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WORKER MORALE AND EFFORT: IS THE RELATIONSHIP CAUSAL?*

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We investigate a unique setting which enables us to distinguish between two theories of work performance. A standard labor supply framework implies a negative effect of the nonpecuniary cost of work on the employee's effort. In contrast, a model of worker morale that is consistent with a widely used theory of Akerlof and Yellen (QJE, 1990) predicts this negative effect is stronger (weaker) for low-morale (high-morale) workers. We exploit a natural experiment design of a firm relocation from Milwaukee's Central Business District to the area's suburban ring in 1992. There is an exogenous source of variation on the adjusted commuting distance among those who stay at the firm. Some workers received a windfall gain, whereas other workers experienced an unforeseen cost in longer commuting time. The estimates suggest that low-morale workers are responsive to the shock in commuting time for some of the dimensions of morale. We conclude that the results give some indication of the model of worker morale.

1 Introduction

The management literature has provided abundant evidence that firms spend resources to increase the commitment and loyalty of their work force, and that these investments are likely to pay off (Pfeffer, 1994, 1998; O'Reilly and Pfeffer, 2000). In other words, by putting their people first, profits to the firms will be increased. But does worker loyalty produce better job performance? There are different perspectives on worker loyalty or what is referred to in the economics literature as worker morale.[1]

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[1]Whereas the management literature uses the term worker loyalty (e.g. Mowday *et al.*, 1982), the economics literature applies the term worker morale (e.g. Bewley, 1999). In this paper, we treat worker morale and loyalty as synonymous terms that refer to the commitment of worker to the firm that goes beyond the financial reward to the worker.

On the one hand, many economists would be skeptical of claims of worker morale mattering because of the issue of adverse selection. Morale is adversely related to the value of the outside option in the local labor market. Simply put, workers with a poor bargaining position in the external labor market—those with bad external prospects—would declare themselves to be loyal to the firm and display high morale. It can be clarified by the workers' response to an increase in the nonpecuniary cost of work, making work at this firm less attractive (more costly) to the worker. Economists argue that workers would lower their effort in response to the higher nonpecuniary costs. There is no reason why morale would mitigate such a negative change, even if workers declare a strong commitment to the firm that goes beyond their financial reward. The reaction to the higher nonpecuniary costs would differ across workers depending on the attractiveness of the outside option. High-morale workers with a worse outside option would be less inclined to leave the firm than those with good external options, because they are less likely to find another employer where they can receive equivalent earnings. Therefore, by setting a higher wage, the firm can worsen the relative attractiveness of the worker's external options, so that the firm can in effect purchase worker morale. If raising wages is always available as an option to induce the appropriate behavior, why would a firm need to pay any attention at all to worker morale?

On the other hand, other research in economics is more sympathetic with the idea that many researchers have considered a class of models of worker's morale and their commitment to the firm (Bewley, 1999). It is based on the starting point that worker's utility may be based on nonpecuniary variables in addition to monetary variables and costly effort. Commitment to the firm may be shaped by the firm's identity (Akerlof and Kranton, 2005). According to this line of reasoning, to the extent that there are nonmonetary attributes of the job that are part of the worker's utility function, improving worker morale can be employed as an a means of inducing effort from workers, leading to higher productivity (Akerlof and Kranton, 2005). Additionally, worker morale may be important to a firm as a means of establishing a long-run relationship between the worker and the firm, over and above the firm's reputation and the content of the labor contract (Bolton, 1990). From the firm's perspective, such a long-term orientation can be very useful as a means of withstanding unanticipated adverse market shocks.

Distinguishing between these two lines of thought on the role of worker morale is empirically very difficult. To gauge the effect of morale on the worker's productivity, we are confronted by an econometric identification issue. First, both aforementioned explanations imply that an increase in the costs of paid work to the worker (changes that make it is costlier to have a match with the employer) lead to lower production. Thus, in order to discriminate between these theories, in addition to data on productivity, information on worker morale and her outside option is also needed. This raises a second thorny issue, i.e. how does one measure morale independent of

changes in worker's behavior in the face of increased costs to the paid worker? Third, even if these challenges could be overcome, were we to observe relationships among worker morale, output, effort and the value of the outside option, we could not be sure of the causal order of these effects. It is hard to find an exogenous source of variation to the worker in long-run relationships, which can be related to differences in worker morale and the outside option.[2]

To assess the relevance of worker morale at explaining the changes in effort, we apply a design that is driven by an exogenous shock in the nonpecuniary cost of work. It is based on the prediction that increased commuting time leads to lower productivity (through higher absence) and a higher likelihood of separation from the employer. Our empirical research approach can be labeled as insider econometrics (Shaw, 2009). We consider a firm in downtown Milwaukee that moved from the central city to a suburb of that town, which is located about 10.5 miles away from the old plant. From the worker's perspective, this plant relocation comes as an exogenous shock in commuting time.[3] For some workers who need to commute over longer distances it is experienced as an unforeseen additional cost, while for the other workers it constitutes a windfall gain in time. Exploiting this exogenous information, we observe that the negative shock of a longer commuting distance elicits lower worker productivity measured in the form of higher absenteeism.

According to worker morale theories, the response to the shock should differ across employees. High-morale workers should not respond to a negative shock, either in terms of productivity and/or separation from the firm, whereas low-morale workers should respond to the longer commute by lowered productivity and/or seeking external options for employment. Exploiting a combination of this shock with ex ante information on the worker's morale prior to the shock, our estimates indicate that over all workers, there is a negative effect of the adverse circumstance on work effort. However, this effect is absent for the workers who stated prior to the move that they had relatively high morale. In contrast, for the workers who declared themselves to have low-work morale at time 1, the shock has a strong negative impact on work effort. Moreover, supporting the idea that the morale effect is causal, the effect of the shock does not change with differences in the worker's assessments of the strength of their outside options prior to the shock. A supplementary point is that there is usually a risk of a crowding-out effect of work morale using extrinsic regulations (Frey, 1993). However, the setup of the natural experiment is such that there is no risk that the worker morale

[2]The scope condition of the laboratory experiments is short-run relationships. See for instance Fehr and Falk (1999) and Fehr and Gächter (2000).

[3]This setup of such a shock variable that results from a change of a location of a firm from the city center to the suburbs has been applied in studies designed to test the spatial mismatch hypothesis regarding race differences in labor market behavior (Fernandez 1994, 2008; Zax 1989, 1990; Zax and Kain 1991, 1996; for a review, see Fernandez and Su (2004), pp. 547–553).

could be crowded out by a change in his locus of control or by his perception of the employment relationship.

The paper has the following structure. In Section 2 gives the conceptual framework of morale. In Section 3 the plant's relocation, the shock variable of commuting time and the measures of worker morale are described in great detail. Section 4 considers the statistical identification strategy. In Section 5, the estimates are presented. The robustness checks are given in Section 6. The conclusion is given in Section 7.

2 Conceptual Framework

Worker morale is a broad concept. Various classes of theories of employee performance are based on the key issue of worker morale and loyalty. It includes theories of the identity of organizations (Akerlof and Kranton, 2005), exit, voice and loyalty (Hirschmann, 1970), reciprocity and gift exchange (Akerlof, 1982) and team spirit (Kandel and Lazear, 1992). Bewley (1998, p. 476) applies the following definition: 'Morale is the acceptance and willingness to contribute to organizational objectives and is important because people tend to benefit those who help them and to hurt those who harm them. (...) good morale implies willingness to make personal sacrifices for the good of the organization'.[4] According to interviews of Campbell and Kamlani (1997) and Bewley (1998) managers emphasize that morale is an important reason why employers do not want to decrease their nominal wage, because they expect workers to respond to such decreases with lower effort.

We consider worker morale against the backdrop of the influence of the cost of work on work performance. Broadly speaking, two opposite approaches have been developed in different literatures. The first approach—that excludes morale—is based on the assumption that effort is reduced by a higher disutility (or cost) of work to the worker. The marginal change of effort at the intensive margin is[5]

$$\frac{\partial E}{\partial c} < 0 \tag{1}$$

where E is effort, and c is cost of work to the worker. Many empirical studies of worker effort are based on this simple framework. The cost variable c includes family conditions or home production (Vistnes, 1997), commuting

[4]As such, this definition is related to the concept of 'organizational citizenship behavior' and 'organizational commitment' in the organizational psychology literature (Mowday, Porter and Steers, 1982; Podsakoff *et al.*, 2009).

[5]Of course, it is a very stylized expression, which can be made richer by including worker's benefit and the firm's costs and benefits of maintaining the high effort of the worker. In this exposition, we abstract from effort at the extensive margin (separations). It has been demonstrated that an increase in commuting costs induces voluntary resignations (Zax and Kain, 1996; Van Ommeren *et al.*, 2000; Bajari and Kahn, 2008; Russo *et al.*, 2012).

distance to work (Allen, 1981), work incentives (Barmby *et al*., 1991; Johansson and Palme, 1996; Ichino and Riphahn, 2005; Hassink and Koning, 2009), as well as the bargaining position of the worker on the external labor market (Arai and Skogman Thoursie, 2005). There is no need to include morale in this framework, since morale is posited to be inversely related to the worker's bargaining position.

The second approach is based on the influence of worker morale on effort. It predicts that a shock in the cost of paid work has a stronger effect on the marginal effort of low-morale workers compared with that of the high-morale workers. The intuition behind the second approach is that equation 1 does not allow for any interaction between a change in the cost of work and initial morale. Hence, it adds worker morale to the effort equation

$$E=f(c,m) \tag{2}$$

and it allows for an interaction between morale and the cost of paid work in explaining work effort. In case of a negative interaction between c and m in equation 2, the response to an increase of the cost of work may be stronger for a low-morale than for a high-morale worker.

$$\left|\frac{\partial E}{\partial c}\right|_{m\ \text{large}} < \left|\frac{\partial E}{\partial c}\right|_{m\ \text{small}} \tag{3}$$

It leads to the mechanism that firms may benefit from a work force with high morale, because it may help cushion the effect of an adverse shock on the cost of effort for high-morale workers.

So far, the empirical literature on morale and workplace performance has concentrated on the reciprocal mechanism of equation (2), in which a change in morale induces a change of effort. Lee and Rupp (2007) considered the effect a change of morale through a permanent wage cut on performance of airline pilots. They found a strong negative decline of effort, which is however short lived and is limited to nonbankrupt airlines. Cohn *et al*. (2011) found evidence of a fair wage, which is determined by reference and social comparison with their team members' wages. The estimates of Kube *et al*. (2012) were based on a field experiment in the workplace, which resulted in evidence of reciprocity of workers to a monetary and nonmonetary gift by the employer.

In all of the aforementioned studies, *changes* in morale of individual workers were evoked by imposing different rewards relative to some measure of a fair wage. To get a measure of differences in the *level* of morale across workers, there are stronger requirements on the quality of the data, since it requires a direct measure of worker morale. The organizational literature has investigated employee morale (Podsakoff *et al*., 2000, 2009) using various measures of dimensions that were developed by Mowday *et al*. (1982). As far as we know, these measures have not been used in an empirical analysis of worker performance based on quasi-experimental design.

3 The Firm

We study a food processing firm that publicly announced in the fall of 1989 that it was going to relocate the plant from Milwaukee's Central Business District to the area's suburban ring in 1993. The firm invested $92 million in building a new facility located about 10.5 miles from the old plant. The old facility was located in a 100-year old, cramped, multistory plant. The new facility allowed for a massive upgrade of the production equipment. The new machines delivered higher quality, and there was a clear increase in the productivity of the new plant. In previous studies, the case was used to find support of the spatial mismatch hypothesis (Fernandez, 1994, 2008) and the effect of the process of transition on skill-biased technical change (Fernandez, 2001).

Fernandez (1994, 2001) argued there was good evidence that the firm was not relocating to change the work force. First, in making the decision, the firm's management considered three alternative suburban locations. The management conducted a study measuring what the commuting distance would be for each of the incumbent workers to the three alternative sites, and then chose the location that was the least disruptive to workers' commutes. Second, the firm announced that there was no intention to dismiss the current employees through the move, and publicly gave the incumbent workforce a no-layoff guarantee. Third, the firm's management publicly guaranteed workers an hourly wage in the new plant which was to be no less than their wage in the old plant. Fourth, in response to the no-layoff and wage guarantees, the union supported relaxing seniority and work rule requirements as well as the firm's retraining efforts.

Fernandez (2001) gives a careful description of the change of the production process. The firm is an industrial food producer, taking raw food inputs (such as sugar, flour, lecithin) and producing finish goods which are processed and packaged for sale to distributors and retail markets. An essential component of the change in technology was that if knitted together where were previously a series of stand-alone steps of the production process into a continuous flow. Whereas operators in the old plant would physically direct the transfer of the results of each process to the next step, the new plant links these processes via pneumatically run lines. The process of changing over from one product to another is also made much more efficient, as the clearing of old product is done automatically through computer controlled processes. Hence, it is clear that the relocation resulted in a more efficient and productive production process which increased the productivity of blue-collar workers in particular. Moreover, as noted above, since no workers were laid off through this process, the technological change was implemented as a complement, and not as a substitute for the existing blue-collar workers.

The firm's workforce was studied before and after the firm relocation. The survey data were collected by face-to-face interviews with all employees

in spring 1991, which was about six to nine months before the relocation of the firm. In 1994, the workforce was surveyed again, also tracking those workers who left the firm (Fernandez, 2008). Respondents received $15.00 ($50.00) for participating in the first (second) wave of the survey. Of the 337 employees who were employed in the production plant in 1991, a total of 252 employees stayed with the firm through the transition to the new plant. Of these, 178 employees responded to surveys for both periods (78 white-collar, and 100 blue-collar employees). In addition, there is survey information for available for 71 employees who left the firm (34 white-collar, and 37 blue-collar workers).

For all employees in 1991, information of their postal address was available, so that it was possible to measure the road map commuting time from their 1991 address to both the downtown plant and suburban locations. Our empirical analysis will be based on the time to commute to both locations. It is defined as

$\widetilde{com}_{91}$ = total round-trip commuting time (in hours) from 1991 residence to old location
$\widetilde{com}_{94}$ = total round-trip commuting time (in hours) from 1991 residence to new location

The size of the shock is the difference between $\widetilde{com}_{94}$ and $\widetilde{com}_{91}$. From the perspective of the worker, there is no additional utility attached to commuting. Of course, the response to the shock could be different across groups of workers. However, the firm did not compensate any (additional) costs of commuting. Neither was there any change of the incentive structure to the employees. All workers came by car in 1994.

Because the employees did not choose the location of the new plant and the relocation decision of the firm was not focused on specific groups of workers either, there is an exogenous source of variation on the commuting distance among the workers. For those who stayed with the firm, 27 workers (15 percent) got a windfall decrease in commuting time, whereas the remaining 151 workers got an increase in commuting time.[6]

Figure 1(A) shows for the stayers that the increase in commute was more substantial for the blue-collar workers than for the white-collar workers. This finding is corroborated for the leavers in Fig. 1(B).

The firm had a capital-intensive production process in both locations. Unionized blue-collar workers were operating the machines in various production lines. Absenteeism of these workers was costly to the firm, because replacement workers had to be hired and it could also affect the productivity

[6]For the leavers, 13 workers (18 per cent) got a reduction in commute, and 58 workers had an increase in commuting time.

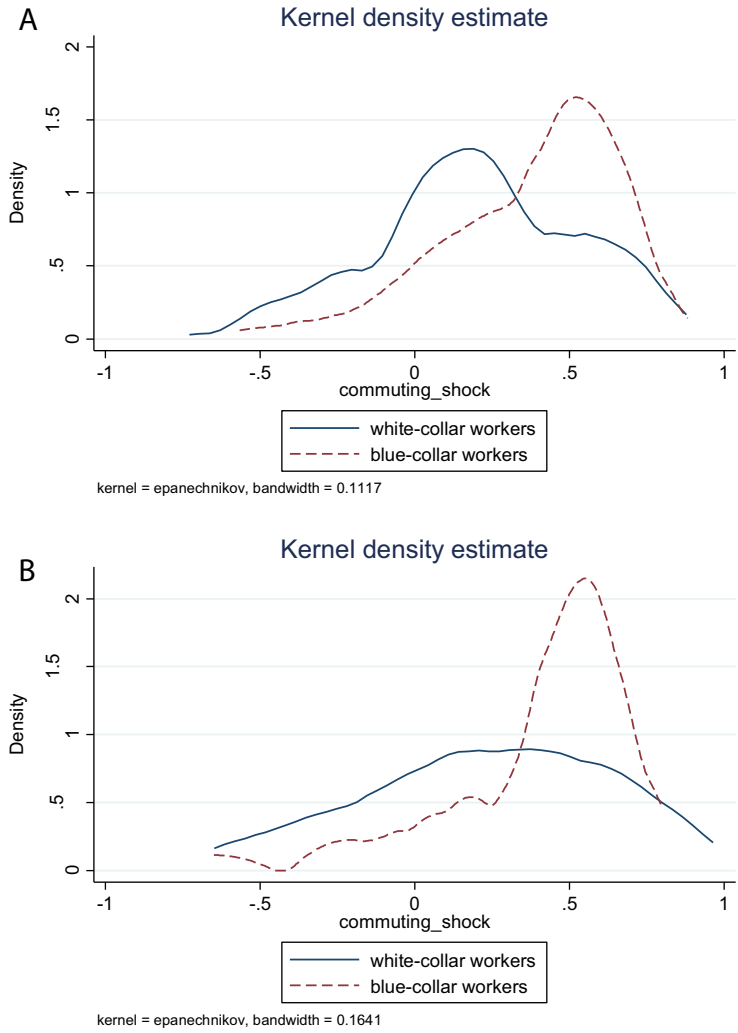

FIG. 1. (A) Difference between $\widetilde{com}_{94}$ and $\widetilde{com}_{91}$ (white-collar workers and blue-collar workers)—Stayers. (B) Difference between $\widetilde{com}_{94}$ and $\widetilde{com}_{91}$ (white-collar workers and blue-collar workers)—Leavers.

of the other blue-collar workers because of the interdependencies or complementarity in production. According to the union contract, the blue-collar workers were allowed to be absent from work for funeral leave, personal leave, illness or injury, armed forces, maternity leave and family and medical leave. For the remaining white-collar workers, the consequences of absence did not have an immediate impact on the production process, but they felt the pressure of caught shirking through an employment-at-will contract.

Hence, for the white-collar workers, the rules about absence were more flexible and depend on the supervisor.[7] For both groups of workers, the firm could not perfectly monitor the validity of absence, so that there was some scope to shirk through workplace absence.

We take worker absenteeism as a measure of effort, for which we follow a broad literature (Johansson and Palme, 1996; Barmby and Stephen, 2000; Chatterji and Tilley, 2002; Røed and Fevang, 2007; Lanfranchi and Treble, 2010; Treble and Barmby, 2011; Hesselius *et al*., 2013; Dale-Olsen, 2013; Ziebarth and Karlsson, 2014). Hours of work is a less suitable measure of effort for this particular firm, because there is hardly any variation in the contractual hours and overtime of work. White-collar workers are expected to work a minimum of 40 h. They are exempt from overtime regulation, so they can work more on some days and then less on other days.

Absenteeism was asked to the workers in both waves of the survey as: 'About how many days would you say that you are *absent* from work during the average month not counting vacations and paid holidays?' Table 1 shows the averages of the key variables before and after the plant relocation, across the categorizations blue-collar/white-collar workers and stayers/leavers. The decline in absence was stronger for the blue-collar workers (from 0.47 to 0.28 days a month) than for white-collar workers (from 0.14 to 0.12 days a month). In terms of the indicator of monthly absence (one if absent on one of the working days of the month), the declines were from 49 to 20 per cent (blue-collar workers) and from 23 to 12 per cent (white-collar workers), respectively.[8] The average commuting time increased from 0.45 h (from 1991 residence to old factory) to 0.82 h (from 1991 residence to new factory) for the blue-collar workers and from 0.74 to 0.94 h for the white-collar workers. Especially noteworthy for our purposes is the survey question on the worker's outside option.[9] The difficulty of finding a comparable job (on a 10-point Likert scale where 10 is 'Very Easy') is on average 3.71 for the blue-collar workers, and 4.77 for the white-collar workers so that they reported they have a better outside option. These outcomes hardly changed between 1991 and 1994.

[7]Note that well after the period of our study, Milwaukee passed paid sick days standards that included paid 'safe' days for victims of domestic violence, sexual assault and stalking (National Partnership for Women & Families, 2013).

[8]A reason for the drop in absenteeism between 1991 and 1994 is that the existing rules on absenteeism (remember it is a unionized plant) were being enforced more stringently in the new plant. This makes sense since each worker's productivity had been raised, so that not having people available is more costly in the new plant. Furthermore, that workers were happier to come to work at a clean, modern plant.

[9]The question was formulated as follows. 'On a scale of 1 to 10 where 1 is very easy and 10 is very hard, how easy would it be for you to find another employer located nearby with approximately the same income and fringe benefits as your job at (this firm)?' We reverse coded this question, so that 10 corresponds to a very easy job change. Our reverse coding, which of course does not change the statistical results, leads to an easier interpretation of the coefficient on the outside option.

TABLE 1
DESCRIPTIVE STATISTICS FOR BLUE-COLLAR AND WHITE-COLLAR WORKERS

	Stayers			*Leavers*		
	Mean	*Std*	*Median*	*Mean*	*Std*	*Median*
Blue-collar workers						
Absenteeism (in days per month), 1991	0.47	0.67	0	0.53	0.85	0
Absenteeism (in days per month), 1994	0.28	0.68	0	–		
Monthly incidence of absenteeism (=1), 1991	0.49	0.50	0	0.47	0.51	0
Monthly incidence of absenteeism (=1), 1994	0.20	0.40	0	–		
Road map commuting time to old factory in hours, from 1991 residential location	0.45	0.43	0.34	0.35	0.35	0.23
Road map commuting time to new factory in hours, from 1991 residential location	0.82	0.37	0.77	0.75	0.28	0.75
Age (in years)	37.8	9.0	36.0	39.4	12.8	34.0
Tenure (in years)	9.6	6.8	8.9	7.7	8.3	4.0
Hourly wage in $, 1991	10.17	1.85	9.87	9.79	1.94	9.51
Female (=1)	0.35	0.48	0	0.32	0.47	0
House move between 1991 and 1994 (=1)	0.43	0.50	0	0.65	0.49	1
Difficulty of finding another job (10 is very easy; 1 is very hard), 1991	3.71	2.50	3	3.85	2.78	3
Difficulty of finding another job (10 is very easy; 1 is very hard), 1994	3.84	2.50	3	–		
Number of observations		100			34	
White-collar workers						
Absenteeism (in days per month), 1991	0.14	0.34	0	0.20	0.33	0
Absenteeism (in days per month), 1994	0.12	0.32	0	–		
Monthly incidence of absenteeism (=1), 1991	0.23	0.42	0	0.32	0.47	0
Monthly incidence of absenteeism (=1), 1994	0.12	0.32	0	–		
Commuting time to old factory in hours, from 1991 residential location	0.74	0.51	0.66	0.73	0.75	0.52
Commuting time to new factory, from 1991 residential location	0.94	0.46	0.88	0.97	0.57	0.85
Age (in years)	39.7	9.6	39.0	37.9	12.4	35.0
Tenure (in years)	7.5	6.9	5.8	8.5	10.6	3.8
Hourly wage in $, 1991	15.24	5.65	14.38	15.81	8.13	13.02
Female (=1)	0.37	0.49	0	0.51	0.51	1
House move between 1991 and 1994 (=1)	0.27	0.45	0	0.46	0.51	0
Difficulty of finding another job (10 is very easy; 1 is very hard), 1991	4.77	2.21	5	5.81	2.50	5
Difficulty of finding another job (10 is very easy; 1 is very hard), 1994	4.36	2.30	4	–		
Number of observations		78			37	

The workers were asked a set of items measuring worker morale in both surveys. They responded to eight questions (M1–M8) that were developed by Mowday *et al*. (1982).[10] See Table 2 for the exact wording of the questions. For instance, caring about the future of the company can be interpreted as a specific dimension of worker morale. Although all of the questions consider different dimensions of worker morale, the eight questions yield internally consistent and highly reliable information on worker morale. First, using all workers in 1991, 25 out of 28 correlations among the responses to these items are positive and statistically different from zero for all pairs of correlations. Second, the reliability of these items is quite high by established psychometric standards (specifically, the standardized Cronbach's alpha is 0.853). Moreover, the response to questions M1–M8 are stable and well-behaved over the two waves of the survey. More specifically, the average values of 1991 and 1994 cannot be distinguished statistically, and the median values are the same for both years.[11] Furthermore, a substantial fraction of workers scored above the median worker morale both in 1994 and in 1991 (see Column 7 of Table 2).

4 Identification Strategy

The analysis starts with the empirical analog of equation 1, in which worker effort is a negative function of the nonpecuniary cost of work. It would give a regression of an indicator of absenteeism (work effort) on commuting time (cost of work). The drawback of such a specification is that the use of information on actual commuting time before and after the plant relocation would lead to inconsistent parameter estimates, because a substantial fraction of workers has moved house between 1991 and 1994 after the plant's relocation (see Table 1).[12] It is possible to evade the issue of endogeneity by using the shock variable $\widetilde{com}$, so that commuting time in 1994 is considered from the perspective of the worker's residence in 1991 to the plant's new location.[13] Thus, $\widetilde{com}$ is an exogenous shock variable—the plant relocation is neither controlled by the worker nor is it focused on specific groups of workers—which is based on a precise measure of commuting time considered

[10]For questions M2 and M5, we reverse coded the variables such that 5 corresponds to the highest morale.

[11]In Section 7, Table 8 we will show that M1, M2 and M5 are statistically different for the blue-collar workers. There are two ways to explain this finding. First, the outcome may be surprising, given that workers would be happier to come to work in the new plant. One could also explain the empirical outcome of Table 8 that work morale has hardly changed, given that it deteriorated slightly for blue-collar workers only.

[12]For this reason, too, we did not apply a dif-in-dif approach.

[13]Thus for the workers who moved house after 1991 as a way of absorbing the shock of the firm relocation, absenteeism would be even larger if they had not changed residence. As a result, our test of $\widetilde{com}$ on absenteeism can be considered as a conservative test.

TABLE 2
QUESTIONS ABOUT WORKER MORALE, STAYERS (178 WORKERS)

Worker morale question M1–M8[a]	*Median 1991*	*Mean (sd) 1991*	*Median 1994*	*Mean (sd) 1994*	*I(>median) 1991*	*I(>median) 1994*	*I(>median) 1994 - Subselection*[b]
M1: I am willing to work harder than I have to, to help the company succeed	4	3.80 (0.84)	4	3.70 (0.99)	0.15 (0.36)	0.19 (0.39)	0.63 (0.49)
M2: I feel very little loyalty to the company	4	3.75 (0.91)	4	3.62 (1.03)	0.16 (0.37)	0.17 (0.38)	0.55 (0.51)
M3: I would take almost any job to continue working for the company	2	2.38 (1.01)	2	2.37 (0.95)	0.35 (0.48)	0.37 (0.48)	0.58 (0.50)
M4: I am proud to work for the company	4	3.87 (0.78)	4	3.78 (0.89)	0.19 (0.39)	0.19 (0.39)	0.65 (0.49)
M5: Deciding to work for the company was a real mistake	4	4.18 (0.65)	4	4.07 (0.85)	0.31 (0.47)	0.31 (0.47)	0.64 (0.48)
M6: I talk up the company to my friends as a great company to work for	4	3.41 (1.03)	3	3.25 (1.01)	0.13 (0.34)	0.45 (0.50)	0.78 (0.42)
M7: I really care about the future of the company	4	4.05 (0.76)	4	4.02 (0.84)	0.25 (0.43)	0.26 (0.44)	0.55 (0.50)
M8: For me this is the best of all possible companies for which to work	3	2.93 (0.94)	3	2.97 (1.00)	0.28 (0.45)	0.31 (0.47)	0.66 (0.48)

[a]The highest scale corresponds to the highest morale. M1–M8 are measures at a scale of 1 (strongly agree) to 5 (strongly agree), for which M2 and M5 are reported in reverse coding.
[b]As a fraction of the workers who were above median in 1991.

from the worker's residence prior to the plant's relocation.[14] As a result, $\widetilde{com}$ has a zero correlation with the error term of the regression equation, so that the parameter on $\widetilde{com}$ registers its causal influence on absenteeism. With the inclusion of individual fixed effects, the major variation comes from the commuting distance before and after the relocation. The empirical specification is

$$abs_{it} = \alpha_i + \beta_1 \widetilde{com}_{it} + \delta_1 D94_t + \delta_2 DBlue_i \text{x} D94_t + u_{it} \quad t = 91,\ 94 \qquad (4)$$

where the dependent variable *abs* is an indicator for absenteeism, which is one if the worker reports absent for one of the working days of a month and zero otherwise. Subscripts i and t refer to worker and year, respectively; α_i is the unobserved worker-specific effect; $D94$ is an indicator for the year 1994. Equation (4) also includes an interaction term between an indicator for blue-collar worker (*DBlue*) and $D94$. This interaction term allows for any difference in the effect of relocation on absence for the unionized, contract workers versus the salaried workers who are subject to an employment at-will contract. u is an idiosyncratic error term. The disadvantage of equation (4) is that is not possible to compare any difference in effects between low-morale and high-morale workers.

Of course, the effect of $\widetilde{com}$ on absence may be different between high-morale and low-morale workers. We test for the alternative hypothesis that the effect of $\widetilde{com}$ on absenteeism differs across workers with different levels of worker morale prior to the change of location. We add three interaction terms between 0 and 1 indicator for high morale in 1991 and each of the explanatory variables of equation 4[15,16]

$$abs_{it} = \alpha_i + \gamma' X_{it} + \delta' DMhigh_{i,91} X_{it} + v_{it} \quad t = 91,\ 94 \qquad (5)$$

for which X_{it} is a vector $(\widetilde{com}_{it}, D94_t, DBlue_i D94_t)$. *DMhigh* is a 0–1 indicator (based on one of the dimensions of morale M1–M8), which is one if the worker has a value of morale above the median in 1991 (the median values are reported in Table 2). γ and δ are vectors of parameters. The implication of the inclusion of *DMhigh* is that the level of morale—ex ante, prior to the plant's relocation—absorbs the positive effect of commuting time (equation (3)). If so, the parameter δ_1 on the interaction term $DMhigh_{i,91} \text{x} \widetilde{com}_{it}$ has a negative sign. Equation (5) will be estimated separately for each dimension of work morale (M1–M8). Furthermore, it makes it possible to compare any difference in effects between low-morale and high-morale workers.

[14]We used round-trip commute time based on road map information estimated from Geographic Information System maps of the Milwaukee area.

[15]Equations (5) and (6) are formulated at the level of one of the dimensions of worker morale (M1–M8). For clearness of exposition, the parameters and the error terms of both equations do not include superscripts that refer to M1–M8.

[16]The model is formulated at the extensive margin. As a robustness check we will consider differences between stayers and leavers with respect to commute.

TABLE 3
EQUATION (4) (DEPENDENT: 0–1 INDICATOR FOR MONTHLY ABSENCE)[a,b]

	(1)	*(2)*
$\widetilde{com}$	0.115 (0.128)	0.208 (0.127)
*D*94	−0.248*** (0.046)	−0.157*** (0.051)
DBlue x *D*94	–	−0.211*** (0.079)
σ_α	0.348	0.381
σ_u	0.383	0.377
Number of observations	356	356
Number of workers	178	178

[a]Fixed-effects LPM. Standard errors clustered on worker reported in parentheses.
[b]$\widetilde{com}$: road map commuting time from 1991 residence to new or old location. *D*94: indicator for 1994. *DBlue* x *D*94: interaction term between indicators for blue-collar worker and 1994.
***Statistically significantly different from zero at the 0.01 level.

Equation (5) is based on the assumption that $DMhigh_{i,91}$ is unrelated to $\widetilde{com}_{94}$. In other words, there is no relationship between morale in 1991 and the size of the shock in distance (1991 residence to the new location of factory). This assumption can be tested by considering the parameter κ_1 of the regression of morale:

$$M_{it} = \lambda_i + \kappa_1 \widetilde{com}_{it} + \kappa_2 DOutsidehigh_{it} + \tau_1 D94_t + \tau_2 DBlue_i \text{x} D94_t + w_{it} \quad t = 91, 94 \tag{6}$$

where the dependent variable M is one of the dimensions of morale (M1–M8). It implies that a shock of commuting time does not affect morale ($\kappa_1 = 0$). In addition, the indicator variable *DOutsidehigh* measures the quality of the outside option, which is one if the worker reported that he can easily find another job (above the median value). A negative κ_2 implies that workers with a better outside option have a lower morale.

5 ESTIMATES

We estimated equations (4)–(6) as a fixed-effects Linear Probability Model with standard errors that are clustered on worker. The benchmark estimates are based on a sample of 178 workers who were at the firm in both 1991 and 1994. As a measure of commuting time we use commuting time based on road-map distances. In Table 3, we present estimates of equation (4). The effect of commuting time on absenteeism is statistically insignificant at the 10-per cent level. Furthermore, the estimated parameters (Column 2) imply a decrease of absence of 16 percentage points from 1991 to 1994. For blue-collar workers, there was an additional decrease of 21 percentage points. These outcomes are in line with the statistics of Table 1.

For each dimension of worker morale (M1–M8), we take subselections of workers who had a score either above or equal and below the median value of the specific question of morale in 1991. See the first

column of Table 2 for the median of these variables. Table 4 reports the estimated parameters on $\widetilde{com}$, *D94* and *DBlueD*94 for both subselections separately (so that the table is based on 16 estimated regression equations). The major finding reported in Column 1 of Table 4 is that an increase in the estimated commuting time by one hour increased worker absence by 0.2–0.3 day per month among workers who previously self-reported lower morale, for seven out of eight dimensions of morale. Column 4 indicates that for all of the eight dimensions of morale the effect of commuting time is statistically insignificant among workers who self-reported high morale. The impression overall is that for low-morale workers, there is a positive effect of commuting time on absence. In contrast, for the group of high-morale workers, there is no effect of commuting time on absenteeism. The fact that M1–M8 hang together in a valid scale suggests that it would be fine to combine them into a latent variable for morale.[17] There is a negative effect of commuting time on absence for the low-morale workers, using the latent variable of morale. The disadvantage of Table 4 is that it does not allow for any conclusion on the difference in effects between high-morale and low-morale workers.

Table 5 reports the estimated parameters of equation (5) for each of the dimensions of worker morale M1–M8 in 1991. By including the interaction terms with morale, we can test for any difference in effect between high-morale and low-morale workers. The parameter on commuting time becomes positive and statistically significant from zero for all questions, except for M7. Compared with the results of Table 4, the estimates of Table 5 give somewhat more inconclusive evidence about the differences between high-morale workers and low-morale workers. For three out of eight dimensions of morale (M2, M4 and M6), the interaction term is negative and statistically significant. For the latent worker-specific variable of morale, the estimate of the parameters on $\widetilde{com}$ is positive and statistically significant, whereas the interaction term is statistically insignificant.

What is remarkable is that the three statistically significant dimensions of morale are statements in absolute terms—the three dimensions do not imply any comparison, and hence they involve a more strong and conclusive aspect of loyalty. In contrast, the other five statistically insignificant dimensions which are expressed in relative terms. Overall, the statements map different type of morale and motivation, and they are obviously (empirically at least) not equally important for absence.

[17]We combined them by running a regression of morale in 1991 on worker-specific indicators and morale-specific indicators. The estimated indicator for worker (the worker fixed effect) is a latent worker-specific variable for morale. Following our approach for M1–M8, we constructed a dummy variable for which the worker fixed effect was larger than the median value.

TABLE 4
ESTIMATES OF EQUATION (4) FOR DIFFERENT SELECTIONS OF WORKER MORALE (DEPENDENT: 0–1 INDICATOR FOR MONTHLY ABSENCE)[a]

	Selection of worker morale: median and below in 1991 (low morale)				*Selection of worker morale: above median in 1991 (high morale)*			
	Independent variables[c]				*Independent variables*[c]			
Selection based on dimension of worker morale in 1991[b]	$\widetilde{com}$	*D94*	*DBlue* x *D94*	*N*	$\widetilde{com}$	*D94*	*DBlue* x *D94*	*N*
M1	0.281* (0.144)	−0.140** (0.059)	−0.255*** (0.089)	302	−0.112 (0.213)	−0.164 (0.102)	−0.138 (0.216)	54
M2	0.286** (0.143)	−0.162*** (0.063)	−0.249*** (0.089)	298	−0.180 (0.180)	−0.106 (0.076)	0.052 (0.144)	58
M3	0.333** (0.151)	−0.155** (0.061)	−0.242** (0.099)	232	−0.052 (0.217)	−0.171* (0.097)	−0.136 (0.126)	124
M4	0.317** (0.141)	−0.121* (0.062)	−0.281*** (0.086)	288	−0.243 (0.219)	−0.171** (0.080)	−0.192 (0.213)	68
M5	0.284* (0.162)	−0.151** (0.072)	−0.233** (0.103)	244	0.045 (0.194)	−0.136* (0.076)	−0.254 (0.164)	112
M6	0.291** (0.142)	−0.182*** (0.061)	−0.232*** (0.088)	310	−0.253 (0.184)	−0.004 (0.034)	−0.030 (0.139)	46
M7	0.219 (0.154)	−0.176** (0.069)	−0.220** (0.100)	268	0.171 (0.220)	−0.117* (0.068)	−0.123 (0.157)	88
M8	0.331** (0.147)	−0.161** (0.065)	−0.278*** (0.092)	256	−0.052 (0.226)	−0.157** (0.079)	−0.056 (0.147)	100
Latent variable work morale[d]	0.336* (0.173)	−0.123 (0.085)	−0.318** (0.118)	206	0.044 (0.167)	−0.165** (0.067)	−0.085 (0.114)	150

[a]Fixed-effects LPM. Standard errors clustered on worker reported in parentheses. Each row reports a separate regression. *N*: number of observations.
[b]See Table 2 for the definitions and the 1991-medians of questions M1–M8.
[c]See Table 3 for the definitions of the independent variables. Estimated parameter on intercept is not reported.
[d]See footnote 17 for the construction of the worker-specific latent variable.
* Statistically significantly different from zero at the 0.10 level; **at the 0.05 level; ***at the 0.01 level.

Table 5
Estimates of Equation (5) for Various Dimensions of Worker Morale (Dependent: 0–1 Indicator for Monthly Absence)[a]

	Independent variables	
Dimension of worker morale in 1991[b,c]	*DMhigh* x$\widetilde{com}$	$\widetilde{com}$
M1	−0.392 (0.251)	0.281* (0.144)
M2	−0.466** (0.225)	0.286** (0.144)
M3	−0.384 (0.262)	0.333** (0.151)
M4	−0.559** (0.256)	0.317** (0.141)
M5	−0.239 (0.251)	0.284* (0.162)
M6	−0.543** (0.227)	0.291** (0.143)
M7	−0.048 (0.265)	0.219 (0.154)
M8	−0.383 (0.268)	0.331** (0.148)
Latent variable work morale[d]	−0.293 (0.240)	0.337* (0.173)

[a]Fixed effects LPM. Standard errors clustered on worker reported in parentheses. Each row contains a separate regression. Three hundred and fifty-six observations.
[b]Each regression estimate includes six explanatory variables. Not reported are estimated parameters on intercept, *D*94, *DBlue* x *D*94, interaction terms between 0 and 1 indicator for high worker morale (*DMHigh*) and D94, and the interaction term between *DMhigh* and *DBlue* x *D*94.
[c]See Table 2 for the definitions and the 1991-medians of questions M1–M8.
[d]See footnote 17 for the construction of the worker-specific latent variable.
* Statistically significantly different from zero at the 0.10 level; **at the 0.05 level.

6 Robustness Checks

We discuss three robustness checks on the benchmark estimates. A first issue concerns the possible endogeneity and interpretation of the effect of worker morale in equation 5. One could argue that the estimates are affected by the timing of the first interview with the workers. It was held at the moment the pending plant's relocation was known to the workers, so that it may have influenced their worker morale. It means that the negative effect of commute on absence would be correlated with the morale. If this argument were correct, the effect of commuting time $\widetilde{com}$ on worker morale (equation (6)) would be negative and statistically significant.[18] Another argument against the outcomes of the benchmark estimates is that worker morale reflects the lack of possibilities of the worker in the outside labor market. We check for both possibilities by estimating equation (6). If this argument is right, there would be two testable implications. First, the effect of the outside option on morale (equation (6)) would be statistically significant. And second, the outcomes of equation (5) would also hold true for the interaction with respect to the outside option.

[18]There are two additional findings that suggest that a substantial change of morale is unlikely to be associated with the announcement of the firm move. We found no evidence of workers' changing their behavior in the pre-1991 period. First, annual worker turnover did not change between the pre-move period (1989–91) and the post-move period (1991–4). Second, for workers who stayed with the firm, household moves were random between 1989 and 1991, whereas household moves were in the 1991–4 period were in the direction of the new plant (see Fernandez, 2008).

TABLE 6
ESTIMATES OF EQUATION (6) (DEPENDENT: M1–M8)[a,b]

	M1	*M2*	*M3*	*M4*	*M5*	*M6*	*M7*	*M8*
$\widetilde{com}$	−0.111	−0.219	−0.024	−0.334*	−0.299	0.054	−0.256	−0.144
	(0.237)	(0.228)	(0.262)	(0.185)	(0.207)	(0.216)	(0.187)	(0.223)
DOutsidehigh	−0.044**	−0.024	−0.048*	−0.023	−0.042**	−0.047*	−0.029*	−0.078***
	(0.021)	(0.031)	(0.028)	(0.021)	(0.021)	(0.025)	(0.017)	(0.023)
*D*94	−0.069	−0.077	−0.010	0.006	−0.032	−0.171**	0.039	0.074
	(0.093)	(0.097)	(0.113)	(0.075)	(0.082)	(0.076)	(0.080)	(0.095)
σ_λ	0.807	0.864	0.799	0.784	0.687	0.896	0.710	0.839
σ_w	0.661	0.714	0.776	0.545	0.569	0.684	0.595	0.696
Number of observations	353	351	353	353	351	351	353	353

[a] Fixed-effects LPM. Standard errors clustered on worker reported in parentheses. Each column represents a separate regression equation.
[b] See Table 2 for the definitions of M1–M8. See Table 3 for the definitions of $\widetilde{com}$ and *D*94. *DOutsidehig* h_t is a 0–1 indicator which is one if difficulty of finding another job is above the median in year t (1 = easy).
* Statistically significantly different from zero at the 0.10 level; **at the 0.05 level; ***at the 0.01 level.

We investigate the validity of this issue by running regressions of different dimensions of morale (equation (6)) for the stayers (see Table 6). There are three results. First, the shock variable has no influence on worker morale for all measures (except for M4, which is significant at the 10-per cent level). Furthermore, there was no substantial change of worker morale between the two waves of the study. Both results suggest that endogeneity of worker morale in equation (5) is not an important issue. In addition, the estimates imply that worker morale is negatively correlated with the outside option, and therefore, it would be incorrect to interpret the parameter estimates as a causal effect. We further investigated this interpretation of worker morale by re-estimating equation (5) for workers above (and below) the median value of the outside option prior to the plant relocation. The estimates do not imply any difference in the effect of effect of commuting time on absence. It suggests that although morale is related to the outside option, it cannot explain the difference in effect of the shock variable on absence.

A second issue with the benchmark estimates is that the effect of commute on absenteeism is for the stayers only, so that the response is considered at the intensive margin of workers effort. We broaden this effect to the leavers (effort at the extensive margin) by regressing an indicator of leaving the firm on the interaction of morale and the commuting shock. Although the specification does not include fixed effects, the commuting time variable $\widetilde{com}$ is not correlated to the error term of the regression equation. Table 7 reports the regression results of the separation equation for the various dimensions of morale (M1–M8). The estimated parameter on the interaction term of morale and the shock variable is statistically significant for four out of eight regressions (M2, M3, M4, M8). For the latent variable that was also applied in Tables 4 and 5, there is no significant interaction term. The

Table 7
Estimates of Leave Equation for Various Dimensions of Worker Morale (Dependent: 0–1 Indicator for Leaver)[a]

	Independent variables[b]	
Dimension of worker morale in 1991[b]	*DMhigh* $\widetilde{xcom}$	$\widetilde{com}$
No *DMhigh* included	–	−0.030 (0.064)
M1	0.010 (0.140)	−0.039 (0.073)
M2	−0.241** (0.118)	0.023 (0.074)
M3	−0.327* (0.194)	−0.006 (0.067)
M4	−0.212* (0.121)	0.015 (0.074)
M5	−0.042 (0.118)	−0.012 (0.091)
M6	0.095 (0.320)	−0.034 (0.065)
M7	−0.137 (0.145)	0.011 (0.075)
M8	−0.195* (0.111)	0.017 (0.076)
Latent variable work morale[c]	−0.199 (0.124)	0.078 (0.098)

[a]Robust standard errors in parentheses. Dependent: 0–1 indicator which is one if the worker left the firm between 1991 and 1994. Each row reports a separate regression. Two hundred and sixty-eight observations.
[b]See Table 3 for the definition of $\widetilde{com}$. *DMHigh* is 0–1 indicator for high worker morale. The table does not report the estimated parameters on the intercept, indicator for blue-collar worker, and *Dmhigh*.
[c]See footnote 17 for the construction of the worker-specific latent variable.
* Statistically significantly different from zero at the 0.10 level; **at the 0.05 level.

estimates suggest that workers with high morale are less inclined to leave the firm if they experience an unfavorable shock of commuting time. Hence, the benchmark estimates can be interpreted as a lower bound of the total effect at the intensive and extensive margin.

A third issue is whether there are alternative factors correlated to morale that could also mitigate the negative influence of the commuting time variable $\widetilde{com}$ on absenteeism. One could argue that the dummy for high morale in 1991, $DMhigh_{91}$, in equation (5) reflects two alternative influences. First, morale may be associated to the quality of working conditions in the factory and second, workers in the upper (lower) tail of the wage distribution may have a higher (lower) morale. These variables are particularly interesting as they may have changed between 1991 and 1994. The production tools and working conditions within the plant were better, in particular for the blue-collar workers. The firm guarantee about the wage policy may have affected morale also for workers that were likely to lower their effort during the process of relocation. However, both changes between 1991 and 1994 would not affect the parameter estimates in equations (4) and (5), because of the inclusion of the dummy variables for year and type of worker.

For the first alternative explanation, the first two columns of Table 8 give the average change of morale for each of the eight items for white-collar blue-collar workers separately. The statistics suggest that between 1991 and 1994 there was a statistically significant change in morale for only one item for the white-collar workers. Furthermore, for three out of eight items there was some decrease in morale for the blue-collar workers. It is a remarkable outcome, given that the working conditions were improved in the new plant.

Table 8
Further Descriptive Statistics on Worker Morale

	$M_{94}-M_{91}$		*Average M for upper quartile of wage distribution blue collar*		*Average M for upper quartile of wage distribution white collar*	
Dimension of worker morale	*Blue collar*	*White collar*	*1991*	*1994*	*1991*	*1994*
M1	−0.18* (0.11)	0.01 (0.08)	3.56	3.68	4.42	4.62
M2	−0.22** (0.11)	−0.03 (0.09)	3.38	3.48	4.16	4.17
M3	−0.09 (0.11)	0.09 (0.12)	2.00	2.12	2.37	2.15
M4	−0.11 (0.09)	−0.06 (0.07)	3.40	3.56	4.26	4.46
M5	−0.23** (0.09)	0.03 (0.08)	4.00	3.96	4.63	4.77
M6	−0.13 (0.11)	−0.17** (0.08)	2.79	2.92	4.05	4.00
M7	−0.09 (0.10))	0.05 (0.07)	3.88	3.84	4.47	4.69
M8	−0.10 (0.11)	0.22 (0.09)	2.44	2.44	3.48	4.00

* Statistically significantly different from zero at the 0.10 level; ** at the 0.05 level.

For the second explanation, the last four columns of Table 8 gives the averages of morale for the upper quartile of the wage distribution. It shows that this segment contains a larger fraction of high-morale workers for both years and both types of workers. Hence, the question remains whether the morale in equations (4) and (5) reflect the worker's position in the wage distribution. We cannot fully rule out the possibility that morale partly picks up the worker's position in the wage distribution.

7 Conclusion

Using a natural experiment design, we provided estimates of the causal effect of an exogenous shock of commuting distance—a measure of nonpecuniary cost of work—on worker effort. Our estimates render new insights of its interaction with worker morale, which opens avenues for further research. Our main conclusions are threefold.

First, the estimates give some indication that for three out of eight dimensions of morale there is a positive effect of commuting distance on absence for workers with low morale prior to the shock. In contrast, it is reduced to zero for high-morale workers. Remarkably, the three statistically significant dimensions of morale are statements in absolute terms, whereas the other five statistically insignificant dimensions which are expressed in relative terms. At least from an empirical perspective, not all of the dimensions are equally important for the mechanism investigated. Overall, this empirical outcome for the statements in absolute terms of morale gives some evidence of the theoretical framework that was formulated by Akerlof and Yellen (1990). It bolsters the case made by Fehr and Falk (1999) and Fehr and Gächter (2000) about the importance of morale for short-run relationships

in experimental settings Furthermore, it generalizes previous empirical studies in which worker morale was represented by worker reciprocity during adverse circumstances (Lee and Rupp, 2007). The empirical outcome suggests that worker morale cushions the effect of adverse shocks to the worker's nonpecuniary cost of work on their work performance. A question for further research is whether this outcome can be generalized to a system of financial incentives. Although the effect of negative financial incentives on work performance in the workplace has been widely analyzed, there is no empirical investigation about its interaction with worker morale.

Second, an important issue that results from our estimates is how firms can strengthen worker morale. One could argue that a higher wage—and thus a weaker outside option—would reinforce worker morale, because it would exacerbate the negative financial consequences of a possible dismissal. Indeed, our fixed-effects estimates indicate a negative relation between worker morale and the worker's value of the outside option. Furthermore, workers have a higher morale in the upper segment of the wage distribution. However, our estimates also indicated that the outcome of the shock of commuting distance on work effort is irrespective of the value of the outside option, so that there is no indication that our major result is due to the influence of the outside option. Our result that worker morale did not change across time for the stayers raises the question of how firms can influence morale, and how costly it is to increase worker morale. Are there any specific stages of the work career in which it is more effective to influence worker morale, for instance during the probationary period (Akerlof and Kranton, 2005)?

Third, in our analysis, work performance is the sum of effort at the extensive margin (the decision of leaving the firm) and effort the intensive margin (the decision to report absent for the stayers). So far, most of the empirical analysis on work performance consider both types of effort from an isolated perspective (Manning, 2003; Treble and Barmby, 2011). Our estimates suggest that worker morale cushions the effect of commute for both types of effort for some of the dimensions of morale. It gives indirect evidence that the firm gets high-morale stayers to weather unforeseen shocks. Because high-morale stayers have a lower incidence of absence, it results in a separating equilibrium. This outcome indicates that worker morale may provide an interaction between effort at the intensive margin (absence) and the extensive margin (resignations).

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