alternatively, the effect of 1994 EAI on subsequent branch closings shown in Table 4 need not be causal. The previous results in Section IV show that there are significant branch-specific components to EAI, and the results in Table 3 show that controls for time-invariant branch-specific factors eliminate the positive cross-section correlations between the EAI and performance measures. Likewise, the results in the branch closing models in columns (3) and (4) of Table 4 could also reflect the effects of this kind of omitted branch-specific factor that negatively affects attitudes and increases the chances that bank management will close the branch.³⁶ Under either interpretation, the results in the Table 4 column (4) model indicate that the bank did close branches with more negative employee attitudes, and moreover, a branch's EAI index is a more important factor in the decision to close branches than the recent level of net sales in the branch. This particular pattern is consistent with an interpretation that management views employee attitudes as a better predictor of the long-run branch performance than the prior year's net sales performance, and thus with the finding in Table 3 that workplace attitudes are a good predictor of future sales growth.

³⁶ One version of this class of explanations implies reverse causality from (expectations of) future branch closings to more negative employee attitudes. For example, this kind of reverse causality could occur if some exogenous factor in 1994 increased the likelihood of the branch being closed in 1996 and also negatively affected the 1994 levels of employee attitudes (because employees in these branches were suspicious about an increased risk of branch closings). Given the timing of branch closings and the dates of the surveys, this particular variant of this type of omitted variable explanation does not seem especially persuasive. The bank first disclosed to its employees in early 1996 that branches would be closed during that year and these closings were completed within a few months. The first reports in the business press of branch closings in this bank were also in early 1996. The 1994 attitude surveys were completed by employees before the end of the first quarter of 1994, well before any branch closings seem to even have been contemplated. The time gap between when the 1994 surveys were completed by the employees and when the branch closings were being considered is substantial and suggests that this particular version of a reverse causality explanation – i.e., prior to completing the attitude survey in the spring of 1994, employees suspected that their branches would be closed in 1996 and therefore reported poor attitudes in 1994 – does not appear to account for the Table 4 results.

The results in Table 4 also caution against drawing strong conclusions from the results of the fixed effects net sales models reported in Table 3. As we suggest above, the results in Table 3 are consistent with the effect of an omitted branch factor that causes both more favorable attitudes and higher sales. However, the results in columns (3) and (4) of Table 4 document selectivity in branch closings between 1994 and 1996, with the low-EAI branches the ones that were more likely to be closed. This kind of selectivity in branch closings could also bias downward the coefficient on the change-in-EAI variable in the Table 3 growth-in-net-sales models. The bank closed branches that, on average, had low net sales in less affluent neighborhoods and that had poor employee attitudes. These branches may have been the best candidates for improving net sales through a management initiative to improve attitudes. For example, the bank could have removed managers from low-performing branches and replaced them with managers from high-performing branches. Had the bank maintained these branches and managed to improve the employee attitudes, we may have seen an improvement in performance as well, producing a significant first difference result in Table 3. But even this scenario relies on the role of the omitted factor, i.e. the managerial behaviors that could lead to an improvement in attitudes.

VI. Conclusion

Bank branches are small establishments where co-workers do their jobs in sufficiently close proximity to constitute a genuine workplace. Branches are therefore well suited for a study of the importance of workplace effects. This study examines the relationships among workplaces, employee attitudes and performance outcomes in a sample of 193 branches of a major U.S. bank. Our analyses of employee opinion survey responses from several thousand workers in these bank branches consistently show evidence of a distinctive workplace component to employee attitudes despite the common set of corporate human resource

management practices that cover all the branches. Differences in the branch-level measures of employee attitudes across branches are highly significant and are too large to be explained by chance alone. Moreover, the attitudes of new employees converge with the pre-existing attitudes of their longer-tenured co-workers, either through changes in employee attitudes over time or through turnover. We also find that cross-branch differences in attitudes are highly correlated with sales performance of the branches – branches in which employees have more favorable attitudes have superior sales performance. “Branch effects” again appear to be important in understanding this pattern as well. In particular, the existence of a branch-specific factor that affects both attitudes and sales provides an explanation for our findings that the significant cross-sectional relationship between branch attitudes and branch performance is not observed in longitudinal fixed-effects net sales models.

While we consider several possible interpretations for each individual empirical result, the full set of results is consistent with an interpretation that branch-specific factors lead to better outcomes for both employees (more favorable employee attitudes) and the bank (better sales performance), and that this factor is more likely to be some aspect of the branches’ internal operations rather than some characteristic of the external market of the branch. Previous research has also found that the adoption of innovative human resource management practices produces good outcomes for employees and businesses in terms of higher levels of employee involvement and greater productivity. While the formal human resource management practices are the same across all branches in the company we study, the results here may indicate that other management decisions and approaches that vary from workplace to workplace within a single company and industry can promote superior outcomes for both the employee and the company. Future research that goes even deeper inside firms and their establishments to identify these distinctive, and beneficial, workplace factors would be especially valuable.

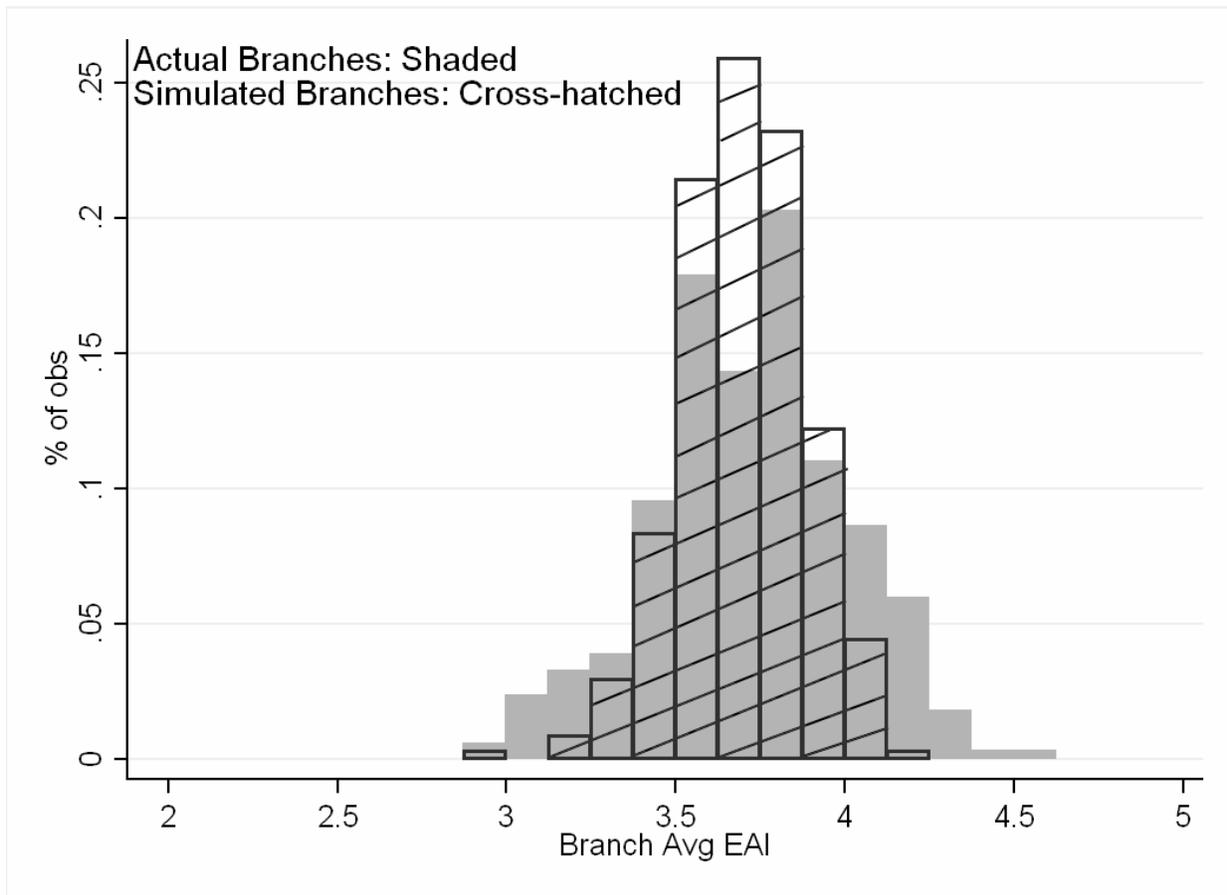
Bibliography

- Allen, David G., Lynn M. Shore and Rodger W. Griffeth (2003), "The Role of Perceived Organizational Support and Supportive Human Resource Practices in the Turnover Process," *Journal of Management* 29 (1): 99-118.
- Autor, David, Frank Levy and Richard Murnane (2001), "Upstairs, Downstairs: Computers and Skills on Two Floors of a Large Bank," *Industrial and Labor Relations Review*, 53(3), 432-47.
- Azoulay, Pierre, Joshua Zivin and Jialan Wang (2010), "Superstar Extinction", *Quarterly Journal of Economics* 125(2): 549-589.
- Bandiera, Oriana, Iwan Barankay, and Imran Rasul (2007), "Incentives for Managers and Inequality among Workers: Evidence from a Firm Level Experiment" *Quarterly Journal of Economics* 122(2): 729-773.
- Bartel, Ann P., Casey Ichniowski and Kathryn Shaw (2007), "How Does Information Technology Affect Productivity? Plant-Level Comparisons of Product Innovation, Process Improvement and Worker Skills," *Quarterly Journal of Economics*, 122(4): 1721-1758.
- Berger, Allen N. and David B. Humphrey (1992), "Measurement and Efficiency Issues in Commercial Banking." In Zvi Griliches, ed., *Output Measurement in the Service Sector*, NBER Studies in Income and Wealth, Vol. 56. Chicago: University of Chicago Press.
- Black, Sandra and Lisa Lynch (2004). "What's Driving the New Economy? The Benefits of Workplace Innovation," *Economic Journal*, 114(493): 97-116.
- Black, Sandra and Lisa Lynch (2001). "How to Compete: The Impact of Workplace Practices and Information Technology on Productivity," *Review of Economics and Statistics*, 83(3): 434-445.
- Bloom, Nick and John Van Reenen (2007). "Measuring and Explaining Management Practices Across Firms and Countries," *Quarterly Journal of Economics*, 122(4): 1351-1408.
- Bloom, Nick, Benn Eifert, David McKenzie, Aprajit Mahajari and John Roberts (2009), "Does Management Matter? Evidence from India," unpublished manuscript.
- Bloom, Nick, Raffaella Sadun and John Van Reenen (forthcoming). "Americans do IT Better: American Multinationals and the Productivity Miracle," *American Economic Review*, (revision of NBER Working Paper 13085).
- Bresnahan, Timothy, Erik Brynjolfsson and Lorin Hitt (2002). "Information Technology, Workplace Organization and the Demand for Skilled Labor: Firm-Level Evidence," *Quarterly Journal of Economics* 117(1): 339-376.

- Bryk, A. S. and Raudenbush, S. W. (1992), *Hierarchical Linear Models: Applications and Data Analysis Methods*. Newbury Park, CA: Sage Publications.
- Bowling, Nathan A. Terry A. Beehr, and Lawrence R. Lepisto (2006), "Beyond Job Satisfaction: A five-year prospective analysis of the dispositional approach to work attitudes" *Journal of Vocational Behavior* 69: 315-330.
- Cappelli, Peter and David Neumark (2001). "Do 'High-Performance' Work Practices Improve Establishment-Level Outcomes?" *Industrial and Labor Relations Review* 54(4): 737-775.
- Clark, Andrew and Andrew Oswald (1996), "Satisfaction and Comparison Income," *Journal of Public Economics*, 61(2): 359-81.
- Cote, Stephanie and Laura M. Morgan (2002) "A longitudinal analysis of the association between emotion regulation, job satisfaction, and intentions to quit" *Journal of Organizational Behavior* 23: 947-962.
- Cropanzano, Russell and Marie S. Mitchell (2005). "Social Exchange Theory: An Interdisciplinary Review," *Journal of Management*, 31: 874-900.
- Eisenberger, R., Huntington, R. Hutchiso, S. and Sowa, D. (1986). "Perceived Organizational Support," *Journal of Applied Psychology*, 71:500-507.
- Gibbons, Robert and Rebecca Henderson (forthcoming). "Relational Contracts and the Origins of Organizational Capabilities" in *Handbook of Organizational Economics* (R. Gibbons and J. Roberts, eds.), Princeton University Press.
- Graafland, Johan J. and B.A. Rutten (2004). "Perceived Organizational Support and Profitability," Tilburg University CentER Discussion Paper 2004-45, .
- Griffith, Rachel and Andrew Neely (2009). "Performance Pay and Managerial Experience in Multi-task Teams: Evidence from Within a Firm," *Journal of Labor Economics* 27(1): 49-82.
- Hamermesh, Daniel (2001) "The Changing Distribution of Job Satisfaction," *Journal of Human Resources*, 36(1): 1-30.
- Haltiwanger, John (2008), "Top Ten Questions for Understanding Firm Dynamics and Productivity Growth" Keynote address at CAED.
- Hamilton, Barton, Jack Nickerson, and Hideo Owan (2003), "Team Incentives and Worker Heterogeneity: An Empirical Analysis of the Impact of Teams on Productivity and Participation," *Journal of Political Economy*, 111(3): 465-497.
- Hunter, Larry, Annette Bernhardt, Katherine L. Hughes and Eva Skuratowicz (2002), "It's Not Just the ATMs: Technology, Firm Strategies, Jobs and Earnings in Retail Banking," *Industrial and Labor Relations Review*, 53: 402-24.

- Ichino, Andrea and Giovanni Maggi (2000), "Work Environment and Individual Background: Explaining Regional Shirking Differentials in a Large Italian Firm." *Quarterly Journal of Economics* 115 (3): 1057-1090.
- Ichniowski, Casey, Kathryn Shaw and Giovanna Prennushi (1997), "The Effects of Human Resource Management Practices on Productivity: A Study of Steel Finishing Lines," *American Economic Review*, 86: 291-313.
- Katz, Harry C., Thomas A. Kochan and Kenneth R. Gobeille (1983) "Industrial Relations Performance Economic Performance, and QWL Programs: An Interplant Analysis." *Industrial and Labor Relations Review* 37: 3-17.
- Lazear, Edward and Kathryn Shaw (2007) "Personnel Economics: The Economist's View of Human Resources," *Journal of Economic Perspectives*, 21 (4), (Fall): 91-114.
- Lord, F. M. (1980), *Applications of Item Response Theory to Practical Testing Problems*. Hillsdale, NJ: Erlbaum.
- MacDuffie, John Paul (1995), "Human Resource Bundles and Manufacturing Performance: Organizational Logic and Flexible Production Systems in the World Auto Industry," *Industrial and Labor Relations Review*, 48: 197-221.
- Mas, Alexandre and Enrico Moretti (2009), "Peers at Work," *American Economic Review*, 99(1): 112-145.
- Oyer, Paul and Scott Schaefer (2011) "Personnel Economics: Hiring and Incentives," In Orley Ashenfelter and David Card, editors: *Handbook of Labor Economics*, vol. 4b (Great Britain, North Holland), pp. 1769-182
- Rhoades, Linda and Robert Eisenberger (2002). "Perceived Organizational Support: A Review", *Journal of Applied Psychology*, 87:698-714.
- Rode, Joseph C. (2004), "Job Satisfaction and life satisfaction revisited: A Longitudinal Test of an Integrated model" *Human Relations* 57: 1205-1230
- Van Sanne, N, J.K. Sluiter, J.H.A.M. Verbeek, and M.H.W Frings-Dresen, (2003), "Reliability and Validity of Instruments Measuring Job Satisfaction—A Systematic Review," *Occupational Medicine* 53:191-200.

Figure 1: Distribution of Actual Branch-Level Averages of the EAI Index Compared to Distribution of Simulated Branch-Level Averages of the EAI Index^a



Mean for Distribution of Actual Branch Average Values of EAI = 3.72; Std. Dev. = 0.285

Mean for Distribution of Simulated Branch Average Values of EAI = 3.70; Std.Dev. = 0.184

Kolmogorov-Smirnov: D=0.1488, p-value=0.001.

^a See text for discussion of simulated distribution.

Table 1
Estimates of Branch Effects on Employee Attitudes

Panel A: ANOVA

	Degrees of Freedom	Total Sum of Squares	Mean Squares	F Value	p-value
Person Effects	3482	117287.7	33.7	53.8	.00
Branch Effects	192	19525.0	101.7	162.5	.00
Question Effects	105	53976.8	514.1	821.4	.00
Year Effects	1	123.8	123.8	197.8	.00
Branch * Question	20157	23995.6	1.2	1.9	.00
Question * Year	105	410.1	3.9	6.2	.00
Branch * Year	142	6581.3	46.3	74.1	.00
Grade	6	928.9	154.8	247.4	.00
Tenure with Bank	4	1406.4	351.6	561.8	.00
Model	24194	224235.6	9.3	14.8	.00
Error	338033	211566.5	0.6		
Total	362227	435802.1			

Panel B: Hierarchical Linear Model^a

Fixed Effect	Coefficient	SE	t-value	p value
Intercept γ_{00}	3.6976	0.0178	207.51	0
Random Effect	Variance Component	SE	Z	p value
Branch level, μ_{0j}	0.06054	0.0063	9.68	0
Level-1 effect r_{ij}	1.1814	0.0026	456.55	0

- 2 Log likelihood 1254005

^aResults of estimating the following model:

$$Y_{ij} = \beta_{0j} + r_{ij} \quad \text{-----Individual-level equation (i denotes individual and j denotes branches).}$$

$$\beta_{0j} = \gamma_{00} + \mu_{0j} \quad \text{----- Branch-level equation.}$$

Table 2
The Effects of 1994 Branch-Level Attitudes on
Attitudes of New and Longer Tenured Employees in 1996^a

Dependent Variable: Individual EAI in 1996

<i>Independent Variables</i>	(1) All	(2a) Tenure>2	(2b) Tenure< 2	(3a) Tenure>2	(3b) Tenure<1	(3c) 1<Tenure<2
1994 Branch EAI	0.397*** (0.090)	0.397*** (0.091)	0.427** (0.166)	0.397*** (0.091)	0.181 (0.226)	0.812*** (0.268)
Tenure < 2 years	0.111 (0.583)					
1994 Branch EAI * Tenure < 2 years	0.017 (0.158)					
N	1517	1275	242	1275	138	104

* - Significant at 0.10 level; ** - Significant at 0.05 level; *** - Significant at 0.01 level.

^a Robust standard errors clustered by branch are in parentheses. All regressions include the average age of branch employees, the number of employees in the branch, and the following 1995 zip code-specific variables: total population, number of households, number of owner-occupied households, per capita income, average household wealth, median education, unemployment rate, median housing value, total employees in area and total sales in area.

Table 3

Regressions of Sales and Growth of Sales on Branch Level Attitudes, 1994–1996^{a,b}

	(1)	(2)	(3)	(4)	(5)
	1994 Ln Net Sales	1996 Ln Net Sales	1966 Ln Net Sales Minus 1994 Ln Net Sales	1996 Ln Net Sales Minus 1994 Ln Net Sales	1996 Ln Net Sales Minus 1994 Ln Net Sales
Branch EAI 1994	0.0493** (.020)				0.057** (.027)
Branch EAI 1996		0.0607* (.031)			
1994-1996 Change in EAI			- 0.0090 (0.030)	0.0007 (0.027)	
1994 Ln Net Sales				- 0.818*** (0.142)	- 0.833*** (-.150)
Branch Controls ^b	Yes	Yes	Yes	Yes	Yes
N	193	143	143	143	143

* - Significant at 0.10 level; ** - Significant at 0.05 level; *** - Significant 0.01 level.

^a Robust standard errors are in parentheses.

^b Regressions in columns (1) and (2) include the average age of branch employees and the number of employees in the branch as well as the following 1995 zip-code specific variables: Total population, number of households, number of owner-occupied households, per capita income, average household wealth, median education, unemployment rate, median housing value, total employees in area, and total sales in area. Regressions in columns (3), (4), and (5) include the change in the age of branch employees and the change in the number of employees in the branch.

Table 4: The Effects of Employee Attitudes on Branch Closing by 1996

Dependent Variable =1 if Branch Closed between 1994 and 1996
(N=193)^a

	(1)	(2)	(3)	(4)
1994 Net Sales	-0.729* (0.422)	-0.178 (0.402)	-----	-0.022 (0.405)
1994 EAI	-----	-----	-0.268** (0.126)	-0.269** (0.129)
Branch Controls ^b	No	Yes	Yes	Yes

* - Significant at 0.10 level.

** - Significant at 0.05 level.

*** - Significant at 0.01 level

- a- Linear probability model with robust standard errors. Sample includes all branches that were in operation in 1994.
- b- Regressions in columns (2), (3) and (4) include the average age of branch employees and the number of employees in the branch in 1994 as well as the following 1995 zip code specific variables: Total population, number of households, number of owner-occupied households, per capita income, household wealth, median education, the unemployment rate, median housing value, total employees in area and total sales in area.

Appendix A

Selected Questions from Employee Survey

I. Pride in the Bank

1. I am proud to work for the bank.
2. I feel a strong commitment to the goals and values of this organization.
3. I would recommend working at the bank to my friends.

II. Values

1. I am given the authority I need to do the right thing for the customer.
2. Service to the customer is an important part of the way my performance is measured.
3. I am recognized for the service I provide to customers.
4. My manager/supervisor respects his/her employees.
5. I am dealt with in an open and honest manner.
6. The bank supports my efforts to achieve balance between my work and personal life.

III. Work Environment

1. I have enough information to do my job well.
2. I know the basis on which my performance will be judged.
3. In my work unit, people have a clear understanding of their roles and responsibilities.
4. I feel encouraged to come up with new and better ways of doing things.
5. My manager/supervisor listens to my ideas and concerns.
6. My job makes good use of my skills and abilities.
7. My work gives me a feeling of personal accomplishment.
8. My job is too monotonous.
9. I regularly get feedback from my manager/supervisor about my performance.
10. If I do a good job, I know I'll be considered when the right job opportunities become available.
11. Adequate training is provided when new products and technologies are introduced.
12. My manager/supervisor provides coaching and/or guidance to help me improve my performance.
13. The people I work with cooperate to get the job done.
14. My manager/supervisor encourages teamwork among group members.

IV. Quality

1. My manager/supervisor encourages continuous improvement.
2. I am recognized for my efforts to gain quality improvements.
3. I have the authority to make decisions that improve the quality of my work.

V. Personal Responsibility

I am personally responsible for:

1. Delivering quality service to the customer
2. Obtaining adequate feedback about my performance
3. Developing job-relevant skills

VI. Overall Satisfaction

1. Considering everything, how satisfied are you with your job?
2. How satisfied are you with your involvement in decisions that affect your work?
3. How satisfied are you with the recognition you receive for doing a good job?
4. How satisfied are you with the training you received for your present job?
5. Overall, how good a job do you feel is being done by your immediate manager/supervisor?

Appendix B: Relationship of Age, Tenure and Job Grade to Branch-Level EAI

Dependent Variable: EAI Index

	Coefficient	s.e.	t-value
Age	0.011	0.005	2.24
Tenure_1	0.273	0.268	1.02
Tenure_2	-0.062	0.309	-0.20
Tenure_3	0.219	0.209	1.05
Tenure_4	-0.077	0.174	-0.44
Grade_1	-0.258	0.377	-0.68
Grade_2	0.122	0.369	0.33
Grade_3	0.008	0.562	0.01
Grade_4	-0.133	0.533	-0.25
Grade_5	-0.182	0.396	-0.46
Grade_6	-0.060	0.372	-0.16
_cons	3.344	0.427	7.83
Observations		193	
F(11, 181)		1.11	
Prob > F		0.3568	
R-squared		0.0631	
Adj R-squared		0.0062	

Age is the average age of employees working at a branch; Tenure is measured in 5 categories, and each variable is the proportion of employees who belong to each tenure category (Tenure_5 is the reference group); Grade indicates job grade measured in seven grades and is the proportion of employees who belong to each job grade (Grade_7 is the reference group).

Tenure categories:

Tenure_1: One year or less

Tenure_2: More than 1 year but less than 2 years

Tenure_3: More than 2 years but less than 5 years

Tenure_4: More than 5 years but less than 10 years

Tenure_5: More than 10 years

Grade categories:

Grade_1: Staff 7 or below

Grade_2: Staff 8-10

Grade_3: Staff 11-13

Grade_4: Staff 14+

Grade_5: Officer Q/R

Grade_6: Officer S/T

Grade_7: Officer U+

Appendix C: Estimating the Correlation Between 1994 and 1996 Branch-Level Employee Attitudes For Employees Who Answer the Survey Only Once

The covariance formula that links the EAI measures over time can be decomposed into the part of the covariance due to employees who answer the survey once and those who answer the survey in both years. Let X_{i1} be the EAI measure for branch i in the first survey and X_{i2} be the EAI for the branch in the second survey and let $\text{Cov}(X_{i1}, X_{i2})$ be the variance. Assume that λ percent of workers in the branch answered the survey both times, so that the correlation between their responses might reflect an unmeasured personal attitude rather than persistent workplace attitudes at the branch. Then the covariance can be divided into the part contributed by these workers and the part contributed by other workers:

(1) $\text{Cov}(X_{i1}, X_{i2}) = \lambda \text{cov}(X_{i1}, X_{i2}; S) + (1 - \lambda) \text{cov}(X_{i1}, X_{i2}; N)$, where S relates to workers who responded on both surveys and N relates to workers who responded only once. In our data, the observed covariance for the 143 branches that were in existence in 1994 and 1996 was 0.34.

(2) Since the correlation coefficient is the covariance divided by the standard deviation of X_{i1} , times the standard deviation of X_{i2} , we estimate the covariance for the workers who responded in both surveys as equal to the correlation coefficient from the studies cited in the text (0.5 or 0.7) times the multiplicand of the estimated variances for all workers in our data in 1996 (0.29) and in 1994 (0.27). This is 0.078.

(3) Rearranging the terms in (1) gives the formula for the covariance of branch average attitudes for workers who responded to the survey only once: $\text{cov}(X_{i1}, X_{i2}; N) = [\text{Cov}(X_{i1}, X_{i2}) - \lambda \text{cov}(X_{i1}, X_{i2}; S)] / (1 - \lambda)$

(4) We estimate the correlation coefficient that we would get between branch average attitudes for workers who responded to the survey only once by dividing the estimated $\text{cov}(X_{i1}, X_{i2}; N)$ in (3) by 0.078.

When $\lambda = 0.25$ and the correlation for the workers who responded in both surveys was 0.50, these calculations give our upper bound estimate of 0.28. When $\lambda = 0.31$ and the correlation for workers who responded in both surveys was 0.70 gives our lower bound estimate of 0.19.

Appendix D: Summary Statistics^a

<u>Variable</u>	<u>Mean</u>	<u>Std. Dev.</u>
Growth Rate of Footings	.058	.081
Total Population	40894	24853
Number of Households	17152	12375
Per Capita Income	32188	21420
Household Wealth	146268	74805
Owner-Occupied Households	6314	4420
Median Education	13.77	1.50
Unemployment Rate	.065	.032
Median Housing Value	292357	130188
Total Employees in Area	26762	38399
Total Sales in Area	3997	6570
Age of Branch Employees	36.36	4.98
Branch Employment	11.57	7.17

^a Growth rate of footings, age of branch employees and branch employment are reported for 1994. All other variables are measured at the level of the zip-code in 1995.