# FAIRNESS AND FREIGHT-HANDLERS: LOCAL LABOR MARKET CONDITIONS AND WAGE-FAIRNESS PERCEPTIONS IN A TRUCKING FIRM

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The authors draw on an internal attitude survey conducted yearly from 1996 to 2000 in the freight-handling terminals of a unionized trucking firm to investigate the effect of local labor market conditions on employee wage-fairness perceptions. Their research design exploits the fact that local managers had no discretion to vary wage rates in response to local labor market conditions; local economic shocks thus generated exogenous variation in the attractiveness of the wage paid by the firm relative to employees' options in the outside labor market. The authors find robust associations between the wage-fairness perceptions of employees in the firm and two indicators of local conditions—the rate of unemployment and the wages of similar workers in the outside market. They argue that these correlations reflect a causal relationship: an increase in unemployment or a decrease in outside wages led workers to perceive their wage to be more fair.

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Observers of workplaces have long noted that workers' attitudes and in particular their perception of the fairness of their wage can have important effects on economic outcomes. As far back as 1911, John R. Commons wrote,

Each individual differs from others … in the psychological motives that induce attention, continuity, watchfulness. Compensation is the inducement that evokes these motives, and compensation should be as nicely adjusted to each detail of psychology and effort as is the adjustment of an electric current to the machine it is fed into. The blacksmith's bonus should be greater than the machinist's, because the blacksmith has to be induced to carry a greater load. (Commons 1911:468)

In psychology, Commons's observation is embodied in the "equity theory" of Adams

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(1963), which argues that workers will adjust their performance according to whether they feel they are being fairly or unfairly paid relative to the amount of effort they expend on the job. This idea is the basis of the gift-exchange theory of Akerlof (1982) and Akerlof and Yellen (1990), which formalizes the hypothesis that workers will reciprocate high relative wages with high effort. This theory has gained increasing attention from economists in recent years, in part because it is consistent with evidence from surveys of managers, who typically report that they believe employee behavior is influenced by fairness perceptions and that they take those perceptions into account in their wage and employment decisions,[1] and in part because laboratory experiments have shown that subjects consistently reward behavior perceived as fair and punish behavior perceived as unfair, even at a cost to themselves in one-shot interactions.[2]

In order to give gift-exchange theory empirical content, one must take a stand on the determinants of fairness perceptions—on what makes a wage fair. But despite the increasing attention to the role of fairness, we can still say little with confidence about the determinants of employees' wage-fairness perceptions in real workplaces. One conclusion that emerges from the experimental literature in psychology and sociology is that people tend to form fairness judgments in reference to an alternative transaction or aspect of behavior that has come to be seen as fair, often referred to as a *reference point*.[3] A second conclusion is that the process by which an alternative transaction comes to be seen as fair can be sensitive to apparently incidental details of the framing of an experiment or hypothetical situation (Kahneman, Knetsch, and Thaler 1986). As a consequence, the experimental results are not robust indica-

tors of which reference points—the salaries of other employees in the same workplace, the profits of the firm, conditions in the outside labor market, or some other point of comparison—are salient for employees in real workplaces.

A large number of non-experimental studies have documented correlations between employee attitudes and wages relative to various reference points (Akerlof, Rose, and Yellen 1988; Cappelli and Sherer 1988, 1990; Levine 1993b; Lincoln and Kalleberg 1990).[4] But such correlations are consistent with a number of causal mechanisms: an effect of relative wages on employees' fairness perceptions; an effect of selection of workers with management-friendly attitudes into jobs with high relative wages; or an effect of unobserved heterogeneity across workplaces—for instance, in the abilities of managers—on both wages and attitudes. Existing studies using observations from real workplaces have had difficulty distinguishing among these different effects.

In this paper, we examine the relationship between local labor market conditions and employees' perceptions of the fairness of their wage.[5] We draw on an internal attitude survey in the freight-handling terminals of a large unionized U.S. trucking firm, conducted yearly over the period 1996–2000. The key to our identification strategy is the fact that wages in each terminal are determined in collective bargaining at a national and regional level, with local managers having no discretion to vary wage rates in response to local labor market conditions.[6] As a result of this pattern

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[1]See Agell and Lundborg (1995), Bewley (1999), Blinder and Choi (1990), Campbell and Kamlani (1997), Levine (1993a), and Bewley (1999). Bewley (2002) provides useful surveys.

[2]See Fehr and Gachter (2000) and Rabin (1998) for surveys.

[3]See Martin (1981) and Dornstein (1991) for surveys.

[4]See also the reviews in Martin (1981) and Dornstein (1991).

[5]The institutional characteristics of the firm we study, discussed in more detail below, limit variation in internal wage structure and prevent us from evaluating the role of internal reference points.

[6]Because terminal managers have no discretion, we are not able to examine the role of intentions in the formation of fairness judgments, as emphasized by Rabin (1993). We test instead the original formulation of Akerlof (1982), in which the effect of relative wage premia on fairness perceptions does not depend on how the premia are brought about. The fact that wage premia in the firm we study are not a consequence of

of wage determination, economic shocks in the local area surrounding each terminal over the study period generated exogenous variation in the attractiveness of the wage paid by the firm relative to employees' options in the outside labor market. We relate this variation to variation in fairness attitudes, and argue that our estimates measure the causal effect of local labor market conditions on employee wage-fairness perceptions separate from the confounding effects of selection and unobserved heterogeneity.

Recent surveys of managers have found that managers do not believe outside labor market conditions have an important effect on employee morale.[7] As we will see below, our results using direct responses of employees differ sharply from those of the manager surveys, suggesting that the opinion of managers may sometimes be a poor guide to the process by which employees form fairness judgments.

In addition to the work cited above, our study is related to an extensive literature in industrial relations on the role of wage comparisons in wage-setting. In an important early contribution, Ross (1948) observed that workers' fairness perceptions often depend on external comparisons and, in turn, drive the bargaining behavior of union leaders. Ross tended to downplay the role of local labor market conditions, and instead stressed

the role of product markets, common ownership of establishments, centralized bargaining, and government involvement.[8] In another important early contribution, Dunlop (1957) attributed a central role to "key rates," which we can interpret as reference points in our terminology, against which wage-fairness is evaluated. Dunlop argued that the set of outside wages that are relevant for external comparisons—the "wage contour"—are those in firms with product market characteristics, geographic location, and occupational mix similar to those of the firm in question. We view our work as complementary to this institutionalist literature, which has often relied heavily on case-study evidence. The advantage of our research design is that we are able to control for a wide variety of possible confounding factors and isolate the causal effect of local conditions on worker wage-fairness perceptions. Our work is also related to Cappelli and Chauvin (1991), who related local labor market conditions to employee dismissal rates across plants of a single large firm, but who possessed neither data on employee attitudes nor time-series information on particular plants.

## 1. The Firm and the Data

The firm we study is a large, national carrier in the less-than-truckload segment of the U.S. for-hire freight-hauling industry. The term less-than-truckload, as opposed to truckload, refers to companies that mainly move freight smaller than the capacity of a standard tractor-trailer.[9] Unlike truckload companies, which require no special coordinating mechanism to ship freight between two points, virtually all successful less-than-truckload companies maintain a network of distribution terminals to collect freight from surrounding catchment areas and consolidate it into tractor-trailer-size loads for shipment to other

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the intentional behavior of local managers should make it more difficult for us to find effects of local conditions on fairness perceptions. Also, we observe attitudes for a relatively small number of years and cannot investigate how or why fairness norms arise, the subject of Axelrod (1986), Carmichael and MacLeod (2003), and many other papers.

[7]Summarizing his findings from conversations with managers, Bewley (2002) wrote, "Employees usually have little notion of a fair or market value for their services and quickly come to believe they are entitled to their existing pay, no matter how high it may be. Workers do not use pay rates at other firms as reference wages, for they know too little about them" (Bewley 2002:9). He acknowledged that unionized workers may be an exception to this rule. Levine (1993a), summarizing managers' responses to a series of hypothetical wage-setting scenarios, wrote, "The interviews strongly supported the hypothesis that unemployment rates are not important determinants of pay changes in large organizations, since the respondents neither formally nor informally considered unemployment rates when determining pay adjustments" (Levine 1993a:1249).

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[8]Ross wrote, "Locality, an essential characteristic of the labor market so far as supply and demand are concerned, is of limited relevance for wage determination." (Ross 1948:62.)

[9]The capacity of an entire tractor-trailer is about 45,000–50,000 lbs. A typical shipment in the less-than-truckload segment is 1,000 lbs.

terminals. Many of the larger firms in the industry organize such local terminals into hub-and-spoke networks, with a second level of consolidation taking place at hubs. Prior to the deregulation of the trucking industry in 1980, most firms provided both truckload and less-than-truckload services. Following deregulation, the industry divided sharply, with most firms specializing in one or the other segment (Belzer 1994; Burks, Monaco, and Myers-Kuykindall 2004). The less-than-truckload segment, with higher barriers to entry in the form of costs of establishing and maintaining a distribution network, has remained more oligopolistic than the truckload segment, although industry analysts agree that price mark-ups over costs are low (Nebesky, McMullen, and Lee 1995), and in recent years smaller regional carriers have made inroads into the national market. The labor market in the industry has segmented in parallel with the product market, with wages and union coverage declining sharply in the truckload segment, but more slowly in the less-than-truckload segment (Belzer 1995, 2000; Burks 1999).

The hubs in the hub-and-spoke terminal networks are referred to in the industry as breakbulk terminals. The breakbulk terminals in the firm we study are evenly dispersed across the continental United States. In June, July, or August of each year from 1996 to 2000, the firm paid an outside consultant to conduct an anonymous attitude survey of its employees. We have individual-level responses to the survey for 29 breakbulks.[10] We focus on the attitudes of dockworkers, the employees who load and unload freight. These workers are not drivers; they are stationed permanently on a loading dock in a particular terminal. The work they do is semi-skilled, requiring agile use of a forklift and some ingenuity to move and stack freight of varying size, weight, shape, and fragility compactly and with a minimum of damage. We have data only on regular, full-time employees, not on contingent ("casual") employees.

The attitude survey consisted of a series of statements—20 in 1996–1998, 40 in 1999–2000—with which respondents were asked to agree or disagree. The statements addressed various aspects of social relations within each terminal, including communication between employees and managers, the quality of working conditions, and work rules and procedures. In 1996, 1997, and 1998, respondents were also asked to report their age, education, race, sex, and tenure in the firm. In 1999 and 2000, partly in response to employee complaints, the demographic questions were dropped, but the tenure question remained. The response rate to the attitude survey, which varied little across breakbulks, averaged 71.5%.

We focus on the statement regarding wage fairness, "I feel I am paid fairly for the kind of work I do." Respondents filled in a bubble for one of three possible responses, "agree" "disagree," or "?"[11] Using this question as a measure of fairness perceptions may raise a number of concerns. The first is whether the measure is consistent in the sense that it captures the same underlying attitude across different respondents and for a given respondent over time. The attitude survey we use was developed by a private consultant, and to our knowledge no rigorous studies of the consistency of this particular question have been carried out. But the wording of the question is nearly identical to the wording of questions from two popular attitude surveys. The Job Satisfaction Survey (JSS) asks respondents to rate their agreement with the statement "I feel I am being paid a fair amount for the work I do" on a 6-point scale (disagree very much, disagree moderately, disagree slightly, agree slightly, agree moderately, agree very much). The Minnesota Satisfaction Questionnaire (MSQ) asks respondents to rate their satisfaction with "The amount of pay for the work I do"

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[10]The firm operates more terminals than we have data for. The exact number of terminals is unreported in order to preserve the confidentiality of the firm.

[11]One unfortunate characteristic of the attitude data is that missing values were given the same code as "?" responses, and are indistinguishable from those responses. In unreported results, we estimated models treating the "?" as missing, as "agree" responses, and as "disagree" responses. The results are similar to those reported here.

on a 5-item scale (very dissatisfied, dissatisfied, neutral, satisfied, very satisfied). The JSS has been used in dozens and the MSQ in hundreds of studies, and both have been validated extensively.[12]

A second concern is that our attitude measure is based on the response to a single question, unlike most standard measures of pay satisfaction (including those derived from the JSS and the MSQ), which combine several questions into an index. It would clearly be preferable to have additional responses related to pay satisfaction. But in a meta-analysis of research in the closely related area of job satisfaction, Wanous, Reichers, and Hudy (1997) recently showed that single-item measures tend to have an acceptably high correlation (average .63) with multi-item scale measures. In addition, greater measurement error in the fairness response, our main dependent variable, should make it more difficult for us to find a statistically significant effect of local labor market conditions.[13] The fact that we nonetheless find statistically significant results suggests that our measure is capturing a real attitude.

A third concern is whether the question captures the theoretical concept that it is designed to capture—what social psychologists call "construct validity." The question corresponds closely to the notion of fairness in "equity theory" (Adams 1963)—on which the gift-exchange approach of Akerlof (1982) and Akerlof and Yellen (1990) is in part based—in that it explicitly asks respondents to account for the skill and effort they devote to the job (the "inputs" in Adams's terminology) as well as the level of compensation. The fact that the question corresponds so closely to the questions in the JSS and MSQ also suggests

that it captures what social psychologists conventionally mean by pay satisfaction.

A fourth concern relates to the way we use the question. Our empirical specification will test whether higher wages are positively and linearly related to wage-fairness perceptions. We thus assume that respondents are not more likely to think of themselves as overpaid—and to think of their wage as unfair for that reason—as their relative wage rises. Our approach is in the spirit of Akerlof (1982) and Akerlof and Yellen (1990), who assumed that workers reduce effort if their wage is below a reference "fair" wage, but not if the wage is above the fair wage (regardless of how far above it is).[14] The psychological evidence on the effect of overpayment is controversial and mixed (see the review in Akerlof and Yellen 1990), but a growing body of work on "self-serving biases"—the tendency for people "to conflate what is fair with what benefits oneself" (Babcock and Loewenstein 1997:110)—in a variety of domains supports the view that well-paid employees are likely to adjust their perception of the value of their contribution to the firm upward rather than view their wage as unfair. Again, if some employees did become less likely to view their wage as fair as their relative wage rose, that would make it harder for us to find the results we find. For the above reasons, we have confidence that our measure of fairness perceptions, while far from ideal, is acceptable for our purposes.

The results in this paper are based on two different samples: the "short" sample, which includes information on demographics as well as tenure and attitudes but only covers the years 1996–98; and the "long" sample, which includes information on tenure and attitudes but not demographics and covers the years 1996–2000. Within each sample, observations with incomplete information have been discarded. Summary statistics for the short sample appear in Panel A of Table 1. The dockworkers in the firm were almost entirely male and approximately three-quarters white,

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[12]See Spector (1985, 1997) on the JSS, and Weiss et al. (1967) on the MSQ.

[13]Bertrand and Mullainathan (2001) expressed a general concern with attitude surveys that measurement error in attitudes may be correlated with individual characteristics. But in our case, since we control for terminal fixed effects and turnover is low (6% on average), identification is largely based on *changes* in fairness perceptions by individuals over time. As long as the correlation between individual characteristics and the measurement error in attitudes is constant over time, it will be largely captured by the terminal effects.

[14]More specifically, Akerlof and Yellen (1990) assumed that workers withdraw effort if their wage is below the relevant reference wage, but that effort is unchanged if their wage is above the reference wage.

*Table 1.* Summary Statistics,
Individual-Level Variables.

| Response | Percentage of Total |
|---|---|
| **A. Short Sample, 1996–1998** | |
| Sex | |
| Male | 98.6 |
| Female | 1.4 |
| Race | |
| White | 79.7 |
| Non-White | 20.3 |
| Age | |
| 16–24 | 3.7 |
| 25–30 | 15.5 |
| 31–40 | 38.3 |
| 41–50 | 26.3 |
| >50 | 16.2 |
| Schooling | |
| Some HS | 4.5 |
| HS Degree | 51.8 |
| Some College | 35.6 |
| College Degree | 8.1 |
| Tenure | |
| <1 Yr. | 6.6 |
| 1–5 Yrs. | 26.1 |
| 6–10 Yrs. | 31.4 |
| >10 Yrs. | 35.9 |
| Fairness Response | |
| Agree | 72.2 |
| ? | 7.4 |
| Disagree | 20.4 |
| **B. Long Sample, 1996–2000** | |
| Tenure | |
| <1 Yr. | 8.0 |
| 1–5 Yrs. | 26.3 |
| 6–10 Yrs. | 27.1 |
| >10 Yrs. | 38.6 |
| Fairness Response | |
| Agree | 70.0 |
| ? | 8.5 |
| Disagree | 21.5 |

*Notes:* N = 9,361 for short sample, 15,657 for long sample. Samples include only observations with complete data (on sex, race, age, schooling, tenure, and fairness response for the short sample, and on tenure and fairness response for the long sample). See section 1 of text and the data appendix for details on sample selection. Fairness response is in reference to statement, "I feel I am paid fairly for the kind of work I do."

with a higher-than-proportionate number of non-whites concentrated in a few terminals in the South. The modal worker was 31–40 years of age, with a high school diploma, although over 40% were older than 40, and over 40% had some college experience or a college degree. Roughly 35% of workers in the firm had more than 10 years of tenure, and roughly 70% considered themselves to be paid fairly. Summary statistics on tenure and fairness responses for the long sample appear in Panel B of Table 1 and are similar to those for the short sample.

Workers in the firm are unionized and represented by the International Brotherhood of Teamsters. Two characteristics of the collective bargaining process are especially relevant. The first is that the patterns of changes in wages and working conditions are determined at a national and regional level by negotiations between the Teamsters union and a consortium of national trucking firms. The national negotiations, codified in the National Master Freight Agreement, set the pattern of wage increases over the life of the contract. Relatively small adjustments can then be made at a regional level in supplements to the national agreement, again as the result of negotiations between the union and the consortium of firms. The second noteworthy characteristic of the collective bargaining process dates from the days of James R. Hoffa in the 1960s, when the Teamsters union successfully bargained for a nationally uniform wage for each category of employees, to prevent employers from shifting work geographically to reduce wages (Levinson 1981). This wage structure persists, and still specifies nearly identical wages for workers doing similar jobs across the country, despite large variations in regional labor market conditions.

As a consequence of this institutional priority of the union, wages in the firm vary little across breakbulk terminals.[15] The average real base wage over the period was $17.80/hour in 1996 dollars, and the standard deviation within a given year was never more than

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[15]A complete table of base wage rates at each terminal in each year is available from the authors.

*Table 2.* Summary Statistics, Terminal-Level Variables
from Firm and Indicators of Local Labor Market Conditions.

| Variable | N | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| **A. Terminal-Level Variables from Firm** | | | | | |
| Dismissal Rate | 144 | 0.02 | 0.02 | 0.00 | 0.08 |
| Separation Rate | 144 | 0.06 | 0.03 | 0.00 | 0.16 |
| Overtime Share | 144 | 0.03 | 0.02 | 0.00 | 0.11 |
| Log Projected Work-Time | 144 | 0.48 | 0.52 | −0.42 | 1.82 |
| Base Wage | 144 | 17.80 | 0.25 | 16.93 | 18.31 |
| Log Base Wage | 144 | 2.88 | 0.01 | 2.83 | 2.91 |
| **B. Indicators of Local Labor Market Conditions** | | | | | |
| Local Unemployment Rate | 144 | 0.04 | 0.01 | 0.02 | 0.08 |
| Weighted-Average Log Outside Wage | 144 | 2.66 | 0.10 | 2.38 | 2.94 |
| Individual-Specific Log Outside Wage | 9,163 | 2.65 | 0.21 | 1.80 | 3.44 |

*Notes:* One terminal does not have attitude data in 1999 and is omitted in that year. Projected work-time is measured in 100,000s of hours. Dismissal rate is the number of dismissals and resignations in lieu of dismissal in the year as a fraction of total employment at the time of the survey. Separation rate is total separations in the year as a fraction of total employment at the time of survey. Overtime share is yearly overtime hours as a fraction of total hours worked. See section 2 of the text and the data appendix for details on construction of outside wage terms. Wages are in constant 1996 dollars.

$.08 over the 1996–2000 period. The pattern of yearly wage increases is set out in the national contract, and wage increases each year are roughly constant across terminals. New (non-casual) hires receive 75% of the base wage initially, 80% after 1 year, 90% after 18 months, and 100% after 2 years, after which they receive the base wage for the remainder of their tenure in the firm. Because newly hired workers could expect to rise up the wage ladder quickly, we assume that new hires took the full base wage to be the relevant wage in forming fairness judgments; the results are not affected if we assume instead that they focused on the actual new-hire wage. The crucial aspect of this wage-setting process for our study is that local managers have no discretion to adjust wage rates at the terminal level. Variation in local labor market conditions over the study period thus generated exogenous variation in the attractiveness of the wage paid by the firm relative to employees' outside options.

The firm made available the measure it uses internally to track the workload in each terminal. The firm's industrial engineers have calculated how long each task involved in loading or unloading a truck (for example, "push empty cart into trailer," "carefully read freight label," "walk laden to cart unob-

structed") should take to complete. On the basis of these measurements, they calculate the length of time the bundle of tasks that each freight load represents should take to complete. We refer to the predicted time required for all freight passing through a terminal in a given year as the terminal's "projected work-time." Note that the composition of freight is determined by factors outside of each breakbulk, and can be taken to be exogenous to employee attitudes and performance within the terminal.

The firm also provided us with data on the number of new hires and permanent separations in each terminal in each year. We know the type of separation: dismissal, resignation in lieu of dismissal, quit, retirement, or death.[16] This measure does not include layoffs due to fluctuations in the freight flow at each terminal. Under the union contract, permanent (that is, not "casual") workers who are laid off retain the right to be recalled; the firm does not count such layoffs as dismissals. The dismissal rate is a measure of serious

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[16]Our measure of separations only includes separations of workers who were employed on June 30, the day for which we have measures of total employment, in some year 1996–2000. Our measure thus misses some workers who left shortly after being hired.

behavioral infractions.[17]  Summary statistics on the terminal-level variables from the firm appear in Panel A of Table 2.

Further details on variable definitions are in the data appendix.

## 2. Indicators of Local
## Labor Market Conditions

We focus on two indicators of local labor market conditions: the local unemployment rate and the wage received by similar workers in the outside labor market.  The definition of local labor markets is explained in detail in the data appendix; as a general rule, the local labor market is the Metropolitan Statistical Area (MSA) in which a given terminal is located.  The measure of local unemployment is the average yearly unemployment from the Local Area Unemployment Statistics published by the Bureau of Labor Statistics (BLS).

Our measures of the wages of similar workers in the outside labor market are constructed as follows.  We estimate a wage equation on pooled 12-month samples of full-time male workers from the merged Outgoing Rotation Groups (ORGs) of the Current Population Survey (CPS), separately for each local labor market in each year.  (Details on selection of the sample appear in the data appendix.) There are a number of ways that one might specify the wage equations.  If we think that workers in the firm compared their wage to the wage that they themselves would have received if they had lost their jobs, then we should regress wages only on demographic characteristics and perhaps occupation.  If, on the other hand, we think that workers compared themselves to *workers in similar jobs* in the outside market, then we should include an indicator of union status as well. The theoretical and experimental literatures

on fairness do not provide much guidance in making this decision.  We prefer the latter specification, because our sense is that workers have better information about the wages of workers in similar jobs than about the wage they themselves would receive if they lost their jobs.  The former specification is also plausible, however, and we report results using both approaches.

Using our preferred specification, we estimate the following equation, separately for each local labor market in each year:

$$(1) \qquad w_{kjt} = \pi_{0,jt} + D'_{1,kjt}\pi_{1,jt} + D'_{2,kjt}\pi_{2,jt} + D'_{3,kjt}\pi_{3,jt} + D'_{4,kjt}\pi_{4,jt} + D'_{5,kjt}\pi_{5,jt} + \varepsilon_{kjt},$$

where $k$ indexes individuals in the CPS; $j$ indexes local labor markets; $t$ indexes years; $w$ represents the log real hourly wage, deflated by a regional price index (see the data appendix for details); $D_1$, $D_2$, and $D_3$ are vectors of dummy variables for age, education, and race, defined according to the demographic categories in the firm's attitude survey; $D_4$ is a dummy variable indicating blue-collar or white-collar occupation; and $D_5$ is a dummy variable indicating union status.  Because of insufficient numbers of observations for each MSA-year in the CPS, it is not possible to estimate a more general model with more detailed occupation indicators or interactions of the demographic indicators.

On the basis of these regressions, we construct two different outside wage measures. For the first measure, which we refer to as the *individual-specific outside wage,* each individual in the firm is assigned the predicted log real wage for a blue-collar, unionized full-time male worker with identical age, race, and schooling characteristics in the CPS regression.  This method has the advantage that it takes the human capital and other individual characteristics of workers into account in calculating the relevant outside wage, but the shortcoming that it can calculate the outside wage only for the three years for which we have complete demographic data in the attitude survey.  For the second measure, which we refer to as the *weighted-average outside wage,* the proportions of employees in the firm in each age-education-race group in each terminal in 1996 are used as weights in an average of

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[17]The union grievance procedure makes it costly for the firm to fire employees without strong contractual grounds, and although it would be possible for the firm to build a case against an employee who had low productivity, typically dismissals are the result of a clear pattern of violations of contractually sanctioned disciplinary rules, such as those against stealing, coming to work drunk, excessive tardiness, or unexcused absences.

the outside wages for each age-education-race group in the CPS. This is our preferred measure, because it allows us to construct an outside wage for all five years for which we have attitude data. Formally, the two outside log-wage terms, the individual-specific outside wage, $ow_{ijt}$, and the weighted-average outside wage, $\overline{ow}_{jt}$, are calculated using the firm's internal dataset in conjunction with the estimated coefficients from the CPS wage regressions as follows:

$$(2) \qquad ow_{ijt} \equiv \hat{\pi}_{0,jt} + D'_{1,kjt}\hat{\pi}_{1,jt} + D'_{2,kjt}\hat{\pi}_{2,jt} + \\ D'_{3,kjt}\hat{\pi}_{3,jt} + D'_{4,kjt}\hat{\pi}_{4,jt} + D'_{5,kjt}\hat{\pi}_{5,jt}$$

$$(3) \qquad \overline{ow}_{jt} \equiv \sum_g \lambda_{gj1996}[ow_{gjt}],$$

where $i$ indexes individuals in the firm, $j$ indexes terminals, $t$ indexes years, $D_1, D_2, D_3, D_4,$ and $D_5$ are defined as above, $g$ indexes all possible age-education-race combinations, and $\lambda_{gj1996}$ is the proportion of dockworkers in terminal $j$ in year 1996 corresponding to age-education-race combination $g$. Table 2 contains summary statistics for the local unemployment rate and the outside wage terms.

## 3. Local Labor Market Conditions and Fairness Perceptions

### 3.1 Econometric Model

One consequence of the near-uniformity of wage structure across the terminals was that the gap between the wage that employees received in the firm and the outside wage varied substantially across terminals. The weighted-average outside wage varied from $10.83 per hour to $18.97 per hour in the 2000 cross-section, for instance. We will see below that this cross-sectional variation in outside wages was negatively correlated with cross-sectional variation in fairness perceptions: where the outside wage was low, employees were more likely to perceive their wage as fair. This correlation, however, may not reflect a causal relationship. There may have been unobserved heterogeneity across terminals correlated with both the wage gap and employee attitudes, for instance, if employees were inherently less likely to think of their wage as fair in regions of the

country with histories of labor-management conflict (that is, the industrial Midwest and Northeast), which also happened to be places where the outside wage was high. A stricter test of the relationship between local conditions and fairness perceptions would control for time-invariant influences such as regional cultural differences. For this reason, we include terminal fixed effects in our baseline estimates.[18]

The period of this study, 1996 to 2000, saw a steady expansion of the national economy and tightening of labor markets. The indicators of labor market conditions display a common national trend in the direction of lower unemployment over time. If attitudes display a trend for reasons unrelated to local labor market conditions, then a regression of attitudes on external conditions may generate a spurious association. To control for this possibility, as well as for region-invariant factors such as the negotiation of a new collective bargaining contract in 1998 and company-wide changes in management practices, we also include year effects in some estimations.

We would expect workers' wage-fairness perceptions to depend in part on the real purchasing power of their wage. Nominal wages were nearly the same across terminals in the period of our study, but the prices of consumer goods differed. Time-invariant regional differences in price levels are captured by the terminal fixed effects and region-invariant inflation is captured by the year effects, but different regions experienced different rates of inflation over time. For this reason, the regressions include the log of the base wage deflated by our region-specific price index.

It may be that workers with certain observable characteristics are inherently more likely than others to think their wage is fair or unfair. For regressions using the weighted-average outside wage and all five years of data (1996–2000), we include indicators for tenure category. For regressions using the

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[18]We are thus controlling for the persistent effects of workplaces on attitudes emphasized by Bartel, Freeman, Ichniowski, and Kleiner (2003).

*Figure 1.* Fairness Response *vs.* Unemployment, 5-Year Means.
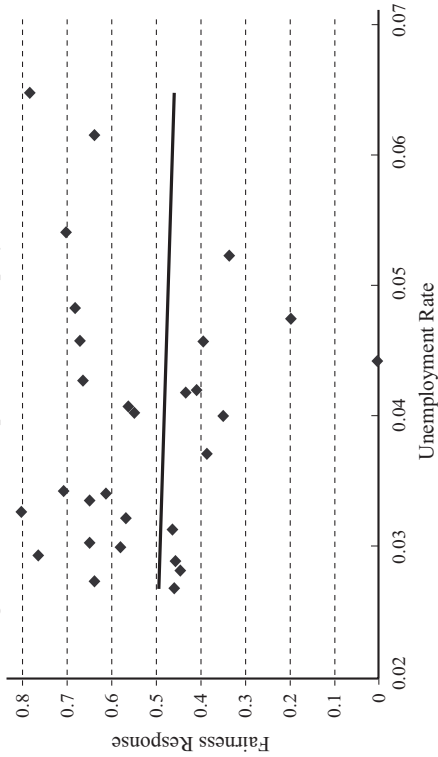
*Figure 2.* Fairness Response *vs.* Weighted-Average Outside Wage, 5-Year Means.
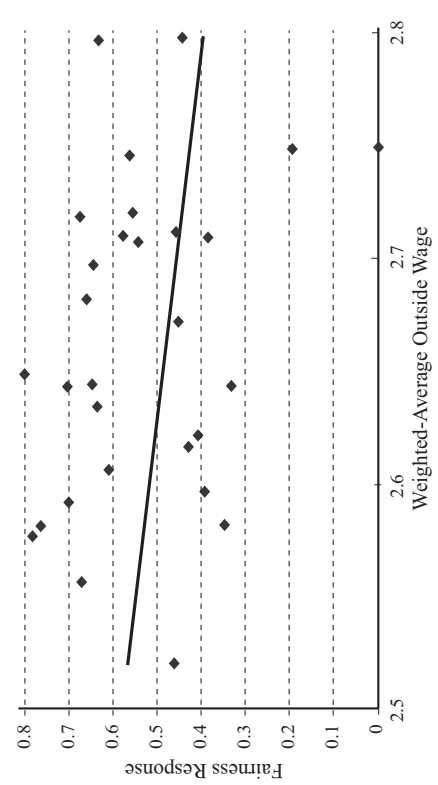
*Figure 3.* Fairness Response *vs.* Unemployment, Deviations from 5-Year Means.
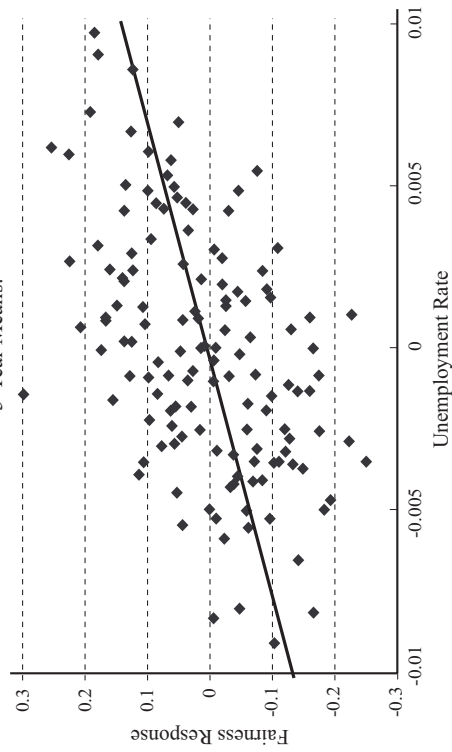
*Figure 4.* Fairness Response *vs.* Weighted-Average Outside Wage, Deviations from 5-Year Means.
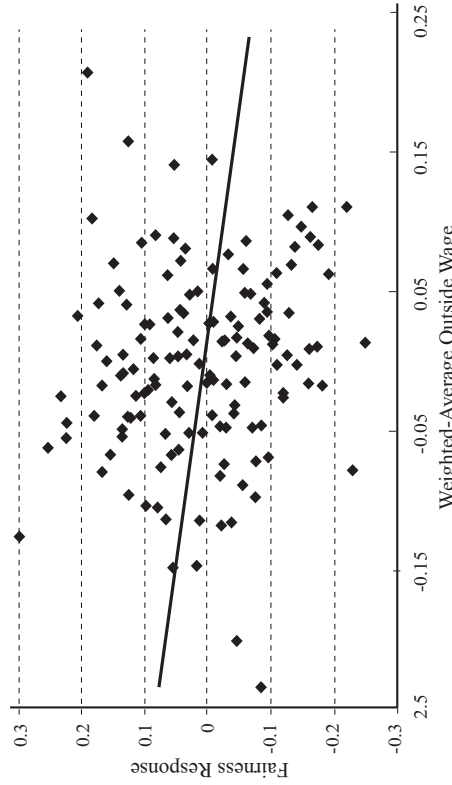
*Notes:* Figures 1 and 2 present mean responses to the fairness question over the entire 1996-2000 period against means of the local unemployment rate and the weighted-average outside wage (see definition in text) over the same period. Figures 3 and 4 present the same variables deviated from the mean values presented in Figures 1 and 2.

individual-specific predicted wage and three years of data (1996–98), we include a full set of indicator variables for age, education, race, sex, and tenure categories. We might also expect the nature of the freight flow to affect workers' fairness perceptions; the more onerous the task of unloading or loading, the less fair we would expect a worker to consider his wage. The firm's projected work-time measure has been designed to capture differences in the amount of time required to move particular loads of freight, and we take it as an indicator of the onerousness of the work.

We rank the responses to the fairness question in the order "disagree," "?," "agree," and estimate the model as an ordered logit. Expressed as a latent-variable model, the model is the following:[19]

$$(4) \qquad f_{ijt}^* = \theta_0 + U_{jt}\theta_1 + (ow)\theta_2 + w_{jt}\theta_3 + \\ y_{ijt}'\theta_4 + s_{jt}'\theta_5 + \phi_j + \mu_t + v_{ijt}$$

$$(5) \qquad f_{ijt} = -1 + \sum_{r=1}^{2} 1\,(f_{ijt}^* \geq c_r),$$

where $i$ indexes individuals within a terminal-year, $j$ indexes terminals, and $t$ indexes years; $U$ is the local unemployment rate; $ow$ is one of the predicted outside wage terms, $\overline{ow}_{jt}$ or $ow_{ijt}$; $w$ is the logarithm of the real base wage; $y$ is a vector of indicator variables for individual characteristics, the dimension of which will vary according to which sample is used; $s$ is the logarithm of projected work-time; $\phi$ is a terminal fixed effect; $\mu$ is a year effect; $f^*$ is the latent fairness response; $f$ is the observed fairness response (coded $-1$, $0$, $1$); the $c_r$ (for $r = 1,2$) are cut-points; and $1(\ )$ is an indicator function, taking the value 1 if the enclosed expression is true, 0 otherwise.

The distribution of the error term, $v$, is assumed to be logistic. The standard errors reported in all tables have been corrected to account for noise in measurement of the outside wage term (Murphy and Topel 1985). Because the unemployment variable and the weighted-average outside wage vary only at the terminal-year level, we cluster errors by terminal-year. Following on the discussion above, we expect fairness perceptions to be positively related to the attractiveness of employees' current job relative to their outside options. That is, we expect fairness perceptions to be positively related to the unemployment rate and negatively related to the outside wage rate: $\theta_1 > 0$ and $\theta_2 < 0$.[20]

## 3.2 Results

Figures 1–4 present a simple graphical depiction of the main results on the determinants of fairness perceptions. Figures 1 and 2 present raw cross-sectional scatterplots of fairness perceptions in each terminal against the local unemployment rate and the weighted-average outside wage, with each variable averaged over the 5-year period 1996–2000.[21] Figures 3 and 4 present scatterplots of the terminal-year average fairness perception against unemployment and the outside wage, with each variable deviated from the 5-year terminal means. The regression lines are weighted by the number of respondents in each terminal.

The most remarkable pattern in the data is evident in Figures 1 and 3: unemployment bears essentially no relationship to fairness perceptions in cross-section, but a strong and readily apparent positive relationship once terminal fixed effects are removed.

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[19]Our specification differs from those of Cappelli and Sherer (1988, 1990), the most closely related studies in the literature, in that we run an ordered logit, making use only of the ordinality of the attitude responses, rather than OLS regressions, which assume cardinality. In our reported results, we avoid including other attitude variables as covariates because of concerns about the possible endogeneity of such additional attitude variables, but when (in unreported results) we run specifications similar to those of Cappelli and Sherer (1988, 1990), the level of explanatory power of our models is roughly similar.

[20]Note that employees may work harder when they perceive their wage to be fair, and this may dampen the fairness response to relative wages, since they may adjust their fairness perceptions according to "the work that [they] do," as requested in the attitude survey. Note further, however, that such a dampening effect would make it more difficult for us to find evidence for our hypothesis.

[21]In calculating the average fairness perceptions, "agree" responses were assigned the value 1, "?" the value 0, and "disagree" the value –1.

*Table 3.* Effect of Local Conditions on Fairness
Perceptions: Ordered Logit, Long Sample, 1996–2000.
(Dependent Variable: Response to Wage-Fairness Question)

| Independent Variable | (1) No Terminal or Year Effects | (2) Terminal Effects Only | (3) Terminal and Year Effects |
|---|---|---|---|
| Local Unemployment Rate | –0.283 [8.356] | 30.787*** [5.971] | 15.193** [6.549] |
| Weighted-Average Log Outside Wage | –1.791** [0.822] | –0.706* [0.430] | –0.821** [0.387] |
| Log (Real Wage) | 13.969** [5.970] | 7.283*** [2.379] | –6.623 [7.799] |
| 1–5 Yrs. Tenure | –0.254 [0.177] | –0.273** [0.132] | –0.262* [0.134] |
| 6–10 Yrs. Tenure | –0.795*** [0.154] | –0.807*** [0.130] | –0.810*** [0.132] |
| >10 Yrs. Tenure | –0.927*** [0.146] | –0.912*** [0.122] | –0.907*** [0.125] |
| Log (Projected Work-Time) | –0.527*** [0.170] | –0.549 [0.379] | –0.364 [0.361] |
| Cut 1 | 33.042* [16.976] | 17.947*** [6.762] | –23.185 [22.781] |
| Cut 2 | 33.511** [16.977] | 18.430*** [6.763] | –22.701 [22.780] |
| Terminal Effects | No | Yes | Yes |
| Year Effects | No | No | Yes |
| N | 15,657 | 15,657 | 15,657 |
| Pseudo R-Squared | .032 | .051 | .053 |

*Notes:* Robust standard errors in brackets. Errors are clustered by terminal-year, adjusted for measurement error in the outside wage term. Ordered-logit procedures ranks the fairness responses "Disagree"", "?" and "Agree"" in increasing order. Parameters cut 1 and cut 2 are ancillary cut-off parameters estimated by ordered-logit procedure.
    *Statistically significant at the .10 level; **at the .05 level; ***at the .01 level.

Figures 2 and 4 suggest that the outside wage is negatively related to fairness perceptions both without and with terminal fixed effects, although the relationship is weaker than that for the unemployment rate with terminal effects illustrated in Figure 3.[22]

Table 3 presents the baseline estimates of the effect of local labor market conditions on wage-fairness perceptions, using the weighted-average outside wage and the long sample. There is no statistically significant

relationship between the local unemployment rate and wage-fairness perceptions without terminal fixed effects in column (1). Once fixed effects are included in column (2), however, the positive relationship between unemployment and fairness perceptions shows up strongly, with a t-statistic of 5.16. It appears that deviations of the local unemployment rate from average levels were salient for fairness judgments, while average levels of unemployment themselves were not. Once year effects are included in column (3), the magnitude of the unemployment coefficient drops by 50%, suggesting that the coefficient on the unemployment rate in columns (1) and (2) is in part reflecting business-cycle effects that are common across

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[22]Figure 2 illustrates the negative cross-sectional correlation between the outside wage and fairness perceptions mentioned in the first paragraph of section 3.1, above.

*Table 4.* Marginal Effects Corresponding to Baseline Ordered-Logit Estimates.

| | Marginal Effects Corresponding to Table 3, Column 2 | | | Marginal Effects Corresponding to Table 3, Column 3 | | |
|---|---|---|---|---|---|---|
| | *(1)* | *(2)* | *(3)* | *(4)* | *(5)* | *(6)* |
| *Independent Variable* | *d[Pr(fair)]/ dx* | *d[Pr(?)]/ dx* | *d[Pr(unfair)]/ dx* | *d[Pr(fair)]/ dx* | *d[Pr(?)]/ dx* | *d[Pr(unfair)]/ dx* |
| Weighted-Avg. Log Outside Wage | −0.14 | 0.03 | 0.11 | −0.17 | 0.04 | 0.13 |
| Local Unemployment Rate | 6.26 | −1.40 | −4.86 | 3.09 | −0.69 | −2.40 |
| Log (Real Wage) | 1.48 | −0.33 | −1.15 | −1.35 | 0.30 | 1.04 |
| 1–5 Yrs. Tenure[†] | −0.06 | 0.01 | 0.04 | −0.05 | 0.01 | 0.04 |
| 6–10 Yrs. Tenure[†] | −0.17 | 0.03 | 0.14 | −0.18 | 0.03 | 0.14 |
| >10 Yrs. Tenure[†] | −0.19 | 0.04 | 0.15 | −0.19 | 0.04 | 0.15 |
| Log (Projected Work-Time) | −0.11 | 0.02 | 0.09 | −0.07 | 0.02 | 0.06 |

*Note:* Marginal effects are evaluated at the means of the covariates. For dummy variables (indicated by [†]), the table reports the difference in Pr(fair) for values 0 and 1, holding other variables constant at their means.

regions.[23] But the important point is that the coefficient remains significant at the 5% level. We conclude that variation in the unemployment rate within a local labor market is a quite robust predictor of within-terminal variation in wage-fairness perceptions. The negative association between our preferred outside wage measure and fairness perceptions is also robust.[24] The coefficient on the outside wage term is statistically significant and of the expected sign without terminal fixed effects. The coefficient is marginally significant when only terminal fixed effects are included, but again significant at the 5% level when both terminal and year effects are included.[25]

Tenure is also a strong predictor of employee wage-fairness perceptions. Employees were decreasingly likely to consider their wage fair as their tenure increased. There are at least two possible explanations. One is that the tenure profile in the firm reaches the maximum wage quickly—workers with 25 or 30 years of seniority are paid the same wage as those with 2 years—and more senior workers may resent this. Another possible explanation is a change in overtime-allocation rules in the 1994–98 National Master Freight Agreement. Prior to 1994, terminal managers were not allowed to hire temporary, "casual" dockworkers until all of the regular dockworkers had worked all the overtime hours they wished to work. Beginning with the 1994–98 contract, terminal managers were allowed to hire casual dockworkers as soon as all regular dockworkers had worked 40 hours in a given week. High-tenure dockworkers who were employed before 1994 may have resented the change in overtime policy more than low-tenure workers did. Unfortunately, because the attitude data only cover the period 1996–2000, it is not possible to differentiate between these two explanations.

The log of the real wage in each terminal enters as we would expect in columns (1) and (2): as the real value of the wage rose, employees were more likely to consider it fair. Once year effects are included in column (3), the sign flips and the standard error rises. The reason is that the terminal fixed effects and the year effects capture almost all of the variation in wages at the terminal level, and the real wage term in column (3) is identified on the basis of a small number of terminals with atypical wage changes over the period—in particular, one large terminal in which a wage increase relative to other

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[23]It may also be that including year effects exacerbates attenuation bias by absorbing much of the signal in the unemployment measure and reduces the point estimate.

[24]In unreported results, we entered unemployment and the outside wage term separately, and found coefficient estimates not appreciably different from those presented in Table 3.

[25]Note that attenuation bias due to measurement error in the outside wage term—which is constructed from the (noisy) coefficients from a CPS wage regression—may make it less likely for us to find a statistically significant relationship than in the case of unemployment.

*Table 5.* Alternative Specifications: Ordered Logit.
(Dependent Variable: Response to Wage-Fairness Question)

| | Short Sample, 1996–1998 | | Long Sample, 1996–2000 | | | |
| | Terminal Effects Only | Terminal and Year Effects | Terminal Effects Only | Terminal and Year Effects | Terminal Effects Only | Terminal and Year Effects |
| Independent Variable | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Ind.-Specific Log Outside Wage | −0.524* [0.272] | −0.572** [0.273] | | | | |
| Weighted-Avg. Log Outside Wage, Alt. 1 | | | −0.253 [0.529] | −0.365 [0.441] | | |
| Weighted-Avg. Log Outside Wage, Alt. 2 | | | | | −0.716 [0.605] | −0.697 [0.533] |
| Local Unemployment Rate | 46.495*** [11.412] | 14.245 [14.208] | 31.545*** [5.581] | 16.445*** [6.018] | 31.878*** [5.857] | 17.433*** [6.469] |
| Log (Real Wage) | 11.536** [5.104] | −20.388** [7.915] | 6.863*** [2.459] | −5.338 [7.029] | 6.273** [2.539] | −5.315 [7.088] |
| 1–5 Yrs. Tenure | −0.196 [0.187] | −0.181 [0.187] | −0.277** [0.130] | −0.266** [0.131] | −0.276** [0.131] | −0.267** [0.131] |
| 6–10 Yrs. Tenure | −0.777*** [0.193] | −0.774*** [0.193] | −0.811*** [0.128] | −0.814*** [0.130] | −0.810*** [0.129] | −0.814*** [0.130] |
| >10 Yrs. Tenure | −0.988*** [0.189] | −0.979*** [0.190] | −0.915*** [0.120] | −0.911*** [0.122] | −0.914*** [0.121] | −0.910*** [0.123] |
| Log (Projected Work-Time) | −1.165*** [0.436] | −0.606 [0.496] | −0.487 [0.374] | −0.274 [0.347] | −0.536 [0.364] | −0.316 [0.339] |
| Male | −0.206 [0.249] | −0.201 [0.250] | | | | |
| White | 0.178* [0.097] | 0.189* [0.098] | | | | |
| Age 25–30 | −0.144 [0.192] | −0.126 [0.198] | | | | |

*Continued*

terminals in 1998 was accompanied by an unrelated deterioration in wage-fairness attitudes.

To facilitate interpretation of the size of the coefficients, Table 4 presents the marginal effects corresponding to the coefficient estimates in columns (2)–(3) in Table 3. The effects in columns (1)–(3) of Table 4, corresponding to the model that includes terminal fixed effects but not year effects (column 2 of Table 3), indicate that an increase of 1% (slightly less than one standard deviation) in the local unemployment rate is associated with a 6.3% increase in the probability that the average employee in the firm will consider his wage fair, and a 4.9% decrease in the probability that he will consider it unfair. A one-standard-deviation (approxi-

mately $1.50/hour) increase in the outside wage term would decrease the probability of a "fair" response by approximately 1.4%, and increase the likelihood of an "unfair" response by 1.1%. The corresponding numbers for the model including both terminal and year effects (column 3 of Table 3) are 3.1% and 2.4% for unemployment, and 1.7% and 1.3% for the outside wage.

Table 5 presents results using alternative specifications of the outside wage term. Columns (1)–(2) report estimates of the basic model using the individual-specific outside wage and the short sample, taking full advantage of the individual-level demographic information available in the attitude survey (but dropping the years 1999 and 2000). Schooling is not a good predictor of fairness

*Table 5.* Continued.

| | Short Sample, 1996–1998 | | Long Sample, 1996–2000 | | | |
| | Terminal Effects Only | Terminal and Year Effects | Terminal Effects Only | Terminal and Year Effects | Terminal Effects Only | Terminal and Year Effects |
| Independent Variable | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Age 31–40 | 0.006 [0.212] | 0.037 [0.218] | | | | |
| Age 41–50 | 0.151 [0.224] | 0.181 [0.231] | | | | |
| Age >50 | 0.558** [0.242] | 0.592** [0.249] | | | | |
| HS Diploma | 0.164 [0.133] | 0.181 [0.133] | | | | |
| Some College | 0.145 [0.151] | 0.171 [0.152] | | | | |
| College Degree | 0.303 [0.216] | 0.34 [0.217] | | | | |
| Cut 1 | 30.902** [14.489] | –62.375*** [22.942] | 18.049** [7.605] | –18.076 [20.423] | 15.092* [8.032] | –18.885 [20.523] |
| Cut 2 | 31.343** [14.487] | –61.933*** [22.942] | 18.531** [7.604] | –17.592 [20.423] | 15.575* [8.032] | –18.402 [20.523] |
| Terminal Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Effects | No | Yes | No | Yes | No | Yes |
| N | 9,163 | 9,163 | 15,657 | 15,657 | 15,657 | 15,657 |
| Pseudo R-Squared | .061 | .062 | .051 | .052 | .051 | .052 |

*Notes:* Robust standard errors in brackets. Errors are clustered by terminal-year, adjusted for measurement error in the outside wage term. Weighted-average outside wage alternative 1 includes a blue-collar dummy but no union dummy in the CPS log-wage regression; weighted-average outside wage alternative 2 includes neither a blue-collar nor a union dummy in the CPS log-wage regression.

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

perceptions; nor is sex, although there are very few women in the sample against whom to identify the male coefficient. Controlling for tenure, workers older than 50 were more likely than younger workers to consider their wage fair; in other words, controlling for other factors, the workers with the most positive attitude toward their wage were recently hired older workers. Non-white workers were less likely than white workers to consider their wage fair. The coefficient on race is only marginally statistically significant, but is relatively robust.

Consider now the coefficients on the outside wage and unemployment terms in columns (1)–(2). Note that the outside wage term remains statistically significant, even after we control in more detail for the demographics of employees and focus the outside comparison on workers with identical characteristics. The coefficient estimates are statistically distinguishable from zero, but not from the estimates using the long sample and the weighted-average outside wage in columns (2)–(3) of Table 3.

There are two main differences between the estimates for the unemployment coefficients in columns (1)–(2) and those in columns (2)–(3) of Table 3. The first is that the estimate of the coefficient in the specifications without year effects rises (from 30.787 to 46.495). This suggests that there is a negative correlation between the unemployment rate and demographic characteristics associated with positive wage-fairness perceptions that biases the unemployment coefficient downward when the demographic characteristics are omitted. This correlation appears to

be common across terminals within years, however, since including demographics has little effect on the point estimates in the specification with year effects.

The second main difference is that the standard errors on the unemployment coefficients approximately double in moving to the short sample. Although the unemployment coefficients are similar in the specifications with year effects (15.193 in the long sample and 14.245 in the short sample), the larger standard error means that the coefficient is no longer statistically significant. The loss of approximately 40% of the data when we move from the long sample to the short sample may partly explain the decline in precision of the estimates. Nonetheless, the fact that the coefficient on the unemployment rate is not statistically significant in this specification suggests a need for caution in interpreting our results for the unemployment rate.

Columns (3)–(4) and (5)–(6) of Table 5 present results for the weighted-average outside wage term, but using two alternative specifications of the underlying CPS wage equation (equation 1). Alternative 1 includes demographic indicators and a blue-collar indicator but not a union indicator. Alternative 2 includes demographic indicators but neither a blue-collar indicator nor a union indicator. The coefficients on the outside wage terms are no longer statistically significant. The differences between these results and those using the preferred measure are largely attributable to differences in the patterns of union wage premia between the North and the South, which have been noted by Lewis (1986). Although we believe that the comparison with unionized, blue-collar workers with similar demographic characteristics in the outside labor market was the most salient comparison for wage-fairness judgments, the fact that plausible alternative comparisons do not yield statistically significant results suggests caution is warranted in interpreting the results on the effect of outside wages. It is notable that the point estimates for the unemployment coefficient in the long sample are not greatly affected by varying the definition of the outside wage term.

Do these estimates reflect a causal effect of local conditions on fairness perceptions?

Here we consider two plausible counter-arguments: that the association is due to heterogeneity across terminals in the provision of overtime work, and that it is due to the selection of workers with management-friendly attitudes into workplaces with high relative wages.[26]

While individual terminal managers in the firm do not have discretion over base wage rates, they do have discretion over the amount of overtime work offered to employees. If it were the case that terminal managers increased the amount of overtime offered when local labor markets were slack, then we would expect to observe a positive correlation between unemployment and earnings in the terminal and hence a positive correlation between unemployment and wage-fairness perceptions. The correlation between overtime hours as a percentage of total hours and unemployment, however, is negative.[27] A similar result (with opposite sign) holds for the outside wage term. In other words, managers were more likely to offer overtime when labor markets were tight and replacement workers hard to find; hence heterogeneity in the provision of overtime work cannot explain why employees were more likely to perceive their wage as fair when local labor markets were slack.

In periods of high unemployment in the local labor market, the firm may have been able to hire better-quality workers for a given wage. If these better-quality workers were inherently more likely than other workers to have a positive attitude regarding the fairness of their wage, then we might observe a positive correlation between unemployment and fairness perceptions due solely to this selection effect. Since it is not possible to follow individual employees over time, we cannot control for such selection directly. Our primary strategy in addressing this issue is to examine the sensitivity of different ten-

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[26]We also examined the relationship between response rates and local labor market conditions and found no correlation.

[27]When we regress overtime hours as a percentage of total hours on unemployment and terminal fixed effects, weighted by the number of respondents, the coefficient on unemployment is –.30, with a robust standard error of .38.

ure groups to local conditions.[28] If terminals were actively selecting new employees on the basis of worker quality, then we would expect the wage-fairness perceptions of newly hired workers to have been more responsive to slack in the local labor market than those of workers with more tenure, since the total effect of local conditions on the wage-fairness perceptions of newly hired workers would have been the sum of two effects: the direct effect of local conditions on wage-fairness perceptions and the effect of hiring more management-friendly new employees.[29]

Table 6 presents estimates of the basic model with unemployment and the outside wage interacted with the dummy variables for the four tenure categories; columns (1) and (2) interact only unemployment with tenure, columns (3) and (4) interact only the outside wage term with tenure, and columns (5) and (6) interact both unemployment and the outside wage with tenure. In all specifications involving the unemployment interactions, the estimated slope of the fairness-unemployment relationship is steeper for the tenure categories 1–5 years, 6–10 years, and greater than 10 years than for the omitted <1 category. We can reject the hypothesis that the slope on the unemployment term is greater for the new hires than for the 1–5 years and 6–10 years tenure groups at the 5% significance level (one-tailed test) in columns (1), (2), (5), and (6). We cannot reject the hypothesis that

the coefficient on the outside wage term is of greater magnitude for workers with less than one year of tenure than for the other tenure groups, but the point estimates in columns (5) and (6) also suggest that higher-tenure groups were, if anything, more responsive to changes in outside wages than were new hires. In sum, the fairness perceptions of new hires do not appear to have been more sensitive to local conditions than were those of higher-tenure workers.

In addition, if terminal managers were actively selecting higher-quality workers with more positive attitudes in periods of slack labor markets, then we would expect them to have fired more workers in such periods to take advantage of the presumably higher-quality pool of applicants. Table 7 regresses the dismissal rate on our measures of local labor market conditions, including terminal fixed effects in column (1) and terminal and year fixed effects in column (2). The results indicate that the relationship between the dismissal rate and the outside wage is zero in both specifications and the relationship between the dismissal rate and unemployment is either *negative* and not statistically significant or zero. There is no evidence that the dismissal rate increased when local labor markets were slack.

Although we cannot definitively rule out the selection hypothesis, the available evidence suggests that selection effects are unlikely to be the primary explanation for the correlation between local labor market conditions and wage-fairness perceptions. Our results come with the caveat that the coefficients on the unemployment and outside-wage terms are not statistically significant in every regression, but the preponderance of the evidence supports the interpretation that the correlation between local labor market conditions and wage-fairness perceptions represents a causal effect: a deterioration in local labor market conditions (an increase in unemployment and a decrease in the outside wage) led employees to think that they were being paid more fairly, and an amelioration had the opposite effect.[30]

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[28]In unreported results, we use each new hire's predicted rank in the CPS wage distribution in each local labor market in each year as an index of the desirability of his or her observable characteristics, and find that new hires did not have statistically significantly more desirable observable characteristics in periods of low unemployment than in periods of high unemployment. Using an additional question from the attitude survey, we also find that the responsiveness of employee attitudes to external conditions is limited to wage-fairness perceptions, rather than perceptions of the fairness of management more generally. Both results argue against the selection interpretation.

[29]Theories of internal labor markets, such as that of Doeringer and Piore (1971), suggest that low-tenure workers may be less insulated than high-tenure workers from conditions in outside labor markets. The National Master Freight Agreement institutionalizes this pattern, by requiring employers to lay off employees by reverse seniority. As a result, we would expect low-tenure workers to be even more responsive to outside unemployment than are more senior workers.

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[30]We have also implemented an instrumental-variables strategy using the outside wage and unemployment

*Table 6.* Interacting Local Conditions and Tenure: Ordered Logit, Long Sample, 1996–2000.
(Dependent Variable: Response to Wage-Fairness Question)

| Independent Variable | Interacting Unemployment and Tenure | | Interacting Outside Wage and Tenure | | Interacting Unemployment, Outside Wage, and Tenure | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Local Unemployment Rate | 13.065 [14.198] | –3.184 [13.042] | 30.501*** [6.096] | 14.785** [6.536] | 12.192 [13.823] | –4.324 [12.799] |
| Weighted-Average Log Outside Wage | –0.677 [0.424] | –0.798** [0.382] | –0.746 [1.051] | –0.832 [1.058] | –0.401 [1.017] | –0.48 [1.013] |
| 1–5 Yrs. Tenure | –1.204*** [0.445] | –1.231*** [0.443] | 1.486 [2.668] | 1.66 [2.786] | 1.63 [2.536] | 1.818 [2.622] |
| 6–10 Yrs. Tenure | –1.601*** [0.484] | –1.614*** [0.484] | –1.537 [2.837] | –1.533 [2.903] | –1.372 [2.646] | –1.354 [2.697] |
| >10 Yrs. Tenure | –1.386*** [0.459] | –1.399*** [0.464] | –1.485 [2.600] | –1.395 [2.684] | –1.248 [2.504] | –1.151 [2.574] |
| Unemployment*(1–5 Yrs. Tenure) | 24.175** [11.805] | 25.174** [11.837] | | | 25.810** [11.715] | 26.973** [11.572] |
| Unemployment*(6–10 Yrs. Tenure) | 20.644* [12.172] | 20.905* [12.227] | | | 21.204* [12.275] | 21.510* [12.191] |
| Unemployment*(>10 Yrs. Tenure) | 12.634 [11.669] | 13.126 [11.824] | | | 13.025 [11.783] | 13.604 [11.735] |
| Weighted-Avg. Log Outside Wage*(1–5 Yrs. Tenure) | | | –0.656 [1.018] | –0.717 [1.064] | –1.082 [0.958] | –1.165 [0.985] |
| Weighted-Avg. Log Outside Wage*(6–10 Yrs. Tenure) | | | 0.274 [1.066] | 0.271 [1.093] | –0.093 [1.009] | –0.106 [1.027] |
| Weighted-Avg. Log Outside Wage*(>10 Yrs. Tenure) | | | 0.216 [0.984] | 0.184 [1.018] | –0.056 [0.965] | –0.099 [0.988] |
| Log (Real Wage) | 7.454*** [2.422] | –7.051 [7.753] | 7.270*** [2.408] | –6.694 [7.833] | 7.396*** [2.351] | –7.141 [7.343] |
| Log (Projected Work-Time) | –0.537 [0.383] | –0.361 [0.362] | –0.539 [0.386] | –0.35 [0.366] | –0.52 [0.378] | –0.338 [0.352] |
| Cut 1 | 17.847*** [6.767] | –25.069 [22.511] | 17.801*** [6.722] | –23.423 [22.535] | 18.403*** [6.462] | –24.499 [21.199] |
| Cut 2 | 18.330*** [6.767] | –24.584 [22.511] | 18.284*** [6.723] | –22.939 [22.534] | 18.887*** [6.462] | –24.015 [21.198] |
| Terminal Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Effects | No | Yes | No | Yes | No | Yes |
| N | 15,657 | 15,657 | 15,657 | 15,657 | 15,657 | 15,657 |
| Pseudo R-Squared | .052 | .053 | .052 | .053 | .052 | .053 |

*Notes:* Robust standard errors in brackets. Errors are clustered by terminal-year, adjusted for measurement error in the outside wage term.

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

rate as instruments for fairness perceptions in order to estimate the effect of fairness perceptions on employee performance (as measured by the dismissal rate or the ratio of actual work-time to projected work-time). Such a strategy requires the strong assumption that local conditions affect employee performance only through fairness perceptions—the exclusion restriction—which is vulnerable to criticism. In the specification with terminal effects, our point estimate of the effect of fairness perceptions on the dismissal rate is negative as expected and of an economically significant magnitude. This estimate is not statistically significant, however, and when year effects are also included the point estimate is essentially zero. On the advice of an anonymous referee, we omit the results.

## 4. Conclusion

This paper has presented robust evidence that the unemployment rate and the wage of similar workers in the external labor market were important reference points—or components of a composite reference point—for employee wage-fairness judgments in the firm we study. To our knowledge, ours is the first study based on observations of workers in real workplaces to identify the effect of credibly exogenous determinants of employee wage-fairness perceptions.[31] Our results stand in contrast to findings from surveys of managers, which suggest that external labor market conditions are not important in determining employees' wage-fairness perceptions (Bewley 2002; Levine 1993a). An interesting question that remains unanswered is whether the unemployment rate and outside wage affected fairness judgments simply because they entered into an individual's calculation of his expected payoff in the outside labor market or because they were in themselves salient points of comparison. While our research design does not permit us to evaluate the relative importance of internal versus external reference points in the formation of wage-fairness judgments, the results do suggest that in the future, formal models

and empirical tests of the role of fairness perceptions should explicitly take external labor market conditions into account.

*Table 7.* Effect of Local Conditions on Dismissal Rate: OLS, Long Sample, 1996–2000. (Dependent Variable: Dismissal Rate)

| Independent Variable | Terminal Effects Only (1) | Terminal and Year Effects (2) |
|---|---|---|
| Local Unemployment Rate | −0.508 [0.387] | −0.006 [0.458] |
| Weighted-Average Log Outside Wage | 0.001 [0.025] | −0.001 [0.024] |
| Log(Real Wage) | −0.053 [0.158] | 0.426 [0.378] |
| 1–5 Yrs. Tenure | 0.015 [0.027] | 0.005 [0.028] |
| 6–10 Yrs. Tenure | −0.01 [0.025] | 0.014 [0.027] |
| >10 Yrs. Tenure | 0.006 [0.025] | 0.003 [0.027] |
| Log (Projected Work-Time) | 0.008 [0.027] | −0.003 [0.027] |
| Terminal Effects | Yes | Yes |
| Year Effects | No | Yes |
| N | 144 | 144 |
| R-Squared | .346 | .395 |

*Notes:* Robust standard errors in brackets. Errors are adjusted for measurement error in the outside wage term. Tenure variables are terminal-level averages of individual-level indicator variables. Results are weighted by the number of respondents in each terminal.

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

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[31]Subsequent to our first submission of this paper, Mas (2006) has made an important contribution in the area.

**Data Appendix**

*Attitude Data*

The possible responses to the demographic questions were the following:

—*Age:* (1) 16–24, (2) 25–30, (3) 31–40, (4) 41–50, and (5) over 50.

—*Education:* (1) Some high school, (2) High school degree, (3) Some college, and (4) College degree.

—*Tenure:* (1) <1 year, (2) 1–5 years, (3) 6–10 years, (4) >10 years.

—*Race:* (1) White, (2) Black, (3) Hispanic, (4) Asian/Pacific Islander, and (5) Native American.

For the race variable, there were few Hispanic, Asian/Pacific Islander, or Native American respondents; categories (2)–(5) were consolidated into a single "Non-White" category.

*Definition of Local Labor Markets*

Of the 29 breakbulk terminals, 26 are located within MSAs. One terminal is located within 5 miles of an MSA. In these cases, the corresponding MSA is taken as the local labor market. Two terminals, both in the South, are located well outside the nearest MSA. In these cases, we take all non-MSA areas of the state in which the terminal is located as the local labor market. (County-level data are not available in the CPS for counties with population less than 100,000, which prevents us from defining the local labor market more narrowly for these two terminals.) In the case of unemployment, it would be possible to define local labor markets more narrowly, but the BLS warns that its estimates of unemployment below the MSA level may be subject to large and unquantifiable errors.

*Regional Consumer Price Indices*

We deflated both the hourly wage in the firm and the hourly wage we calculate from the CPS by a regional consumer price index (CPI), constructed as follows. For 12 of the 29 local labor markets, the BLS calculates a separate CPI for the corresponding MSA. For the remaining 17 local labor markets, we used the regional CPI calculated for the corresponding Census region, Northeast, Midwest, South, or West. The series is the CPI for all urban wage earners and clerical workers, for all goods.

*Local Unemployment Data*

The primary basis for employment estimates at the MSA level in the BLS Local Area Unemployment Statistics is the joint federal-state Current Employment Statistics (CES) surveys, which gather information from worksites. The statistics are then converted to a place-of-residence basis using information on commuting patterns from the Current Population Surveys (CPS) and the decennial censuses. Estimates of employment and unemployment at the state level, used in the case of the two terminals for which we employ non-MSA data, are based entirely on the Current Population Survey (CPS). Average unemployment is calculated for the calendar year of the attitude survey. We experimented with an alternative specification of the unemployment rate, taking the average for June–August, the months in which the attitude surveys were carried out, but the results were unchanged.

*Constructing the Outside Wage Measures*

We re-code the CPS variables for age, race, and schooling to match the categories of the demographic questions on the attitude survey listed above. We define blue-collar workers as workers in occupations 403–469 or 503–889 of the CPS occupation codes. This definition includes service occupations (including private household and protective service occupations) and excludes farming, forestry, and fishing occupations. We define a worker as full-time if either (a) hours usually worked at the main job are reported as greater than or equal to 35 hours, or (b) hours usually worked are reported as variable and hours worked at the main job in the previous week are greater than 35 hours.

Our wage measure from the collective bargaining contracts for the firm is the hourly non-overtime wage. We construct a similar measure from the CPS as follows. If respondents report their hourly wage (not including overtime, tips, or commission) in their main job, we take that measure as their hourly wage. If they do not report their hourly wage, we calculate the non-overtime hourly wage as follows: first, we calculate total weekly hours as a sum of hours usually worked at all jobs (if hours usually worked were reported as variable, we use hours worked at all jobs in the previous week); second, we calculate what an individual's total weekly earnings would have been had he not earned an overtime premium by subtracting one-third of usual weekly overtime earnings from usual weekly earnings; third, we divide this adjusted weekly earnings measure by total weekly hours. We deflate the hourly wage by the regional CPI, as described above.

We limit the sample to individuals in the CPS who fit all of the following criteria: (1) Male. (As mentioned above, 99% of the employees in the firm are male.) (2) Civilian. (3) Full-time, as defined above. (4) Age 16–64. (5) Hourly wage (calculated as described above) greater than or equal to $3 in constant 1996 dollars. (6) Weekly earnings less than $1,880.32 in constant 1996 dollars. This is the value in 1996 dollars of the 1997 top-code of $1,923 for weekly earnings. The top-code was raised in January 1998, and the 1997 top-code is the lowest in real terms over the 1996–2000 period. (7) Non-allocated earnings. Neither region nor union status is an imputation match

criterion in the CPS outgoing rotation groups, and including allocated wages can introduce important biases. For details, see Hirsch and Schumacher (2004).

### *Terminal-Level Variables from Firm*

The dismissal rate is calculated as the number of dismissals and resignations in lieu of dismissal in the year as a fraction of total employment at time of survey. The separation rate is calculated as total separations in the year as a fraction of total employment at the time of the survey. The overtime share is calculated as yearly overtime hours as a fraction of total hours worked.

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