Lights On: Transparency and Compliance

Evidence from Cambodia

29
DISCUSSION PAPER

JANUARY 2019

Raymond Robertson

International Labour Organization

IFC International Finance Corporation WORLD BANK GROUP

BetterWork

ILO CATALOGUING IN PUBLICATION DATA

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Evidence from Better Factories Cambodia

International Labour Office

clothing industry / clothing worker / factory / working conditions

January 2019

First published JANUARY 2019

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Printed by ILO

Lights On: Transparency and Compliance: Evidence from Better Factories Cambodia

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JEL Codes: J8, J5, J3

Abstract: The author uses repeated factory-level compliance data from the Better Factories Cambodia program to evaluate the change in compliance with labor law and international standards after a return to public disclosure. Using a difference-in-difference approach that is often applied to control for endogeneity, the author finds that compliance improved following the implementation of transparency. The change does not appear to be correlated with higher compliance in the least-compliant firms, but does appear to be correlated with higher compliance in a group of 21 critical compliance areas that represent fundamental worker rights.

Finding ways to improve working conditions in global value chains is a policy priority for governments, international organizations, unions, corporations, and non-governmental organizations (Elliott and Freeman 2003; Jammulamadaka 2013). Indeed, some have suggested compliance is necessary to integrate into global value chains (Oka 2010a; Davide et al. 2016). Examples of poor conditions and proposed solutions are numerous. Some have suggested that the potential for audits alone to improve conditions is limited (Locke et al. 2006; Sinkovics et al. 2016), and that audits in combination with other measures have a higher chance of success.

One possible other measure is transparency. Transparency in this context implies making factory-level audit information publicly available. The argument for transparency has roots in Louis Brandeis's 1913 Harper's Weekly article that extolls the potential benefits of publicity. In theory, transparency increases the benefits of compliance (because consumers and other stakeholders who value compliance may accurately reward compliant firms) and increases the costs of non-compliance through direct and indirect channels.[1]

While theory suggests that transparency can induce rule-following, there is limited evidence of the application of transparency to compliance with labor law and international labor standards. One recent prominent example comes from the Better Factories Cambodia program. The BFC program has been widely studied since its initial 2001 implementation. Studies have generally found a positive relationship between program participation and working conditions (Polaski 2006; Beresford 2009; Miller et al. 2009; Adler and Woolcock 2010; Berik and van der Meulen Rodgers 2010; Oka 2010a, 2010b). By engaging multiple stakeholders, the program has been accredited with significant improvements in working conditions and factory compliance (Shea et al. 2010; Brown et al. 2016).[2]

The BFC program, now held up as a model approach that has spread to at least seven other countries,[3] combines monitoring, remediation, and training. Between 2001 and 2006, the program also included public disclosure. Ang et al. (2012) find that the end of public disclosure in 2006 adversely affected compliance. BFC returned to public disclosure in October 2013 and announced in January 2014 that public disclosure on line would begin in March 2014. The goal of this paper is to estimate the changes in compliance around the return to public disclosure in 2014.

The return to disclosure was multifaceted, focusing on critical areas of compliance (across all factories), least compliant factories (across all areas), and strikes. I focus on the first two and addresses several questions with regards to changes in compliance, such as: Has compliance in the factories affected by the transparency program increased or decreased relative to compliance changes in factories less affected? Have the changes in compliance with critical issues been greater than in other compliance areas? Do the changes following the return to public disclosure depend on the comparison group?

The empirical analysis reveals that compliance increased in the critical areas of compliance, but that the program was not associated with rising compliance among the least compliant firms. As demonstrated in the empirical analysis, low-compliant firms are firms that struggle generally. The empirical analysis does, however, show that engagement with international

[1] For a more thorough presentation of the relevant theory, see Ang et al. (2012).

[2] Other studies focus on other aspects of Better Work. Bair (2017) focuses on Better Work Nicaragua and illustrates how this hybrid governance structure has worked there. Posthuma and Rossi (2017) extend the idea of supranational governance of global value chains more generally using Better Work as an example.

[3] The BFC program evolved into a global Better Work program that now operates in Indonesia, Vietnam, Bangladesh, Nicaragua, Jordan, Haiti, and Nicaragua. The Lesotho Better Work program ended in 2016. See www.betterfactories.org.

buyers is associated with a much larger improvement in compliance than that found in more compliant firms. This result suggests that international buyers may be able to play a significant role in improving working conditions in value chain producers in developing countries.

The BFC Transparency Program

The BFC Transparency Program officially began in October 2013. The BFC program implemented the change after months of discussion with factory representatives (such as the Garment Manufacturer's Association of Cambodia, GMAC) and other stakeholders. The factories and subscribing buyers began to receive reports in December 2013, and the first posting went live in March 2014.

The transparency program contains three key components: Critical Areas (which focuses on areas of compliance across all factories), Low Compliance (which focuses on the least-compliant factories), and Strikes. To focus on fundamental worker rights, BFC identifies 21 measured aspects of working conditions and labels them "Critical Areas." Table 1 contains the full list of compliance areas to put the 21 Critical Areas in context.[4] Since these Critical Areas are considered to be fundamental worker rights, BFC considers these 21 areas to be the "minimum requirement" that a factory is expected to maintain. The list of 21 Critical Areas was populated following discussions between BFC, the Better Work Global staff, brands, unions, and other stakeholders. Each of the 21 critical areas has a legal foundation that comes from either local labor law, international standings, or signed memorandums of understanding (MOU).

The second component of the transparency program is titled "Low Compliance" and represents overall compliance in 52 measured areas that include an additional 31 issues besides the 21 fundamental worker rights described above. Table 1 contains the list of 52 issues, of which the first 21 issues are the Critical Areas discussed in the previous paragraph. The compliance of factories in the 52 issue areas is assessed for each factory, and factories whose average compliance in these areas that fall two standard deviations below the mean are considered to be the low compliant factories. The two-standard-deviation criterion comes from statistics, where, in a normal distribution, 95% of the values fall within two standard deviations from the mean. Values beyond two standard deviations are generally considered to be true outliers in the sense that it is very unlikely (actually there would be only a 2.5% chance) that factories would fall into this group by chance if they were actually complying at an "average" level.

The third category for the transparency program relates to strikes. The transparency program also evaluates union and workers' representatives' compliance with legal requirements for strikes. Unions, therefore, are also included in the transparency database. For this sake of this study, however, we focus on the first two categories (Critical Issues and Low Compliance) because this study focuses on factory compliance.

According to the BFC Transparency Database Report (9th Cycle, available at http://betterfactories.org/transparency/pages/view/17), the percentage of factories with compliance with critical issues increased from 30 to 46%. The number of violations on 21 critical issues fall from 281 to 196. Many categories demonstrated improvements, including emergency drills, open emergency exits, and having one complete and accurate payroll. Furthermore, the percentage of low-compliance factories fell fairly consistently since November 2013.

[4] Note that BFC also gathers data on a number of other areas beyond the 52 listed in Table 1. Later in the paper these other areas are grouped into a single 53rd group.

These simple summary statistics help frame the program and indicate increased compliance following the implementation of transparency. To go into more depth and answer the questions posed in the introduction, we first describe the compliance data.

Data

In some ways, Better Work and BFC are similar to other auditing programs. During unannounced visits, monitors assess working conditions in exporting garment factories. Local monitors are trained and employed to carry out the assessments. Monitoring teams contain at least two people who rarely assess the same factory twice. In Cambodia, monitors use an instrument containing several hundred questions designed to evaluate conditions and wage requirements relative to national law and international standards. Based on this comparison, BFC makes decision about whether or not the factory is compliant on each question. For this study, we take the BFC assessment as the measure of compliance and do not evaluate (second-guess) their compliance decision.

Unlike in other countries, the Cambodian government required BFC program participation for permission to export. Factory visits in the early waves were intended to identify significant violations with the goal of using follow-up visits to identify progress in problem areas. As a result, early records are less complete than later visits. Later visits began with the launch of an improved Information Management System (IMS) survey in December 2005. Monitors subsequently visited each factory approximately every eight months.Factories are followed over time through repeated visits. New factories enter and some factories close. To show how factory counts change throughout the BFC program, Table 2 shows the number of factories by year from 2001 to 2017 for which we have compliance data. Data collection in the first waves (2001-2002) included full audit instruments. In the three years that followed (2002-2005) factory visits focused on addressing low-compliance areas that were identified in the first wave. As mentioned earlier, this approach meant that fewer factories have available compliance data. In 2006 a new system was implemented and full audits were conducted in every visit starting in 2006. The slight drop in 2017 reflects the fact that, at the time of this analysis, data are available through October 2017. It is also important to note that the factory counts include both new and revisited factories.

Table 2 also shows the mean compliance across all questions and factories without controlling for any potentially relevant variables. The mean compliance in Table 2 is therefore the simple arithmetic average of the 0/1 compliance variable taken over all questions and all factories within each year. Since 1 indicates compliance (and 0 noncompliance), the higher numbers in Table 2 indicate higher average compliance. Note that the compliance averages rise between 2002 and 2010 but at a slower rate after 2006 (Ang et al. 2012). From 2011 to 2017, overall average compliance rates fall.

The data set tracks plants over time. Table 3 shows the factory counts by year and visit number to illustrate the fact that the data includes factories with a range of experience with BFC. New firms may have different average compliance, or factories may change compliance as they age. Table 3 shows that the data have variation along both dimensions, which helps identify the effects of the transparency program on compliance. Table 3 also shows that apparel factories close often, which means that changes in the composition of factories may also affect mean compliance rates. Brown et al. (2011) find that improving working conditions between the first and second visits is associated with a higher probability of plant survival. The table also shows factories are not visited necessarily once per year; they may be visited twice in a given year. Data for 2017 run

through October, which explains why the number of factories is smaller in 2017 than in other years. These points, shown in Table 3, suggest that the data contain variation along the dimensions thought to affect compliance (age, number of visits, and time).

Changes in the assessment instrument over time, required to accommodate learning and shifting emphasis, makes tracking individual questions difficult. Question codes were changed more frequently than individual questions: the same questions would be encoded differently over time. The resulting question set for this study was then restricted to just questions that directly imply compliance and could be consistently tracked through time. For example, questions such as "How many office staff are employed by the factory?" are not included as compliance questions. The information in the continuous questions (not 0/1 compliance) was saved as part of the plant characteristics when appropriate and dropped in other cases. To maximize compatibility and to compare questions over time, the individual questions from each instrument were matched manually. The match was reviewed by BFC staff. Questions that could not be consistently matched through time were dropped from the dataset.

To maximize comparability over time, we classify compliance questions into 52 compliance categories described in Table 1 (and put the rest of the compliance questions into a 53rd category labeled "all other questions"). For some exercises, presenting compliance for 53 categories is not very practical. There are many ways to group individual questions. Table 4 contains a list of 21 "Critical Issues" that BFC currently identifies. To simplify the presentation of the analysis, the 21 critical issue areas are grouped into seven Critical Issue Groups (CIGs) that are described in the right-hand side of Table 4. The label of each group is used in the remainder of the paper to identify each group in the results tables. Questions that do not fall into one of the CIGs are grouped into a category labeled as "Other" or, in Table 5, "Not 21 CI".[5]

The number of total observations in each category is shown in Table 5. The number of observations is the product of the number of compliance categories times the number of factories times the number of time periods for each factory. The CIGs are clearly a minority of the total available questions, as shown by the much higher number of observations in the first category. Some categories are quite specific (such as Safety Guards, S_Guards in Table 5) and therefore only have a few relevant questions. Others, such as the core labor standards, include a very wide range of questions.

Table 5 also summarizes compliance for each CIG to show that compliance rates for the CIGs are generally higher than for non-CIGs. The higher rates are important for the current question because they suggest that the BFC focus on these areas may lead to higher compliance. The one exception is in the Emergency category, which includes Emergency Drills, Doors Unlocked, and Doors Sufficient. The "Bonuses" category also has lower than average compliance rates. Both the Emergency and Bonus categories stand out in later results.

The core labor standards category has nearly perfect compliance and varies little over time. It is important to note that some of the issues, such as child labor and forced labor, have very high compliance rates because these issues are "zero tolerance" issues for many, if not all, buyers. Therefore, when data do exist, they show very little variation either over time or across factories because they are nearly always compliant. Others, such as unions and minimum wages also exhibit over 96% average compliance.

[5] The grouping collapses the individual issue areas into groups using the unweighted arithmetic average of compliance scores. While using identical weights (that is, using no weights) imposes the assumption that all categories are valued equally, alternative weighting schemes would require additional justification that would go beyond the scope of the paper.

Table 2 suggests that average compliance is falling over time. From a statistical perspective, there are two main (not mutually exclusive) reasons why average compliance may change over time. The first is that firms may enter or leave the sample who have higher or lower-than-average compliance. To consider the effect of entering and leaving, Figure 1 shows the change in compliance for firms during their first visit for each year from 2001 and 2016 (note the that the numbers along the X-axis are years, so that 1 represents 2001). Figure 1, therefore, shows compliance for new factories. The box-and-whisker plots in Figure 1 show the median, 25th, and 75th percentiles of compliance by year. Figure 1 shows that compliance increased greatly between 2001 and 2010. Median compliance fall a bit between 2009 and 2016, but the change is small relative to the whole sample. Figure 1 also shows that the range of compliance is increasing since 2010.

The second possibility is that firms change their compliance over time. Figure 2 shows the compliance by BFC visit. Previous research (e.g. Ang et al. 2012) show that most of the change in compliance occurs between the first and second visit. It is also possible that the BFC program pays more attention to firms with very low compliance than to firms with higher compliance. Figure 2 shows that in the first visit, the median compliance is lower than in subsequent visits, but the main feature of Figure 2 is that there are many low compliance scores in the first visit and that these lower scores tend to disappear as visits increase. While the spread increases around the 10th visit, in general the lower values are much closer to the median than during early visits. This result suggests that participating in the BFC program increases compliance, especially for the firms with lowest initial compliance, which has been cited in other studies as evidence of the effectiveness of the BFC program.

Figures 1 and 2 show falling compliance near the end of the sample, whether this is measured in average compliance, new factory compliance, or factory visit. A natural question that arises with this research question is whether or not there was a noticeable change in the pattern of compliance around the time of the policy change. For example, did some categories seem to go from falling compliance to rising compliance? Since the focus on the transparency program was on low-compliance areas, did the low-compliance areas become more compliant?

One way to answer this question is to estimate the change in the compliance trend over time for different categories. Table 6 contains the results from the trend break tests in the form of reporting the dates at which the series change direction.[6] None of the trend breaks occur in the first quarter of 2014, when the change occurs. Of the eight categories, five exhibit breaks after the change in policy. The change for the Unions category comes very early. The change that occurs closest to the policy change is in the Emergency category – around the third quarter of 2013. It is also important to note that the Emergency category had the second-lowest mean compliance and may suggest that BFC resources are directed towards addressing low-compliance areas.

The main message from the trend break analysis is that two categories seem to change from a negative trend to a positive trend: Emergency and Bonuses. As mentioned above, these two are two of the lowest-compliance categories. The estimated trend breaks for these two categories are closest to the return to transparency, which is probably explained by the BFC focus on low-compliance categories. Higher-compliance categories, such as Water and Safety Guards, have consistent downward trends that do not seem to change around the time of the policy change. Thus, there is informal evidence suggesting that the change in transparency, as it was specifically implemented, was correlated with changes in firm-level compliance behavior. In the next section, we apply more formal techniques that account for unobserved factors that might also contribute to

[6] A full description of this approach is found in Appendix A.

compliance.

Analysis

The goal of this paper is to assess changes in the patterns of compliance after the return to transparency. The difference-in-difference technique from the program evaluation literature is a well-accepted approach that addresses concerns about potentially endogeneity. In this section, we first describe the technique and then present the results.

Difference in Differences

One of the concerns about estimating the effect of a program is that unobserved factors (such as management quality) might affect the outcome that is hypothesized to be linked to an external policy change. That is, endogeneity might arise if firms become more compliant after the return to disclosure for reasons other than disclosure (for example, they may have management that was more likely to become compliant for other reasons). The intuition if the difference-in-difference approach is that the effect of a program, such as the implementation of transparency, would change the difference between the targeted group and the rest of the sample. As long as unobserved characteristics that might affect compliance of the factories remain constant, the change in that difference, also called the difference in the difference, is often considered to be the effect of the program in the program evaluation literature.

In the program evaluation literature, such as that reviewed by Imbens and Wooldridge (2009), focuses on the importance of accurately identifying the most relevant comparison group. Simple "before and after" assessments can lead to inaccurate results when selection is important. Comparing "participants" with "non-participants" after the program is problematic because program "participants" may be different (e.g. endogenously selected), and it is possible, and perhaps even likely, that such differences (and not the program per se) explain differences in post-participation outcomes. Imbens and Wooldridge (2009) show that randomized experiments, propensity score matching, and difference-in-difference (DiD) models are three of the most common approaches used in evaluation.

In the absence of a randomized experiment, propensity score matching (PSM) has been considered to be the "gold standard" in program evaluation when selection into the program is made by the participants. The PSM approach identifies non-participants who are "most similar" to participants and therefore the best comparison group. Imbens and Wooldridge (2009) point out, and appeal to Smith and Todd (2005) for support for the argument, that the difference-in-difference (DiD) approach provides an alternative to the PSM approach that addresses the same concern driving the PSM approaches.

The intuition of the DiD approach involves finding a good comparison group. A good comparison group has been elusive for evaluations of Better Work generally and BFC in particular. In the case of transparency in Cambodia, the program design offers two excellent and arguably exogenous comparison groups. Under these conditions, Smith and Todd (2005) find that the DiD approach "did exhibit better performance than cross sectional estimators" in which the cross-sectional estimators include the PSM approach described above.

The two comparison groups follow from the way that transparency was implemented. The first focuses on Critical Areas (for all factories). The comparison group in this case would be compliance in the non-Critical Areas. That is, we ask the question "Did compliance increase in

the Critical Areas relative to the rest of the compliance areas in the transparency period?" The second focuses specifically on low-compliant factories. Here we ask the question "Did the low-compliance factories increase compliance relative to other Cambodian factories?" In the next two sections, we present the analysis for each in turn.

Estimation Issues

The literature on supply chains generally, and BFC specifically, identify four potential confounding factors that might affect the estimation results. The first is changes in the global apparel market. The second is country of ownership. The third is the relationship with international buyers. The last is factory size. Each of these, and how they are addressed in the estimation, are discussed in turn below.

Changing conditions in the global apparel market may affect the ability or desire for firms to improve working conditions. Specifically, falling demand is important because, as Rawanpura and Wrigley (2011) point out, falling demand puts pressure on exporters and may make improving working conditions more difficult. Rawanpura and Wrigley (2011) describe how the pressures of the financial crisis challenged Sri Lankan garment producers. In Cambodia, Beresford (2009) finds that working conditions did not fall in response to an increasingly competitive environment when the MultiFibre Arrangement (MFA) ended at the end of 2004. The end of the MFA increased competition by effectively increasing the number of suppliers that directly competed with each other. The global financial crisis in 2007-2008, however, may have changed the perceived pressure by Cambodian producers through a reduction in demand.

Figure 3 shows the change in the overall mean compliance rate and U.S. apparel imports. In addition to two series moving very closely together, several important features stand out. First, the Great Trade Collapse in 2007-2008 is clearly evident in the U.S. apparel import series. The financial crisis in the United States lead to a reduction in demand for imports, and Cambodia was clearly affected. As with global trade, the import demand quickly recovered. Import demand rises until about 2012, when, with the exception of 2014, U.S. imports from Cambodia fall. The simple (unconditional) correlation between the two is 0.816, which suggests that the correlation between U.S. imports and changes in compliance is high. To control for potential changes in demand over time, the analysis below includes individual year variables.

Ownership can affect compliance decisions. Foreign owners may have more resources and cultural norms that influence the working conditions and compliance decisions of Cambodian factories. As a very rough proxy for parent-company support, Figure 4 compares factories that eventually close and those that survive, low-compliance status, and ownership region. Several interesting patterns emerge. First of all, there are significant differences in patterns across the four panels. Cambodian factories emerge most prominently in the lower right – the panel with factories that close and below to the BFC Low Compliance category. This suggests that domestic factories may have less access to resources and support, and that these resources may be related to compliance decisions. In contrast, the panel in the upper right shows that Hong-Kong-Taiwan-Macao factories most prominently feature as surviving with Low Compliance. To control for the possible effects of region of ownership, we include variables in the regressions that control for country of ownership.

In addition to ownership, having a relationship with a reputation-sensitive buyer also affects compliance decisions (Oka 2010a, 2010b). Reputation sensitive buyers may offer support or incentives to factories to improve working conditions. To illustrate this, Figure 5 shows that there is a clear difference between factories that have a relationship with a reputation-sensitive

buyer and those that do not. Specifically, Figure 5 shows the average compliance rates over time for each of four categories: those with and without a reputation sensitive buyer and those in and out of the Low Compliance group. There are several important results from Figure 5. The first is that compliance rates in the different groups follow similar paths over time. The second is that there is a clear gap between the compliance rates: factories with a reputation sensitive buyer are clearly higher than those without. To control for the possible effects of having a reputation-sensitive buyer, we include a binary variable in the regressions that represents that relationship.

The last potential confounding variable is the size of the factory, which is also included in the regressions that follow. Larger factories may have more resources than smaller factories and, if improving compliance involves high fixed costs (such as installing an air conditioner), larger firms may be more able to afford these fixed costs.

Critical Areas

The other facet of the transparency program is the focus on the 21 critical issues. All factories have their compliance with the 21 critical issues posted on line. As a result, the "treatment" focused on the 21 critical issues and, as long as the factories are not at risk of being listed as a low-compliance factory, factories have a much larger incentive to focus resources at becoming compliant with the 21 critical issues relative to the other 32 categories. Essentially, this means that the rest of the compliance categories are a reasonable comparison group.

To evaluate the effects of the transparency program on compliance with the 21 critical issues, Table 7 presents the results of difference-in-difference regressions. The first row shows the compliance rate in the 21 critical areas relative to the rest of the categories. These coefficients are consistently positive, and statistically significantly so. Compliance in the 21 critical issues is higher, on average, than in other categories, even before the transparency program.

The second row shows the average overall compliance during the transparency program. These estimates are generally close to zero or negative, which is consistent with the falling overall compliance described earlier.

The third row contains the estimates of the effect of the transparency program on compliance with the 21 critical areas. These coefficients are consistently positive and statistically significant. The main implication is that factories significantly improved compliance in the 21 critical areas relative to the rest of the compliance areas during the transparency period. In other words, this result is consistent with the hypothesis that the transparency program effectively increased compliance in the 21 critical areas.

To explore the robustness of the DiD results, the three columns use different comparison groups. The first compares the 21 critical areas to all other categories. The second compares the compliance of the 21 critical areas with the areas not included in Table 1. The third compares compliance in the 21 critical areas with the areas 22-52 listed in Table 1. The results are very intuitive. The largest difference is between the 21 critical issues and compliance in the issues not listed in Table 1. These clearly are lower priorities for BFC than the 52 categories listed in Table 1, and so these results are consistent with factories shifting compliance resources towards the 21 critical issues. The results are robust to the inclusion of the control variables described above (factory size, association with a reputation-conscious buyer, year effects, and region of ownership). The results are also robust to limiting the sample to the 2006-2017 period.

The main message from this section is that the transparency program is strongly associated with increasing compliance for the 21 critical areas. To the extent that the difference-in-difference approach effectively addresses concerns about endogeneity, these results are consistent with the

hypothesis that the return to transparency contributed to increasing compliance in the Critical Areas.

Low-Compliance Factories

The rule for identifying the low-compliance factories, as described above, is that factories that fall two standard deviations below the mean compliance level. These factories are identified on line and given special attention from BFC to help them address compliance issues. Given BFC's decision about which firms meet this criterion, the factories' decisions of compliance after the transparency program, relative to the factories *not* included in this group, offer a good opportunity for evaluation using the rest of the factories as a comparison group. In this context, the DiD approach first asks the question "Did low compliance factories increase compliance more than factories not at risk of being posted on line as part of the low-compliance group?

The implementation of the DiD method is straightforward. Compliance is regressed on a dummy variable indicating membership in the low-compliance group, a dummy variable for the transparency period, and then the interaction between these two, and a group of other control variables (year, size, region, and having a reputation-conscious buyer). The coefficient on the interaction term is the change in compliance in the low-compliance group *relative to the rest of the factories*. The identification comes from the fact that the rest of the factories (those not on the list) did not have the same incentives to improve compliance.

The results of the DiD approach are shown in Table 8. The first column presents the simple results described above. The difference between the low-compliance factories and the rest of the factories prior to the transparency program are shown in the first row. The significant negative result shows that the low-compliance factories were low-compliance factories prior to the transparency program.

The positive coefficient in the second row show that overall compliance improved during the transparency period (although the effects are very small and not generally statistically significant) relative to the overall downward trend captured by the year variables (the year variables results are not shown to save space but are available upon request). The coefficients in the third row are, to the extent that the DID approach addresses endogeneity, the estimated effects of compliance on the low-compliance factories (the treatment group) relative to the comparison group. The coefficients are negative and generally statistically significant. The implication is that the low-compliance factories experienced falling compliance during the transparency program relative to the other factories.

For another comparison, we limit the sample to just factories with below-average compliance. Along with the same caveat about endogeneity mentioned above, the estimated program effects are larger (in absolute value, which means the effects are more negative). One interpretation of this result is that the effects of the transparency program were more positive on those most at risk of being listed (but were not actually listed). The factories below the mean (but above the two-standard-deviation cutoff) have a higher risk of being listed at some point and they may have had an incentive to improve even more than the factories that were already listed.

The results in column 3 compare the factories below the mean but are not in the low-compliance group with the rest of the factories. These factories also exhibit falling compliance following a return to disclosure but much less so than the least compliant firms. One might expect that the risk of being listed might have induced an improvement in compliance, but Table 8 suggests that this is not the cases.

Overall the results in Table 8 are robust to a number of alternative specifications. Neither

result is much affected by the addition of the control variables (that is, these findings are robust to the inclusion or exclusion of the control variables). Additional controls for selection also generate similar results, which suggests that the results are not driven by changes in the composition of the sample over time. The results are also robust to limiting the sample to the 2006-2017 period.

Since the low-compliance factories exhibit falling compliance during the return to transparency, it is important to explore the characteristics of these factories in more detail. Figure 4 shows that the Cambodian factories feature more prominently in the bottom half – factories that are more likely to close. But Cambodian factories are especially prominent in the lower right quadrant, which suggests that domestic factories struggle with both survival and compliance. Of course, factories from other countries are also associated with low-compliance and closed factories.

Figure 5, however, shows that the compliance levels are surprisingly persistent over time. That is, after 2006, the compliance averages for the different groups do not cross. The ranking remains constant even as the averages slightly fluctuate. The category that changes the most in compliance between 2006 and 2017 is the low-compliant factories without a relationship with a reputation-sensitive buyer. In fact, the gap between the reputation-sensitive buyer factories and the others is much larger for the low-compliance group. This gap may suggest that the effect of being associated with a reputation-sensitive buyer may be much larger for the low-compliance factories.

Since compliance rates seem to persist over time, but are falling most for the least-compliant factories, it is also interesting to compare the less compliant firms by size. Figure 6 shows the size of the open and more compliant factories, the low-compliant factories that remain open, and the low-compliant factories that close. Figure 6 shows that the open low-compliant factories seem to fall into two groups: large (around 1100 workers) and small (around 400 workers). Note that the factories that low-compliant factories that have closed fall into the smaller group. That is, the solid closed low-compliant factories are very similar in size to the smaller but open low-compliant factories. In contrast, the open compliant factories tend to be much larger. The policy implication of this pattern is that to improve compliance among the least-compliant factories might most effectively include access to resources and buyers that will help the factories grow. In other words, low compliance may be linked to resources and size (both of which are linked to foreign ownership), and these barriers may be too difficult to surmount with a return to transparency.

Conclusion

Finding ways to improve working conditions in developing countries is a policy priority for many stakeholders, including unions, international buyers, governments, and factory managers. The idea of transparency has been advocated theoretically and has received some empirical support in the literature. This paper evaluates changes in compliance following a targeted program of transparency. The program focused on three main areas: critical issues, low-compliance factories, and strikes. Focusing on the first areas, this paper finds strong and positive results. The return to transparency is associated with a statistically significant (and economically significant) increase in compliance in a group of 21 critical issues that represent fundamental worker rights. In particular, compliance in these areas improved relative to the rest of the compliance issues. The most significant changes around the time of the implementation of the program were those areas that had the lowest prior compliance (Emergency Preparedness and Bonuses). These results are

important both for the program and for the literature more broadly because there are few examples a targeted program like the BFC transparency program that allows for identification of a clear comparison group.

On the other hand, the difference-in-different results suggest that the program was not associated with rising compliance of the low-compliance factories listed on line. In fact, compliance in these factories fell during the transparency period. The falling compliance results are robust to different specifications, control variables, and selection issues. To explore these results in more detail, the paper uses the data to show that the low-compliance factories face a host of problems. Low compliance persists over time and many low compliant factories are similar in size to the low-compliant factories that have closed. Larger low-compliant factories are associated with foreign ownership and may be more likely to survive. Association with a reputation-sensitive buyer is also associated with higher compliance, and this difference is especially stark within the group of least-compliant factories. The policy implications are that addressing low compliance factories may require a wide range of policies that are associated with factory growth, including access to capital and markets, that may go beyond what transparency alone can deliver.

Moving forward, there are several questions that emerge from this research. The first is to track individual factory decisions using an approach such as the regression discontinuity approach or a quantile regression approach. The second is to formally evaluate the survival of the low-compliance factories. Understanding whether or not the low-compliance factories tried increasing compliance as a strategy for survival would help shape transparency programs for other countries into the future.

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Table 1. Transparency Issues and Questions

No.	Cluster	Critical Issues	Sample Questions	Legal Reference
1	Fundamental rights	Child labour is not found, or (where confirmed) is remediated	Is there any indication that the factory employs children below the age of 15? (Based on visual check and random record checks during factory visit)	C 38; LL 177(1, 4) P 307/07
2	Fundamental rights	No forced labour	Is there any evidence of forced (involuntary) labour?	C29, C1, LL 15
3	Fundamental rights	No discrimination against workers during hiring, employment, or termination based on their race, colour, sex, religion, creed, ancestry, social origin, or political opinion	Does management discriminate against workers during hiring, employment, or termination based on their race, colour, sex, religion, creed, ancestry, social origin, or political opinion?	LL 12, C.111
4	Fundamental rights	Women workers are not dismissed or forced to resign due to pregnancy	Does management dismiss pregnant workers or force them to resign?	LL 12; ILO C111
5	Fundamental rights	Women workers are not dismissed, and their employment status or seniority is not changed during maternity leave	Does management dismiss workers or change their employment status or seniority during maternity leave?	LL12, 169, 182, C. 111
6	Fundamental rights	No sexual harassment	Are workers subject to unwelcome conduct of a sexual nature (physical contact, spoken words, or conduct that creates an intimidating or humiliating work environment)?	LL 172, C. 111; C100. LL 12
7	Fundamental rights	Men and women doing work of equal value receive different pay	Are men and women doing work of equal value, but receiving different pay?	LL 12, C. 100
8	Fundamental rights	No discrimination against any worker due to the worker's union membership or union activities (during recruitment, employment or termination)	Has management discriminated against any worker because of the worker's union membership or union activities?	LL 271
9	Fundamental rights	Workers can freely form and join trade unions of their choice	Can workers freely form and join trade unions of their choice?	LL 266, 271, C.87
10	Fundamental rights	The employer has not taken steps to bring the union(s) under its control	Has management taken steps to bring the union(s) under its control?	LL 280, C.87
11	Fundamental rights	A worker's job is not dependent on the worker not joining a union	Is any worker's job dependent on the worker not joining a union?	LL 271
12	Fundamental rights	Management does not interfere with workers or unions when they draw up their constitutions and rules, hold elections, or organize their activities, administration or finances	Does management interfere with workers or unions when they draw up their constitutions and rules, hold elections, or organize their activities, administration or finances?	LL 267, 280, C. 87
13	Fundamental rights	Workers are free not to join a union	Are workers free not to join the union(s)?	LL 273
14	OSH/Emergency	The factory conducts regular emergency evacuation drills (every 6 months)	Does the factory hold regular emergency evacuation drills?	LL 230
15	OSH/Emergency	Emergency exits are unlocked during work hours	Are all emergency exit doors unlocked during working hours, including overtime?	LL 230

16	OSH/Emergency	Sufficient number of emergency exit doors	Does the factory have enough emergency exit doors?	LL 230
17	OSH/Emergency	Proper guards installed on all dangerous moving parts (not including needle guards)	Are proper guards installed on all dangerous moving parts of machines and power transmission equipment? (not including needle guards)	LL 230
18	OSH/Emergency	Water for drinking is clean and sufficient	Does management provide safe drinking water? Does management provide enough drinking water?	LL 229; P.054/00
19	Wages	Minimum wages are paid correctly for all types of workers	Does management pay all workers at least the correct minimum wage for ordinary hours of work?	LL 10, 104; Notice 745/06; LAC Statement, 8 July 2010
20	Wages	Overtime wages are paid correctly for all types of workers	Does management pay all workers correctly for overtime work performed on a normal workday before 22:00?	LL 139; P 80/99; AC 78/04
21	Contracts	Management does not use fixed-term rotating contracts, or otherwise not include the entire period of continuous employment when determining workers' entitlements to maternity leave, attendance bonus, seniority bonus, and/or annual leave	Does management use fixed-term rotating contracts, or otherwise not include the entire period of continuous employment when determining workers' entitlements to maternity leave, attendance bonus, seniority bonus, and/or annual leave?	LL 9, 10, 73, 166, 169; N 017/00
22	Fundamental Rights	Management gets permission from the labour ministry before dismissing union leaders or candidates for union leadership	Does management get permission from the labour ministry before dismissing shop stewards? Does management get permission from the labour ministry before dismissing union leaders or candidates for union leadership?	LL 293, P.305/01
23	OSH/Emergency	Emergency exit doors are accessible	Are all emergency exit doors accessible?	LL 230
24	OSH/Emergency	Access paths are free of obstruction	Are access paths free of obstruction?	LL 229
25	OSH/Emergency	Training to use fire extinguishers (one training/year)	Has management trained enough workers to use the fire extinguishers (both men and women)?	LL 230
26	OSH/Emergency	Fire extinguishers are sufficient	Are there enough regularly serviced fire extinguishers within easy reach of workers?	LL 230
27	OSH/Emergency	Electrical wires and switches are well maintained	Are electrical wires and switches at main electrical switch boxes well maintained?	LL 230
28	OSH/Emergency	Safety warnings are posted on the main electrical switch boxes	Are safety warnings posted on the electrical switch boxes?	LL 230
29	OSH/Emergency	Chemicals are stored properly	Are chemicals properly stored in a separate area of the workplace?	LL 229, 230
30	OSH/Emergency	Chemicals are labelled in Khmer	Are chemical containers properly labelled in Khmer?	LL 230
31	OSH/Emergency	Exhaust ventilation where chemicals are used	Does the factory have satisfactory exhaust ventilation in areas where chemicals are used?	LL 229, 230

32	OSH/Emergency	Proper personal protective equipment is provided	• Does management provide proper clothing and equipment to workers who work with chemical substances? • Does management provide workers with all necessary protective clothing and equipment?	LL 229, 230
33	Wages	Management keeps one complete and accurate payroll	Does management keep only one payroll ledger that accurately reflects the wages actually paid to workers?	LL 39-41; P 269/01; see also R. 85
34	Wages	Sunday and holiday work payments are paid correctly	• Does management pay all workers correctly for work during weekly time off (Sunday)? • Does management pay all workers correctly for work on public holidays?	LL 139; LL 10; LL 164; P 10/99; AC 82/06
35	Wages	Severance payments (5%) are paid correctly	Does management pay workers severance pay equal to at least 5% of the total wages paid under the contract when workers' contracts expire or are terminated?	LL 73, 89, 110
36	Wages	Required bonuses and allowances are paid correctly	• Does management pay all workers who work regularly the correct attendance bonus per month and any other mandatory wage supplements (including health and transportation allowances)? • Does management pay workers the correct seniority bonus? Does management pay all workers the correct meal allowance or give them a reasonable free meal if they work overtime?	N 041/11, 017/00, 745/06; AC 51/07
37	Wages	Wage deductions are legal and authorized	Does management make any unauthorized deductions from workers' wages?	LL 28, 44, 126, 127, 129; see also R. 85
38	Contracts	Workers receive clear written payslips in Khmer	Does management provide clearly written pay slips to workers?	LL 112
39	Hours	Overtime is limited to 2 hours per day and is voluntary	Is overtime voluntary, exceptional, and limited to 2 hours per day?	LL 139, 141(4); P 80/99
40	Hours	Workers are not punished if they refuse to work overtime	Are workers punished if they refuse to work overtime?	P.80/99
41	Leave	Attendance bonuses paid with authorized use of leave	Does management deduct the attendance bonus when workers take annual leave?	LL 168; N 041/11, 017/00, 745/06; AC 62/07

42	Leave	Management gives workers annual leave (paid or unpaid) or annual leave compensation	• Does management give workers any annual leave at all (paid or unpaid) or any annual leave compensation? • Does management give workers at least 18 days of paid annual leave each year? • Does management unreasonably restrict workers from taking annual leave? • Does management give workers an extra day of annual leave for every three years of service? Does management get workers' consent before converting annual leave to cash compensation?	LL 166; N.017/00
43	Leave	Unused annual leave is paid out upon termination	Does management pay workers for their accrued annual leave (when workers resign, their contracts expire, or they are terminated)?	LL 166, 167
44	Leave	Management gives workers paid sick leave	Does management give workers paid sick leave (100% pay for month 1; 60% pay for month 2; 40% pay for month 3; no pay for months 4-6)?	N 14/02; AC 26/03; MOLVT Policy
45	Leave	Women workers get at least 90 days off for maternity leave	Do women workers get at least 90 days of maternity leave?	LL 182
46	Leave	Maternity leave payments are correct	Do women workers who have worked for more than one year get paid for maternity leave?	LL 182, 183; AC 66/06
47	Leave	Workers are allowed to take special leave (paid or unpaid)	Are workers who request special leave allowed to take any special leave at all (paid or unpaid)?	LL 171; P.267/01
48	Collective Disputes	Conciliation agreements are implemented (rights issues)	Has management implemented the conciliation agreement?	LL 307; P.317/01
49	Collective Disputes	Arbitration awards are implemented (rights issues)	Did management implement the arbitration award?	LL 314
50	Indecent Behaviour	Management, including line supervisors, treats workers with respect	Does management, including line supervisors, treat workers with respect?	LL 172
51	Monitoring	Monitors are allowed entry	Was the ILO monitor's access to the factory restricted in any way?	Factory and BFC MoU
52	Monitoring	All documents requested are provided	Were any documents requested by monitors not provided in a timely manner?	Factory and BFC MoU

Notes: This table is copied directly from the BFC Transparency Website and can be found at http://betterfactories.org/transparency/uploads/CI_LC_Issues&Legal_Ref.pdf. MoU stands for memorandum of understanding. LL stands for Labor Law, P. stands for Prakas.

***Table 2*. Factory Count and Mean Compliance**

Year	Number of Factories	Mean Compliance
2001	26	0.748
2002	9	0.713
2003	5	0.793
2004	19	0.790
2005	48	0.843
2006	269	0.827
2007	281	0.928
2008	290	0.929
2009	255	0.936
2010	234	0.938
2011	282	0.933
2012	235	0.920
2013	318	0.914
2014	374	0.920
2015	392	0.908
2016	333	0.900
2017	274	0.886

***Table 3*. Factory Counts by Visit Number**

Visit No.	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	25	6		10	27	205	30	34	25	16	48	32	71	69	61	20	0
2	2	3	4	4	31	98	132	32	29	12	20	29	42	57	56	57	33
3		1		3	9	44	178	39	22	28	11	14	33	41	42	48	40
4				1	3	10	75	140	29	19	25	5	26	25	42	28	36
5					1	6	25	98	77	22	20	22	9	19	24	27	21
6						2	10	44	97	40	23	13	22	12	16	21	19
7							4	12	46	74	45	12	20	20	18	8	19
8								6	21	43	71	23	15	16	18	17	9
9								1	4	23	43	44	29	18	17	18	9
10								1		6	26	27	44	31	14	12	10
11									1		7	21	31	39	24	10	10
12										1	2	3	27	25	35	16	11
13												2	5	22	25	23	13
14													2	8	17	18	14
15														1	13	12	12
16														1		13	11
17															1	2	8
18															1		3
19																1	1

***Table 4*. Critical Issue Areas and Question Groupings**

No.	Label	Full Description	Group	Label
1	Child Labor	No unremediated child labour	1	Core
2	Forced Labor	No forced labour	1	Core
3	Discrimination	No discrimination against workers	1	Core
4	Dismiss Pregnant	No dismissal of pregnant workers	1	Core
5	Dismiss Maternity	No dismissal of workers during maternity leave	1	Core
6	Harassment	No sexual harassment	1	Core
7	Equal Pay	Equal pay for men and women	1	Core
8	Union Discrimination	No discrimination against workers based on union membership	2	Unions
9	Freedom Association	Workers can join and form unions freely	2	Unions
10	Union Control	No control of union by employer	2	Unions
11	Job Not Union Dep	Job is not dependent on union membership	2	Unions
12	Union Interference	No management interference with unions when they draw up their constitutions and rules, hold elections, or organize their activities, administration or finances	2	Unions
13	Free Not Join Union	Workers are free not to join a union	2	Unions
14	Emergency Drills	Regular emergency evacuation drills (two drills/year)	3	Emergency
15	Doors Unlocked	Emergency exit doors are unlocked during working hours	3	Emergency
16	Doors Sufficient	Emergency exit doors are sufficient	3	Emergency
17	Safety Guards	Dangerous machine parts have safety guards (not needle guards)	4	S_Guards
18	Clean Water	Water for drinking is clean and sufficient	5	Water
19	Minimum Wages	Correctly paid minimum wages	6	MinW
20	Overtime Wages	Correctly paid overtime wages	6	
21	Bonuses Accurate	Bonuses, allowances, leaves count entire employment period	7	Bonus

***Table 5*. Summary of Critical Area Groups**

Group	Total Observations	Mean Compliance
Not 21 CI	131,461	0.835
Core	19,076	0.986
Unions	23,328	0.975
Emergency	12,227	0.836
S_Guards	4,416	0.837
Water	4,504	0.946
MinW	4,532	0.963
Bonuses	3,392	0.797
Total	202,936	0.87

Notes: The groups are defined in Table 4. The total number of observations includes all questions and factories included in the sample. The mean compliance is the simple (unweighted) arithmetic average across all factories, time periods, and questions within each category.

***Table 6*. Trend Breaks by Critical Issue Group**

Category	Turning Point
Non-Critical Areas	2012q4
Core	2012q4
Unions	2017q3
Emergency	2013q3
S_Guards	2015q3
Water	2015q3
MinW	2009q2
Paid Bonuses	2014q4

Notes: The turning points are estimated using the second additive outlier model of Vogelsang and Perron (1998), which is a model for identifying the unknown trend break in time series data.

Table 7. Critical Issues Diff-n-Diff Estimates

VARIABLES	(1) Vs All Other Cats	(2) Vs NonCritCats	(3) Vs Cats 22-52
Critical Issues	0.091***	0.033***	0.091***
	(0.003)	(0.002)	(0.003)
Post Program	0.005	-0.010	0.005
	(0.009)	(0.008)	(0.009)
CI x Post	0.026***	0.045***	0.027***
	(0.005)	(0.004)	(0.005)
Constant	0.556***	0.590***	0.611***
	(0.018)	(0.015)	(0.019)
Observations	8,978	8,978	8,964
R-squared	0.267	0.234	0.266

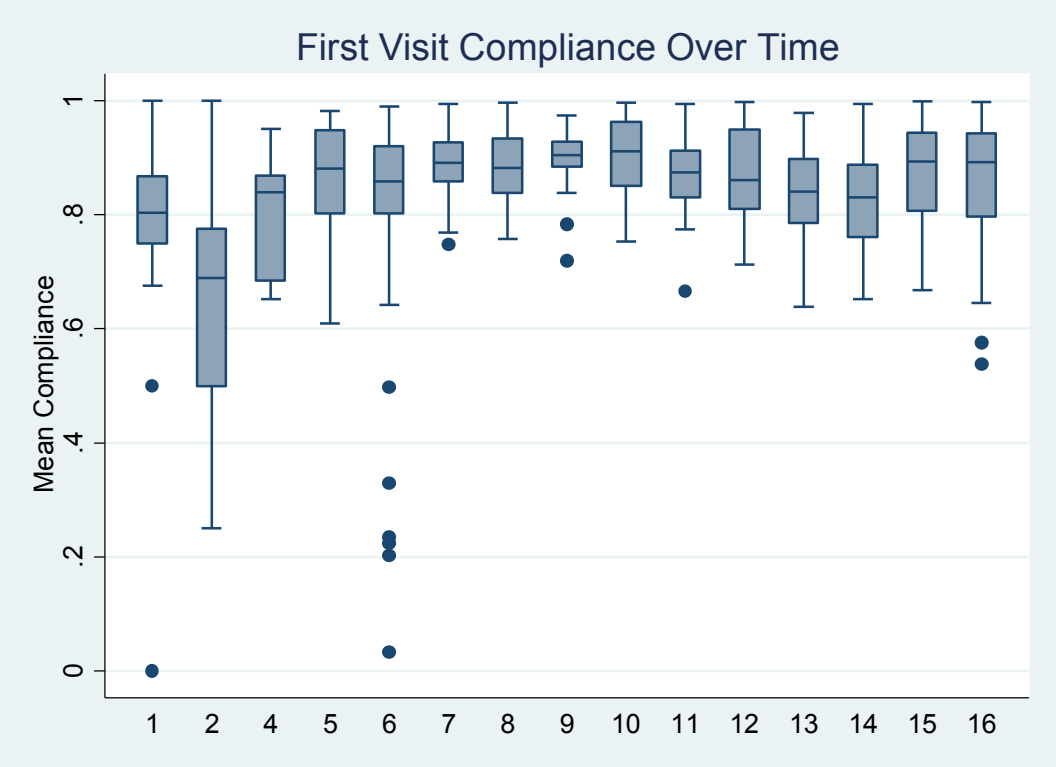
***Notes*:** Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The "CI x Post" is the interaction between the Critical Issues variable and the Post Program variable and represents the difference in difference estimate.

Table 8. Low Compliance Diff-in-Diff Estimates

VARIABLES	(1) Vs All Other Factories	(2) Compared to Below Avg.	(3) Mid Compared to Above Avg.
Group	-0.067***	-0.042***	-0.114***
	(0.008)	(0.009)	(0.003)
Post Program	0.020*	0.024*	0.025***
	(0.011)	(0.014)	(0.009)
Group x Post	-0.036**	-0.057***	-0.014***
	(0.016)	(0.017)	(0.005)
Constant	0.618***	0.608***	0.763***
	(0.022)	(0.028)	(0.018)
Observations	4,492	2,196	4,301
R-squared	0.163	0.172	0.446

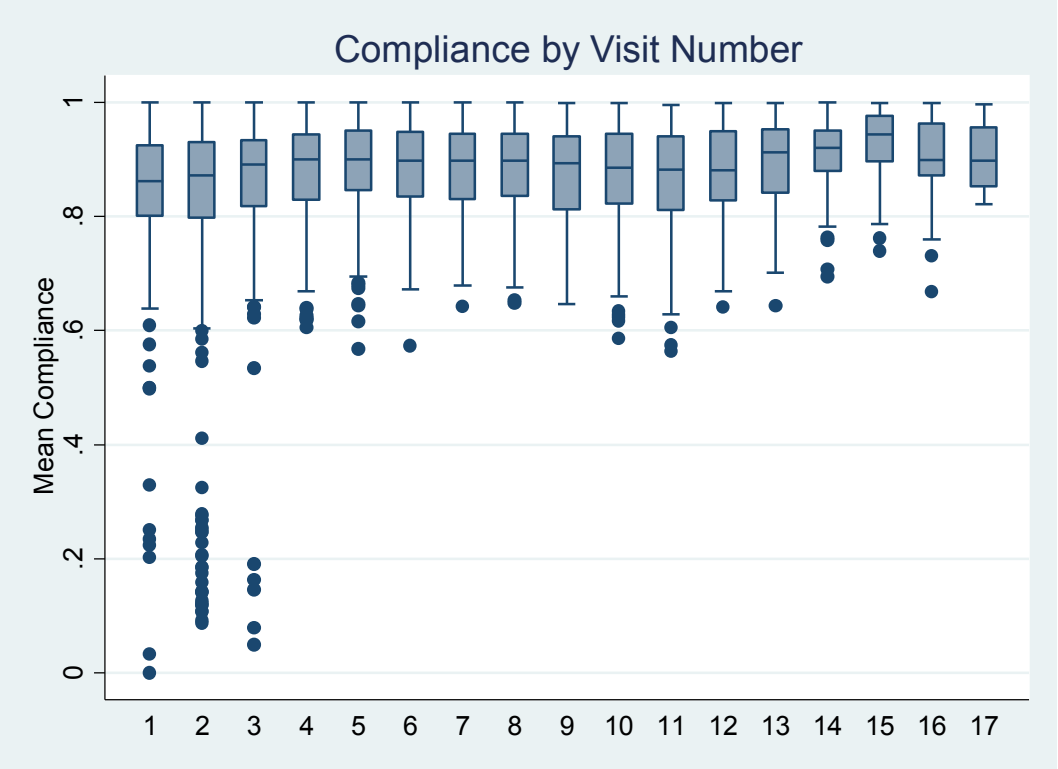
Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The "Group" variable represents the low-compliance factories in columns 1 and 2 and represents factories below the mean who are not in the low-compliance group in column 3. The "Group x Post" is the interaction between the Group variable and the Post Program variable and represents the difference in difference estimate.

***Figure 1*. First Visit Compliance Over Time**



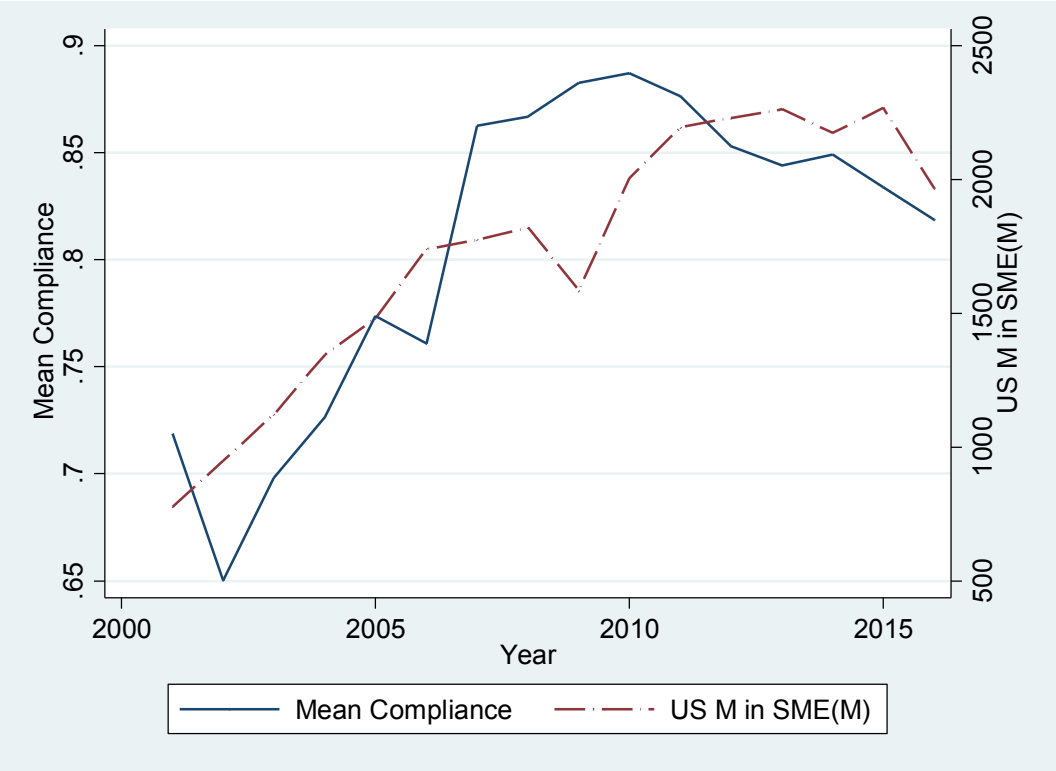
Notes: Standard box-plot interpretation applies. The horizontal line in the middle of the box represents the median and the upper and lower limits of the box represent the 75th and 25th percentile values. The X-axis numbers represent years starting with 2001 and ending with 2016 (1 = 2001).

Figure 2. **Compliance by Visit Number**



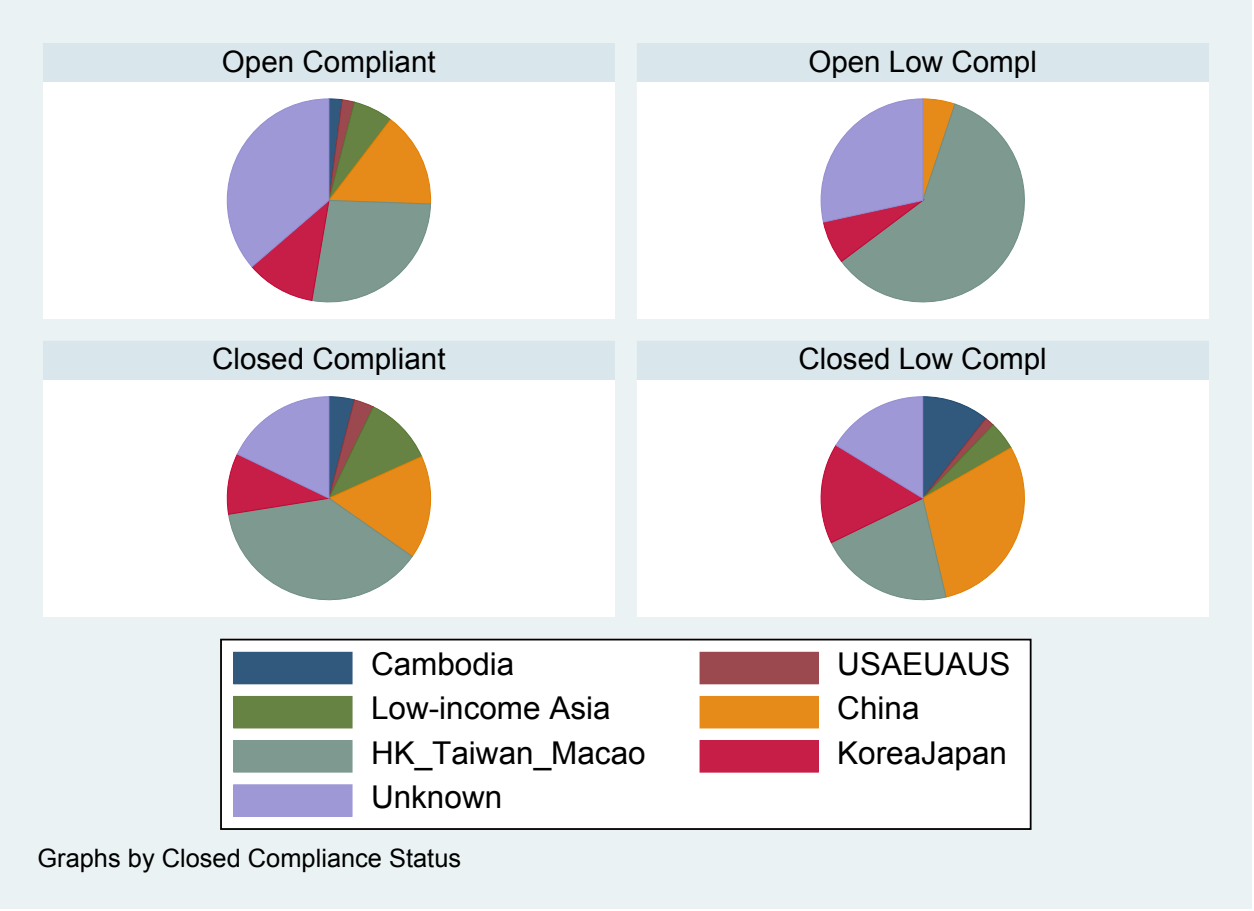
Notes: Standard box-plot interpretation applies. The horizontal line in the middle of the box represents the median and the upper and lower limits of the box represent the 75th and 25th percentile values.

Figure 3. **Changes in Average Compliance and U.S. Apparel Imports from Cambodia**



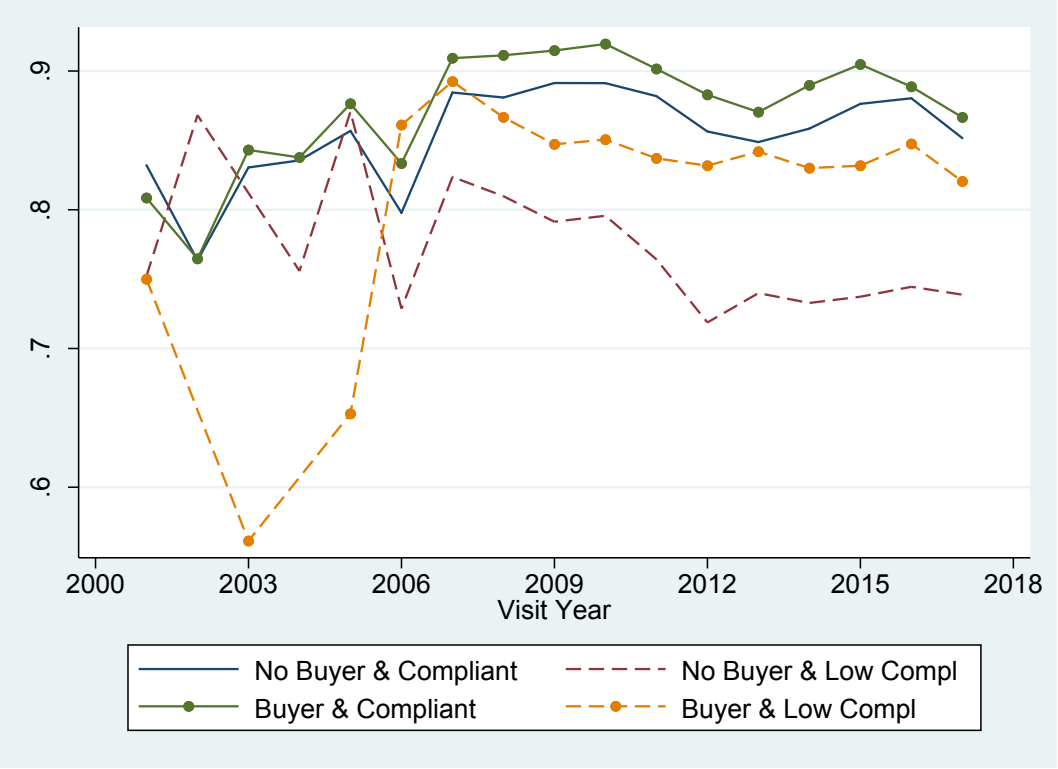
Notes**:** U.S. import data are from the United States Trade Administration's Office of Textiles and Apparel (OTEXA) and are available at http://otexa.trade.gov/. SME(M) means millions of square meter equivalent, which is a measure of volume (not value). The values on the right axis are in millions. "M" stands for "Imports". The share is calculated as total apparel imports from Cambodia (OTEXA categories 0,1, and 2) divided by total U.S. imports in those categories from the world. Mean compliance is the simple arithmetic average across all questions and factories.

Figure 4. **Ownership by Compliance and Operation Status**



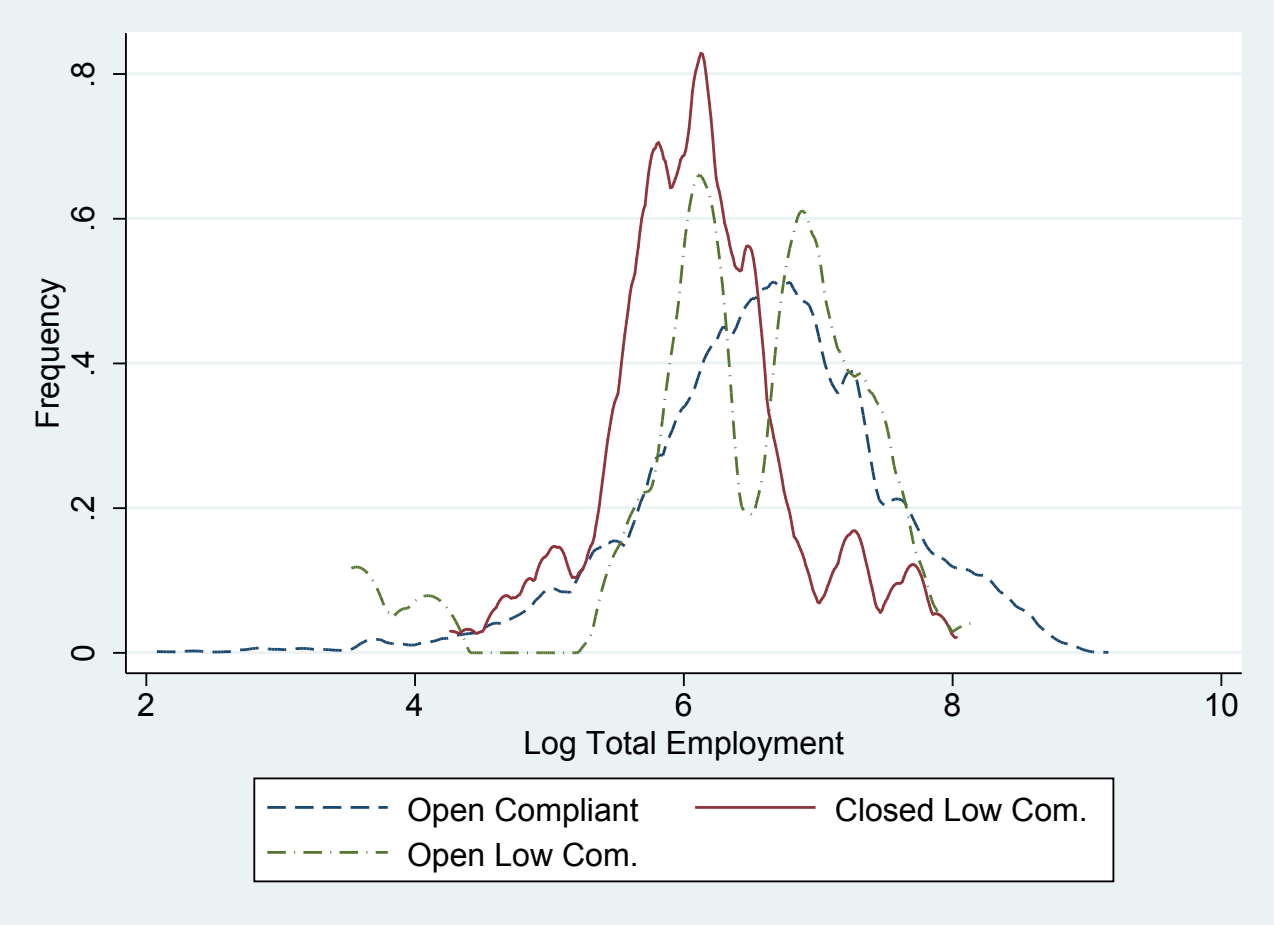
Notes: Compliance status is defined in the text using the BFC criterion of being two standard deviations below the mean compliance level. The regions defined here represent factory ownership as recorded by BFC. The Unknown category includes factories that are either listed as unknown or have no country of ownership listed (missing values).

Figure 5. **Compliance by Reputation Sensitive Buyer and Compliance Status**



Notes: The vertical axis is mean compliance across all areas of working conditions shown in Table 1. The Low Compliance factories are identified by BFC as defined in the text. The Buyer status is defined as having a buyer registered with the BFC program, which has been taken as a proxy for reputation sensitivity.

***Figure 6*. Factory Sizes by Operation and Compliance Status**



***Notes*:** The horizontal axis represents the natural logarithm of total factory employment because the log transformation generates distributions that are closer in appearance to the normal distribution. An x-axis value of 6, therefore, represents a factory of about 400 workers. An x-axis value of 7 represents factories of about 1100 workers.

Appendix A: Estimating Trend Breaks in Compliance

A change in trend is common in statistics that are observed over time. To describe our approach a bit more specifically, suppose we have a variable *y* that varies over time. If we use *t* to denote time periods, then we may want to know the *t* at which a trend in y_t changes. Figure 6 illustrates a break in a trend at time T*. In practice, the date of the time trend may not be known, as the trends in the time series are estimated from individual data points. As a result, this procedure requires that we estimate both the time trend and the possible break point.

More formally, assume that this break occurs instantly and is not affected by the dynamics of the series (that is, the break is not more likely to occur during rising or falling times). If the trend were constant, we could use *a* to denote the intercept and *b* to denote the slope (trend) of the series. Given some error *e,* we could express the change over time in y_t *as*

(1) $$y_t = a + bt + e_t \ .$$

A break in the time series at time T* would imply that, for all times greater than T*, the trend would be different. If the difference between the original trend and the new trend was equal to *c*, then we would express the evolution of y_t *as*

(2) $$y_t = a + bt + cd + e_t \ .$$

In the equation, the variable *d* is equal to 0 at the time of the trend break and then increases by 1 in every period after the trend break.[7] This specification matches Figure 6, which is provided simply to illustrate the concept, in the sense that the two segments of the line meet at the time of the break.

Equation (2) can be estimated using ordinary least squares (OLS). Specifically, the parameters *a, b,* and *c* and their standard errors are estimated. As usual with OLS, the standard errors can be converted into *t*-statistics to evaluate the statistical significance of the parameters.

Identifying the trend involves a "grid search" approach. Equation (2) is estimated separately using different values of T* that start near the beginning of the time period covered by the data and end near the end of the covered time period. The individual *t*-statistics are captured and compared. Local (or global) extremes (minimum or maximum values) indicate the trend break.

[7] More formally, d=1(t>T*)(t-T*). Note that this is Vogelsang and Perron's (1998) third additive outlier model. Vogalsang and Perron introduce six possible models, but this one is the most intuitive and suitable for this study.

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