Factory Decisions to become Noncompliant with Labor Standards: Evidence from Better Factories Cambodia

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Abstract: Much of the current literature on labor standards focuses on the decision to become compliant with labor standards. Factory-level data from Cambodia, however, suggest that most factories are mostly compliant with established standards. Examining the movement from compliance to noncompliance in working conditions (regress) increases the understanding of both the effects of compliance on factories and what factors drive decisions related to working conditions.

INTRODUCTION

Efforts to improve working conditions in developing countries have generated a large and growing literature (Elliott and Freeman 2003, Harrison and Scorse 2010). Much of this literature is motivated by the common perception of very poor conditions in developing country factories (the term "sweatshop" appears often in this literature). As a result, the usual approach is to focus on the debate around policies (or potential policies) to improve working conditions in developing countries. One key issue in the debate centers on the optimality of such improvements (Brown et al. 2011a). While such improvements may be beneficial to workers, the effects on the factory as a viable economic unit are less clear. The conventional wisdom in economics suggests that if factories are optimizing and efficient, imposing additional constraints from the outside pushes factories from their privately-determined optimal practices.[i] Poor conditions are the result of optimizing behavior of firms and attempts to improve working conditions from the outside threaten factories and therefore the jobs of the very workers that the policies were intended to help. Some have even suggested that "sweatshop" conditions are a necessary stage of economic development.

Recent data from Cambodia, however, suggests that compliance with national law and ILO core labor standards may not be as low as commonly believed. Since 2001, the Better Factories Cambodia program has been monitoring detailed working conditions in garment factories. Overall compliance rates are over 50%, with the lowest aggregated compliance rates reported by Ang et al. (forthcoming) being over 60%. They report an overall average of compliance rates over all visits and all categories of 87.0% and an average of first-visit compliance rates across all factories and all categories of 82.4%.

These relatively high compliance rates may suggest that compliance in many of the areas monitored by the program is optimal for the factories.

Given these relatively high compliance rates, it is possible that we may learn a great deal about factory decisions by analyzing the decision to become *noncompliant.* Identifying factors affecting the decision to become noncompliant may provide information that would help identify the kinds of changes that are beneficial, the factors that may affect the sustainability of such improvements, and the balance of costs and benefits for various areas of working conditions.

This paper analyzes the decision to become noncompliant in the context of Cambodian apparel factories. The 1999 U.S.-Cambodia trade agreement created the incentive for factories to improve working conditions by linking such improvements to increased access to the U.S. market (Polaski 2004, Berik and van der Meulen Rogers 2010). Such market access captured the attention of Cambodian producers because apparel trade was restricted by the Multi-Fibre Arrangement (MFA) and the Agreement on Textiles and Clothing (ATC). The Better Factories Cambodia (BFC) program was created to monitor and help factories improve working conditions. The monitoring reports were used by the U.S. government to determine Cambodia's apparel export quota allocation.

The BFC program has captured a great deal of attention in academic literature. Combining interviews, observations, and BFC synthesis reports, Shea et al. (2010) document sustained increases in working conditions in Cambodia. Others, such as Polaski (2006), Adler and Woolcock (2010), and Miller et al. (2009) also document progress linked to, and concerns about, the BFC program and generally agree that the

program has made positive contributions towards improvements in working conditions in Cambodia.

The market incentive linked to the MFA and the BFC program were probably not the only factors affecting working conditions. Several papers that analyze the effects of the BFC program consider other factors that might also have been at work. In particular, Oka (2010a and 2010b) and Robertson et al. (2011) show that the presence of a reputation-sensitive buyer and the policy of public disclosure of noncompliance through the BFC program both increased the likelihood of compliance. Some of these factors changed during the 2001-2011 period. Although the MFA/ACT ended January 1, 2005, Beresford (2009) in particular finds that, overall, working conditions did not fall in response to an increasingly competitive environment. Ang et al. (forthcoming) find that ending the program of public disclosure reduced the rate of compliance, especially between the first and second visit. Another challenge emerged with the global financial crisis in late 2008. Exports fell and recovered, but the effects on compliance, much less the decision to become noncompliant, have not been examined.

To analyze the decision to become noncompliant, this paper uses factory-level data from the Better Factories Cambodia program. The dataset has several characteristics that make it ideal for analyzing the decision to become noncompliant. First, the data track individual factories over time so that individual fixed effects can be included in the empirical analysis. Second, the data include over 400 measures of individual compliance points allowing us to identify both the effects of various factors on both broad and narrowly-defined areas of compliance. Third, the data span several important changes in

environment that could affect the decision to become noncompliant, allowing us to separately identify the effects of each change.

We contribute three main results to the literature. Our first main result is that the rates of becoming noncompliant are overall quite low. Even when the market-access incentive is diminished, the rates of the decision to become noncompliant do not increase dramatically. Second, consistent with capital investment literature, adjustment costs matter. Costly investments are less likely to be reversed. Third, factors that affect compliance also, not surprisingly, affect the decision to become noncompliant. In particular, public pressure also matters: we find a significant break in behavior following the BFC policy change in 2006 related to public disclosure of factory-level working conditions. Together these results do not seem to support the hypothesis that improvements are harmful to factories. On the contrary, taken together the results seem consistent with the hypothesis that such improvements help factories.

DATA DESCRIPTION, SUMMARY STATISTICS, AND FACTOR ANALYSIS

The Better Factories Cambodia program was established by the International Labor Organization (ILO) in 2001. Since the program is becoming increasingly well-known, readers are referred elsewhere for a detailed description of the program.[ii] It combines monitoring, remediation, and training with the goal of improving working conditions in apparel-exporting factories. Monitors observe working conditions in all apparel-exporting factories during unannounced visits. To avoid monitor bias, each monitoring team contains at least two people, and the same team rarely assesses the same factory twice. After the factory's second BFC visit, BFC publishes the firm's name and

progress on improving working conditions in an annual synthesis report, which they share with the factories' buyers. Much of the recent literature that focuses on the BFC program use data contained in these publically-available synthesis reports (such as Beresford 2009 and Shea et al. 2010).

National law mandated universal participation, reaching 119 factories in the original 2001-2002 wave of visits. In the next three years, however, monitors focused on following up on previously non-compliant items rather than comprehensively assessing factories against the full checklist. As a result, data are unavailable for this three-year period. The launch of the improved Information Management System (IMS) survey in December 2005 marks the beginning of the next wave of documented visits in which monitors have visited each factory once every ten months on average.

1. Summary Statistics

Rather than aggregate synthesis reports, this paper uses factory-level monitoring reports generated by the BFC program. Table 1 shows the number of factories by visit by year for the 2001-2011 period. New firms entering each year (with a first visit) and existing firms accumulating visits generate the table's upper triangular structure. The total of 2,113 total observations is the product of 446 individual factories times each factory's number of individual visits (the maximum number of visits observed for any factory is 10). Visits typically fall about ten months apart, but the time between visits varies widely. National ownership also varies. The vast majority of the sample (93.7%) is foreign-owned, with 42% owned by China, Hong Kong SAR, and Macau SAR, 23.3% owned by Taiwan, and less than 3% owned by Western countries.

Table 1 also reveals significant attrition in the data. While there are a total of 446 factories with an initial visit, there are only 241 with a fifth visit. Much of the lack of 5th visit observations comes from the fact that the second "wave" is relatively large. Since tracking factories over time is important, we take care to identify factories that have actually closed rather than simply changed names. We combine an official list maintained by the BFC program of confirmed closings and we compare the addresses of the factories over time. Fewer than five have the same address with distinct names (we use the same factory identifier for these observations). If a factory closes and then re-opens at another location with a different name and different ownership (e.g. Macau SAR may have a factory that closes and passes its business to a firm owned by mainland China), we treat these as separate factories.

Working conditions are evaluated using 405 individual questions, such as "Has management appointed a liaison officer?", "Are women paid their maternity leave benefits either before or during leave?", and "Does management keep an up-to-date list showing each worker's schedule for weekly time off?" These questions are then compared to domestic law and international standards and coded into binary variables that indicate compliance. Of these 405 questions, 62 show no variation across both factory and visit. These questions are dropped from the analysis. The remaining questions are analyzed at three levels of aggregation: six factors that are identified through factor analysis, 31 aggregate compliance groups that roughly conform to groups commonly used by the ILO, and individual questions.

In practice our measures of the decision to become noncompliant also vary by aggregation level. At the individual question level, the decision to become noncompliant

is measured using a binary variable equal to one for factory-question observations that have become noncompliant (and zero otherwise). For aggregate levels, our measure of the decision to become noncompliant is measured as the change in the average value across all questions within each group for each factory. This approach gives us a continuous measure of compliance that allows us to assess the magnitude of changes as well as the direction. Therefore we analyze case is defined as either a negative change in the compliance average or with a binary indicator for the cases in which the change in the aggregate measure at the factory level was less than zero. All changes are based on the difference between the current and the previous visit unless otherwise indicated.

Table 2 contains the average of the binary measures of reduced compliance for the 31 aggregate compliance groups for 2006, 2008, and 2010. The changes vary considerably across groups. The "core" labor standards, such as forced labor, have very little reduction in compliance. Core labor standards such as forced labor and child labor are *zero-tolerance* points from the perspective of reputation-sensitive buyers. These are highly sensitive issues for buyers that are extremely likely to result in the buyer ending the relationship with the factory.

Areas related to industrial relations such as shop stewards, unions, and strikes have some of the lowest rates of reduced compliance. This may be because these changes are relatively costless to the factory to implement and, once these changes are put in place, it would take a deliberate and conspicuous effort to remove them (going from having a shop steward to not having a shop steward, for example). It is important to note that areas such as "strikes" and "unions" do not necessarily imply that an active union that engages in strikes is present in the factory. These areas are based on questions

that are designed to capture compliance with national labor law with respect to these areas. Note that the areas of "Collective Agreements" and "Disputes" have relatively high rates. These areas capture potentially contentious areas that may easily change through time depending on changes within the factory.

Others, such as "Holidays/Annual/Special Leave", "Termination," and "Maternity Benefits" also have relatively high rates. These areas illustrate areas that do not necessarily represent an investment on the part of the factory. Violations in these areas might also be the result of idiosyncratic situations that may not have emerged or tested the factories in earlier surveys.

For most areas, there is no clear trend overall in reduced compliance rates over time. They increase across years for some, fall across years for others, and exhibit other patterns as well. One area that seems to show consistent improvement over time is the rates of reduced compliance in Payment of Wages, and Regular Hours/Weekly rest. These are the areas that seem to be most closely linked to the "efficiency wage" literature that suggests that workers that are paid and get adequate rest might be more productive and therefore offer direct benefits to factories through compliance. This is an example of the possibility that individual groups' patterns are driven by underlying factors. If underlying factors are driving compliance decisions of compliance questions to change in similar ways, then grouping questions that move together help present a more intuitive and compact set of results. Grouping questions, however, can be subjective. To minimize the subjectivity of our groupings, we apply factor analysis. Factor analysis is an empirical technique that identifies common movements in underlying data to help

identify groups of results whose common movements may be driven by common underlying factors.

2. Factor Analysis

Factor analysis helps identify a few common factors that may explain common changes in individual categories. The groupings are admittedly subjective in factor analysis, and therefore we explain our steps carefully.

The core labor standards of child labor, forced labor, and discrimination start with generally high compliance and vary little, so we group them. We then apply an orthogonal rotation to the results generated by applying the principle-factor method to the remaining 28 of the 31 compliance categories.[iii] The resulting matrix identifies nine possible factors, but none of the maximum values appear in factors 5 and 8, so we focus our attention on the remaining factors. Although involving a combination of subjective judgment and interpretation, it appears that the emerging pattern allows us to sort the 31 categories into the 5 additional factors shown in Table 3.

Table 4 contains the summary reduced compliance measures for the six factors identified in Table 3. Some of the compliance groups in Table 4 fall (Unions and Core Labor Standards). Others rise and then level off (Compensation). The others rise over time. The rates are also higher. The rates start relatively low in 2006, but increase in 2010. While always below fifty per cent, some of the rates, such as Modern HR practices in 2010, seem very close to fifty per cent. The core labor standards remain relatively low, possibly suggesting that these are considered important to buyers or have stronger consequences associated with noncompliance.

One of the concerns with the aggregate measures presented in Tables 2 and 4 is that they include composition effects. The entrance of factories that are more likely to regress would increase average reduced compliance rates. It seems likely that both of these results are due to aggregation and the definition of the decision to become noncompliant that we use. We control for this by using question-level measures of the decision to reduce compliance in the analysis.

EMPIRICAL ANALYSIS

In this section we take two approaches. We first apply a Chow-like test to evaluate the possibility of a structural break in the pattern of the decision to become noncompliant as a result of a policy change in the middle of our sample. We then apply a question-level regression analysis to identify the importance of several factors that theory suggests would affect the decision to become noncompliant.

1. Did Public Disclosure Matter? A Chow Test for Structural Break

As noted earlier, one of the characteristics of the BFC program involves audits in which monitors enter the plants and record observations. These observations were the basis of BFC Synthesis Reports that were publically available on the internet. These reports named factories and linked them directly to working condition violations. The policy of posting these reports changed in November 2006, at which point Synthesis Reports stopped naming specific factories and only published aggregate compliance data.

This change in policy provides an opportunity to investigate the possible role that public disclosure has in plant manager behavior. To investigate this change formally, we

first apply a Chow-type test for a structural break in the decision to become noncompliant. The decision to become noncompliant is calculated at the compliance question level and is defined as a factory being observed as compliant and then subsequently observed to be noncompliant.

Figure 1 shows that two peak values emerge for our definition of the decision to become noncompliant. The peak values in both figures suggest that a structural break occurred around October 2006. Figure 1 also suggests that a second break occurred at the onset of the financial crisis. The fact that the data suggest a structural break at approximately at the same time as the policy change supports the hypothesis that public disclosure affects the decision to become noncompliant. The fact that the break appears one month before the policy change would be consistent with some advance notice of the change occurring or that the break induced the policy change. Discussions with ILO/BFC management, however, suggest that the former is a much more likely explanation.

2. Regression Analysis

Given the strong evidence supporting the possibility of a change in behavior at the same time public reporting ceased, we now turn to a more detailed regression analysis. In the regressions that follow we first create a noncompliance variable for each question so that the unit of observation is a factory-question in each visit. Define g_{qit} = 1 if question q in plant i at time t changes from compliant to non-compliant and 0 otherwise. Using this as a dependent variable gives us about 300,000 observations (questions * plants * visit).

The mean of the first reduced compliance dummy variable is 0.035. This 3.5% of the question-plant-period observations can be decomposed to reveal falling rates of reduced compliance as the visit number increases. Between the first and second period the falling compliance rate (which is across all questions and factories) is 7.3%, but that rate falls to 3.3% between the fourth and fifth visit. Part of this may be explained by a selection bias if the least successful firms are most likely to reduce compliance and are more likely to drop out of the sample. These means are much smaller than the aggregate figures presented in Tables 2 and 4, which, though aggregation, contain composition effects.

In order to investigate the impact of buyer reputation sensitivity on labor law compliance, we collect data on each buyer's commitment to corporate social responsibility, whether the firm is an apparel retailer or mass merchandiser, and other measures of brand value as determined by consulting firms such as Inter-Brand's Best Global Brands Ranking and *Fortune*'s "Most Admired Companies" scoring system. Based on this survey of information, buyers were first separated into apparel retailers and mass merchandisers. Apparel retailers are primarily in the business of selling apparel and may sell other related but non-apparel goods. Mass merchandisers refer to large chain stores that sell a wide range of products, with apparel being only one subgroup. These two groups of buyers differ principally in terms of product quality measures both in terms of the technical characteristics of the garment and defect rate.

Within these two groups, buyers are subsequently divided by reputation sensitivity. Reputation-sensitive firms are characterized by evidence of a policy on corporate social responsibility in the form of a website or public report. Of buyers

sourcing from Cambodia during the study period, firms fell into four broad categories. The first (Type 1) includes apparel retailers with significant evidence of corporate social responsibility. Apparel retailers with little evidence of a policy relating to corporate social responsibility fall in the second group (Type 2). Type 3 buyers are mass merchandisers with significant evidence of corporate social responsibility. No buyers fell into the category of mass merchandiser without evidence of CSR. The last type (Type 4) consists of buyers that were not accessing BFC compliance reports.

The simplest specification results, broken down by buyer type and using just the factors identified in the factor analysis, are found in Table 5. The regressions in all columns represent OLS estimation of a linear probability model of the binary dependent variable for the decision to become noncompliant that is described above. We do not report the R-squared statistic because it has limited applicability in the linear probability model. Probit estimation generates very similar results. The constant term is suppressed to allow the main effects of the various groups to each be represented as conditional means. In other words, the results in Table 5 simply represent the conditional means of the rates at which factories become noncompliant calculated at the question level for each of the groups identified in the factor analysis. These numbers differ from those in Table 2 because those were the group averages (which are in a sense cumulative within the group) rather than the question-level averages.

The first thing to notice about the results in Table 5 is that the rates of becoming noncompliant are very low (less than 5% in all cases). The second main message is that the overall results are very similar across buyer types. Considerable cross-factor variation occurs across the six factors. There is very little movement towards noncompliance in

Core Labor Standards which, as described earlier, are *zero-tolerance* points of compliance for buyers. Thus, it is not surprising to see few factories becoming noncompliant on these points. By contrast, becoming noncompliant in areas that involve more complex factory organizational change is considerably more common. The probability BFC enterprise advisors would observe noncompliance on a visit following a visit where the factory was found to be in compliance in Communication and Workplace Systems, Occupational Safety and Health and Modern HR Practices are all close to 0.04.

3. Control Variables

The means in Table 5 are largely descriptive and are meant to illustrate the differences across the different compliance areas, but omit variables identified in the theory section that might affect the decision to become noncompliant. The first control variables we add are geographic fixed effects that control for the nation of factory ownership. They are added to the regression as a set of dummy variables (one variable for each country identified in the data). Previous studies have found a significant effect of foreign ownership on technology adoption and survival (Harris and Li 2010).[iv] Although we are not aware of studies that have included this variable, we include these effects in each of the columns of Table 6.

We also add several other variables that theory suggests might play a role. Previous papers have found that a relationship with a reputation-sensitive buyer increases the propensity to improve working conditions (Oka 2010a). The first column of Table 6 shows that this relationship is statistically significant effect on the decision to retrogress as well: a relationship with a reputation-sensitive buyer deters the decision to become

noncompliant. This effect is relatively small, however, as suggested by the point estimate.

The discussion of the theory in Section 2 suggests that adjustment costs can affect the regression. We model adjustment costs by classifying each of the areas in the survey with a dummy variable equal to one if the change implied represents a "physically irreversible" decision (such as the purchase of capital or some other physical equipment that would be costly to remove), and zero otherwise. The results in Table 6 suggest that the presence of a physically irreversible compliance point has a statistically significant effect of reducing the decision to become noncompliant. This effect is quite similar across buyer types as well, and is consistently negative. This result is consistent with the investment literature that shows that irreversibility matters (Anderson et al. 2010, Mason and Weeds 2010).

We also consider whether or not the threat of public disclosure of noncompliance can also deter the decision to become noncompliant. In Table 6 the coefficients of the Public Disclosure variable are all positive, suggesting that the decision to become noncompliant became more common during the public disclosure period. The effect is relatively large and is not consistent with Ang et al. (2011), who find that compliance generally was higher during the public disclosure period. It is important to note, however, that compliance rates do not fall to initial (first-visit) levels for any factory. Relative to overall compliance and relative to previous improvements in compliance, the rates of becoming noncompliant are low. We interpret this result to suggest that, while some firms may have been motivated to comply in some areas due to public exposure, most factories had additional motivation for most compliance points.

We also include four union variables. Unions are particularly interesting in Cambodia because they may either represent workers, and therefore support improvements in working conditions (holding all else constant) or they may be aligned with either factory managers or political parties that either support or do not support such improvements. The estimates in Table 6 show very few statistically significant union coefficients. This may be due to large but heterogeneous union effects (therefore giving rise to large standard errors) or very small effects of unions (small estimated coefficients). The estimated coefficients in Table 6 are quite small, suggesting that unions have very little effect on the decision to become noncompliant. Unions active in labor rights are the only ones with statistically significant coefficients, and these are both positive (in columns (1) and (3)). The positive coefficients suggest that the presence of these unions increases the likelihood of the decision to become noncompliant, which is a result that merits additional research.

Finally, we also include controls for the financial crisis (June 2008-December 2009) and recovery period (beginning in January 2010 and extending to the end of the sample period). During the financial crisis developed-country demand dropped considerably (Baldwin 2009), causing Cambodian exports to drop sharply, which placed increased pressure on factories. Factory closures increased significantly. The crisis therefore offers an opportunity to consider the effects of an exogenous adverse demand shock. If sustaining improvements is costly to factories, then it is possible that the decision to become noncompliant would become more common during the crisis. A negative estimate could be consistent with positive effects of working conditions such that noncompliance is less attractive during the crisis.

The crisis coefficient estimates in Table 6 are negative, suggesting that the decision to become less compliant became less common during the crisis. These results seem inconsistent with the hypothesis that reversing improvements in working conditions helped factories during adverse economic times because they were burdensome. Given that there were significant productivity improvements in Cambodian apparel factories that occurred along with improvements in working conditions (Asuyama et al. 2010), it seems possible that the two improvements might be related.

One concern about the results in Table 6 is that unobserved firm-specific characteristics could be driving our results. For example, it is possible that more able managers are more likely to be able to make improvements in working conditions increase the productivity of the factory and therefore they are less likely to retrogress. One advantage of our data is that factories are followed over time, which allows us to include factory-specific fixed effects.

Table 7 contains the results that include factory-specific fixed effects. This set of dummy variables (one for each factory) controls for any factory characteristic that is constant over time (such as a manager or factory owner that remains in his/her position for the entire sample). The results with these controls are very similar to those in Table 6, suggesting that Table 6 results are not driven by unobserved factory-specific characteristics. In particular, physically irreversible compliance points and the crisis reduce the decision to become noncompliant. The union variables remain largely insignificant but follow similar patterns as those suggested in Table 6.

CONCLUSIONS

Using data from the BFC program, this paper estimates the rates of, and factors that affect, factory-level decisions to become noncompliant on a very wide range of individual compliance points. The main conclusions from this study are that rates of becoming noncompliant are extremely low among Cambodian garment factories, a result that seems inconsistent with the idea that improvements in working conditions are especially burdensome for factories. The rates of becoming noncompliant are lowest in the areas of Core Labor Standards and Unions. Compensation follows these areas with much lower rates of becoming noncompliant than other areas such as Communication and Workplace systems. The low rates of becoming noncompliant in this area are consistent with the "efficiency-wage" idea that offering consistent compensation to workers may help improve productivity and increase factory performance.

The results identify several factors that may affect a factory's decision to become noncompliant with a very large number of working conditions. An important determinant of a factory's decision to become noncompliant is adjustment costs. Compliance areas that require an investment, or that are costly to reverse, are less likely to be reversed. While this may seem like a trivial point, the implication of this is that there are points that might be beneficial to the factory (that would bring the benefits that compliance brings), but not implemented by the factory because of the certainty of the cost and the uncertainty of the benefit combine to make managers hesitant to implement such changes. When given additional incentive to make these investments, such as through the Better Factories program, factories may "take the leap" and then later discover that the changes were indeed beneficial. The large and growing investment

literature focusing on the dynamic effects of irreversibility suggest that the strategic implications of the effects of irreversibility merit attention in future research.

In terms of policy recommendations, this paper has important implications. Although improving human resource policies may have positive benefits for the factory, they may not be implemented if factories are certain about the one-time costs of implementing such improvements but are uncertain about the benefits. If this is the case, and the results in this paper are consistent with this hypothesis, then the policy implication is that subsidizing one-time investments and sharing information about the specific reforms that factories have tried and have proven to be beneficial would help other factories overcome these obstacles and lead to more beneficial improvements in working conditions.

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Table 1: Factory Visits by Year

	Visit Year									
Visit	2001	2002	2005	2006	2007	2008	2009	2010	2011	Total
1	85	34	7	188	30	37	27	20	18	446
2	0	0	18	122	136	34	28	16	6	360
3	0	0	0	48	186	33	24	27	5	323
4	0	0	0	0	80	152	27	20	11	290
5	0	0	0	0	11	112	82	24	12	241
6	0	0	0	0	0	38	102	42	12	194
7	0	0	0	0	0	0	52	75	20	147
8	0	0	0	0	0	0	11	43	28	82
9	0	0	0	0	0	0	0	13	12	25
10	0	0	0	0	0	0	0	3	2	5
Total	85	34	25	358	443	406	353	283	126	2,113

Notes: Data are missing for 2003-2004 because BFC monitors concentrated on previously-identified issues rather than completing a full evaluation. See text for details.

Table 2: Regression Summary Statistics
31 Compliance Groups

Group	2006	2008	2010
Forced Labor	0.357	0.005	0.000
Sexual Harassment	0.065	0.051	0.015
Strikes	0.000	0.000	0.000
Accidents/Illnesses Compensation	0.224	0.024	0.038
Unions	0.006	0.008	0.004
Discrimination	0.077	0.141	0.160
Internal Regulations	0.047	0.060	0.042
Child Labor	0.071	0.035	0.027
Collective Agreements	0.200	0.244	0.262
Liaison Officer	0.394	0.301	0.297
Disputes	0.371	0.252	0.247
OSH Assessment/Recording/Reporting	0.377	0.320	0.224
Machine Safety	0.229	0.157	0.152
Shop Stewards	0.006	0.000	0.000
Discipline	0.135	0.089	0.049
Emergency Preparedness	0.076	0.024	0.046
Maternity Benefits	0.207	0.236	0.335
Drinking Water	0.231	0.146	0.110
Information About Wages	0.331	0.352	0.338
Regular Hours/Weekly Rest	0.408	0.211	0.156
Food	0.254	0.266	0.278
Contracts/Hiring	0.255	0.190	0.274
Holidays/Annual/Special Leave	0.284	0.214	0.300
Health/First Aid	0.089	0.122	0.125
Sanitation	0.408	0.325	0.319
Workplace Operations	0.284	0.206	0.163
Termination	0.341	0.306	0.285
Overtime	0.147	0.257	0.236
Payment of Wages	0.067	0.030	0.000
Chemicals	0.396	0.263	0.202
Temperature/Ventilation/Noise/Light	0.148	0.230	0.198

Notes: OSH denotes "Occupational Safety and Health." These measures are calculated by taking the average of the binary compliance indicators across individual questions within each group and across all existing factories in the sample for each year.

Table 3: Groupings Resulting from Factor Analysis

Factor 1: Communication and Workplace Systems	Factor 4: Compensation
6 Shop Stewards	10 Payment of Wages
7 Liaison Officer	11 Contracts/Hiring
23 Workplace Operations	16 Internal Regulations
	29 Accidents/Illnesses Com
Factor 2: Occupational Safety and Health	30 Holidays/Annual/Special
17 Health/First Aid	31 Maternity Benefits
18 Machine Safety	
19 Temperature/Ventilation	Factor 5: Unions
20 Drinking Water	4 Collective Agreements
21 Sanitation	5 Strikes
22 Food	8 Unions
24 OSH Assessment/Recording	14 Sexual Harassment
25 Chemicals	15 Disputes
26 Emergency Preparedness	
Factor 3: Modern HR Practices	Factor 6: Core Labor Standards
9 Information About Wages	1 Child Labor
12 Termination	2 Discrimination
13 Discipline	3 Forced Labor
27 Overtime	
28 Regular Hours/Weekly Rest	

Table 4: Aggregate Regression Rates for Underlying Factors

Factor	2006	2008	2010
Communication and Workplace Systems	0.095	0.278	0.332
Occupational Safety and Health	0.142	0.451	0.488
Modern HR Practices	0.159	0.421	0.495
Compensation	0.115	0.392	0.392
Unions	0.142	0.116	0.085
Core Labor Standards	0.176	0.052	0.014

Notes: The individual factors are comprised of various groups as described in Table 3.

Table 5: Regression Main Factor Groups
Question-level Linear Probability Model

VARIABLES	(1) Means Full sample	(2) Means Buyer type=1	(3) Means Buyer type=3
Communication and Workplace Systems	0.040***	0.037***	0.040***
	[0.001]	[0.002]	[0.002]
Occupational Safety and Health	0.044***	0.039***	0.041***
	[0.001]	[0.002]	[0.002]
Modern HR Practices	0.036***	0.033***	0.034***
	[0.001]	[0.002]	[0.002]
Compensation	0.027***	0.022***	0.026***
	[0.001]	[0.001]	[0.001]
Unions	0.010***	0.008***	0.010***
	[0.001]	[0.001]	[0.001]
Core Labor Standards	0.007***	0.006***	0.009***
	[0.001]	[0.001]	[0.002]
Observations	459,589	128,605	141,991

Notes: Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.10

Table 6: Regression Main Factors with Controls

VARIABLES	(1) Full sample	(2) Buyer type=1	(3) Buyer type=3
Communication and Workplace Systems	0.052***	0.039***	0.051***
	[0.003]	[0.005]	[0.004]
Occupational Safety and Health	0.059***	0.043***	0.055***
	[0.003]	[0.004]	[0.004]
Modern HR Practices	0.046***	0.033***	0.043***
	[0.003]	[0.005]	[0.004]
Compensation	0.038***	0.022***	0.035***
	[0.003]	[0.004]	[0.004]
Unions	0.019***	0.008*	0.018***
	[0.003]	[0.004]	[0.004]
Core Labor Standards	0.017***	0.005	0.017***
	[0.003]	[0.004]	[0.004]
Reputation-sensitive buyer	-0.006***		
	[0.001]		
Physically irreversible compliance point	-0.015***	-0.014***	-0.017***
	[0.001]	[0.002]	[0.002]
Union active in labor rights	-0.004*	-0.001	-0.007*
	[0.002]	[0.004]	[0.004]
Small unions possibly controlled by management	-0.005*	-0.001	-0.009*
	[0.003]	[0.006]	[0.005]
Unions known to be politically affiliated	-0.013***	-0.006	-0.026***
	[0.004]	[0.004]	[0.005]
Large unions known to serve management	0.001	0.004	-0.001
	[0.003]	[0.006]	[0.005]
Public Disclosure Period	0.030***	0.020***	0.033***
	[0.004]	[0.007]	[0.007]
Crisis Period	-0.007***	-0.003	-0.010**
	[0.002]	[0.004]	[0.004]
Recovery Period	-0.006**	-0.003	-0.004
	[0.002]	[0.004]	[0.005]
Observations	445,817	122,322	139,324

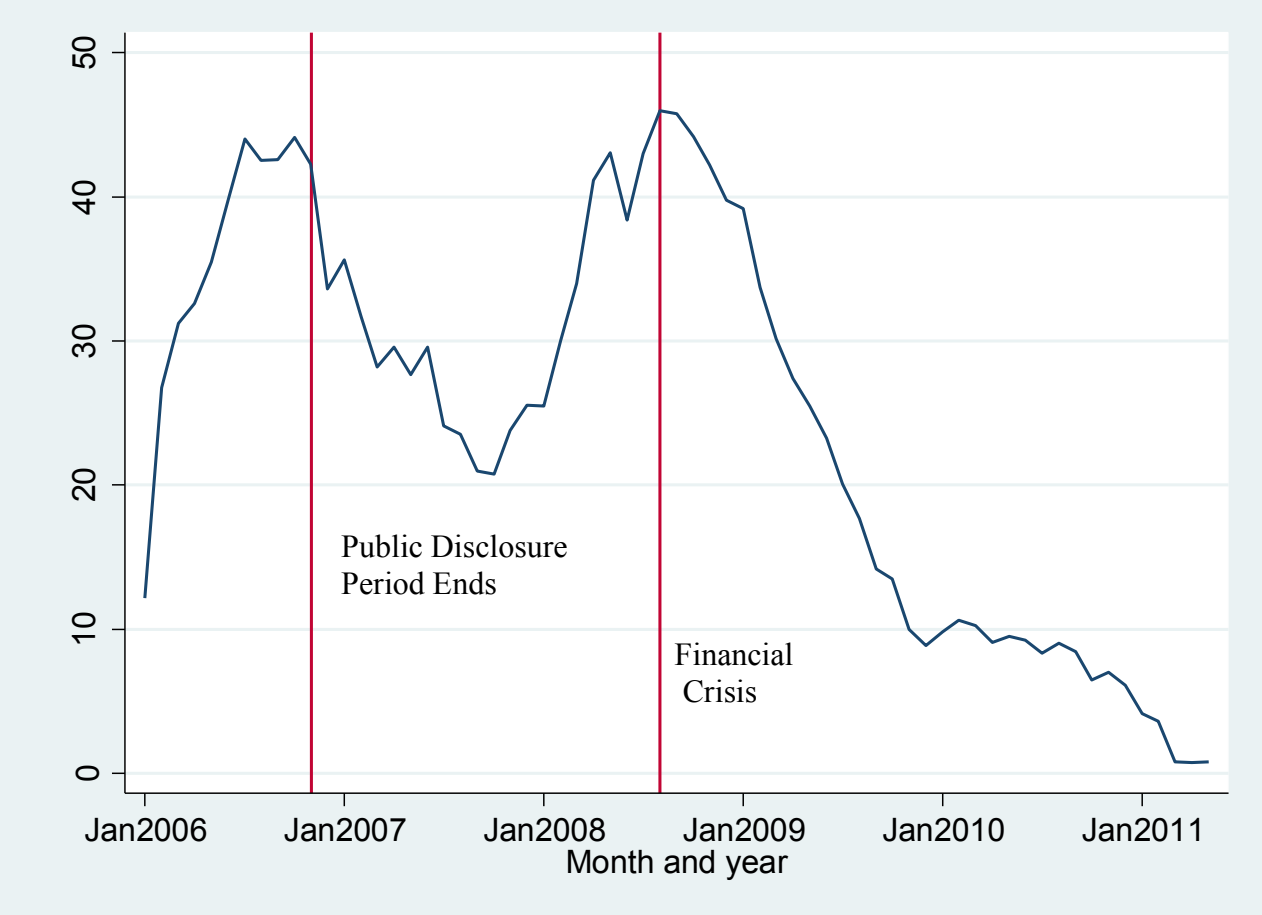
Notes: Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.10. Buyer types are explained in the text.

Table 7: Factory-level Fixed Effects

VARIABLES	(1) Full sample	(2) Buyer type=1	(3) Buyer type=3
Communication and Workplace Systems	0.060***	0.036***	0.056***
	[0.005]	[0.005]	[0.003]
Occupational Safety and Health	0.067***	0.040***	0.060***
	[0.005]	[0.004]	[0.003]
Modern HR Practices	0.054***	0.030***	0.049***
	[0.005]	[0.005]	[0.003]
Compensation	0.046***	0.019***	0.040***
	[0.005]	[0.004]	[0.003]
Unions	0.028***	0.004	0.023***
	[0.005]	[0.005]	[0.003]
Core Labor Standards	0.025***	0.002	0.022***
	[0.005]	[0.005]	[0.003]
Physically irreversible compliance point	-0.015***	-0.014***	-0.017***
	[0.001]	[0.002]	[0.002]
Union active in labor rights	-0.003	-0.004	-0.005
	[0.003]	[0.005]	[0.005]
Small unions possibly controlled by management	-0.004	-0.004	-0.002
	[0.003]	[0.006]	[0.005]
Unions known to be politically affiliated	-0.018***	0.002	-0.019***
	[0.004]	[0.004]	[0.004]
Large unions known to serve management	0.003	0.003	0.002
	[0.004]	[0.006]	[0.005]
Public Disclosure Period	0.032***	0.026***	0.036***
	[0.004]	[0.008]	[0.006]
Crisis Period	-0.005**	-0.003	-0.006
	[0.003]	[0.005]	[0.004]
Recovery Period	-0.003	-0.003	0.000
	[0.003]	[0.004]	[0.005]
Observations	445,817	122,322	139,324

Notes: Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.10

Figure 1: Chow-type Test for Structural Break
General Definition of Regression



[i] Some regulations seem to push factories so far from their optimal practices that they increase the probability of closure (Biørn et al. 1997). There are very few papers that examine the link between factory survival and improvements in working conditions; Harrison and Scorse (2010) is one notable exception.
[ii] Prominent examples include Polaski, 2004 and 2006, Berik and van der Meulen Rogers 2010, Oka 2010a. More information can be found at http://www.betterfactories.org/.
[iii] The principle-components factor method is a common alternative, but this method assumes that the commonalities are equal to one. The average of our uniqueness estimates is just over 0.65, and the principle-components method is most appropriate for uniqueness values close to zero. In our case, therefore, the principle components analysis is probably not appropriate.
[iv] Brown et al. (2011b) examine improvements in working conditions and factory survival in Cambodian apparel factories.