

# Do Factory Managers Know What Workers Want? Manager–Worker Information Asymmetries and Pareto Optimal Human Resource Management Policies

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This paper evaluates the conjecture that factory managers may not be offering a cost-minimizing configuration of compensation and workplace amenities by using manager and worker survey data from Better Work Vietnam. Working conditions are found to have a significant positive impact on global life assessments and reduce measures of depression and traumatic stress. We find significant deviations in manager perceptions of working conditions from those of workers. These deviations significantly impact a worker's perception of well-being and indicators of mental health. Such deviations may lead the factory manager to underprovide certain workplace amenities relative to the cost-minimizing configuration, which may in part explain the persistence of relatively poor working conditions in developing economies.

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## I. Introduction

Human resource management (HRM) literature spanning more than 50 years reveals a significant debate over whether or not HRM (or strategic HRM) policies improve firm performance generally or induce specific worker responses such as loyalty or effort.<sup>1</sup> Hackman and Oldham (1976) find that specific job characteristics can put workers in a psychological state that motivates them to focus on work quality. Huselid's (1995) finding of a positive correlation between high-performance work systems and turnover, profits, and firm value suggests that

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<sup>1</sup>McGregor (1960) points out that firms may choose to view workers as either factor costs to be minimized or as talent that improves with investment.

positive worker responses increase firm performance. While the causality has been debated (see, for example, Wright et al. 2005), meta-analyses (Combs et al. 2006, Judge et al. 2001) and broad literature reviews (Croucher et al. 2013) suggest an emerging consensus of a positive relationship.

The necessary conditions for positive effects of HRM policies include the ability and willingness of managers to understand and implement such policies (Khilji and Wang 2006; Kuvaas, Buch, and Dysvik 2014) and that the HRM policies are congruent with worker preferences (Bowen and Ostroff 2004). This paper falls into the second category of findings and extends them by comparing worker and manager perceptions of the value workers place on different HRM policies using detailed manager and worker-level data from Viet Nam's apparel sector.

Working conditions in developing economies that are below international standards pose a significant challenge for international value chains. The argument that developing economy producers choose relatively poor conditions is often cited as evidence that such conditions are optimal for local producers. Economic theory, for example, suggests a cost-minimizing firm will divide monetary compensation and workplace amenities at the point where the marginal cost of an amenity is equal to the modal worker's marginal willingness to forgo earnings (Lazear and Gibbs 2009, Lazear and Oyer 2013).

Several factors may interfere with the firm's ability to construct the cost-minimizing compensation configuration of HRM policies. Firms that face binding capital constraints or find acquiring information about efficiency-enhancing investments in amenities to be costly or uncertain may underprovide amenities. Uncertainty, in particular, or a lack of information, in general, features prominently in recent research. Mezas and Starbuck (2003) suggest managers do not always have perfect information. Using experimental data from India, Bloom et al. (2013) show that informational barriers were the primary factors precluding the implementation of productivity-improving measures. From a theoretical perspective, Bowles (2004) concludes that firms will underprovide workplace amenities in a bargaining context in which supervisors imperfectly observe worker effort.

Imperfect information concerning the marginal value of workplace amenities may extend to workers as well. For some innovations, particularly those related to HRM, the employee must perceive and understand the organizational change the firm is attempting to implement. For example, the introduction of significant pay incentives will only increase productivity if employees understand the formula that rewards effort and the firm complies *ex post* with its *ex ante* pay commitments. Dunn, Wilson, and Gilbert (2003) report evidence that firms underprovide workplace amenities because workers themselves underappreciate the importance of workplace amenities *ex ante* when choosing employment. The implication is that comparisons between supervisor and worker perceptions should be based on contemporaneous data.

It may not be surprising, therefore, that several other studies find that firms underprovide nonpecuniary compensation to workers. For example, Herzog and Schlottmann (1990), analyzing United States Census data for the period 1965–1970, find that the willingness to pay in the form of forgone earnings for risk mitigation and workplace safety exceeds its marginal cost. Leblebici (2012) finds that 100% of employees strongly agree that supervisor relations affect their productivity. Helliwell, Huang, and Putnam (2009) and Helliwell and Huang (2010a, 2010b) find that firms appear to undervalue the importance of trust and workplace social capital. Moving 1 point on a 10-point workplace trust scale has the same effect on global life satisfaction as a 40% increase in income.

This paper presents a simple test for detecting errors in implementation of HRM innovations by comparing worker and manager perceptions of working conditions. The value of workplace innovations can be measured by estimating a standard hedonic equation that regresses a measure of worker well-being on wages and working conditions. Working conditions are measured first from the perception of workers and then from the perspective of the firm. The estimated coefficients in the hedonic equation when working conditions are measured from the perspective of the employee provide the true value to the firm of a workplace innovation once effectively implemented. The estimated coefficients when working conditions are measured from the perspective of the manager indicate the value of workplace innovations that the firm perceives. The difference between the coefficients provides a measure of the efficiency loss due to ineffective implementation.

Data collected during the monitoring and evaluation of Better Work Vietnam provide a novel opportunity to measure HRM implementation errors and their impact on the cost structure of apparel firms in global supply chains.<sup>2</sup> Survey responses from 3,526 workers and 320 factory managers in 83 apparel factories enrolled in Better Work Vietnam provide measures of worker well-being, wages, and working conditions from the perspective of both workers and managers. This allows us to empirically estimate a hedonic model of worker well-being using both worker perceptions of working conditions and manager perceptions, and then to compare the two.

Anticipating the results reported below, a broad range of workplace innovations as perceived by workers have a significantly higher impact on measures of worker well-being than innovations reported by human resource managers. The discrepancy strongly suggests that firms enrolled in Better Work Vietnam are failing to effectively implement innovations in which workers place a high value.

A theoretical framework is presented in section II, data in section III, and results in section IV. Conclusions and directions for future research follow.

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<sup>2</sup>Better Work is a program developed by the International Labour Organization and the International Finance Corporation. Firms are monitored against core standards and local labor law. Additional information is available at <http://betterwork.org/global/>

**II. Theoretical Framework**

Profit-maximizing HRM requires that factories allocate resources to a package of compensation and workplace amenities to minimize the cost of providing employees a reservation level of workplace satisfaction. If labor markets are perfectly competitive, the cost of the reservation compensation package will be equal to the employee’s marginal revenue product. To model this formally, we begin with the assumption that a firm will choose a vector of compensation components,  $B$ , to minimize the cost of inducing work effort by an employee.<sup>3</sup> For a factory with two compensation components,  $B_1$  and  $B_2$ , the cost-minimizing problem is

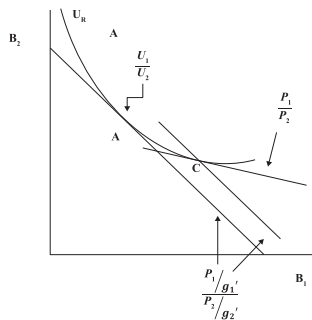
$$\min_{\{B_1, B_2\}} P_1 B_1 + P_2 B_2 + \lambda[U\{g_1(B_1), g_2(B_2)\} - U_R] \tag{1}$$

where  $P_i$  ( $i = 1, 2$ ) is the cost to the firm of providing benefit  $B_i$ , and  $U_R$  is the reservation utility necessary to induce the representative worker to accept employment. Identifying the cost-minimizing compensation configuration will require the firm to know how workers value different types of benefits and amenities. Therefore,  $g_i$  is a function that reflects the worker’s perception of any working condition,  $B_i$ , as perceived by the firm. The  $\lambda$  represents the Lagrange multiplier. The first order conditions for the program in equation (1) imply that

$$\frac{P_1/g'_1}{P_2/g'_2} = \frac{U_1}{U_2} \tag{2}$$

The condition in equation (2) is depicted at point A in the figure below.

**Cost-Minimizing Working Conditions**



Source: Author’s illustration based on equation (2).

<sup>3</sup>In our model, we do not distinguish between the incentives of owners and managers. For the dimension of management that we are studying, the design of HRM schemes, this seems like a plausible assumption since owners will observe factory costs and we are assessing a one-time or periodic design of HRM systems rather than a continuous effort.

Firms may make two errors in attempting to locate point A. The first, of course, is that the firm may simply lack information on the marginal rate of substitution ( $U_1/U_2$ ). However, consider the possibility that the firm manager has collected information on the relative valuation placed on each workplace amenity  $B_i$  by the firm's employees but may not know how workers perceive working conditions as given by  $g_i$ . In this case, the firm will attempt to set the cost-minimizing bundle according to

$$\frac{P_1}{P_2} = \frac{U_1}{U_2} \quad (3)$$

as indicated by point C. Here, we have assumed that the firm particularly underappreciates the small size of  $g'_1$ . The true cost of achieving reservation utility  $U_R$  is higher at compensation configuration C than at the efficient bundle A, given imperfect implementation.

The slope of the indifference curve in the figure is determined by the relative weights that workers place on wages, benefits, and workplace amenities. We employ a hedonic model to estimate these preferences by predicting measures of individual worker well-being,  $U_{ij}$ , which is a function of the following compensation components:

$$U_{ij} = \alpha_0 + \alpha_W B_{ij} + \gamma X_{ij} + \mu Z_j + \varepsilon \quad (4)$$

where  $B_{ij}$  is a vector of workplace amenities as perceived by worker  $i$  in factory  $j$ ,  $X_{ij}$  is a vector of characteristics of worker  $i$  in factory  $j$ , and  $Z_j$  is a vector of characteristics for factory  $j$ . The estimated coefficients on the compensation components reveal the weights that workers associate with different compensation components in terms of well-being.

To compare differences between worker and manager perceptions of working conditions, we replace information on working conditions as reported by workers with information on working conditions as reported by human resource managers. The dependent variable remains a measure of self-reported worker well-being. However, workplace characteristics are reported by the factory human resource manager as given by  $B_j$  in equation (5):

$$U_{ij} = \alpha_0 + \alpha_M B_j + \gamma X_{ij} + \mu Z_j + \varepsilon \quad (5)$$

Given that  $B_{ij} = g_{ij}(B_j)$  from equation (1), it follows that  $\alpha_M = g' \alpha_W$ . Thus, a measure of working conditions transmission fidelity can be measured by  $g' = \frac{\alpha_M}{\alpha_W}$ .

In estimating equation (4), there is a possibility of reverse causality. For example, poor mental health may affect the perception of a hostile work environment.

Better Work compliance assessments provide an alternative measure of working conditions. We then use Better Work compliance assessment data to measure  $\beta_j$  as in equation (6):

$$U_{ij} = \alpha_0 + \alpha_C \beta_j + \gamma X_{ij} + \mu Z_j + \varepsilon \quad (6)$$

Estimating equations (4), (5), and (6) generates a set of coefficients on working condition indices from the perspective of workers, managers, and Better Work compliance assessments. The coefficients provide a measure of the relative importance to workers of each working condition at the present level, relative to other working conditions. A difference in magnitude of the worker coefficient and the manager coefficient indicates discrepancies in implementation of workplace amenities and components of working conditions. For example, if the coefficient from the worker's perspective on a particular index is twice the magnitude of the same coefficient from the manager's perspective, then the implementation of that working condition is half as effective as the manager believes.

The factory may address a problem of implementation in two ways. It can either increase the quantity of a benefit or working condition that is poorly implemented or it can improve its implementation of that benefit. A factory intervention program could therefore improve the efficiency in a factory by finding differences in perceptions of implementation and providing benefit levels that more closely match worker perceptions.

Below, a two-step procedure is used to construct the working condition aggregates from the survey and compliance data. In the first step, working conditions as reported by workers, human resource managers, and compliance assessments are aggregated into indices of working conditions. Factor analysis is then applied to identify the underlying HRM systems. Equations (4), (5), and (6) are each estimated using the indices and underlying factors.

We use two different measures of worker well-being as dependent variables. The first is a global life satisfaction assessment and the second is a mental health index comprised of five indicators of depression including feelings of sadness, restlessness, hopelessness, fear, and instances of crying.

The independent variables are indices of working conditions including information on wages, regularity of pay, information provided to workers, pay structure, training, verbal and physical abuse, sexual harassment, working time, issues related to freedom of association and collective bargaining, occupational health and safety, and health services provided by the factory. Differences in factories unrelated to the compensation package are controlled for using an index of factory characteristics. Factory characteristics include number of employees and the ratio of workers to managerial employees. Additionally, worker demographic controls include gender, marital status, education level, self-perceived health status, age,

and number of family members living in the household. Clark (2010) finds that after controlling for these worker characteristics, levels of happiness among similar workers are comparable within an economy, which is an assumption we make in the subsequent analysis.

Each independent variable of interest is represented by an index with values between 0 and 1. The resulting coefficient on each index will therefore be interpreted as the relative value the worker places on each working condition, holding other characteristics constant.

### III. Data

When a factory enters the Better Work Program, Better Work Enterprise Advisors visit the factory to collect information about the factory's compliance with labor standards and working conditions before implementing any other program elements or training. At some point after enrollment, an independent research team visits the factory from Better Work's monitoring and evaluation program (separately from the Better Work Enterprise Advisors). The data used in the analysis below were collected during these independent worker and manager surveys undertaken in Vietnamese apparel factories from January 2010 through August 2012.

A total of 3,526 workers were surveyed at 83 factories, with no nonresponses among factories or managers. Thirty-three of these factories had an additional round of surveys taken after having participated in the program for approximately 1 year. In each factory, 30 randomly selected workers and four factory managers (general manager, human resources manager, financial manager, and industrial engineer) undertook a self-interview via a computer program loaded onto a PC tablet, again with no nonresponses. In our hedonic regressions, the managers' survey responses on working conditions are matched with the workers in their factory.

The population surveyed was not a random sample of workers in the Vietnamese apparel industry. Firm enrollment in Better Work Vietnam is voluntary and workers who are randomly selected have the option to refuse to participate. Limiting analysis to a self-selected group of apparel factories focuses specifically on those factories that are attempting to achieve a competitive advantage by developing a record of compliant behavior. However, there is little cross-worker variation in wages in the apparel sector. As a consequence, the contribution of monetary income to worker well-being may not be detected by the statistical analysis.

The worker survey includes information about households and family composition, health, compensation, benefits, training, working conditions, workplace concerns, mental well-being, and life satisfaction. The human resource manager survey asks questions about the factory's human resource practices including hiring, compensation, and training. This survey also asks about manager perceptions of worker concerns with factory conditions and practices.

Table 1. **Worker Characteristics**

	%
<b>Gender</b>	
Female	81.71
Male	18.29
<b>Current Marital Status</b>	
Never married	44.02
Married	54.19
Widowed divorced or separated	1.79
<b>Highest Level of Education</b>	
No formal education	0.70
Primary school	12.06
Lower secondary school	57.95
Upper secondary school	24.76
Short-term technical training	0.33
Long-term technical training	0.91
Professional secondary school	2.01
Junior college diploma	0.64
Bachelor's degree	0.64
<b>Rate Overall Health</b>	
Very good	18.68
Good	44.71
Fair	36.36
Poor	0.24

Source: Authors' calculations.

## A. **Worker and Manager Data**

A summary of worker demographics can be found in Table 1. Over 80% of workers in the survey are female and over 50% are married. Around 87% of workers have completed at least lower secondary school, nearly a third of whom have completed upper secondary school as well. Only 65% of workers consider themselves to be in good or very good health, and almost a quarter consider their children's health to be only fair or poor. Over 50% of workers occasionally experience severe headaches and 20% of workers occasionally experience severe stomach pain (Better Work Monitoring and Evaluation 2011).

### 1. **Worker Well-being**

Following Lazear and Gibbs (2009), participants were asked to rate their global life satisfaction on a 5-point scale. Table 2 contains a summary of worker responses. In measures of worker well-being, almost three-quarters of workers stated that they are either satisfied or very satisfied with their lives. Measures of mental well-being were selected from the Harvard Symptoms Checklist (Mollica et al. 1987) and include feelings of sadness, crying easily, feeling restless, feeling fearful,



**Table 2. How Satisfied Are You with Your Current Life?**

	%
Don't want to answer	0.09
Very satisfied	20.14
Satisfied	52.79
Somewhat satisfied	19.50
Somewhat unsatisfied	6.99
Not satisfied at all	0.49

Source: Authors' calculations.

**Table 3. How Much Have You Been Bothered or Troubled by the Following?**

	Feeling sad	Crying easily	Feeling hopeless about the future	Restless, unable to sit still	Feeling fearful
Don't want to answer	0.15	0.09	0.09	0.09	0.12
Not at all	73.33	82.29	86.54	88.61	87.97
A little of the time	18.89	13.09	10.51	8.81	8.90
Some of the time	6.29	4.25	2.13	2.13	2.49
Most of the time	1.18	0.21	0.55	0.30	0.39
All of the time	0.15	0.06	0.18	0.06	0.12

Notes: Numbers represent percentages of responses. Columns sum to 100.

Source: Authors' calculations.

or feeling hopeless about the future. Table 3 contains a summary of responses for the mental well-being variables. Though a quarter of workers reported feeling sad a little or some of the time, more than 80% of workers reported that they are not troubled by crying easily. More than 85% of workers said that they do not feel restless, fearful, or hopeless about the future (Better Work Monitoring and Evaluation 2011).

## 2. Wages

In 66% of factories, managers stated that 100% of workers are paid hourly. Only 20% of workers stated that their pay is determined by a piece rate. Thirty percent of workers reported that they have a production quota set by their supervisor. Factory managers state that piece rate pay is a concern for employees in 25% of factories and that the explanation of the piece rate is a concern in 14% of factories. Fifteen percent of employees stated that the piece rate is a concern and 7% of employees stated that the explanation of the piece rate is a concern for workers in the factory. Managers said that low wages are a concern in over 23% of factories, while only 17% of workers expressed concerns with low wages. Similarly, though 10% of factory managers stated that late payment of wages is a concern, only 5% of workers articulated their concerns with late payments (Better Work Monitoring and Evaluation 2011).

### 3. Concerns with Abuse, Occupational Safety, and Health

Managers stated that workers are concerned with verbal abuse in over 20% of factories, while physical abuse was reported as a concern in less than 7% of factories. Almost 10% of workers expressed concerns with verbal abuse and 3% of workers reported concerns with physical abuse or sexual harassment (Better Work Monitoring and Evaluation 2011).

While almost 30% of managers reported that workers have concerns with factory temperature, only 12% of workers expressed similar concerns. Around 15% of factories reported concerns with accidents or injuries, though less than 5% of workers reported similar concerns. Less than 8% of factories reported that workers have concerns with air quality or bad chemical smells, while 9% of workers expressed concerns with air quality and over 10% of workers expressed concerns with bad chemical smells (Better Work Monitoring and Evaluation 2011).

### 4. Training

Though over 90% of factory managers said that they have some sort of induction training for new workers that includes information on work hours, overtime, safety procedures, and equipment, less than half of workers said that they received any type of training other than in basic skills when they began working in the factory. Managers stated that information on items such as incentives and pay structure are included in less than 50% of factory induction training programs. Half of the managers surveyed said that 50% or more of their sewers had been trained in new sewing skills or quality control in the last 3 months, but no more than 7% of workers stated that they had gone through any type of training in the past 6 months (Better Work Monitoring and Evaluation 2011).

### 5. Worker–Manager Relations

Over 75% of workers stated that they would be very comfortable seeking help from a supervisor, but only half of workers stated that they felt treated with fairness and respect when a supervisor corrected them. Only 37% of workers stated that their supervisor followed the rules of the factory all of the time.

One hundred percent of factories report having a trade union representative, which is typical for Viet Nam, but only 52% of factory managers thought that the trade union representative would be very effective in helping resolve a conflict between managers and workers. At least 70% of factories have worker committees, but only 45% of factory managers thought that a worker committee would be effective in helping resolve a conflict. Almost 90% of workers are represented by a collective bargaining agreement (Better Work Monitoring and Evaluation 2011).

## B. Coding the Worker and Manager Data

All responses to questions for the worker and manager surveys were fitted to a scale that ranges from 0 to 1. This process differed slightly for each question depending on the type of question. For all questions, answers nearer to 1 reflect a more desirable working condition.

There are four different types of questions on the surveys: (i) binary (yes or no), (ii) multiple-choice questions with mutually exclusive answers, (iii) questions where the participant is prompted to check all that apply, and (iv) open-ended questions. Each of these was coded as follows:

**Yes or no questions.** The more desirable response was coded as a 1 and the other response as a 0.

**Multiple-choice questions.** Responses were first ordered from least desirable to most desirable and then divided by the number of possible responses. This category includes all questions pertaining to concerns despite the fact that they were instructed to choose all that apply. The reason is that the possible responses could still be rated from least severe to most severe. Thus, the most severe response given is the most relevant.

**Multiple-response questions.** The number of responses selected by the participant was divided by the total number of possible responses. If the responses were negative aspects of working conditions, the score was then subtracted from 1.

**Open-ended questions.** These questions solely dealt with wages. Hence, each worker's reported wage was divided by the highest paid worker's wage.

## C. Constructing Indices

The subclusters of working conditions identified by Better Work guided the construction of aggregates from the worker and manager surveys. Within subclusters, the mean of the questions was taken to be the score for that aggregate. This yielded 21 aggregates from the worker survey and 16 aggregates for the managers from which we work with an overlapping set of 15 working condition aggregates. These include issues related to child labor, paid leave, and contracting procedures. The components of the indices are reported in Tables A.1 and A.2 of the Appendix for workers and managers, respectively, and in the summary statistics in Table 4. Wage, gender discrimination, forced labor, collective bargaining, and chemical hazards are the most favorable conditions from worker perspectives. The ratio of temporary to permanent workers, training, and concerns about the method of pay are the least favorable. Except for health services and in-kind compensation, managers perceive less variation in working conditions than workers.

Table 4. Summary Statistics

Variable	Worker Concerns			Manager Perceptions of Worker Concerns		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Wage concern index	5,790	0.961	0.129	305	0.874	0.244
Bonus concern index	5,874	0.652	0.123	305	0.948	0.161
In-kind compensation and benefits index	5,864	0.667	0.114	305	305	0.652
Pay transparency index	5,878	0.845	0.101	305	305	0.667
Training index	5,855	0.304	0.280	305	0.739	0.164
Gender discrimination index	5,863	0.939	0.165	305	305	0.123
Forced labor index	5,880	0.988	0.049	305	0.972	0.111
CBA index	5,627	0.909	0.288	305	0.814	0.177
Chemical hazard index	5,860	0.982	0.078	305	305	0.109
Health services index	5,881	0.672	0.120	305	0.518	0.243
Equipment safety index	5,872	0.991	0.051	305	305	0.054
Environment index	5,877	0.971	0.080	305	0.916	0.152
Temporary to permanent worker index	5,323	0.178	0.168	305	305	0.168
Method of pay index	5,880	0.493	0.064	305	0.943	0.163

CBA = collective bargaining agreement.

Source: Authors' calculations.

Compliance data are stratified into eight clusters that are further divided into 38 subclusters. All of the compliance questions are simple yes or no questions. Hence, the compliance score is the mean of all the questions that belonged to a specific subcluster. The means of all the subclusters within a cluster are calculated to obtain that cluster's score. Subcluster means were excluded when data were missing or exhibited zero variance across all factories. For example, among the child labor subclusters the variance was nearly zero. Therefore, only the broad cluster of child labor was included when performing the analysis on the subclusters. Note that there are more aggregates for compliance data than for the worker and manager surveys. The reason is that there are several points that are covered in the compliance data that are not covered in the surveys. These include issues related to child labor, paid leave, and contracting procedures.

Control variables include worker demographics and an index controlling for the size of the factory, which is composed of questions pertaining to how many full-time and part-time workers are in a factory.

#### IV. Empirical Results

Specifications are estimated with ordinary least squares.<sup>4</sup> Two indicators of worker well-being, life satisfaction and worker well-being, serve as the dependent variables. There are three sources of working conditions: worker survey, manager survey, and compliance assessment.

<sup>4</sup>Results are qualitatively similar when using ordered logits.

Every regression equation includes a common set of worker demographic and factory controls. Control variables include the factory size index in addition to the gender of the worker, age, education, general health, marital status, and number of people living in their household. It is worth noting that selection on unobservables remains a concern: if workers with better unobservables have both higher life satisfaction and are sorted in better jobs, this would tend to induce a correlation between working conditions and well-being.

Controlling for age and education addresses the observable dimension of this sorting, but not the unobservable dimension.

### A. Worker Perceptions of Working Conditions

Consider first the estimation of equation (4): life satisfaction and worker well-being for which working conditions are measured based on worker perceptions as reported in the worker survey. Findings are reported in columns (1) and (2) of Table 5.

First, the coefficient on the wage is statistically significant only in the worker well-being equation. In a hedonic equation, the coefficient on the wage is usually used to place a monetary value on the other working conditions, which then is possible for well-being but not worker satisfaction. One possible explanation is that there is limited wage variation in this data set, therefore the lack of statistical significance is not entirely surprising.

Second, working conditions appear to have a stronger effect on life satisfaction than on mental well-being: working conditions have a statistically significant effect for seven indices in column (1) compared to four in column (2). Furthermore, for three of the four indices that are significant for well-being (wage concerns, pay transparency, and health services), the magnitude of the impact on satisfaction is larger. This is not surprising given that the worker well-being questions are intended to identify participants that are suffering from various degrees of depression. These results suggest that poor working conditions may affect a global sense of life satisfaction even before workers begin to experience symptoms of depression.

Turning to the indices themselves, eight working condition factors in the life satisfaction equation reported in column (1) are significant at a 10% level or higher. However, they are not all positive. Lack of wage concerns, access to health services, pay transparency, collective bargaining, and the environment index are positive. Training, gender discrimination, and equipment accidents are negative. However, these negative impacts are not statistically significant in column (2) for worker well-being.

The negative effect of training is understandable if training is undertaken in a hostile tone or is perceived as disciplinary in nature. Explaining the environmental index is more challenging. One would expect that fear of dangerous equipment and

Table 5. Life Satisfaction and Worker Well-being—Worker and Manager Perceptions

Variables	Worker Perception		Manager Perception		Transmission Index	
	Worker Satisfaction (1)	Worker Well-being (2)	Worker Satisfaction (3)	Worker Well-being (4)	Satisfaction (5)	Well-being (6)
Annual wage	0.269 (0.172)	0.194*** (0.0650)	0.0882 (0.0992)	0.0577** (0.0229)	<b>0.327</b> 0.0136	0.297 0.865
Wage concern index	1.091*** (0.141)	0.407*** (0.0959)	0.142 (0.167)	0.0717 (0.0525)	<b>0.130</b> 0.000	0.176 0.724
Bonus concern index	-0.358** (0.141)	0.0831 (0.0695)	-0.272 (0.345)	-0.237** (0.0954)	0.760 0.689	-2.851 0.846
In-kind compensation and benefits index	-0.0898 (0.186)	0.0549 (0.0676)	-0.323 (0.345)	0.0797 (0.189)	3.594 0.634	1.452 0.300
Pay transparency index	0.303* (0.170)	0.216*** (0.0634)	0.416** (0.196)	-0.0435 (0.0994)	1.375 0.624	-0.201 0.395
Training index	-0.286*** (0.0578)	-0.0329 (0.0265)	0.0378 (0.202)	0.0532 (0.0984)	-0.132 0.0110	-1.615 0.000
Gender discrimination index	-0.325*** (0.0659)	0.00278 (0.0380)	-0.289 (0.479)	-0.227 (0.268)	0.891 0.873	-81.49 0.000
Forced labor index	0.158 (0.272)	0.370** (0.155)	0.0720 (0.428)	-0.0114 (0.142)	0.456 0.730	-0.0307 0.000
CBA index	0.102** (0.0402)	0.00776 (0.0165)	0.384 (0.233)	0.167 (0.103)	<b>3.757</b> 0.143	21.51 0.956
Chemical hazard index	0.0430 (0.269)	0.178 (0.142)	0.212 (0.438)	-0.215 (0.280)	4.920 0.884	-1.208 0.851
Health services index	0.813*** (0.144)	0.184*** (0.0491)	-0.0140 (0.130)	-0.0760 (0.0764)	-0.0172 0.000	-0.414 0.00467
Equipment safety index	-1.103*** (0.405)	0.361 (0.260)	1.036* (0.614)	1.394*** (0.426)	-0.939 0.920	<b>3.862</b> 0.0114
Environment index	1.890*** (0.247)	0.616*** (0.169)	-0.378 (0.502)	0.180 (0.160)	-0.200 0.000	<b>0.292</b> 0.000

Continued.

Table 5. *Continued.*

Variables	Worker Perception		Manager Perception		Transmission Index	
	Worker Satisfaction (1)	Worker Well-being (2)	Worker Satisfaction (3)	Worker Well-being (4)	Satisfaction (5)	Well-being (6)
Temporary to permanent worker index	0.0848 (0.0972)	0.00587 (0.0355)	-0.0368 (0.152)	0.0331 (0.0626)	-0.434 (0.634)	5.647 (0.696)
Method of pay index	0.300 (0.388)	-0.0116 (0.241)	0.342 (0.303)	0.114 (0.118)	1.137 (0.917)	-9.859 (0.935)
Male	0.0431 (0.0309)	0.0721*** (0.0118)	-0.0459 (0.0409)	0.0433** (0.0175)		
Education	-0.0102** (0.00487)	-0.00725*** (0.00171)	-0.0223*** (0.00562)	-0.0108*** (0.00194)		
Married	0.0304 (0.0336)	0.0370*** (0.0126)	0.0368 (0.0356)	0.0354** (0.0163)		
Worker health	0.366*** (0.0554)	0.0971*** (0.0235)	0.528*** (0.0643)	0.151*** (0.0306)		
Household size	0.0288** (0.0131)	0.00442 (0.00529)	0.0234 (0.0142)	0.000704 (0.00695)		
Age	-0.00657*** (0.00184)	0.000962 (0.000749)	-0.00235 (0.00288)	0.00204 (0.00127)		
Constant	0.472 (0.408)	1.467*** (0.283)	1.423** (0.641)	2.526*** (0.425)		
Observations	3,491	3,491	305	305		
R <sup>2</sup>	0.172	0.186	0.054	0.074		

CBA = collective bargaining agreement.

Notes: Robust standard errors in parentheses. \*\*\*p &lt; 0.01, \*\*p &lt; 0.05, \*p &lt; 0.1.

Source: Authors' calculations.

other workplace hazards would be as important as other aspects of harsh working conditions in determining life satisfaction.

## **B. Manager Perceptions of Working Conditions**

We turn now to consider the impact of manager perceptions of working conditions on worker life satisfaction and well-being. Estimates of the parameters of equation (5) are reported in columns (3) and (4) of Table 5.

A striking feature of the results in Table 5 is that far fewer indices have statistically significant impacts. For worker satisfaction, only pay transparency and the equipment safety index enter as statistically significant (and positive). For worker well-being, equipment safety enters as positive and significant as well and the bonus concern enters negatively. The manager assessments do not pick up the relevance of forced labor, health services, environment, training, and wage concerns. In this sense, managers underappreciate the value of workplace amenities on well-being and satisfaction from the workers' perspective. The managers' assessment of the value of wages is also smaller than workers' own assessment.

## **C. Formally Comparing Perceptions of Working Conditions**

The transmission parameters for a common set of working conditions are reported in columns (5) and (6) of Table 5. For each working condition, the  $\alpha$  coefficients from the worker and manager perspectives (estimated separately as described above) are reported along with robust standard errors calculated with the combined variance–covariance matrix from the two separate regressions. The transmission coefficient,  $g'$ , is then calculated as the quotient of the manager coefficient divided by the worker coefficient. Below each quotient (in parentheses) is the p-value of a chi-square test of the nonlinear hypothesis that the quotient is equal to 1.

In column (5), which focuses on the transmission coefficients where the index is statistically significantly and different from 1, we note that the transmission coefficient is less than 1 in all but one instance. In other words, working conditions typically have a greater impact on worker satisfaction based on worker perceptions rather than those of managers. Likewise, in column (6), three of the five transmission coefficients that are statistically significant and different from 1 are less than 1, and one of the coefficients that is greater than 1 in absolute value is negative, meaning that managers flip the importance of working conditions when compared to the workers' assessment. For example, managers underweight the relevance of the wage and low wage concerns more generally than workers.

However, a similar pattern can be observed for nonmonetary benefits such as health services and the working environment, which enter positive for both



Table 6. Compliance Cluster Regression Results

	Satisfied	Well-being
Child labor index	1.247 (3.32)**	0.602 (3.25)**
Compensation index	-1.722 (3.94)**	-1.011 (4.70)**
Contract and HR index	0.020 (0.08)	-0.133 (1.08)
Discrimination index	5.764 (4.27)**	2.800 (4.22)**
Forced labor index	13.538 (4.31)**	6.571 (4.25)**
Freedom of association index	0.925 (1.95)	0.406 (1.74)
OSH index	0.054 (0.29)	0.179 (1.95)
Working time index	0.607 (2.33)*	0.516 (4.01)**
Factory index	0.132 (1.13)	-0.038 (0.66)
Male	-0.039 (0.81)	0.065 (2.80)**
Education	-0.033 (4.80)**	-0.020 (6.02)**
Married	0.109 (2.63)**	0.076 (3.72)**
Worker health	0.481 (6.44)**	0.121 (3.29)**
Household size	0.040 (2.33)*	0.022 (2.58)*
Age	-0.000 (0.07)	0.003 (1.84)
Constant	-4.480 (2.64)**	0.265 (0.32)
$R^2$	0.07	0.08
$N$	2,051	2,051

HR = human resource, OSH = occupational safety and health.

Notes: t-statistics in parentheses. \* $p < 0.05$ ; \*\* $p < 0.01$ .

Source: Authors' calculations.

satisfaction and well-being from the workers' perspective but are not statistically significant from the managers' perspective. This suggests that there are potential efficiency gains from aligning working conditions with worker values.

#### D. Compliance Assessments of Working Conditions

Finally, we consider working conditions as measured by Enterprise Assessments and the results are reported in Tables 6 and 7. Two forms of aggregation are used. Compliance averages are calculated for each subcluster. Subclusters were

Table 7. Compliance Subclusters Regression Results

	Satisfied	Well-being
Child labor index	0.230 (0.44)	0.228 (0.87)
Method of payment index	5.056 (3.48)**	0.861 (1.19)
Minimum wage index	-0.725 (2.02)*	-0.073 (0.41)
Overtime index	-0.143 (0.92)	-0.228 (2.96)**
Paid leave index	-1.049 (3.19)**	-0.340 (2.08)*
Premium pay index	0.525 (3.06)**	0.061 (0.72)
Social security index	-0.283 (1.79)	0.143 (1.82)
Information index	-0.319 (1.51)	-0.272 (2.58)**
Contracting procedure index	0.436 (2.75)**	0.114 (1.44)
Discipline index	-0.621 (3.12)**	-0.327 (3.31)**
Employment contract index	0.099 (0.51)	-0.176 (1.81)
Termination index	0.679 (0.99)	0.558 (1.64)
Gender index	-1.837 (2.94)**	-0.839 (2.70)**
Other grounds index	-2.208 (1.29)	-2.672 (3.14)**
Bonded labor index	4.715 (5.91)**	2.395 (6.04)**
CBA index	-0.258 (0.83)	-0.105 (0.68)
Strikes index	0.420 (0.50)	0.129 (0.31)
Union operations index	1.326 (4.56)**	0.732 (5.07)**
Chemicals index	-0.199 (2.39)*	-0.090 (2.17)*
Emergency prepare index	-0.111 (0.49)	0.183 (1.63)
Health services index	0.174 (1.29)	-0.025 (0.37)
OSH manage index	0.224 (1.92)	0.118 (2.04)*
Welfare facilities index	0.208 (1.25)	-0.218 (2.63)**
Accommodation index	-0.932 (0.88)	-0.398 (0.75)
Work protection index	0.151 (0.73)	0.306 (2.97)**

*Continued.*

Table 7. *Continued.*

	Satisfied	Well-being
Work environment index	0.139 (0.77)	0.067 (0.74)
Leave index	-0.502 (0.83)	-0.394 (1.30)
Overtime working index	0.456 (2.66)**	0.504 (5.93)**
Regular hours index	-0.580 (1.85)	-0.234 (1.50)
Factory index	0.147 (1.12)	0.049 (0.75)
Male	-0.045 (0.94)	0.067 (2.82)**
Education	-0.036 (5.39)**	-0.022 (6.72)**
Worker health	0.411 (5.52)**	0.109 (2.95)**
Household size	0.037 (2.27)*	0.023 (2.82)**
Age	0.001 (0.28)	0.004 (3.10)**
Constant	-1.504 (0.78)	3.700 (3.87)**
$R^2$	0.11	0.11
$N$	2,054	2,054

CBA = collective bargaining agreement, OSH = occupational safety and health.

Notes: \* $p < 0.05$ , \*\* $p < 0.01$ .

Source: Authors' calculations.

aggregated into clusters using the Better Work taxonomy, with the results reported in Table 6. Results within the subclusters themselves are reported in Table 7.

Analysis based on the Better Work clusters suggests that Better Work is effectively identifying working conditions that significantly affect worker well-being. Coefficients are positive and statistically significant for child labor (satisfaction 1.247, well-being 0.602), discrimination (satisfaction 5.764, well-being 2.800), forced labor (satisfaction 13.538, well-being 6.571), and work time (satisfaction 0.607, well-being 0.516).

The coefficient estimates for equation (6) are of the same order of magnitude as for equation (4). That is, variations in working conditions as identified by Better Work are similar in magnitude as those detected by workers themselves.

The one compliance point on which Better Work assessments deviate significantly from those of workers is compensation. Improvements in compensation compliance as measured by Better Work are negatively associated with worker outcomes. The compensation coefficient is -1.722 in the satisfaction equation and -1.011 in the well-being equation.

The source of the discrepancy can be understood by examining the results when working conditions are measured by the subclusters as reported in Table 7. Negative coefficients emerge for the minimum wage index ( $-0.725$ ), paid leave index ( $-1.049$ ), discipline index ( $-0.621$ ), gender index ( $-1.837$ ), and the chemicals index ( $-0.199$ ).

The negative relationship between some compliance points and global life satisfaction raises questions about factory conditions that Enterprise Assessments are identifying, although it is also possible that Better Work assessments are inducing firms to deviate from the cost-minimizing compensation configuration. Placing equal emphasis on all dimensions of compliance may put Better Work assessments somewhat at odds with worker preferences with regard to working conditions.

## V. Conclusion

One possible reason for the persistence of poor working conditions in developing economies is that managers may not be fully aware of the value that workers place on different workplace amenities. Analysis of manager and worker survey data from Better Work Vietnam Monitoring and Evaluation, collected from January 2010 through August 2012, indicates that working conditions have a significant positive impact on global life satisfaction and measures of depression and traumatic stress. This paper offers a simple test of the conjecture that factory managers may not be offering a cost-minimizing configuration of compensation and workplace amenities. The findings reveal significant deviations of manager perceptions of working conditions from those of workers and these deviations significantly impact a worker's perception of well-being and indicators of mental health. Such deviations may lead the factory manager to underprovide certain workplace amenities relative to the cost-minimizing configuration.

In particular, while workers value monetary benefits, they also value nonmonetary amenities such as health services and a safe working environment. Furthermore, the fact that manager perceptions do not align with those of workers suggests that managers are unaware that incremental investments in such nonmonetary benefits would be valued by workers, in addition to incremental monetary rewards.

At the same time, further research will be needed to formulate specific policy proposals. In particular, in order to determine whether the working conditions configuration is cost minimizing, it is necessary to know the marginal cost of each working condition. It would also be valuable to estimate similar hedonic worker satisfaction and well-being models in other labor markets and economies. Finally, our analysis provides a framework for assessing the impact of Better Work on working conditions and the impact that Better Work-induced innovations have on life satisfaction and mental health.

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## Appendix

Table A.1. **Worker Indices**

Index	Components
Method of pay index*	How often paid, late payment concerns
Annual wage*	Annualized pay, Tet bonus
Wage concern index*	Low wage concerns
Bonus concern index*	Bonuses received, Tet concerns
In-kind compensation and benefits index*	In-kind compensation concerns, benefits received
Pay transparency index*	Info on pay statement, piece rate explanation concerns
Deductions concern index	Deductions made, deduction concerns
Disciplinary concerns index	Workers corrected fairly, verbal abuse concerns, physical abuse concerns
Training index*	Induction training, recent training
Gender discrimination index*	Gender as a barrier to promotion, sexual harassment concerns
Race discrimination index	Ethnicity as a barrier to promotion, nationality as a barrier to promotion
Religion and/or ethnic discrimination index	Religion as a barrier to promotion
Forced labor index*	Punch clock concerns, bathroom denials
CBA index*	Presence of a collective bargaining agreement
Union representative assistance index	Comfort in seeking out a trade union representative
Chemical hazard index*	Hazardous chemical concerns
Health services index*	Presence of a health clinic, health services provided, treatment quality
Food water sanitation index	Drinking water satisfaction, canteen satisfaction, bathroom satisfaction, how often workers drink
Equipment safety index*	Dangerous equipment concerns, accident concerns
Environment index*	Temperature concerns, air quality concerns

*Continued.*

Table A.1. *Continued.*

<b>Index</b>	<b>Components</b>
Overtime index	Too much overtime concerns
Sunday work concern index	Too much work on Sundays concerns
Temporary to permanent worker index*	Current employees, ratio of temporary to permanent employees, nonproduction employees

CBA = collective bargaining agreement.

Note: \*denotes indices common to the worker and manager surveys.

Source: Authors' compilation.

Table A.2. **Manager Indices**

<b>Index</b>	<b>Components</b>
Age verification index	Age verification required on application
Method of pay index*	Late payment concerns
Annual wage*	Annualized pay, Tet bonus
Wage concern index*	Low wage concerns
Bonus concern index*	Tet concerns
In-kind compensation and benefits index*	In-kind compensation concerns, meal allowance, benefits provided
Pay transparency index*	Info on pay statement, piece rate explanation concerns
Training index*	Induction training, time spent training basic skills, recent supervisor training, recent sewer training
Gender discrimination index*	Sexual harassment concerns
Forced labor index*	Punch clock concerns
CBA index*	Presence of collective bargaining agreement, issues dealt with by CBA, presence of worker committee, worker committee effectiveness
Union effectiveness index	Trade union effectiveness
Chemical hazard index*	Hazardous chemicals concerns
Health services index*	Health services provided
Housing index	Housing provided
Equipment safety index*	Dangerous equipment concerns, accident concerns
Environment index*	Temperature concerns, air quality concerns
Temporary to permanent worker index*	Current employees, ratio of temporary to permanent employees, nonproduction employees

CBA = collective bargaining agreement.

Note: \*denotes indices common to the worker and manager surveys.

Source: Authors' compilation.