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Do Factory Managers know what Workers Want?

Manager-Worker Information Asymmetries and Pareto Optimal Working Conditions

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Abstract

Analyzing manager and worker survey data from Better Work Vietnam Monitoring and Evaluation collected between January 2010 and August 2012, working conditions are found to have a significant positive impact on global life assessment and measures of depression and traumatic stress. The conjecture that factory managers may not be offering a cost-minimizing configuration of compensation and workplace amenities is then tested. There exists significant deviations of manager perceptions of working conditions from those of workers and these deviations significantly impact a worker's perceptions of wellbeing and indicators of mental health. Such deviations may lead the factory manager to under-provide certain workplace amenities relative to the cost-minimizing configuration.

A common belief among apparel factory managers reported in case study analysis is that workers value money wages above workplace amenities, a finding corroborated by the statistical analysis. However, the analysis also indicates that manager perceptions do not reflect underlying worker values but rather a failure to effectively implement workplace innovations.

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1. INTRODUCTION

A commonly voiced challenge to the business case for international labor standards is, "If humane working conditions increase profits, why don't firms introduce human resource (HR) innovations voluntarily?" There are several possible responses depending on the source of a possible gain in profits. Increased profits that arise from a national reputation for humane working conditions can be realized if externally imposed labor standards discipline firms that seek to free-ride on the reputation created by the HR innovators. A more intriguing challenge to labor standards, though, emerges if their enforcement is believed to increase production efficiency and/or lower the cost of providing a competitive compensation package. A profit-maximizing firm would be expected to unilaterally introduce all such innovations for which the benefits are internal to the firm.

In the case of the optimal compensation package, a cost-minimizing firm will determine the division between 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; 2007, 2009).[1]

Yet, empirical evidence suggests that firms underprovide nonpecuniary compensation. For example, Herzog and Schlottmann (1990), analyzing U.S. Census data (1965-1970), find that the willingness to pay in the form of forgone earnings for risk mitigation and workplace safety exceeds its marginal cost. Similarly, Helliwell et al. (2005, 2007, 2009) find that firms appear to under-value the importance of trust and workplace social capital. Moving one point on a 10-point workplace trust scale has the same effect on global life satisfaction as a 40 percent increase in income.

[1] Workplace characteristics that are more humane may also promote production efficiency. Specific job characteristics put workers in a psychological state that motivates them to focus on work quality (Hackman 1976). In a positive work environment, workers will perform more effectively than they would in a negative work environment. Leblebici (2012) finds that 100 percent of employees strongly agree that supervisor relations affect their productivity.

From a theoretical perspective, Bowles (2004) concludes that firms will underprovide workplace amenities in a bargaining context in which supervisors imperfectly observe work effort. However, the under-provision arises not due to a misallocation between money wages and workplace amenities but rather because work effort and compensation are both inefficiently small. In the Bowles model, a Pareto-improving exchange is available in which workers exert more effort and total compensation is higher. The Bowles model does not explain the failure to equate the marginal cost of an amenity and its marginal benefit to the firm.

Imperfect information concerning the marginal value of workplace amenities provides an alternative explanation. Dunn et al. (2003) report evidence that firms underprovide workplace amenities because workers themselves underappreciate the importance of workplace amenities *ex ante* when choosing employment. Failure to construct the cost-minimizing compensation configuration by a perfectly competitive firm would also arise if workplace amenities require an initial investment and the firm faces a binding capital constraint or the process of acquiring information about efficiency enhancing investments amenities is costly or uncertain.

A firm that faces uncertainty concerning cost-minimizing HR practices may find that HR innovations have a nonmonotonic impact on profits. Full implementation may be deterred if firms experimenting with innovations initially experience a rise in costs and, therefore, a decline in profits. Unsuccessful attempts at improving the work environment in the past may deter future experiments in workplace innovations that mitigate harsh or abusive working conditions. Indeed, it is not uncommon for factories to introduce an innovation such as creating an eating space, only to find that their first attempt was not appreciated by their employees. Experimentation and persistence may be necessary for successful implementation.

For some innovations, particularly those related to HR management, the employee must perceive and understand the organizational change the firm is attempting to implement. For example, the introduction of high powered 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.

A simple test for detecting errors in implementation of HR innovations is to compare worker perceptions 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 wellbeing 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 monitoring and evaluation of Better Work Vietnam[2] provides a novel opportunity to measure HR implementation errors and their impact on the cost structure of apparel firms in global supply chains. Survey responses from 3,526 workers and 320 factory managers in 83 apparel factories enrolled in Better Work Vietnam provide measures of worker wellbeing, wages and working conditions from the perspective of both workers and managers.

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

[2] 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/*.

A theoretical framework is presented in Section 2, data in Section 3 and results in Section 4. Conclusions and directions for future research follow.

2. THEORETICAL FRAMEWORK

Profit-maximizing human resource management 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 value product.

Identifying the cost-minimizing compensation configuration will require the firm to know how workers value different types of benefits and amenities. A key question though is whether factory managers accurately assess the value their employees place on workplace amenities or whether an efficiency loss arises due to imperfect implementation. We begin as our point of departure with the assumption that a firm will choose a vector of compensation components, $\boldsymbol{B}$, to minimize the cost of inducing work effort by an employee. For a factory with two compensation components, $\boldsymbol{B_1}$ and $\boldsymbol{B_2}$, the cost-minimizing problem is

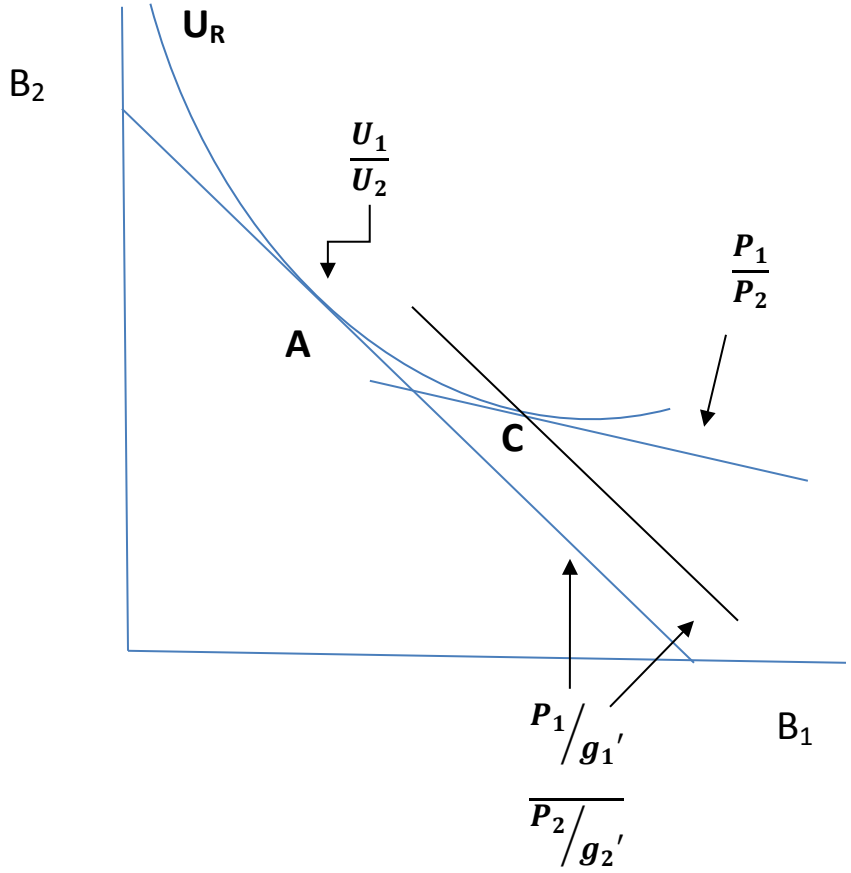
$$\min_{\{B_1, B_2\}} P_1 B_1 + P_2 B_2 + \lambda[U\{g_1(B_1), g_2(B_2)\} - U_R] \qquad \textbf{(1)}$$

where $\boldsymbol{P_i}$ (i = 1,2) is the cost to the firm of providing benefit $\boldsymbol{B_i}$, $\boldsymbol{U_R}$ is the reservation utility necessary to induce the representative worker to accept employment, $\boldsymbol{g_i}$ is a function that reflects the worker's perception of any working condition, $\boldsymbol{B_i}$, as perceived by the firm and $\boldsymbol{\lambda}$ is a Lagrange multiplier. The first order conditions for the program in equation (1) imply that

$$\frac{P_1 / g_1'}{P_2 / g_2'} = \frac{U_1}{U_2} \qquad \textbf{(2)}$$

The condition in equation (2) is depicted at point **A** in *Figure 1*.

Figure 1



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 $\boldsymbol{B_i}$ by the firm's employees but may not know how workers perceive working conditions as given by $\mathbf{g_i}$. Such a firm, in this case will attempt to set the cost minimizing bundle according to

$$\frac{\boldsymbol{P_1}}{\boldsymbol{P_2}} = \frac{\boldsymbol{U_1}}{\boldsymbol{U_2}} \qquad \textbf{(3)}$$

as indicated by point **C**. Here we have assumed that the firm particularly under-appreciates the small size of $\boldsymbol{g_1'}$. Clearly, the true cost of achieving reservation utility $\boldsymbol{U_R}$ is higher at compensation configuration ***C*** than at the efficient bundle ***A***, given imperfect implementation.

The slope of the indifference curve in *Figure 1* 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 worker wellbeing, which are based on compensation components, controlling for factory characteristics and worker demographics:

$$U_{ij} = \alpha_0 + \boldsymbol{\alpha_W B_{ij}} + \boldsymbol{\gamma X_{ij}} + \boldsymbol{\mu Z_j} + \epsilon \qquad \textbf{(4)}$$

where $\boldsymbol{B_{ij}}$ is a vector of workplace amenities as perceived by worker *i* in factory *j*, $\boldsymbol{X_{ij}}$ is a vector of characteristics of worker *i* in factory *j* and $\mathbf{Z_j}$ is a vector of characteristics for factory *j*.

To allow for discrepancies between worker perceptions and manager perceptions of working conditions, equation (4) is estimated using information on working conditions as reported by workers and then replicated using information on working conditions as reported by human resource managers. The dependent variable remains a measure of self-reported worker wellbeing. However, workplace characteristics are reported by the factory human resource manager, as given by $\boldsymbol{B_j}$ in equation (5)

$$U_{ij} = \alpha_0 + \boldsymbol{\alpha_M B_j} + \boldsymbol{\gamma X_{ij}} + \boldsymbol{\mu Z_j} + \epsilon \qquad (5)$$

Given that $\boldsymbol{B_{ij}} = g_{ij}(\boldsymbol{B_j})$ from equation (1), it follows that $\boldsymbol{\alpha_M} = \boldsymbol{g'\alpha_W}$. 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. That is, poor mental health may affect the perception of a hostile work environment. Better Work compliance assessments provide an independent observation of working conditions. Equation (5) is re-estimated using Better Work compliance assessment data to measure $\boldsymbol{\beta_j}$ as in equation (6)

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

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 the 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. Either of these actions would decrease its cost while providing the same worker utility. A factory intervention program could therefore improve the efficiency in a factory by finding differences in perceptions of implementation and providing technology for better implementation of benefits.

Below, a two-step procedure is used to construct the working conditions aggregates from the survey and compliance data. In the first step, working conditions as reported by workers, HR managers and compliance assessments are aggregated into heuristic indexes of working conditions. Factor analysis is then applied to identify the underlying

human resource systems. Equations (4), (5) and (6) are each estimated using the heuristic indexes and underlying factors.

The dependent variable is measured by six indicators of a worker's perception of wellbeing. These are global life satisfaction assessment and 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. We assume that after controlling for these worker characteristics, levels of happiness among similar workers are comparable within a country, as demonstrated by Clark (2010).

Indices are created for each independent variable of interest, where each is scaled to be a value 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.

3. 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. The data used in the analysis below were collected during these independent worker and manager surveys undertaken in Vietnamese apparel factories from January 2010 to August 2012.

A total of 3,526 workers were surveyed at 83 factories. Thirty-three of these factories had an additional round of surveys taken after having participated in the program for approximately one year. In each factory, 30 randomly selected workers and four factory managers undertake a self-interview via computer program using a PC tablet.

The population surveyed is 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 money income to worker wellbeing may not be detected by the statistical analysis.

The worker survey asks questions about worker demographics including information about households and family composition, health, compensation, benefits, training, working conditions, workplace concerns, mental wellbeing 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 the manager's perception of workers concerns with factory conditions and practices.

A summary of worker demographics can be found in Table 1. Over 80 percent of workers in the survey are female and over 50 percent are married. Around 87 percent of workers have completed at least lower secondary school, nearly a third of whom have completed upper secondary school as well. Only 65 percent 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 percent of workers occasionally

experience severe headaches and 20 percent of workers occasionally experience severe stomach pain (Better Work Monitoring and Evaluation, 2011).

Table 1 Worker Characteristics

	Percent
Gender	
Female	81.71
Male	18.29
Current Marital Status	
Never married	44.02
Married	54.19
Widowed divorced or separated	1.79
Highest Level of Education	
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
Rate Overall Health	
Very good	18.68
Good	44.71
Fair	36.36
Poor	0.24

Worker Wellbeing. Estimating equations (4)-(6) requires some measure of utility or wellbeing. Five measures are employed. Following Lazear (2009), participants are asked to rate their global life satisfaction on a five point scale. Follow up questions focus on mental health including feelings of sadness, crying easily, feeling restless, fearful or hopeless about the future were selected from the Harvard Symptoms Checklist (Mollica et al., 1987).

Table 2 How satisfied are you with your current life?

	Percent
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

In measures of worker wellbeing, almost three quarters of workers stated that they are either satisfied or very satisfied with their lives. Though a quarter of workers report feeling sad a little or some of the time, more than 80 percent of workers report that they are not troubled by crying easily. More than 85 percent of workers say that they do not feel restless, fearful or hopeless about the future (Better Work Monitoring and Evaluation, 2011).

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

Concerns with Abuse, Occupational Safety and Health. Managers state that workers are concerned with verbal abuse in over 20 percent of factories, though physical abuse is reported as a concern in less than 7 percent of factories. Almost 10 percent of workers express concerns with verbal abuse and 3 percent of workers report concerns with physical abuse or sexual harassment (Better Work Monitoring and Evaluation, 2011).

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

Training. Though over 90 percent of factory managers say 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 state that information on items such as incentives and pay structure are included in less than 50 percent of factory induction training programs. Half of the managers surveyed said that 50 percent or more of their sewers had been trained in new sewing skills or quality control in the last three months, but no more than 7 percent of workers stated that they had gone through any type of training in the past six months (Better Work Monitoring and Evaluation, 2011).

Worker-Manager Relations. Over 75 percent 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 percent 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, but only 52 percent of factory managers think that the trade union representative would be very effective in helping resolve a conflict between managers and workers. At least 70 percent of factories have worker committees, but only 45 percent of factory managers think that a worker committee would be effective at helping resolve a conflict. Almost 90 percent of workers are represented by a collective bargaining agreement (Better Work Monitoring and Evaluation, 2011).

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. However for all questions, answers nearer to 1 reflect a more desirable working condition.

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

Yes/No questions. The more desirable response was coded as a *1* and the other 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. Note this category includes all questions pertaining to concerns despite the fact that they were "chose all that apply." The reason is that the possible responses could still be rated from least severe to most severe and 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. The score was then subtracted from 1 if the responses were negative aspects of working conditions.

Open Ended questions. These questions solely dealt with wages, and hence each worker's reported wage was divided by the highest paid worker's wages.

Missing Data

Missing data is an issue since workers may either not know the answer or not want to answer one or more questions. Out of a total of 3,526 participants, only 309 records have no missing data. Missing data is addressed through *multiple imputation by chained*

equations (MICE) with *predictive mean matching*. The method of multiple imputation was first proposed and developed by Rubin (1976) and is regarded to be the most reliable and accurate form of imputation. The procedure involves imputing the data several times in order to create several complete data sets. The analysis is repeated on each data set and the results are averaged.[3] We performed 5 imputations and chose to use predictive mean matching because it restricts the possible imputed values to the range of actual values. Hence all imputed values fall between 0 and 1.

Heuristic Aggregate Construction

Working conditions aggregates are constructed from individual questions on the worker and manager surveys and the Better Work Compliance Assessment Tool. Heuristic categories of questions were derived from the preexisting cluster and sub-cluster delineations in the Compliance Assessment Tool.

Compliance data are stratified into 8 clusters that are further divided into 38 sub-clusters. All of the compliance questions are simple yes/no questions; hence the compliance score is the mean of all the questions that belonged to a specific sub-cluster. The mean of all the sub-clusters within a cluster are calculated to obtain that cluster's score. Sub-cluster means were excluded due to missing data or zero variance across all factories. For example, there was little data with variance among the child labor sub-clusters; hence only the broad cluster of child labor was included when performing the analysis on the sub-clusters.

The sub-clusters identified by Better Work were used as a guideline for creating the heuristic aggregates from the worker and manager surveys. Questions on the worker and manager surveys were matched to the various sub-clusters and compliance questions within them. Then, as with the compliance aggregates, the mean of the questions that belonged within and aggregate was taken to be the score for that aggregate.

[3] For more information about multiple imputation see Azur (2011) for an intuitive explanation and Rubin (1996) for a more rigorous explanation.

This procedure yielded 21 aggregates from the worker survey and 16 aggregates for the managers. Note that there are fewer aggregates for the worker and manager surveys than the compliance data. The reason is that there are several points that are covered on the compliance data that are not covered in the surveys. These include issues related to child labor, paid leave, and contracting procedures. The components of the heuristic indexes are reported in Tables A1 and A2 of the appendix for workers and managers, respectively.

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

Two dependent variables are used in the analysis. First, workers are asked to rate their overall life satisfaction, as reported in Table 2 discussed above. The second is a mental wellbeing index and is composed of five questions asking how much workers have been bothered or troubled in the past month by feeling sad, crying easily, feeling hopeless, feeling restless and feeling fearful. A summary of responses is reported in Table 3.

Table 3: How much have you been bothered or troubled by:

	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.

Principal Component Analysis

Assessing working conditions based on the heuristic indexes provides an indication of the impact of individual working conditions on worker wellbeing. However, it is also

worth considering whether there are underlying human resource management systems that more accurately characterize working conditions. Principal components analysis is typically used to identify underlying factors.

Running principal component analysis on all the questions that were used to construct the worker and manager aggregates yields 8 factors each for the workers and managers. For the compliance data, we ran factor analysis on the sub-clusters and obtained 10 factors.

Horn's Parallel Analysis was used to determine the appropriate number of factors rather than the commonly used Kaiser criterion of retaining any factors with an eigenvalue greater than one. The choice was due to unreliability of the Kaiser criterion and tendency of it to produce too many factors (Gorsuch, 1997). Rather, there is evidence that parallel analysis, first developed by Horn (1965), is the more accurate technique (Hayton et al. 2004).

Table 4: Worker Survey Factor Analysis

Factors	Main Components of Factors (Alpha Score)
Factor 1	Verbal abuse, Physical abuse, Sexual harassment, Hazardous chemicals, Accidents, Dangerous equipment, Temperature, Polluted air (0.8577)
Factor 2	Fairly corrected, Comfort in seeking out trade union, Quality of health treatment received in factory clinic, Drinking water satisfaction, Canteen satisfaction, Bathroom satisfaction (0.7455)
Factor 3	Late wages, Low wages, TET bonus, In-kind compensation, Piece rate explanation, Deduction concerns, Punch clock (0.7915)
Factor 4	Types of bonuses, Benefits, Types of deductions, Induction training, Recent training, Drink frequency (0.5453)
Factor 5	Pay frequency, Overtime, Work on Sundays (0.3969)
Factor 6	Info on pay statement, Collective bargaining agreement, Health services provided (0.2626)
Factor 7	Promotion discrimination by religion (n/a)
Factor 8	Toilet denials, Promotion discrimination by gender, Promotion discrimination by ethnicity or nationality (0.1481)

Parallel analysis generates a "parallel" random data set from which eigenvalues are extracted. The procedure is repeated many times and averaged to obtain a vector of average eigenvalues. Eigenvalues are then extracted from the original data set as well.

Both sets of eigenvalues are plotted and compared. Any factors whose eigenvalues are greater than the eigenvalues from the random data are retained.[4] Once the number of factors to be retained is determined, the corresponding factor scores via regression scoring are calculated. Finally, factor scores are standardized on a scale from 0 to 1. The variables that primarily makeup each factor can be seen in Tables 4, 5 and 6 for Worker, Manager and Compliance data, respectively.

Table 5: Manager Survey Factor Analysis

Factors	Main Components of Factors (Alpha Score)
Factor 1	Low wages, TET bonus, In-kind compensation, Verbal abuse, Physical abuse, Sexual harassment, Punch clock (0.9064)
Factor 2	Late wages, Deduction concerns (1)
Factor 3	Hazardous chemicals, Dangerous equipment, Accidents, Temperature, Polluted air (0.7857)
Factor 4	Worker committee, Committee effectiveness, Trade union effectiveness (0.7613)
Factor 5	Age verify, Statement info, Induction training (0.5026)
Factor 6	Meal allowance, Collective bargaining agreement (0.3786)
Factor 7	Benefits, Health services (0.4194)
Factor 8	Supervisor training, Sewer training (0.5920)

For each factor, the corresponding Cronbach's alpha is reported. Cronbach's alpha is a coefficient of internal consistency that is often applied in psychology to estimate the reliability of psychometric tests. We use this statistic to measure the degree to which the grouped questions are identifying a single common underlying factor. Values above 0.7 indicate an "acceptable" level of internal consistency. In many (but not all) factors reported in Tables 4 – 6, the alpha exceeds the critical value of 0.7.

4 See Hayton et al. (2004) for more details.

Table 6: Compliance Factor Analysis

Factors	Main Components of Factors (Alpha Score)
Factor 1	Method of payment, Minimum wage, Paid leave, Termination, Leave time (0.8133)
Factor 2	Overtime wages, Wage information use and deductions, Overtime hours, Regular hours (0.7258)
Factor 3	Chemicals and hazardous substances, OSH management systems, Worker protection (0.7484)
Factor 4	Contracting procedures, Employment contracts (0.5978)
Factor 5	Coercion, Strikes, Worker accommodation (0.6617)
Factor 6	Union operations, Emergency preparedness, Health services and first aid, Welfare facilities (0.5670)
Factor 7	Social security and other benefits, Working environment (0.3162)
Factor 8	Gender discrimination (n/a)
Factor 9	Child labor, Premium pay, Bonded labor, Collective bargaining (0.2667)
Factor 10	Discipline and disputes, Other grounds discrimination (0.3576)

4. EMPIRICAL RESULTS

We estimate 18 different regression equations with OLS.[5] Two indicators of worker wellbeing serve as the dependent variable. There are three sources of working conditions: Worker Survey, Manager Survey, and Compliance Assessment. From each survey, the heuristic aggregates are first used as indicators of working conditions. Second, two variants of the factors are employed; those selected using the Horn Parallel criteria and those indicated by Cronbach's alpha. Each set of independent variables was regressed on both the Life Satisfaction variable and the Mental Wellbeing index.

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 within their household. Results are reported in Tables 7 –13.

[5] Ordinary Least Squares (OLS) is the most common regression technique and is only not used to address specific estimation issues. Our data and approach do not require using an approach other than OLS.

Worker Perceptions of Working Conditions

Consider first estimation of equation (4), life satisfaction and worker wellbeing for which working conditions are measured based on worker perceptions as reported in the worker survey. Findings using factors to assess working conditions are reported in Table 7 and findings based on the heuristic indexes are reported in Table 8. Two sets of regressions are reported using HR factors. In the first set in columns (1) and (2) all eight factors are included. In the second set in columns (3) and (4) only those factors with an alpha greater than 0.3 are employed.

Table 7: Worker Factor Scores Regression Results

	Satisfied 8 Factors	Wellbeing 8 Factors	Satisfied 5 Factors	Wellbeing 5 Factors
	(1)	(2)	(3)	(4)
Annual wage	-0.401	0.014	-0.380	0.020
	(1.41)	(0.11)	(1.33)	(0.15)
Factor 1	1.795	1.521	1.794	1.514
Abuse, Hazards, Air	(7.69)**	(13.25)**	(7.61)**	(13.09)**
Factor 2	3.848	1.456	3.845	1.454
Discipline, Facilities	(26.00)**	(20.19)**	(25.65)**	(20.01)**
Factor 3	1.487	1.041	1.486	1.036
Wages, Deductions	(8.07)**	(11.75)**	(7.95)**	(11.51)**
Factor 4	-1.144	-0.324	-1.148	-0.319
Bonuses, Benefits	(9.31)**	(5.32)**	(9.26)**	(5.22)**
Factor 5	0.544	0.635	0.554	0.639
Pay procedures, Overtime	(2.12)*	(5.15)**	(2.14)*	(5.12)**
Factor 6	0.708	0.381		
Pay statement, CBA	(6.65)**	(7.42)**		
Factor 7	0.184	-0.055		
Discrimination religion	(2.28)*	(1.39)		
Factor 8	-0.463	-0.001		
Discrimination other	(2.98)**	(0.01)		
Factory index	-0.075	-0.121	-0.033	-0.101
	(0.57)	(1.33)	(0.23)	(1.07)
Male	-0.001	0.091	-0.022	0.078
	(0.04)	(5.17)**	(0.61)	(4.43)**
Education	-0.008	-0.004	-0.006	-0.005
	(1.43)	(1.71)	(1.03)	(1.76)
Married	0.034	0.049	0.036	0.050
	(1.07)	(3.18)**	(1.10)	(3.22)**
Worker health status	0.312	0.067	0.333	0.073
	(5.35)**	(2.37)*	(5.66)**	(2.56)*
Household	0.038	0.015	0.042	0.018
	(2.90)**	(2.36)*	(3.20)**	(2.76)**
Age	-0.002	0.000	-0.001	0.000
	(0.84)	(0.09)	(0.54)	(0.39)
_cons	-1.761	0.454	-1.646	0.633
	(4.80)**	(2.56)*	(4.71)**	(3.76)**
R^2	.	.	.	.
N	2,729	2,729	2,729	2,729

Notes: * $p<0.05$; ** $p<0.01$

Table 8: Worker Heuristic Indices Regression Results

	Satisfied	Wellbeing
Annual wage	-0.307	0.028
	(0.99)	(0.22)
Method index	-0.019	-0.034
	(0.06)	(0.23)
Wage index	0.538	0.313
	(4.76)**	(5.29)**
Premium index	-0.240	-0.038
	(1.65)	(0.51)
Benefits index	-0.098	0.291
	(0.36)	(2.19)*
Info index	0.628	0.193
	(4.47)**	(2.96)**
Deduction index	0.827	0.182
	(4.96)**	(2.32)*
Discipline index	0.766	0.187
	(4.48)**	(2.21)*
Training index	-0.366	-0.113
	(4.98)**	(3.07)**
Gender discrim index	-0.048	-0.077
	(0.55)	(1.84)
Race discrim index	0.307	0.062
	(3.64)**	(1.57)
Religion discrim index	0.095	-0.006
	(2.49)*	(0.31)
Force labor index	-0.232	-0.000
	(0.78)	(0.00)
CBA index	0.059	0.003
	(1.17)	(0.12)
Interfere index	0.320	0.282
	(4.28)**	(7.69)**
Chemical index	0.043	0.050
	(0.20)	(0.50)
Health service index	0.690	0.236
	(4.96)**	(3.61)**
Welfare fac index	1.048	0.178
	(8.45)**	(2.97)**
Protection index	-1.185	0.370
	(3.46)**	(2.33)*
Environ index	1.179	0.588
	(5.29)**	(5.56)**
Overtime index	0.011	0.151
	(0.09)	(2.51)*
Reg hours index	-0.324	-0.174
	(1.64)	(1.85)
Factory index	-0.090	-0.101
	(0.67)	(1.04)
Male	-0.009	0.088

	(0.23)	(5.00)**
Education	-0.010	-0.006
	(1.84)	(2.33)*
Married	0.023	0.044
	(0.71)	(2.83)**
Worker health	0.349	0.077
	(5.76)**	(2.70)**
Household	0.030	0.012
	(2.20)*	(1.89)
Age	-0.003	-0.000
	(1.12)	(0.20)
_cons	-0.593	1.402
	(1.52)	(7.56)**
R^2	.	.
N	2,729	2,729

Notes: * $p<0.05$; ** $p<0.01$

Note first that the parameter estimates are not sensitive to the number of factors included in the equation. When comparing parameters in column (1) to those in column (3) (and (2) to (4)), the variation in estimates is not statistically significant.

Second, the coefficient on the wage index is not statistically significant in the equation using factors. In a hedonic equation, the coefficient on the wage is usually used to place a monetary value on the other working conditions. One possible explanation is that it there is very little wage variation in this data set, so lack of statistical significance is not surprising. However, concern about low wages is statistically significant when the heuristic aggregates are used to measure working conditions, as reported in Table 8.

Third, working conditions appear to have a stronger effect on life satisfaction than on worker wellbeing. This is not surprising given that the worker wellbeing 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 factors themselves, all working conditions factors in the Life Satisfaction equation reported in column (1) are significant at the 5 percent level or better. However, they are not all positive. The coefficients on factors 1, 2, 3, 5, 6 and 7 are

positive, with factors 1-3 being the most prominent. Coefficients on factors 4 and 8 are negative.

Factor 1 is composed principally of harsh working conditions including verbal and physical abuse, sexual harassment and a dangerous work environment. Factor 2 reflects workplace amenities such as health care, drinking water, canteen and sanitary facilities. Factor 3 concerns issues related to pay such as timeliness, pay calculation, annual bonus and deductions.

Turning to the factors that are associated with a decline in life satisfaction, it is possible to identify the precise elements of the factor that are contributing to the decline in worker wellbeing by considering the results from the heuristic working conditions aggregates reported in Table 8. In the case of Factor 4, the principal driver of the negative coefficient is training. For global life satisfaction, each unit increase in the training index is associated with a 0.366 unit drop in life satisfaction and a 0.113 fall in the indicator of mental wellbeing. In the case of Factor 8, the source of the negative affect arises from the Protection Index. This aggregate principally reflects dangerous equipment and other workplace hazards.

The negative effect of training is understandable if training is undertaken in a hostile tone or is perceived as disciplinary in nature. Explaining the Protection Index is more challenging. One would expect that fear of dangerous equipment and other workplace hazards would be as important as other aspects of harsh working conditions in determining life satisfaction.

Manager Perceptions of Working Conditions

We turn now to consider the impact of manager perceptions of working conditions on worker life satisfaction and wellbeing. Estimates of the parameters of Equation (5) are reported in Table 9 using the factors and Table 10 using the heuristic indexes to measure working conditions.

Table 9: Manager Factor Scores Regression Results

	Satisfied 8 Factors	Wellbeing 8 Factors	Satisfied 5 Factors	Wellbeing 5 Factors
	(1)	(2)	(3)	(4)
Annual wage	0.697	0.178	0.662	0.159
	(3.99)**	(1.94)	(4.12)**	(1.94)
Factor 1	-0.107	-0.024	-0.116	-0.023
Abuse, low wage	(0.88)	(0.44)	(0.96)	(0.42)
Factor 2	0.123	0.028	0.150	0.033
Late Wage, Deductions	(0.96)	(0.45)	(1.17)	(0.53)
Factor 3	0.504	0.224	0.497	0.223
Dangers	(5.62)**	(5.19)**	(5.81)**	(5.31)**
Factor 4	-0.226	-0.003	-0.238	-0.007
Committees	(1.24)	(0.03)	(1.38)	(0.08)
Factor 5	0.079	0.026	0.097	0.030
Induction	(0.79)	(0.54)	(0.97)	(0.61)
Factor 6	-0.615	-0.065		
Meals, CBA	(4.32)**	(0.97)		
Factor 7	-0.090	-0.095		
Benefits, Health	(0.70)	(1.53)		
Factor 8	0.027	-0.002		
Training	(0.34)	(0.05)		
Factory index	-0.485	-0.256	-0.339	-0.219
	(2.61)**	(2.64)**	(1.94)	(2.41)*
Male	-0.029	0.078	-0.040	0.073
	(0.73)	(4.06)**	(0.98)	(3.82)**
Education	-0.030	-0.013	-0.031	-0.014
	(5.02)**	(4.74)**	(5.23)**	(4.96)**
Married	0.070	0.067	0.069	0.067
	(1.94)	(3.86)**	(1.92)	(3.88)**
Worker health	0.506	0.124	0.528	0.129
	(7.81)**	(3.98)**	(8.13)**	(4.17)**
Household	0.033	0.013	0.034	0.014
	(2.24)*	(1.89)	(2.36)*	(1.98)*
Age	-0.001	0.001	-0.000	0.001
	(0.20)	(1.00)	(0.11)	(1.06)
_cons	2.948	3.719	2.552	3.618
	(12.54)**	(32.52)**	(12.07)**	(35.27)**
R^2	.	.	.	.
N	2,725	2,725	2,725	2,725

Notes: * $p<0.05$; ** $p<0.01$

Table 10: Manager Heuristic Indices Regression Results

	Satisfied	Wellbeing
Annual wage	0.580	0.176
	(3.21)**	(2.30)*
Age verify	0.065	0.039
	(1.89)	(2.36)*
Method index	0.052	-0.011
	(0.45)	(0.20)
Wage index	-0.155	-0.066
	(1.79)	(1.55)
Premium index	-0.375	-0.314
	(2.44)*	(3.48)**
Benefits index	-0.505	0.096
	(2.12)*	(0.98)
Info index	0.362	0.187
	(1.90)	(1.77)
Training index	0.030	-0.017
	(0.29)	(0.31)
Gender discrim index	0.181	0.081
	(0.95)	(0.96)
Forced labor index	0.604	0.317
	(2.37)*	(2.03)*
CBA index	0.237	0.002
	(1.87)	(0.04)
Union index	0.496	0.398
	(3.57)**	(6.15)**
Chemical index	-0.131	-0.099
	(0.55)	(0.91)
Health service index	-0.026	-0.063
	(0.39)	(1.59)
Accomm index	0.039	0.009
	(0.47)	(0.22)
protectionindex	-0.593	-0.079
	(2.12)*	(0.63)
Environ index	0.306	0.168
	(2.15)*	(2.35)*
Factory index	-0.446	-0.196
	(2.23)*	(2.19)*
Male	-0.028	0.073
	(0.76)	(3.96)**
Education	-0.032	-0.015
	(5.99)**	(5.94)**
Married	0.046	0.055
	(1.46)	(3.61)**
Worker health	0.507	0.142

	(8.37)**	(5.08)**
Household	0.024	0.010
	(1.72)	(1.54)
Age	-0.001	0.002
	(0.32)	(1.70)
_cons	2.330	3.209
	(8.22)**	(24.74)**
R^2	.	.
N	3,526	3,526

Notes: * $p<0.05$; ** $p<0.01$

As with worker perceptions, the parameter estimates are not sensitive to the number of factors included in the regression. The coefficients in column (1) of Table 9 in which all eight factors are used are virtually identical to column (3) in which only five factors are used. A similar comparison is observed for columns 2 and 4.

A striking feature of the results in Table 9 is that the coefficients are all uniformly smaller in absolute value than those in Table 7. The only statistically significant positive factor as measured from the perspective of the manager is *standard factor 3* which is dominated by Hazardous Chemicals, Dangerous Equipment, Accidents, Temperature and Polluted Air.

We can determine which aspect of Factor 3 is driving the positive coefficient from the heuristic results in Table 10. Of the components in Factor 3, only the Environment Index (Temperature and Air) has a positive coefficient. The coefficient from the manager survey is 0.306 and the comparable figure from the worker survey (Table 8) is 1.179. Thus, the transmission coefficient g' is 0.26. That is, for each unit increase in working conditions related to pay as reported by the manager, the worker only perceives a 0.26 unit improvement.

A more extreme failure emerges with *standard factor 6* concerning information on the pay statement and the Collective Bargaining Agreement. Workers who perceive an improvement in Factor 6 also report greater life satisfaction (0.708) and wellbeing (0.381). However, HR managers reporting a belief that they are providing working

conditions in Factor 6 have workers that score lower than average in terms of life satisfaction (-0.615). That is, the transmission coefficient, *g'*, is actually negative.

Formally Comparing Perceptions of Working Conditions

The transmission parameters for a common set of working conditions are reported in Table 11. For each working condition, the $\boldsymbol{\alpha}$ 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 results are analogous to the first columns of Tables 8 and 10 but are not exactly the same because they are estimated with a comparable set of variables. The transmission coefficient (*g'*) is then calculated in the last column 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 one.

Table 11: Comparing Manager and Worker Perceptions

Compliance Area	Manager	Worker	g'
Wages	0.552**	-0.239	-2.309
(yearwage)	(0.163)	(0.286)	(0.245)
Late Payment	0.647**	-0.216	-3.001
(metholdindex)	(0.182)	(0.462)	(0.538)
Low Wage	-0.090	0.742**	-0.122**
(wageindex)	(0.095)	(0.173)	(0.000)
Bonuses	-0.434**	-0.232	1.873
(premiumindex)	(0.168)	(0.203)	(0.626)
In-kind, Amenities	-0.345	-0.226	1.527
(benefitsindex)	(0.251)	(0.182)	(0.750)
Pay Information	0.170	0.683**	0.249**
(infoindex)	(0.194)	(0.187)	(0.010)
Training	0.060	-0.451**	-0.132**
(trainingindex)	(0.121)	(0.087)	(0.000)
Gender Discrimination	-0.337	-0.044	7.744
(genderdiscrimindex)	(0.237)	(0.109)	(0.737)
Forced Labor	0.193	-0.477	-0.404*
(forcedlaborindex)	(0.221)	(0.396)	(0.014)
Collective Bargaining Agreement	0.564**	0.112	5.054
(cbaindex)	(0.144)	(0.073)	(0.253)
Chemicals	0.374	-0.031	-12.066
(chemicalindex)	(0.294)	(0.291)	(0.909)
Health Services	-0.063	0.514**	-0.123**
(healthserviceindex)	(0.078)	(0.171)	(0.000)
Dangerous Equipment, Accidents	-0.323	-1.616**	0.200**
(protectionindex)	(0.243)	(0.550)	(0.000)
Temperature, Air Quality	0.000	0.953**	0.000**
(environindex)	(0.230)	(0.327)	(0.000)

Notes: Manager and worker regressions are estimated separately. Both equations also include controls for gender, education, marital status, and age. The manager and worker regressions also contain unique sets of additional conditions indices based on data availability (see Tables A1 and A2). Robust standard errors from the combined variance-covariance matrix are in parentheses in the Manager and Worker columns. The last column (g') reports the quotient of the manager and worker estimates (manager beta/worker beta). The p-values of the nonlinear hypothesis test that the quotient is equal to one are in parentheses. In all columns, * (**) represents statistical significance at the 5% (1%) level.

The variables that are statistically significant for managers and workers are systematically different in Table 11. Variables that are significantly related to worker wellbeing for managers include wages, late payments, and the collective bargaining agreement (with bonuses having a significant negative coefficient). On the other hand, workers measures of satisfaction are significantly related to concerns about low wages, pay information, health services, and temperature/air quality. Training and protection are both exhibit statistically significant but negative coefficients.

To formally test the discord between managers and workers, we formally test the hypothesis that the ratio of the estimated coefficients (*g')* is equal to one. We carry out this nonlinear hypothesis test by first combining the variance-covariance estimates from the two separately-estimated regressions and then generate a chi-square statistic for the null hypothesis. The quotients and estimates p-values are in the last column of Table 11.

The results suggest that there is very little agreement (quotients that seem far from one) but large standard errors. Statistically significant differences emerge for low wages, pay information, training, forced labor, health services, the protection index (dangerous equipment and accidents) and temperature/air quality.

These results indicate that firm manager beliefs about their efforts with regard to wages have a positive impact on worker life satisfaction but work efforts related to other working conditions have little or even a negative effect on workers. Such a configuration is consistent with case study evidence on the deterrents to HR innovations. It is a common belief among apparel factory managers that workers value money wages above workplace amenities. Results reported in Table 9 corroborate the case study reports. However, results in Table 7 and 8 indicate that manager perceptions do not reflect underlying worker values but rather a failure to effectively implement workplace innovations. In other words, the results in the last column of Table 11 suggest that there are potential efficiency gains from aligning working conditions with worker values.

Compliance Assessments of Working Conditions

Finally, consider working conditions as measured by Enterprise Assessments. Results are reported in Tables 12 to 14. Three forms of aggregation are used. Compliance averages are calculated for each sub-cluster. Two sets of aggregates are constructed from the sub-clusters. First, sub-clusters were aggregated to clusters using the Better Work taxonomy. Results are reported in Table 12. Second, factor analysis is applied to the sub-clusters. Regression results are reported in Table 13. Results with the sub-clusters themselves are reported in Table 14.

Table 12: Compliance Cluster Regression Results

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

Notes: * $p<0.05$; ** $p<0.01$

Table 13: Compliance Factor Scores Regression Results

	Satisfied	Wellbeing
Factor 1	-0.193	-0.077
Pay procedures	(1.24)	(1.00)
Factor 2	-0.317	-0.010
Hours, Wage info	(2.29)*	(0.14)
Factor 3	-0.176	0.077
Hazards	(1.78)	(1.56)
Factor 4	0.296	0.083
Contracts	(1.64)	(0.93)
Factor 5	2.416	-0.093
Coercion, Strikes	(4.12)**	(0.32)
Factor 6	0.261	0.016
Emergency, Health	(2.00)*	(0.25)
Factor 7	-0.278	-0.062
Social Security, Benefits	(2.72)**	(1.23)
Factor 8	-0.270	-0.157
Gender Discrimination	(2.29)*	(2.68)**
Factor 9	-0.143	-0.047
Child, Bonded labor	(0.90)	(0.60)
Factor 10	0.437	-0.108
Discipline, Disputes	(1.80)	(0.89)
Factory index	0.280	-0.018
	(2.37)*	(0.31)
Male	-0.042	0.062
	(0.87)	(2.59)**
Education	-0.034	-0.021
	(5.06)**	(6.29)**
Married	0.104	0.075
	(2.51)*	(3.66)**
Worker health	0.449	0.129
	(5.95)**	(3.44)**
Household	0.034	0.020
	(2.01)*	(2.37)*
Age	-0.000	0.003
	(0.08)	(1.93)
_cons	2.588	3.929
	(7.35)**	(22.41)**
R^2	0.07	0.06
N	2,051	2,051

Notes: * $p<0.05$; ** $p<0.01$

Table 14: Compliance Sub-clusters Regression Results

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

	(0.88)	(0.75)
Work protect index	0.151	0.306
	(0.73)	(2.97)**
Work environ index	0.139	0.067
	(0.77)	(0.74)
Leave index	-0.502	-0.394
	(0.83)	(1.30)
Overtime working index	0.456	0.504
	(2.66)**	(5.93)**
Regular hours index	-0.580	-0.234
	(1.85)	(1.50)
Factory index	0.147	0.049
	(1.12)	(0.75)
Male	-0.045	0.067
	(0.94)	(2.82)**
Education	-0.036	-0.022
	(5.39)**	(6.72)**
Worker health	0.411	0.109
	(5.52)**	(2.95)**
Household	0.037	0.023
	(2.27)*	(2.82)**
Age	0.001	0.004
	(0.28)	(3.10)**
_cons	-1.504	3.700
	(0.78)	(3.87)**
R^2	0.11	0.11
N	2,054	2,054

Notes: * $p<0.05$; ** $p<0.01$

Analysis based on the Better Work clusters suggests that Better Work is effectively identifying working conditions that significantly affect worker wellbeing. Coefficients are positive and statistically significant for Child Labor (GLS 1.247, Mental Wellbeing 0.602), Discrimination (GLS 5.764, Mental Wellbeing 2.800), Forced Labor (GLS 13.538, Mental Wellbeing 6.571) and Work Time (GLS 0.607, Mental Wellbeing 0.516).

Note in particular that 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 worker outcomes. The

Compensation coefficient is -1.722 in the Global Life Satisfaction equation and -1.011 in the Mental Health equation.

However, the estimates employing the factors, reported in Table 13, tell a somewhat different story. Workers appear to be positively impacted by improvements in Coercion, Strikes and Worker Accommodation (*factor5*) and Union Operations, Emergency Preparedness, Health Services, First Aid and Welfare Facilities (*factor6*).

In contrast, coefficients for Factors 2, 7 and 8 are significant and negative. The negative coefficient for Factor 2 is not surprising given the findings reported in Table 12. Factor 2 in Table 13 relates to Overtime Wages, Wage Information, Deductions, Overtime Hours and Regular Hours as does the Compensation Index in Table 12. The same cannot be said of Factor 8 Discrimination and the Discrimination Index which has a negative coefficient when using factor analysis (-0.270) but positive when using Better Work clusters (5.764).

The source of the discrepancy can be understood by examining the results when working conditions are measured by the sub-clusters, reported in Table 14. Negative coefficients emerge for 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. Though, 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 over working conditions.

5. CONCLUSION AND DIRECTIONS FOR FUTURE RESEARCH

Analysis of manager and worker survey data from Better Work Vietnam Monitoring and Evaluation collected between January 2010 and August 2012 indicates that working

conditions have a significant positive impact on global life satisfaction and measures of depression and traumatic stress. The conjecture that factory managers may not be offering a cost-minimizing configuration of compensation and workplace amenities is then tested. There exists significant deviations of manager perceptions of working conditions from those of workers and these deviations significantly impact a worker's perceptions of wellbeing and indicators of mental health. Such deviations may lead the factory manager to under-provide certain workplace amenities relative to the cost-minimizing configuration.

Further, a common belief among apparel factory managers reported in case study analysis is that workers value money wages above workplace amenities, a view corroborated by the statistical analysis. However, the analysis also indicates that manager perceptions do not reflect underlying worker values but rather a failure to effectively implement workplace innovations.

The results presented provide a monetary value that workers place on working conditions. However, in order to determine whether the working conditions configuration is cost minimizing it is necessary to know the marginal cost of each working condition. In addition, the above 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. Both directions of analysis will be the subject of future research.

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APPENDIX

Table A1 Worker Heuristic Indices

Index	Components (Alpha)
methodindex	How often paid, late payment concerns (.1391)
yearwage	Annualized pay, tet bonus (.6148)
wageindex	Low wage concerns (n/a)
premiumindex	Bonuses received, tet concerns (.0104)
benefitsindex	In-kind compensation concerns, benefits received (.0235)
infoindex	Info on pay statement, piece rate explanation concerns (.0076)
deductionindex	Deductions made, deduction concerns (.2044)
disciplineindex	Workers corrected fairly, verbal abuse concerns, physical abuse concerns (.5162)
trainingindex	Induction training, recent training (.4060)
genderdiscrimindex	Gender as a barrier to promotion, sexual harassment concerns (.0959)
racediscrimindex	Ethnicity as a barrier to promotion, nationality as a barrier to promotion (.0081)
religiondiscrimindex	Religion as a barrier to promotion (n/a)
forcelaborindex	Punch clock concerns, bathroom denials (.0969)
cbaindex	Presence of a collective bargaining agreement (n/a)
interfereindex	Comfort in seeking out a trade union representative (n/a)
chemicalindex	Hazardous chemical concerns (n/a)
healthserviceindex	Presence of a health clinic, health services provided, treatment quality (.3034)
welfarefacindex	Drinking water satisfaction, canteen satisfaction, bathroom satisfaction, how often workers drink (.6049)
protectionindex	Dangerous equipment concerns, accident concerns (.6681)
environindex	Temperature concerns, air quality concerns (.7128)
overtimeindex	Too much overtime concerns (n/a)
reghoursindex	Too much work on Sundays concerns (n/a)
factoryindex	Current employees, ratio of temporary to permanent employees, non-production employees (.4738)
wellbeindex	Feeling sad, crying, feeling hopeless, feeling restless, feeling fearful (.8213)

Table A2 Manager Heuristic Indices

Index	Components (Alpha)
ageverify	Age verification required on application (n/a)
methodindex	Late payment concerns (n/a)
yearwage	Annualized pay, TET bonus (.6148)
wageindex	Low wage concerns (n/a)
premiumindex	TET concerns (n/a)
benefitsindex	In-kind compensation concerns, meal allowance, benefits provided (.2056)
infoindex	Info on pay statement, piece rate explanation concerns (.1961)
trainingindex	Induction training, time spent training basic skills, recent supervisor training, recent sewer training (.4470)
genderdiscrimindex	Sexual harassment concerns (n/a)
forcelaborindex	Punch clock concerns (n/a)
cbaindex	Presence of collective bargaining agreement, issues dealt with by cba, presence of worker committee, worker committee effectiveness (.4318)
unionindex	Trade union effectiveness (n/a)
chemicalindex	Hazardous chemicals concerns (n/a)
healthserviceindex	Health services provided (n/a)
accommindex	Housing provided (n/a)
protectionindex	Dangerous equipment concerns, accident concerns (.2704)
environindex	Temperature concerns, air quality concerns (.6378)
factoryindex	Current employees, ratio of temporary to permanent employees, non-production employees (.4738)
wellbeindex	Feeling sad, crying, feeling hopeless, feeling restless, feeling fearful (.8213)

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