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The Impact of Workplaces on Employee Attitudes and Economic Outcomes

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Many large U.S. corporations undertake some kind of survey of their workers' attitudes [1]. Market research firms offer standardized and customized questionnaires to client firms, and consortiums of large firms such as the Mayflower Group use common questions to compare responses among participating firms. These surveys are designed to identify possible problems in the firm and in particular departments or areas as well, with the hope of improving retention and economic performance. Analyses serve as the basis for developing human resource strategies like employee involvement and other participatory programs, and for determining whether the firm has gotten its "personnel message" to workers.

While firm opinion surveys are organization or workplace oriented, most academic work on job satisfaction has concentrated on the determinants of individual job satisfaction or attitudes. National data sets do not identify individual workplaces, and many studies of particular workplaces contrast individuals within the workplace. These studies show that worker satisfaction varies with individual characteristics and the features of the workplace, but cannot differentiate the impact of personal predilection – the happy worker – from the impact of the workplace – the good employer – on attitudes. Studies of individual satisfaction find that individuals who are more satisfied at their workplace are less likely to quit (Freeman, 1976, Hulin, 1966), but do not tell us whether workplaces where attitudes are positive on average have lower turnover. Many studies of the equivocal link between job satisfaction and productivity also examine individual performances rather than workplace outcomes (Weiss and Brief, 1998).

How much do responses to firm opinion surveys vary among workplaces as opposed to among workers? Is there a genuine "workplace effect" in employee opinion surveys? To the

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[1]Employee satisfaction and attitudes toward work are among the most researched areas in the social sciences. In a review article Spector estimated that by 1991 more than 12,400 studies had been published on job satisfaction (Spector, 1996).

extent that systematic differences in attitudes exist across workplaces, do these differences help predict workplace economic outcomes, such as productivity or turnover?

This paper examines these questions across branches of a large commercial bank in the New York metropolitan area. The bank provided files from its 1994 and 1996 employee opinion surveys under the condition that we not use its name in the publication of our results, so we will call it Big Bank and use the acronym BB. The sample contains data on 2245 employees working in 193 New York area bank branches in 1994, and 1439 employees working in 142 branches in 1996. The smaller sample sizes for 1996 are due to closings of 51 branches between 1994 and 1996. Since we have the responses of individuals by branch, we can assess whether there is a distinct branch-specific component to the attitudes of employees about their work environments at a point in time and whether this effect persists over time. However, we lack information on individual respondents and thus cannot follow individuals over time. To deal with this problem, we supplement the bank data with information from the NLSY on job satisfaction for the same individual over time. Finally, we combine the employee attitude data with information on the branches' financial performance, characteristics of the branches' local markets, and characteristics of the branch employees, to see whether branch level attitudes help predict employee turnover and productivity in the two cross sections and over time. We reach two conclusions.

1) There is a genuine branch or workplace effect on how workers view their work place. Employee attitudes differ significantly across branches in ways that cannot be explained by branches randomly drawing workers from a distribution of workers with different innate levels of job satisfaction or attitudes. Differences in attitudes are highly positively correlated among branches over time, which suggests that workplace effects are strongly persistent. NLSY data show a higher correlation of attitudes for the same worker at a given workplace than at different workplaces, which also points to the existence of a genuine workplace effect.

2) Branches where workers have more favorable attitudes toward the firm have lower turnover and higher productivity, but our data do not allow us to unpack whether this pattern is due to the effect of attitudes on turnover and productivity or whether it is due to some omitted factor. The correlation of attitudes by branch in our data is so high that changes in outcomes over time appear to be largely measurement error. Thus fixed effects analysis does not help us unpack the potential causal chain between attitudes and outcomes. At the minimum, however, the worker attitudes found on the survey provides information on the symptoms for low retention and low productivity at bank branches.

Our results are consistent with studies of worker attitudes that have stressed the modest impact of individual differences on attitudes compared to reported differences about workplace conditions and of the link between workplace conditions and outcomes (Freeman and Rogers, 2001). The similarity of assessments among respondents at many workplaces in our data shows that individual reports of workplace conditions are indeed reflective of varying workplace conditions rather than of innate attitudes or idiosyncratic responses to the same workplace environment.

The Employee Attitude Survey

The starting point for this study is the employee opinion survey that BB conducted in all of its branches in 1994 and 1996. Although the opinion survey was administered to all workers, a substantial proportion in each year did not respond to the survey. In 1994, 59 percent of employees filled out the survey; in 1996 52 percent of employees filled out the survey. In most analyses, the larger the response rate the better, but for our purposes, the fact that 40-50% of workers did not fill out the survey helps us identify branch effects in the data. This is because it implies that most of the responses in the two years come from different workers. If in each year

workers responded to the survey randomly and there was no turnover among employees, 31% of the respondents would be the same in 1996 as in 1994. With a turnover rate in bank branches of roughly 10% per year, we estimate that 25% of the respondents would be the same in both years. Even if persons who responded to the opinion survey in 1994 were twice as likely to respond to the opinion survey in 1996 as persons who did not respond in 1994, less than one-half of the respondents would be the same between the two years.[2] Thus, correlations of attitudes at branches over time will be more reflective of the workplace than of the particular workers responding to the survey.

The bank opinion survey is fairly representative of surveys used by many large firms in the US. The survey asks employees to respond to statements about their attitudes toward their work environment according to a five-point scale, ranging from 1 (the least favorable response) to 5 (the most favorable response). There are over 100 questions on the survey. We focus on 18 survey items regarding the following issues: employee compensation and performance measurement, teamwork, training and development, information sharing and communication, and supervisor-staff relationships.

Table 1 lists these 18 items and gives the mean responses for each across all surveyed employees. In addition, it records a summary measure of attitudes toward these practices, which we call the "employee attitude index" (EAI). This is just the average summated rating across the 18 items for any given employee. The EAI has a mean value of 3.74 and a standard deviation of 0.71 in 1994 and a mean value of 3.78 with a standard deviation of 0.67 in 1996. The variation in the EAI reflects differences in responses across questions and workers. Average responses to

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[2] With 59% responding in 1994 and 52% in 1996, the proportion responding in both years would be 0.59 x 0.52 = .31. With approximately 20% turnover between the two years, the proportion would be 0.31 x 0.81 = .25. If persons who responded in 1994 were twice as likely to respond in

questions range from a low of 2.98 for the question about whether compensation is consistent with performance, to a high of 4.32 for the question about the importance of service to the customer. Average responses to all questions among individuals range from a low of 1.0 to a high of 5.0. The person who gave 1 on all questions was the most dissatisfied worker. The worker who gave 5.0 on all questions was the most satisfied.

To assess whether the summated rating statistic is a reasonable summary of responses, we computed Cronbach's alpha, perhaps the most widely used statistic in educational research to measure the consistency of items on a test. Cronbach's alpha compares the variance in the sum of the items to the variance that one would obtain if the items were not related, making a summary statistic meaningless. The average alpha in our data was .44, which indicates that individuals reported fairly consistently about their workplace on the 18 items. To assess whether different workers gave similar reports about the characteristics of their branch, we computed the correlation coefficient for items among individuals. The average correlation among all items for all branches was 0.43 in 1994 and 0.41 in 1996. One statistic for assessing the appropriateness of aggregation is the James, Demaree, and Wolf (1984, 1993), r_{wg}, which compares the variance of the summary statistic with an expected variance based on some posited distribution. The statistic is defined as 1 minus the ratio of the actual variance to the expected variance. We calculated the r_{wg}, for each item using a uniform distribution as the "null" for the expected variance. The average r_{wg} across all items and branches was .52. The r_{wg} varied noticeably among branches, implying that workers had highly similar attitudes toward the workplace in some branches but had moderately different attitudes toward the workplace in other branches. With the uniform distribution, it is possible to

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1996 as persons who did not respond in 1994, they would constitute about 2/3rds of the 1996 respondents. In this case, the percentage responding in both periods would be 40%.

get negative r_{wg}s -- for instance if half the workers give 1 on an item and half give 5 on the item, the observed variance will exceed the expected variance. All of our r_{wg}s were positive.[3]

Are there Branch Effects?

Our data are well suited to assess whether employee attitudes differ systemically by workplace. Let OBS_{ijqt} be the response from the opinion survey for the i-th individual in the j-th branch to the q-th question in year t. Equation (1) decomposes the variation in employee responses to the survey instrument into: an individual effect, a branch effect, a question effect; and a year effect.

$$(1) \quad OBS_{ijqt} = INDIVIDUAL_i + QUESTION\ q + BRANCH_j + YEAR_t + e_{ijqt}$$

In this specification, the residual captures all interactions among these main effects. Since we have question and branch data in both time periods, we can distinguish branch, time, and question interactions. The absence of information identifying individuals over time means that we cannot identify variation in responses for individuals by branch, question, or year. The fact noted earlier that most of the responses in our data come from different individuals at the same workplace enables us to test whether branches have sufficiently distinct workplace environments to produce common employee attitudes across branches.

With sufficiently large samples of employees randomly assigned to each branch, we could infer the branch effect from the average of individual responses within a branch. But bank branches are typically small, with an average of 25 employees, and just over half of them responded to the opinion survey. This gives us an average number of respondents per branch of just 13, which creates a potential problem of sampling variability. Average attitudes for some branches may by chance be more or less favorable than those for others. Say the population

[3] Appendix gives the branch level measures of the RWG and the means of the values for each of the branches in our sample.

consists of people who like their workplace and those who do not like the workplace, evenly distributed in the employment pool; and that there is no genuine branch effects. In a small sample, some branches would have a disproportionate number of workers with positive or negative attitudes purely due to chance. To deal with this problem, we calculated a "null distribution" of branch averages on the assumption that branches draw workers randomly from the overall distribution of workers with different attitudes for the entire firm. Genuine branch effects would show up in a deviation of the observed distribution from this expected distribution, with presumably more observations at the extremes of high or low attitudes than in the distribution generated randomly.

Figure 1 shows the distribution of responses on the EAI summary index for all individuals in the survey and the distribution of average responses across branches, for a pooled sample of 1994 and 1996 responses. The distribution of attitudes is considerably more compact among branches than among individuals. If there were no branch effects, so that each branch had the same mean attitude index as the overall population, the two distributions would overlap. Using the standard deviation as the measures of dispersion, the standard deviation for the EAI among individuals is 0.70 while the standard deviation for the branches is 0.34. Figure 2 compares the distribution of the EAI index across branches with our estimate of the "null distribution" – the distribution that would result if each branch randomly hired workers (with replacement) from a distribution of attitudes among all employees. To compute the null, we randomly assigned workers to a branch and calculated the branch average. The actual branch distribution is more highly dispersed than the null distribution, with more branches showing either high or low values of the employee attitude index. That the actual standard deviation of branches is greater than that of the simulated null implies that there are branch effects in the data.

Taking this analysis a step further, we pooled the individual responses to the questions on the bank's attitude survey in 1994 and in 1996 and performed an analysis of variance of the main and relevant interaction effects in equation (1). Table 2 gives the results with the effects listed in order of their contribution to the sum of squares. Panel A presents the ANOVA for all 108 questions on the opinion survey, including those that we ignore in the rest of this analysis. The largest contributor to the sum of squares is the individual effect, due to the sizable number of respondents. This variation could result from individual workers having different preferences about their workplace or to different workers experiencing the work environment differently either because they do different things at the site or interact differently with branch managers in different ways.[4] The second largest contributor to the sum of squares is variation in responses among questions. Given that the there are just 107 questions on the survey, the question effect obtains the highest F-statistic. The implication is that while our summary measure captures the overall picture of employee attitudes, there are substantial differences across questions. Finally, Table 2 shows that the branch effects on which we focus are also substantial and highly statistically significant. The main branch effect is highly significant, consistent with the picture in figures 1 and 2 and our estimated average r_{wg} statistic. The branch x question interaction contributes to the sum of squares, but its F value is relatively small. The branch x time interaction is significant but contributes little to the overall sum of squares since we have just two years.

Panel B gives a similar decomposition of the variance for the 18 questions on which we focus. With fewer questions, the impact of the question effect on the sum of squares falls, but

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[4] Studies of job satisfaction among twins suggest that 30% of the variance in satisfaction is due to genetic components (Arvey, Bouchard, Segal, and Abraham, 1989), which gives a lower bound estimate of the potential effect of differences in preferences in our data. The finding from studies of family environments that siblings share only a modest amount of their environment suggests that genuine environmental differences are also likely to be important at work sites (Arvey, Bouchard, Segal, and Abraham, 1989, and Ryan, Schmidt and Johnson, 1996).

otherwise the results mimic those in Panel A. The branch effect remains substantial and highly significant.

To what extent do branch effects vary over time? If there is a genuine branch effect on attitudes and if work practices at branches are reasonably stable over time, we would expect to find persistence in branch effects. In the variance decomposition, the branch x year effect has a high F-Value but contributes little to the sum of squares since there are only two years of contrast. Correlating the EAI summary measure across the 143 branches for which we have information in 1994 and in 1996 gives a correlation coefficient of 0.993, implying a very strong persistence of branch effects over time. Figure 3 shows the tight link between the average branch effects in the two years. The standard deviation of the change in EAI among branches is just 0.038. The largest absolute change was a bare 0.12. With such a high correlation of branch effects and miniscule variation in the effects over time, the observed variation in the differences would seem to be largely measurement error, with a signal to noise ratio perhaps $1/10^{th}$ that in the cross sections.[5] The implication is that what we can learn from these data is to be found in the cross-section, not in an analysis of changes over time.

Could the Branch Effect Be Spurious?

The principal weakness in our data is that we lack information on individual respondents. If the bank opinion survey covered the same workers in both years, we could not differentiate a branch effect from an individual effect. But as we have seen the survey response rate is sufficiently far below 100% that even if there was no turnover of the work force, it is virtually impossible that the high correlation between the average EAE among branches over time could

[5] If there were no real changes in attitudes among branches, the variance of the change in attitudes would be the sum of cross section error variances for 1994 and 1996. Given that the cross section variance of the EAI is so much greater than the longitudinal variance, the signal to noise ratio in

reflect stability in personal attitudes rather than stability in attitudes induced by workplace conditions. In fact, our branch level correlation far exceeds the correlation of job satisfaction rates found among persons on the same job in one major survey, the NLSY. To assess the potential bias in our correlations due to the same workers reporting similarly in both years, we examined responses to a standard job satisfaction question among workers in the NLSY. The NLS survey question asked workers "How do you feel about the job you have now? Do you like it very much, like it fairly well, dislike it somewhat, or dislike it very much?" and coded the answers on a four point scale. Table 3 records the results of this analysis for all workers who stayed at the same employer between 1992 and 1994 and for workers who changed employers from 1992 to 1994 and then stayed at the same employer in the next survey. From 1992 to 1994, there were 4,499 workers who remained at the same employer and responded to the satisfaction question in each year. The correlation between the responses was 0.44, far below the 0.98 found in our branch level analysis. Even allowing for measurement error or non-reliability in the individual responses on the NLSY, which could raise the correlation substantially;[6] it would be impossible for even a near perfect correlation of responses among individuals to explain the correlation of branch effects over time, given that the opinion survey did not cover the same workers over time.

One other piece of evidence from the NLSY supports the existence of workplace effects independently of individual effects in employee attitudes. This is the pattern of job satisfaction responses among workers who switch jobs and remain on the same job over time. If worker reports of job satisfaction were idiosyncratic, dependent on the worker rather than the workplace, we would expect that the correlation of attitudes would be the same for an individual regardless of

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the cross section would be about ten times that in the first difference since the cross section variance in the EAI was approximately 0.70 compared to just 0.03 in the longitudinal data.

whether he or she changed jobs or remained at the same job. The happy worker would be happy wherever he or she worked. If, by contrast, there were real workplace (branch) effects, the correlation of attitudes would be higher for the same job than between jobs. Between 1992, 1994, and 1996, we identified 544 workers on the NLSY who switched jobs in the 1992-94 period and remained on the same job from 1994 to 1996. The correlation of their responses to the satisfaction question was 0.17 for the different jobs held in 1992 and 1994 compared to 0.29 for the same job held in 1994 and 1996. The higher correlations for the same job switchers when they are with the same employer than when they change employers indicates the existence of a genuine workplace effect on attitudes. If, for simplicity, we postulate a linear additive model, the variance of the effect of personal inclination and of the workplace for the same people at the same job could be decomposed into a person effect, identifiable from the same person when he or she changes jobs, and a job effect. With the observed correlations, this would imply a correlation of attitudes due to the job effect of 0.23.[7] This is smaller than the effects we find for workplaces on average because the observations are for individuals, among whom there is considerable variation independent of the workplace effect.

Employee Attitudes and Economic Outcomes

"Done right, an employee survey can provide you with an understanding of the employee behaviors and perceptions that impact important business outcomes, such as employee retention, customer satisfaction and performance" (www.imercer.com/globalcontent/surveys/eesurveys.asp)

Firms survey their employees to identify attitudes that can affect retention, productivity, and performance. To what extent, if at all, are the branch level differences in employee attitudes linked to turnover and productivity?

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[6] If we assumed workers satisfaction was constant at the same job over this period, the 1992 and 1994 measures would be the equivalent of a test/ retest of satisfaction. This would imply considerable noise in the measure.

To answer this question we estimated the following equations for intended turnover and productivity among branches.

(2) $ITURNOVER_{bt} = a + b_1X_{bt} + b_2L_{bt} + b_3EAI_{bt} + u_{bt}$

(3) $Ln\ PRODUCTIVITY/WORKER_{bt} = a + b_1X_{bt} + b_2L_{bt} + b_3EAI_{bt} + u_{bt}$

In the absence of longitudinal data on individual turnover or of branch level data on retention of employees, our ITURNOVER variable is based on employee responses to the following question:

"I intend to leave BB within the next 12 months (1-5) (Strongly agree to Strongly disagree)"

We aggregated individual responses to this question in 1994 to branch level averages. While actual turnover data would be preferable, studies of employee attitude surveys find a correlation between intent to leave and actually leaving of around .6 and this factor has a higher correlation with turnover than any other characteristic (Hulin, 1966 and Hom, Katerberg, and Hulin, 1979). Thus this is a reasonable indicator of turnover. Perhaps equally important from the point of view of the firm doing the opinion survey, the intended turnover response is the appropriate measure of a potential retention and commitment problem. Workers who intend to leave but do not do so because, say, the outside job market is poor, could in fact create greater problems than those who leave. The intended turnover measure varies considerably among branches. The mean value of the variable in 1994 is 1.92, with a standard deviation of .38. The range in 1994 is from 1 to 3.07.

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[7] Squaring the correlation 0.29 gives 0.084. Squaring the correlation 0.17 gives 0.029. The difference is 0.055, whose square root is the workplace effect on attitudes

Our measure of productivity, PRODUCTIVITY/WORKER, is defined as net sales of deposits and loans at a branch during the year.[8] Data on the dollar value of deposits and loans come from bank records on the balance sheets of each branch. The net sales variable is the change in deposit and loans on a branch's balance sheet from the beginning to the end of the year. The annual net sales measure varies considerably in our sample of bank branches. In 1994, footings grew at an average rate of 5.8% across all branches. The range in this "growth in footings" variable extends from -33% to 53% with a standard deviation of 8% in 1994. Branch performance was, on average, higher in 1996 than in 1994. The mean value of net sales for that year was .13. The standard deviation, minimum and maximum values for net sales in 1996 were .10, -.25, and .51 respectively.

We chose to measure productivity as sales after discussion with managers at BB. The managers described how branches earned income for the bank. 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. Total spread income is the spread income earned on the total value of "footings" (or the sum of deposits and loans) given on the branch's balance sheet. According to managers interviewed, branches were evaluated on sales of their products, because growth in footings on a branch's balance sheet translates into more spread

[8] Because of the inherent difficulties in measuring service sector output, most studies of the effects of human resource practices and employee attitudes on productivity focus on manufacturing industries. In their review of service sector productivity studies, Triplett and Bosworth (2000) conclude that service sector output also needs to be measured on an industry-by-industry basis, because each industry contains its own unique problems.

income[9] and a greater financial contribution to the bank's performance. Previous studies of bank performance conclude that a "production approach" for measuring bank productivity is preferable to other possible methods[10] when studying the relative efficiency of branches within a given bank (Berger, Leusner and Mingo, 1994; Colwell and Davis, 1992). Consistent with comments of bank managers, this literature argues that branches should be evaluated on how successfully they are able to "produce" deposits and loans.

In relying on this net sales measure, we did not subtract branch expenses from sales. This decision was also guided by the judgment of the managers we interviewed. In particular, many branch expenses are not tied to the accounts but to customer activity at the branches regardless of where the account was opened and therefore housed. If we subtracted expenses from sales, we would penalize branches that were busy service centers that process large number of transactions on previously opened accounts. We therefore used the net sales measure to capture the basic notion that new sales and cross-selling mean more money for the bank, regardless of where subsequent transaction costs are incurred.[11]

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[9] While spread income is the largest component of branch income, branches also derive income from: liability fees such as fees from stop payments, bounces checks, low balances, wire transfers, etc.; asset fees such as fees from loan applications, loan processing, and late payments; transaction fees for travelers' checks, safe deposit boxes, and ATM transactions; and brokerage commissions.

[10] The other two main approaches for measuring other aspects of bank efficiency are the asset approach and the user cost approach. For a definition of these methods and their uses, see Berger and Humphrey (1992).

[11] The data cover 198 New York area branches in 1994 and to 146 branches in 1996, with the decline in branches due to branch closings. The large number of branch closings creates an additional issue in how to measure performance in 1996, because accounts of closed branches were assigned to a nearby branch that remained open. Over time, however, some of these accounts migrated to other branches. The simplest adjustment we made to account for this issue in our productivity analyses was to do all analyses excluding accounts from the "rollups." The pre-existing accounts from a continuing branch were kept separate from accounts that got rolled into that branch from a closed branch, so we could do the analyses excluding data from rollups. A second method we used to account for rollups in productivity models was to include rollups as part of the dependent productivity variable, but to include a control for the level of rollups on the right hand side of the productivity equations. The idea here is that footings can grow between

Covariates

Equations (2) and (3) include a diverse set of covariates relating to the characteristics of each branch and its work forces. By controlling for these characteristics, we hopefully eliminate differences in intended turnover and sales per worker that are connected to those outcomes and correlated with the EAI measure of attitudes.

The X vector in the equations measures the market and location characteristics of the branches that might reflect differences in opportunities for alternative employment. The bank's branches operate in different parts of the metropolitan area. Some branches operate in central city locations, and some of these are in commercial business centers while others are in more residential neighborhoods. Other branches operate in suburban areas, and again these branches vary in the degree to which their neighborhoods are commercial or residential. Among city or suburban branches, those that operate in more residential neighborhoods vary in terms of the wealth and demographic characteristics of the populations. In our analyses of employee turnover, these differences in local areas should reflect differences in employment opportunity for branch employees. In productivity models, these differences in the nature of the branches' neighborhoods and client base can impact a branch's ability to increase its deposits and loans, since some areas may have more business activity or wealthier residents. We collected data on characteristics of the branches' local market areas using zip codes for branches collected by the Claritas data service for the bank. Variables measuring characteristics of the population living in the zip code are:

1994 and 1996 due to rollups but we can control for how much is due to that factor. The coefficient on the originally rolled-up footings would be less than one if these accounts drift off to other branches. The productivity analyses we report here are based on the first method, but those obtained using the second method to adjust for this factor are in all cases very similar.

population, number of households, per capita income, average household wealth, number of owner occupied households, median value of housing, and median years of schooling completed for the population. Variables measuring business activity in the zip code are: number of employees in all establishments, estimated sales in all establishments, and the zip code's unemployment rate. These data are derived from census establishment data and pertain to 1995 and thus give no information on changes over time.

The L vector in equations (2) and (3) consists of characteristics of branch employees in 1994 and 1996 created from a data file of employee records created by the bank. It includes the age of employees, the number at branches. There are several limitations with these data. First, when we calculate branch size from these data, the number of employees in the branch does not correspond closely to an accurate count of branch employment available from direct company records on branches. Also, these records do not track employees over time. We did use these records to measure differences in average experience in a branch's work force, and calculate the average age of the branch work force in the given year.[12] Also, these data from personnel files cannot be matched to attitude survey data because attitude survey responses contain no identification numbers for employees.

Intended Turnover Results

Table 4 reports the coefficients on the EAI branch-specific attitude index from a linear regression analysis of the intended turnover equation (2), conditional on the covariates described above. Column 1 gives the results of regressions for the 1994 sample. Column 2 gives results for the 1996 sample. Column 3 gives results for the pooled sample. Line 1 gives results from

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[12] We also calculated a measure of experience of the branch workers. This measure has certain limitations. We can only calculate average experience with the bank and not with the specific branch. Furthermore, the experience measure covers any employee who worked in the branch in a

regressing the branch level average for the intention to quit variable on the branch level average EAI measure. IT shows that the EAI measure is significantly negatively related to intended turnover, with a coefficient of approximately –0.50, so that a one unit improvement in the branch level employee attitude measure reduces the intention to quit in the branch by about a half point. Given the standard deviation of the attitude measure of approximately 0.70, this implies that a one standard deviation improvement in attitudes reduces intended turnover by .35 points over the 5 point scale.

The remainder of the table examine the relation between intention to quit and the EAI measure of attitudes among individuals. Lines 2 and 3 report the results of regressing the individual's response to the intention to quit question to the individual's own EAI index. In line 2 we include all of the characteristics of the branch and surrounding community. In line 3, we replace those measures with branch level dummy variables. In both cases, we obtain significant negative relations between the EAI measure and intention to quit. The coefficient is again about –0.50, which suggests that the results in line 1 are due to the differing proportion of workers with favorable and unfavorable attitudes toward the workplace rather than to some more complex response to the workplace due, say to having co-workers who have different attitudes. Line 4 shows the result from regressing the individual's intention to quit on the average EAI for the branch. Here the coefficients are negative but smaller and less significant than those relating individual intended turnover to individual attitudes.

To see whether workers are responding to anything more than their own assessment of the workplace we estimated the intended turnover model at the individual level with two measures of

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given year including those who leave. While we therefore opt for the simpler average age variable, the two measures are highly correlated.

employee attitudes: one for the individual and one for the average of other employees in the branch:

(4) $ITURNOVER_{ibt} = a + b_1X_{bt} + b_2L_{bt} + b_3EAI_{it} + b_4EAI_{bt} + u_{ibt}$

where EAI_{it} measures the employee attitude index for an individual and EAI_{bt} measures the average attitude of the branch. This equation examines one form of branch-level spillover – from the attitudes of other employees to individual behavior, but it does not allow for the possible spillover of attitudes among employees. Line 5 shows that the employee attitude index of the individual dominates the equation. Taking account of the average value of the EAI index for all employees in a branch does not contribute much to the equation. Higher turnover in branches where employees express negative attitude is concentrated among those (more common) employees who report negative attitudes. The employees who express more positive attitudes despite the negative sentiments that prevail in their branches are no more likely to plan to leave than employees surrounded by co-workers with positive attitudes toward the workplace. This result does not mean that "branch policies don't matter," or that turnover is only determined by individual-level factors. For example, a manager may implement a policy that has a negative (positive) effect on a majority of the branch's employees. Those employees who have the negative (positive) reaction are the ones more (less) likely to quit in coming months, in response to the policy. One possible example of this dynamic would be the case of a manager who plays favorites. Most employees would report negative attitudes and express greater intentions to quit, while the employees receiving beneficial treatment would not express those sentiments. Still, the manager's branch "leadership" policy would be responsible for the observed results.

Productivity results

Most research on employee attitudes and performance tends to focus on individual-level performance measures (Arvey, Carter, and Buerkely, 1991, Ostroff, 1992). Levels of individual

performance are linked to individual job satisfaction, with a wide range of equivocal results. By contrast our analysis looks at the relation between attitudes and productivity at the workplace level. Given the purpose of employee opinion surveys and the fact that production depends on group activity, this is a more appropriate way to analyze the link.[13]

Table 5 reports the coefficients on the variable for the branch-specific EAI index in a least squares analysis of equation (3). Line 1 gives the coefficient on this variable for the 1994 cross section model. Line 2 gives the coefficient form the 1996 cross-section model in column 2. Line 3 gives the coefficient from a pooled 1994-1996 cross-section model. The estimates show that workplaces with more positive employee attitudes are associated with modestly higher levels of sales during the year, on the order of 3-4%. Given a 0.70 standard deviation for the EAI these estimates show that a one standard deviation improvement in branch employees' perceptions to a 2-4 percentage point increase in the net sales performance measure, or some 41% of the average net sales of .058 in 1994.

Decomposing the EAI into individual survey items, some survey questions exhibit stronger correlations with productivity than others. Coefficients on the following variables are significant in both the 1994 and the 1996 cross-section models: two variables related to performance and rewards (Judge Performance and Reward Performers); two variables related to teamwork among branch employees (People Cooperate and Share Knowledge); and the variable measuring the employees sentiment that he has a "Good Supervisor." While coefficients on variables for other survey items are significant in one time period or the other, no survey item measuring employees' attitudes toward training and development is significant in these models. Appendix Table A

[13] Some other studies that have linked group productivity with the attitudes of workers in the group are Ostroff, 1992 and Ryan, Schmit and Johnson, 1996.

reports complete results for the 1994 and 1996 cross-section productivity models when individual survey questions are used as measures of the HRM environment.

Changes over time

With observations on branches in 1994 and 1996, we can examine the link between turnover and productivity over time using a first difference (fixed effects) model. The virtue of such a model is that it allows us to eliminate the impact of some time-invariant branch-specific, factor omitted from the equation (2) and (3) models that could be correlated with the EAI measure and branch level performance. The problem with such a model is that, as shown in Figure 3, there is relatively little variation in EAI over time by branch and what little variation that we find seems more likely due to measurement error than to any causal factor. Still, we have estimated first difference forms of our Iturnover and sales per worker outcome equations.

Table 6 reports the results of the first difference analyses. The results show negligible effects of the change in EAI on Iturnover and sales per worker. There are two potential interpretations of these results. One possibility is that the positive cross-section correlation between employees' HRM attitudes and branch productivity are due toomitted branch-specific variables that are positively correlated with outcomes and employee attitudes. Some employees may be giving favorable attitude survey responses because they feel fortunate to work in "good" branches where small numbers of wealthy customers keep sales high and workloads low. The control variables for community demographics measured at the level of the branches' zip codes may not be detailed enough to capture these differences across branches. In this case, the best interpretation of the employee attitudes results is that the opinion surveys are a useful indicator of more fundamental factors – a symptom rather than a genuine cause. The second, and we believe correct, interpretation of the results is that they reflect the dominance of noise in the change analyses. Given that the "noise-to-signal ratio" is markedly higher in the change in EAI than in the

cross-section measure, the cross-section analyses give more accurate estimates of the true effect of the EAI variable than the fixed effects models do. While this can explain the insignificant coefficients in the fixed-effects model, it does not rule out the potential that the significant cross-section results are due to omitted branch-specific factors.

Conclusion

This study has found that employee attitudes differ significantly across the branches of the same large bank, and that branch level attitudes are highly positively correlated over time. This suggests that there is a genuine workplace effect on attitudes, independent of workers' predispositions. In addition, we find that intended turnover is lower where attitudes are better and sales per worker is higher in branches where employees have more favorable attitudes toward the firm. While the absence of substantial variation in our employee attitude index over time produces negligible linkages of changes in attitudes with changes in performance, our analysis has found that employee opinion surveys give a useful and consistent picture not only about attitudes but about turnover and productivity. Absent some identifiable exogenous variation in employee opinions, associated with some other change in branch activity (a valid instrumental variable), however, we cannot tell the extent to which the cross section patterns reflect some underlying unobservable or the independent effect of attitudes on outcomes. Still, at the minimum, the opinion survey is a useful indicator of other aspects of branch level performance and of the characteristics of a workplace. There are happy (unhappy) workplaces, as well as happy (unhappy) workers.

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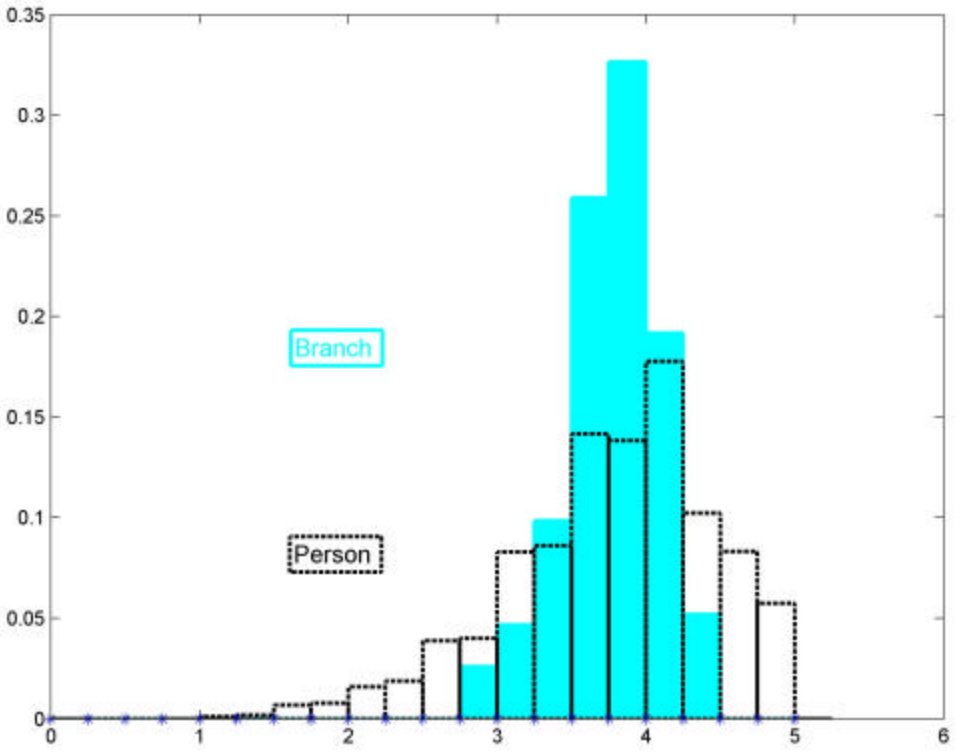
Figure 1:

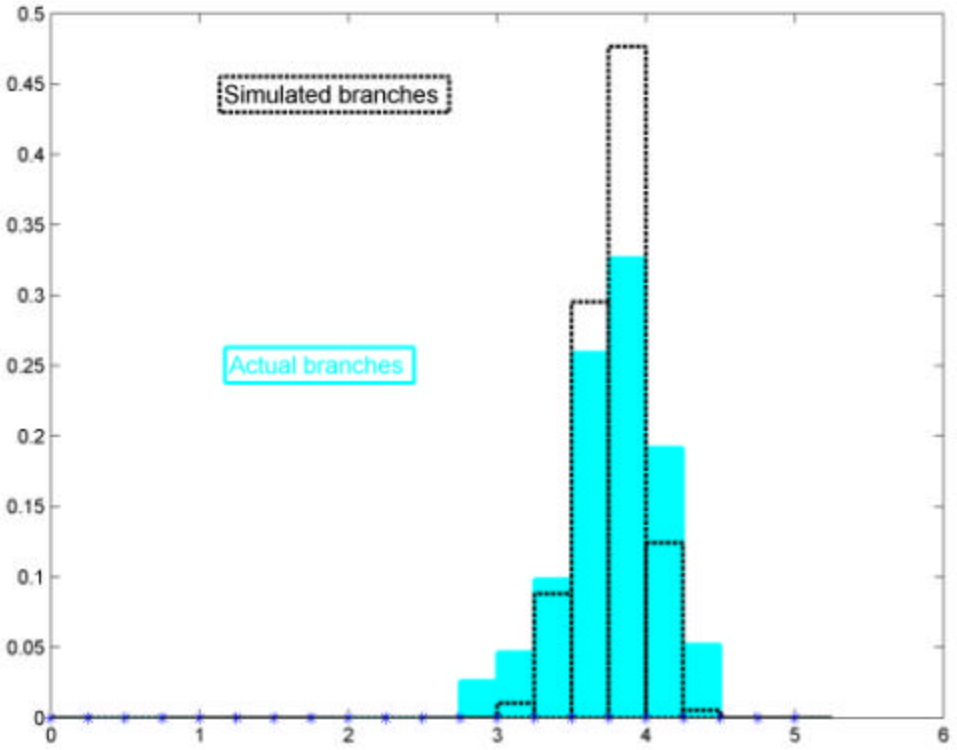
Distribution of branch and person Employee Attitude Indices



Person distribution: mean= 3.75 Std. Dev.=0.70
Branch distribution: mean= 3.77 Std. Dev.=0.34

Figure 2:

Actual and Simulated Distribution of Branch Level Employee Attitude Indices



Actual Branch: mean= 3.77 Std. Dev.=0.34
Simulated Branch: mean= 3.78 Std. Dev.=0.19

Figure 3: Regression Plot of branch-level Employee Attitude Index, 1996 Against 1994 Satisfaction

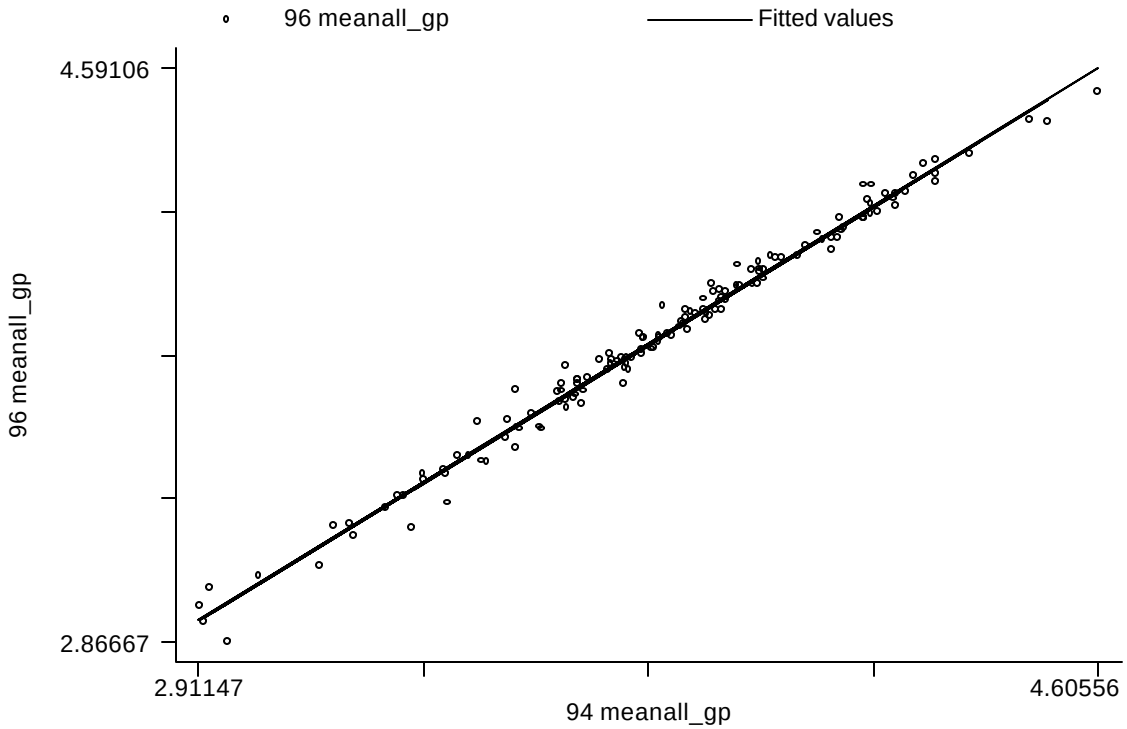


Table 1: Human Resources Attitude Survey Questions Administered to Bank Employees

	VARIABLE NAME	SURVEY QUESTION	1994 MEAN	1996 MEAN
		(A) Employee Performance and Rewards		
1.	**JUDGE PERFORMANCE**	I know the basis on which my performance will be judged.	4.00 (0.93)	4.00 (0.93)
2.	**SERVICE & PERFORMANCE**	Service to the customer is an important part of the way my performance is measured.	4.32 (0.88)	4.28 (0.94)
3.	**REWARD PERFORMERS**	In my work unit, people who do a good job are rewarded more than those who don't.	3.11 (1.17)	3.17 (1.10)
4.	**REWARD CONSISTENT**	Decisions about my compensation have been consistent with my performance.	2.98 (1.15)	3.09 (1.11)
5.	**RECOGNIZED FOR QUALITY**	I am recognized for efforts to gain quality improvements.	3.39 (1.06)	3.44 (1.02)
		(B) Teamwork		
6.	**TEAMWORK ENCOURAGED**	My manager/supervisor encourages teamwork among group members.	4.00 (1.00)	4.00 (0.98)
7.	**PEOPLE COOPERATE**	The people I work with cooperate to get the job done.	3.83 (0.87)	3.80 (1.03)
8.	**SHARE KNOWLEDGE**	The people in my work group share their knowledge and experience when it can benefit others.	3.95 (1.05)	3.92 (0.96)
9.	**IMPROVEMENT ENCOURAGED**	My manager/supervisor encourages continuous improvement.	4.01 (0.86)	4.02 (0.85)
10.	**QUALITY COUNTS**	Day-to-day decisions and activities in my work group demonstrate that quality is a top priority.	3.93 (1.09)	4.00 (0.86)
		(C) Training and Development		
11.	**INVESTS IN EMPLOYEES**	The bank invests in the development of employees.	3.55 (1.18)	3.58 (1.00)
12.	**SATISFIED WITH TRAINING**	How satisfied are you with the training you receive for your current job?	3.80 (0.15)	3.75 (1.07)
13.	**SUPERVISOR COACHES**	The manager/supervisor provides coaching and/or guidance to help improve my performance.	3.62 (1.12)	3.63 (1.07)
		(D) Information and Communication		
14.	**JOB INFORMATION**	I have enough information to do my job well.	4.05 (0.86)	4.04 (0.86)
15.	**SUPERVISOR LISTENS**	My manager/supervisor listens to my ideas and concerns.	3.78 (1.09)	3.87 (1.02)
16.	**SUPERVI SOR FEEDBACK**	I regularly get feedback from my supervisor/manager about my performance.	3.51 (1.18)	3.53 (1.14)
		(E) Supervisor Ratings		
17.	**SUPERVISOR RESPECTS**	My manager/supervisor respects his/her employees.	3.93 (1.15)	3.96 (1.07)
18.	**GOOD SUPERVISION**	Overall, how good a job do you feel is being done by your immediate supervisor/manager?	3.99 (1.11)	4.00 (1.04)
	EAI	Average of 18 items of satisfaction	3.74 (0.71)	3.78 (0.67)

Responses to question 12 are measured from 1 - very dissatisfied to 5 - very satisfied. Question 18 is measured from 1 - very poor to 5 - very good. For all other items, employee responses are measured on a scale from 1 - strongly disagree to 5 – strongly agree.

Table 2: ANOVA of Key Determinants of Employee Opinion Survey Responses

ALL QUESTIONS

	Degrees of Freedom	Total Sum of Squares	Mean Squares	F Value	*p*-value
Person Effects	2761	97890.7	35.5	57.6	.00
Branch Effects	192	17118.7	89.2	145.0	.00
Question Effects	107	52196.4	487.8	793.3	.00
Year Effects	1	62.3	62.3	101.3	.00
Branch * Question	20544	22570.2	1.1	1.8	.00
Question * Year	107	359.2	3.4	5.5	.00
Branch * Year	180	7835.3	43.5	70.8	.00
Model	23892	198032.8	8.3	13.5	0.00
Error	274403	168728.9	.62		
Total	298295	366761.7			

The 18 Questions in the EAI Measure

	Degrees of Freedom	Total Sum of Squares	Mean Squares	F Value	*p*-value
Person Effects	4037	34699.4	8.6	57.6	.00
Branch Effects	192	5850.5	30.5	145.0	.00
Question Effects	17	7291.3	428.9	793.3	.00
Year Effects	1	16.1	16.1	101.3	.00
Branch * Question	3264	3520.2	1.1	1.8	.00
Question * Year	17	37.7	2.2	5.5	.00
Branch * Year	142	1758.2	12.4	70.8	.00
Model	7670	53173.3	6.9	14.7	0.00
Error	64010	30294.7	0.5		
Total	71680	83468.1			

Table 3: Correlation Coefficients for Job Satisfaction Among Workers on the NLSY

	Correlation between 92 and 94	Correlation between 94 and 96
Job Switchers between 92 and 94	0.03 (n=103)	
Job Stayers between 92 and 94	0.44 (n=4499)	
1.Job Switchers between 92 and 94 and stayed in 96	0.17 (n=544)	0.29 (n=544)

Table 4
The Effects of Employee Attitudes about Their Work Environment on Intention to Quit

Dep Variable: Intention to Quit in Next Twelve Months (1 to 5 ranking)
(absolute t-statistics in parentheses)

Model Specification	1994 Data (1)	1996 Data (2)	Pooled 94&96 Data (3)
1. Branch-Level Analysis,[a] Regression of Avg of Quit Intention in Branch) in Avg EAI in branch; with controls for all Branch Characteristics	-.483 (6.19)	-.542 (6.10)	-.508 (8.91)
2. Individual Analysis [b] Individual Quit Intention Regressed on Individual EAI with controls for Branch characteristics	-.537 (17.1)	-.460 (11.9)	-.507 (20.8)
3. Individual Analysis [b] Individual Quit Intention Regressed on Individual EAI with branch dummy Variables	-.547 (15.9)	-.454 (10.3)	-.506 (19.5)
4. Individual Analysis [b] Individual Quit Intention Regressed on Average EAI In Employee's Branch	-.318 (4.83)	-.557 (6.94)	-.41 (8.08)
5 Individual Analysis [b] Individual Quit Intention Regressed on			
(a) Individual EAI	-.538 (16.8)	-.450 (10.3)	- .51 (19.82)
(b). Average of EAI in the Employee's Branch	-.023 (0.34)	-.080 (0.89)	.- 038 (.72)

a – Sample sizes for models in line 1 are n=193 in column 1 for 1994; n= 143 in column 2 for 1996; and n=336 in column 3 for pooled sample of 1994 and 1996 data.

b – The samples in lines 3 through 5 that use individual-level data are: n=2245 in column 1 for 1994; n= 1439 in column 2 for 1996; and n=3684 in column 3 for pooled sample of 1994 and 1996 data.

Table 5
The Effects of Employee Attitudes about Their Workplace on Productivity

Dep Variable: ln(Net Sales)[a]
(absolute t-statistics in parentheses)

	Model Specification		
	Cross-Section 1994 Data	Cross-Section 1996 Data	Cross-Section 94&96 Data
	(1)	(2)	(3)
1. Branch Level EAI	.039**	.043*	.034**
	(2.50)	(1.88)	(2.54)

[a] Reported here are coefficients and standard errors from 4 separate regressions in the four column. The control variables in these cross-section regressions of columns 1-3 are: zip code-specific variables, total population, number of households, number of owner-occupied households, per capita income, house wealth, average education, unemployment rate, median housing value, total employees in area, total sales in area, average age of branch employees and number of employees in branch.

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

Table 6
Longitudinal Results

	Fixed Effects 1994-to-1996 Changes N=143	
	Dep. Variable: Quit Intention	Dep. Variable: ln(Net Sales)
Branch Level EAI	-.23	-.025
	(.87)	(0.85)

Control variables in the fixed effects models are changes in branch employment and in average age of branch employees.

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

Appendix table A
Cross-Section Estimates of the Effects of Employee Attitudes about HRM on Branch Performance
Dep. Variable: Ln (Net Sales)[a, b]

VARIABLE NAME	*1994 Regression* (N = 193)		*1996 Regression* (N = 143)	
(A) Employee Performance and Rewards				
1. **JUDGE PERFORMANCE**	0.040***	(2.69)	0.034*	(1.69)
2. **SERVICE & PERFORMANCE**	0.015	(0.92)	0.027	(1.36)
3. **REWARD PERFORMERS**	0.026**	(2.51)	0.038**	(2.33)
4. **REWARD CONSISTENT**	0.023**	(1.99)	0.017	(0.95)
5. **RECOGNIZED FOR QUALITY**	0.020	(1.64)	0.019	(1.09)
(B) Teamwork				
6. **TEAMWORK ENCOURAGED**	0.028**	(2.47)	0.023	(1.31)
7. **PEOPLE COOPERATE**	0.026**	(2.51)	0.032*	(1.96)
8. **SHARE KNOWLEDGE**	0.028**	(2.33)	0.035*	(1.91)
9. **IMPROVEMENT ENCOURAGED**	0.025*	(1.81)	0.024	(1.15)
10. **QUALITY COUNTS**	0.024	(1.64)	0.043*	(1.78)
(C) Training and Development				
11. **INVESTS IN EMPLOYEES**	0.012	(1.02)	0.017	(0.93)
12. **SATISFIED WITH TRAINING**	0.017	(1.36)	0.013	(0.73)
13. **SUPERVISOR COACHES**	0.012	(1.11)	0.027	(1.63)
(D) Information and Communication				
14. **JOB INFORMATION**	0.035**	(2.18)	0.020	(0.82)
15. **SUPERVISOR LISTENS**	0.018	(1.66)	0.030	(1.88)
16. **SUPERVISOR FEEDBACK**	0.020*	(1.93)	0.019	(1.20)
(E) Supervisor Ratings				
17. **SUPERVISOR RESPECTS**	0.015*	(1.74)	0.017	(1.25)
18. **GOOD SUPERVISION**	0.022**	(2.10)	0.015*	(1.74)

[a] Reported here are coefficients and standard errors from 18 separate regressions. The control variables in these regressions are the following: zip code-specific variables, total population, number of households, number of owner-occupied households, per capita income, house wealth, average education, unemployment rate, median housing value, total employees in area, total sales in area, average age of branch employees and number of employees in branch.

[b] Absolute t-Statistics in parenthesis.

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

Appendix table B:

Branch id	meanall_gp94	meanall_gp96	correlation of 18 questions of branch between 94 and 96	RWG_average
2	3.3717	3.3818	0.9996	0.5085
4	3.7950	3.7907	0.9995	0.5661
6	3.6249	3.6534	0.9977	0.2503
7	3.8308	3.8042	0.9979	0.4411
9	3.8469	3.8542	0.9997	0.4556
10	3.8918	3.8927	0.9996	0.4885
11	3.4207	3.4272	0.9994	0.4010
12	3.5380	3.5533	0.9987	0.4499
15	3.7647	3.7484	0.9992	0.4332
16	3.8818	3.9191	0.9977	0.6161
18	3.7265	3.7227	0.9998	0.4500
20	3.6368	3.6207	0.9986	0.4540
21	3.5539	3.5123	0.9991	0.5310
22	3.7180	3.7196	0.9999	0.4628
23	3.8164	3.8136	0.9971	0.5410
24	3.5912	3.5881	0.9955	0.3021
25	3.5148	3.5067	0.9999	0.3994
27	2.9213	2.9271	0.9976	0.2165
29	3.7002	3.7105	0.9992	0.4141
30	4.1617	4.1390	0.9982	0.6792
32	3.7450	3.7325	0.9990	0.4946
33	4.2204	4.1973	0.9970	0.5075
34	3.2046	3.1834	0.9993	0.3613
36	4.1049	4.0439	0.9946	0.5011
37	3.4907	3.4805	0.9996	0.3748
38	3.9033	3.8965	0.9996	0.6404
39	3.7179	3.7019	0.9966	0.5801
41	3.5087	3.6259	0.9733	0.2118
43	4.1213	4.1019	0.9954	0.7393
46	3.3784	3.3728	0.9996	0.3871
51	3.9296	3.9358	0.9997	0.5873
52	4.2424	4.2177	0.9977	0.6763
53	2.9339	3.0286	0.9889	0.1813
54	3.4445	3.4108	0.9995	0.4446
55	3.6021	3.5942	0.9987	0.3773
56	3.8788	3.9444	0.9951	0.3819
58	4.1768	4.1849	0.9990	0.5856
59	3.9279	4.0000	0.9905	0.4791
60	4.2582	4.2650	0.9997	0.7696
64	3.2991	3.3034	0.9991	0.1683
66	3.6849	3.7351	0.9968	0.5497
67	3.1654	3.2146	0.9961	0.3903
68	4.1620	4.1398	0.9996	0.5014
69	3.8634	3.8657	0.9997	0.4964
70	3.6049	3.5693	0.9968	0.4279

71	3.6825	3.6829	0.9985	0.5653
73	3.9252	3.9375	0.9964	0.6348
74	3.7677	3.7521	0.9974	0.5851
76	3.7215	3.6818	0.9970	0.6267
77	3.8955	3.9014	0.9958	0.5933
79	3.5960	3.6427	0.9978	0.6224
81	3.3990	3.4253	0.9968	0.4343
83	4.5093	4.4290	0.9871	0.7180
86	3.9696	3.9815	0.9927	0.6294
88	3.9028	3.9171	0.9974	0.6301
90	3.3333	3.3704	0.9984	0.4903
91	3.9521	3.9847	0.9994	0.4834
94	3.8960	3.8663	0.9975	0.5086
95	3.8251	3.8241	0.9980	0.5652
96	3.1403	3.0972	0.9976	0.3580
97	3.8215	3.8264	0.9994	0.5684
98	3.7431	3.7892	0.9987	0.5385
100	3.2651	3.2694	0.9983	0.3634
101	3.8634	3.8981	0.9985	0.3826
102	3.6195	3.6100	0.9950	0.3991
103	4.2994	4.2757	0.9993	0.5477
104	3.8300	3.8425	0.9995	0.4958
108	2.9136	2.9730	0.9964	0.2861
110	3.6162	3.5988	0.9943	0.3659
112	4.1644	4.2407	0.9888	0.5745
115	3.7778	3.7873	0.9939	0.1217
117	3.9551	3.9398	0.9962	0.6133
120	4.2984	4.3148	0.9901	0.7090
122	3.4950	3.5323	0.9990	0.5260
125	3.7476	3.7793	0.9966	0.5061
131	4.0556	4.0602	0.9992	0.6504
132	3.5952	3.6202	0.9993	0.5352
137	4.2241	4.2107	0.9960	0.6503
138	3.9653	4.0076	0.9955	0.7186
142	3.1979	3.2225	0.9991	0.3744
149	3.5859	3.6176	0.9964	0.5281
153	3.6877	3.7025	0.9980	0.6578
154	3.6264	3.6539	0.9953	0.5258
157	3.8378	3.8586	0.9985	0.5916
158	4.1254	4.1136	0.9995	0.6891
160	3.0256	3.0669	0.9989	0.3245
161	3.7074	3.7231	0.9994	0.6871
162	4.0376	4.0256	0.9988	0.6254
163	4.0089	4.0219	0.9960	0.5521
164	3.6667	3.7153	0.9878	0.5974
165	4.2057	4.2121	0.9987	0.6470
166	3.8688	3.8542	0.9985	0.4571
168	3.7111	3.6401	0.9802	0.5351

169	4.1793	4.2400	0.9869	0.5610
170	3.4365	3.5259	0.9947	0.3899
171	4.1905	4.1605	0.9892	0.6861
173	3.4546	3.4048	0.9913	0.2949
174	3.9665	3.9881	0.9984	0.6822
176	3.6035	3.6984	0.9876	0.3173
177	3.9888	4.0278	0.9991	0.5803
178	3.6265	3.6405	0.9983	0.4131
180	3.7142	3.6875	0.9994	0.5908
185	4.0780	4.0952	0.9982	0.5216
189	3.9765	3.9568	0.9923	0.7381
199	4.6056	4.5197	0.9880	0.5857
202	3.8864	3.8677	0.9979	0.6311
213	4.2994	4.2522	0.9864	0.5658
215	3.8019	3.7886	0.9864	0.4963
217	4.0864	4.0741	0.9843	0.6314
219	3.8278	3.8678	0.9981	0.7623
221	3.6452	3.6605	0.9983	0.5370
223	4.0000	4.0196	0.9919	0.6850
224	3.8667	3.8356	0.9976	0.6526
225	4.1640	4.1404	0.9977	0.5494
226	4.1723	4.1944	0.9965	0.7137
229	2.9667	2.8667	0.9972	0.3442
230	4.4747	4.4360	0.9969	0.6319
231	3.5078	3.4500	0.9969	0.6053
232	3.2858	3.3080	0.9931	0.3723
233	4.1190	4.1420	0.9963	0.7512
234	3.3136	3.2111	0.9924	0.4444
235	3.7469	3.7445	0.9939	0.2389
236	4.3644	4.3333	0.9967	0.8065
242	3.7490	3.7821	0.9974	0.6092
246	3.5110	3.5139	0.9963	0.5379
251	3.6333	3.5802	0.9983	0.5562
252	3.9645	3.9425	0.9971	0.6632
300	3.7798	3.7811	0.9997	0.6413
330	3.7847	3.8778	0.9905	0.4073
362	3.7778	3.7690	0.9977	0.5189
371	3.3375	3.3535	0.9940	0.5064
395	3.3818	3.2849	0.9966	0.3916
396	3.5573	3.5079	0.9993	0.4534
410	3.8728	3.8485	0.9986	0.5011
412	3.7137	3.7153	0.9983	0.2932
422	4.2778	4.3018	0.9987	0.7314
463	3.8938	3.9222	0.9810	0.4751
536	4.1032	4.0796	0.9884	0.6615
638	3.6890	3.7155	0.9975	0.4737
643	4.1768	4.1556	0.9950	0.6747
644	4.1157	4.0802	0.9989	0.6775

765	3.9770	3.9850	0.9995	0.5936
812	4.2222	4.1767	0.9835	0.5466