The Effect of Reputation Concerns on Labor Law Compliance: A Case Study of Cambodia's Garment Factories

An honors thesis for the Department of Economics

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Abstract

This thesis investigates two types of reputation concerns and their effects on working conditions in garment factories. A case study of the garment industry in Cambodia is made possible by the monitoring efforts of the International Labor Organization program, *Better Factories Cambodia*. The two-part hypothesis posits that the buyer's reputation and the factory's reputation both play a role in determining a factory's level of labor law compliance. A buyer with a substantial record of corporate social responsibility is likely to exert pressure on its supplier to maintain ethical standards in the workplace; the public disclosure of a factory's working conditions — which may enhance or tarnish a factory's reputation — is also likely to lead to higher levels of compliance. *Better Factories Cambodia* provided the compliance data, which was used in conjunction with primary data collected on firm and buyer characteristics. The exogenous change in the program's reporting format in 2006 allowed for a natural experiment regarding the impact of public disclosure. This research is intended to supplement the larger body of literature on personnel economics, which mainly focuses on wages and prices. The methodology in this thesis, however, investigates labor law compliance directly, using ordinary least squares regression to find correlations between the two reputation effects and retrogression on labor laws. The results show that both the buyer effect and the public disclosure effect have a negative correlation with retrogression, but the effects have opposite impacts on different types of compliance points. The conclusion incorporates directions for future research and a number of practical policy recommendations for the *Better Factories Cambodia* program.

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Chapter 1

Introduction

Your reputation matters. This is especially true for politicians, celebrities, educational institutions and governments. Far removed from these spheres of scrutiny and popular attention are the garment factories in less developed countries. This thesis investigates the impact of reputation sensitive buyers and public disclosure on labor law compliance in apparel factories. The *Better Factories Cambodia* (BFC) program, run by the International Labor Organization (ILO), facilitates a specific case study of the apparel industry in Cambodia. By observing compliance patterns in factories with different characteristics, with labor laws possessing different traits, we seek to understand a firm's decision-making calculus regarding the management of their human resources. The objectives of this research can be summarized in two research questions:

1. Does having a reputation sensitive buyer improve labor law compliance in a factory?

2. Does publicly disclosing working conditions improve labor law compliance in a factory?

The primary concern in this research is to uncover the picture our available data paints. The monitoring visits conducted by BFC provide a rich empirical opportunity to understand actual compliance on the ground in Cambodia. A large majority of previous work on labor economics has been concerned with wages and prices, whereas the nature of BFC's monitoring and data collection role allows this research to hone in on labor law compliance itself.

An exogenous event in the form of a format change in the program's Synthesis Reports provides the backdrop for a natural experiment. These reports,

published every few months, are readily available to the general public via the BFC website [1]. Prior to November 2006, the Synthesis Reports contained detailed information that named specific factories and their labor law violations. Together with an overhaul of their information management system in November 2006, the program ceased to name factories in the Synthesis Reports and only published aggregate compliance information for the whole industry. Whether this abrupt change manifests itself in compliance trends is an issue of particular interest.

The impact of a factory's buyer also belies a fascinating back-story. What is it about the type of buyer that encourages certain factories to respond more positively to the program than others? Factors like a buyer's corporate code, the nature of their retail business, and the significance of product quality are considered. If reputation concerns trickle down to the treatment of factory workers, their importance cannot be overstated.

The questions, phenomena, and parties involved in this research are very specific and unprecedented. BFC is the first ILO program of its kind. As a result, there is scant literature and few methodologies this project can adapt or replicate in entirety. Few economists have tested the effects of reputation, either on the part of a buyer or the manufacturer itself, on labor law compliance. The analytical strategies contained in this thesis are hence original and tailored to the data. A straightforward empirical strategy using ordinary least squares regression is employed to handle the large amount of data, and to obtain empirical evidence.

This focused approach intends to share worthwhile findings and provide recommendations to BFC, thereby augmenting the program's effectiveness. After describing the background, relevant literature and theoretical framework, this thesis explains the empirical strategy which aims to capture a coherent argument provided by the data. The paper concludes with some practical implications and directions for future research. The three key recommendations involve an optimal format for the Synthesis Reports, understanding the nature of the buyer's significance in encouraging labor law compliance, and ascertaining a taxonomy of labor laws that accurately reflect the true priorities of apparel factories. As such, the effort behind this research is directed as closely as possible towards improving the life of the factory worker — hopefully an increasingly productive, empowered, informed, and dignified worker.

Chapter 2

Background

2.1 The Garment Industry in Cambodia

The garment industry accounts for approximately 16% of Cambodia's gross domestic product and up to 88% of all exports [8]. This highlights the unambiguous importance of the sector to the country's economy. The United Nations Development Program considers the garment industry a major reason behind a closing income gap between men and women, the rapid fall of poverty, and Cambodia's growth over the last decade. Cambodia exports mainly to the U.S.A (70%) and the European Union (22%), and more than 95% of factories have foreign owners. The ratio of trade to gross domestic product (GDP) has jumped from 22% to 112% between 1990 and 2007 [33]. The sector is thus heavily dependent on the state of the world economy. Through free trade agreements with the U.S.A. and possibly because of a crackdown on sweatshops, the garment industry has experience double-digit annual growth ever since 1994. With the dismantling of quotas upon the expiration of the Multi-Fiber Agreement in 2005, Cambodian factories have weathered intense global competition from low-cost suppliers in India and China. Policy makers have concluded that Cambodia's improved record in working conditions and labor law compliance have served to be a crucial comparative advantage. This manufacturing success story is illuminating in the context of Cambodia's obstacles to development, such as high energy costs, underdeveloped transportation networks, and a low-skilled workforce.

2.2 Better Factories Cambodia

Better Factories Cambodia (BFC), formerly known as the ILO Garment Sector Project, is a not-for-profit organization that aims to improve working conditions in Cambodian apparel factories. This is achieved through monitoring, training and information sharing. Echoing the close relationship between the garment sector and trade, BFC was borne of a bilateral free trade agreement between the U.S.A and Cambodia in 2001. Higher quotas were issued on condition of better working conditions in the factories. The program has achieved remarkable success and has become a model that other industries in Cambodia, and other countries, have looked to as a precedent.

Crucial to the program's success is support from various organizations and governing bodies. BFC was developed and implemented by the International Labor Organization (ILO) and the International Finance Corporation (IFC). Both organizations seek to improve labor standards and factory productivity internationally. BFC also receives support from the Royal Government of Cambodia (RGC), the Garment Manufacturers Association in Cambodia (GMAC), and relevant labor unions. BFC is officially funded by the U.S. Department of Labor (USDOL), U.S. Agency for International Development (USAID), the Agence Française de Développement (AFD), the RGC, GMAC and international apparel buyers. Factories themselves contribute to the funding of the program through their purchases of training services. Cambodian nationals make up the majority of the program's staff, ensuring a sustainable human resource base. In the international garment industry, BFC enjoys the reputation of a transparent, credible and reliable third-party organization.

Of BFC's three-pronged approach, namely monitoring, training, and information sharing, this research is most involved in the results of the monitoring process and the theory and evidence regarding information sharing. The training services of BFC, though beyond the scope of this research, have fortified the goals of the program considerably. They include modular training, single-issue training, and the highly popular supervisor training. The international nature of BFC's management has allowed such services to be conducted in Khmer, Mandarin and English. In fact, my visit to BFC in Phnom Penh coincided with a training session for factory supervisors. All the supervisors undergoing training that day were Chinese nationals, and they were about to participate in a large session conducted entirely in Mandarin. This was a unique firsthand look into the foreign ownership and management of factories in Cambodia.

2.3   Labor Standards

The basis of BFC's monitoring is the set of core labor standards as described by the International Labor Organization. The guiding principles behind these core standards, as summarized by Neak and Robertson (2009), are as follows [29]:

1. Freedom of association and the right to organize,

2. Freedom from forced labor,

3. Elimination of child labor that is harmful to the child or interferes with schooling,

4. Nondiscrimination in employment.

Cambodia has ratified a number of fundamental ILO conventions such as the Forced Labour Convention in 1970 and the Right to Organise and Collective Bargaining Convention in 2000 [29]. The survey administered to workers during monitoring visits is a holistic inspection of the various aspects of working conditions according to these guiding principles and legal precedents.

2.4   Monitoring Visits

The data used in this research, mainly data on labor law compliance, are findings from unannounced monitoring visits that occur every six to eight months. BFC-employed monitors have a checklist of labor standards that have been approved by the ILO, the government, employers and unions. Steps are taken to ensure accuracy and impartiality, through the rotation of monitors and confidential interviews. Monitoring visits reach approximately 90% of all Cambodian apparel factories, and 100% of exporting factories, since participation in the program is requisite for an exporting license. After each visit, factories receive a detailed list of suggestions to improve working conditions, and a subsequent visit is made shortly after the suggestions have been issued as a follow-up. The compliance data used in this research includes information on 363 factories and 1154 visit-per-factory observations.

2.5 Synthesis Reports

Information sharing is a linchpin in BFC's operations. The program publishes Synthesis Reports twice a year, summarizing findings from monitoring visits. The reports describe violations at the follow-up visit, after the factory has been given a list of suggestions to improve compliance. These reports are publicly available and can be easily downloaded from the BFC website [1]. The exogenous event in this research involves a change in the format of these reports that occurred in 2006. Prior to 2006, the 1st to 16th Synthesis Report provided detailed, non-anonymous, factory-specific information about labor law compliance. Factories and their violations were described, including the level of worker affected (contract, temporary etc.). An illustrative example of the initial format is shown in Figure 2.1. This is a page taken from the 15th Synthesis Report.

Management should	Implemented	Partly Implemented	Not implemented	New
ensure that a nurse and/or doctor is on duty during the required number of hours (including overtime)		Ospinter, Vivatino	Archid, Broadland-1, Chung Fai, Ecent, Evergreen, Kin Tai, Ocean, Pak Shun, Rao Yuan, Tactician, Trico	Cambodia Sportwear, Franco, United Knitting
ensure that the infirmary has enough medicine and medical equipment	Ocean, Rao Yuan, Vivatino	Archid, Zhong Yov	Chung Fai, Ecent, Grandtex, Kin Tai, Ospinter, Sportex, Tactician, United Knitting	San San, Trico
ensure that the infirmary is clean			Chung Fai	
ensure that the medical staff in the infirmary treats workers with respect			Yung Wah-1	Franco

2.2.7 Storage/Use of Hazardous Substances

Management should	Implemented	Partly Implemented	Not implemented	New
properly store chemicals in a separate area of the workplace	Ocean		Cambodian Hoi Fu, Chung Fai, Kin Tai	Ecent
properly label chemical containers in Khmer	Chung Fai		Cambodian Hoi Fu, Kin Tai, Ocean, Pak Shun	Ecent, Suntex
post/provide chemical safety data sheets in Khmer	Archid, Chung Fai		Cambodian Hoi Fu, Ocean	
install/repair exhaust ventilation in areas of the factory where chemicals are in use			Kin Tai	Evergreen, San San

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Figure 2.1: Example of factory-specific data with the original format.

In 2006, BFC implemented the Information Management System (IMS), which is an online database of factory data that facilitates the publication of tailored reports for factories, buyers and other readers. Previously, survey responses

from monitoring visits were recorded without a standardized format, and they were presented in individual word processing documents, which greatly hampered data management. The IMS established standardization and automation into the program's data collection process. Along with the introduction of the IMS, the format of the Synthesis Reports underwent a radical change in 2006. From the 17$^{\text{th}}$ Synthesis Report (1$^{\text{st}}$ November 2006) onward, only summary data on labor law compliance across the whole industry are published. Factory names are not linked to specific violations, and only trends in compliance, not specific compliance points, are described. Figure 2.2 is a page from the 19$^{\text{th}}$ Synthesis Report, under the new format.

5.4 Compliance Performance Characteristics

This section of the report looks at how compliance is affected by factory size and number of monitoring visits. This type of information is helpful in gauging the impact of monitoring activities designed to improve working conditions and labour standards

5.4.1 Compliance by Factory Size

This chart shows whether the size of a factory has any impact on the level of compliance. For example, this chart can show whether larger factories are more or less likely to comply with monitoring standards than smaller factories.

Larger factories continue to have slightly higher average percentage compliance levels than smaller factories. Small variations with figures in the 18th Synthesis Report presumably are due to the elimination of the weighting of compliance issues.

Graph 5

Average % Compliance (excluding Fundamental Rights)
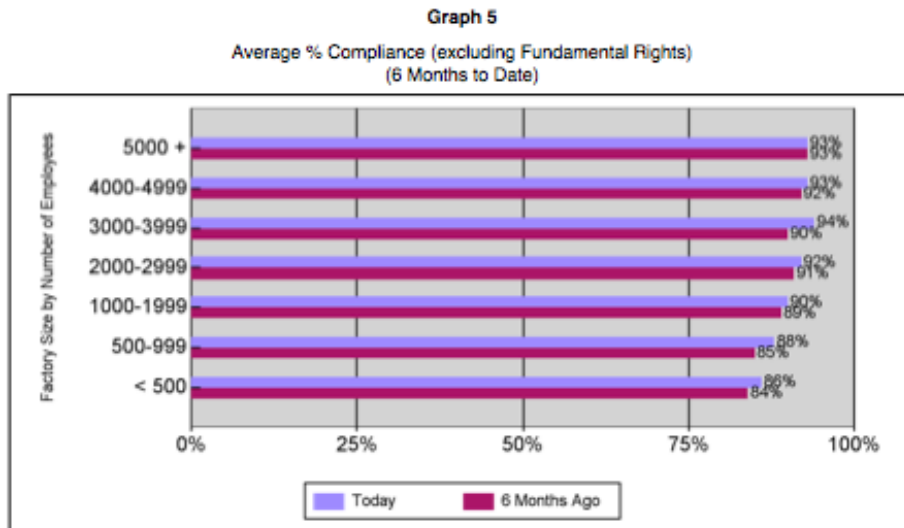**(6 Months to Date)**

Figure 2.2: Example of aggregated data with the current format.

The effect of the change in the reporting format on labor law compliance is a significant question in this research.

Chapter 3

Literature Review

When economists think about factors behind working conditions, the themes of trade, globalization, foreign direct investment or multi-national corporations arise invariably. In the World Bank publication, *Globalization, Wages, and the Quality of Jobs*, research findings quite definitively point towards the fact that in most developing countries, working conditions improve in sectors exposed to globalization [33]. The literature on trade and its effects on the labor market is particularly vast, though not exhaustive. This literature review does not delve deeply into such themes because the empirical investigation in this thesis has a higher level of specificity regarding the two reputation effects. That is not to say that internationalism and the global supply chain has little to do with BFC. In fact, the opposite is true. In the context of BFC, companies sourcing from Cambodia's apparel factories are almost exclusively U.S.A. or European Union multi-nationals. Furthermore, the incentive for factories to participate in the monitoring program is an export license, and under the Multi-Fiber Arrangement, the initial incentive to comply with labor laws was access to greater quota allocations for the whole industry. These proved to be very effective triggers in terms of realized participation and improvements in labor law compliance. Evidence for this is delineated in work by Berik (2007) [4] and Neak and Yem (2006) [30]. However, when the Multi-Fiber Arrangement expired on January 1, 2005, the quota incentive was eliminated, and a gaping hole was left in its place. This changing landscape calls for a new focus in the economic research. A segue into another incentive to participate in the program was necessary, and the role of buyers was hence thrust to the fore.

Another subdivision of literature examines the effectiveness of monitoring on working conditions. Esbenshade's book, *Monitoring Sweatshops: Workers, Con-*

sumers and the Global Apparel Industry, describes the issue in detail [13]. This theme is also not discussed further in this review because this research assumes that monitoring, specifically the monitoring carried out by BFC, is both accurate and effectual. This is supported by the objective fact that Cambodia's apparel industry has grown ever since the introduction of the program, and has weathered a number of large economic changes in its course. The credibility and professionalism of BFC is seldom contested, and audit reports from the ILO are seen as the industry gold standard in Cambodia [22].

Previous relevant work will be discussed in four parts. Firstly, the literature on Personnel Economics provides the theoretical milieu for an empirical study on labor law compliance and the (elusive) factors that promote it or (the not so elusive factors that) impede it. Secondly, a few examples of studies that directly utilize labor law compliance data are discussed. This section also includes a brief discussion on the limitations of using wages as a measure of job quality. The third section covers the expanding literature on the role of buyers and the Corporate Social Responsibility phenomenon. The fourth section focuses on the public disclosure effect, and what other scholars have purported so far for this relatively novel concept.

3.1 Personnel Economics

The field of Personnel Economics examines human resource management systems and seeks to find connections among management techniques, productivity, profitability, worker utility, and other economic phenomena or outcomes. This furnishes the theoretical backdrop for an empirical study on labor law compliance and the factors that encourage or inhibit it.

Lazear and Oyer's working paper on Personnel Economics for the National Bureau of Economics Research lays out the basics [23]. They describe how human resource management has become a predominant source of research within Labor Economics, which should not be used interchangeably with Personnel Economics. Personnel Economics is concerned with employer-employee interactions, and not labor in general. The recent focus is the determination of prescriptive conclusions for personnel managers, with an emphasis on effective incentives to increase worker productivity and profitability. This is a result of a vast continuum of management systems, from primitive methods (e.g. shouting at workers to motivate them) to other more complex, pecuniary or non-pecuniary compensation strategies.

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In "The Effects of Human Resource Management Practices on Productivity: A Study of Steel Finishing Lines", Ichniowski, Shaw and Prennushi (1997) find that innovative human resource management strategies, which use a mix of pecuniary and non-pecuniary compensation, lead to greater productivity in factories [21]. They also find that the marginal effect of each innovation increases as factories raise the level of human resource innovation as a whole. These findings are in good company with another paper by Boning, Ichniowski, and Shaw (2001) which finds that teamwork in the steel industry leads to higher productivity, and even more so for complex production processes [5]. These are encouraging results for factory managers considering a more modern approach towards motivating workers, such as experimenting with incentive pay, but the link with labor law compliance can be said to be a little more tenuous.

In terms of applying empirical methods to Personnel Economics, Eric A. Verhoogen of Columbia University wrote a paper on trade, quality upgrading and wage inequality in Mexico during the peso crisis in December 1994. He finds that from a quality-upgrading perspective, globalized trade benefits the relatively more entrepreneurial and well-endowed in terms of capital [36]. His results are robust and persuasive, but once again have limitations regarding how conclusions can be generalized to other contexts. Another important takeaway from the Verhoogen paper is the premise that heterogeneity in a firm's perceptions and the sunk costs of maintaining work conditions will result in heterogeneity in the personnel management system employed by the firm. This then translates into similarly heterogeneous outcomes in efficiency, profits, wages, and quality.

Specific to BFC, Sandra Polaski's working paper provides a general overview of the program, its novel elements, impacts on the private sector and her thoughts on the replicability of the program (2004). Polaski shows that the program and its monitoring efforts have led to positive outcomes in terms of cross-industry employment levels and working conditions themselves [31]. This is a result of a combination of adequate government and international intervention, cooperation from buyers, active participation by factories, high credibility, and a healthy level of transparency in the program's operations. Though Polaski wrote this working paper at a high point of the program's success and before the end of the Multi-Fiber Arrangement in 2005, the efficacious features she delineates remain relevant even after the quota system expired. Cambodia has seen significant increases in its garment exports and even the reintroduction of buyers who previously withdrew operations from Cambodia due to concerns about human rights violations in factories. This growth has persisted to present day. Therefore, there

is a considerable amount of evidence that the economic theory was accurate in predicting growth in Cambodia's garment industry. Improvements in Cambodia's labor law compliance record served as the comparative advantage that drew business to its factories.

3.2 Wages and Labor Law Compliance

Data on labor law compliance are scant, and it follows that empirical studies on labor law compliance are few and far between. When labor economists investigate working conditions and labor standards in factories, often the most readily available information is data on workers' wages and output prices. Wages have become the easiest measure of the quality of jobs. However, wages remain a measure with analytical limitations. The reason is that wages may have a positive or negative correlation with working conditions. Better working conditions may be manifested in higher wages, making workers better off with a higher disposable income. However, it is also conceivable that workers may be receiving higher wages as compensation for poorer working conditions, and this concept is known as the compensating differential hypothesis. The empirical evidence on compensating differentials has been mixed, but studies in developing countries like South Africa and Brazil, by Moll (1993) [28] and Arbache (2001) [2] respectively, present evidence contrary to the hypothesis. Thus, the debate on using wages as a measure of the quality of jobs has almost evolved into a moot point. The results, especially in lower income countries, are inconclusive.

With BFC, labor law compliance, which is a close proxy for the end-goal of better working conditions, can be observed directly. Unfortunately, few industries possess the infrastructure to craft a comprehensive, tailored set of labor laws. Even fewer have a credible monitoring system, or an avenue with which to gather data suitable for manipulation. Moreover, any results from such a study would be difficult to generalize across industries and countries. The same limitation applies to this thesis. There were hence no precedents from which the methodology in this research could be replicated in full.

The National Labor Force Survey in Indonesia, known as SAKERNAS, provides an example of data on working conditions [34]. The survey, which was conducted yearly before 2005, and then twice yearly thereafter, included qualitative questions on working conditions from 1998 onwards. This allowed for an inter-industry comparison across agriculture, mining, textiles, construction, retail, and many others. Robertson et al. used an ordered probit strategy to

analyze the working conditions data, and found that wage differentials correlate with differentials in working conditions, providing some evidence in support of the compensating differential hypothesis [34]. However, the analysis is hampered by the ranking of responses in the survey. For example, "better","just as good", "worse", are qualitative responses that are very sensitive to the preceding year's situation, and do not provide an objective basis of comparison across time. The results of the study are predicated on the assumption that the responses are relative to the same baseline.

Additionally relevant to the research in this thesis is the Locke, Qin and Brause investigation of 468 Nike factories and their labor law compliance (2006) [24]. The authors concede that the sources of their data were internal audits — prone to present factories in a positive light. This is not an issue for BFC, which has maintained the credible reputation of an impartial auditor through the years. Nonetheless, Locke, Qin and Brause present fascinating results on the factors behind labor law compliance. They find a wide variety of compliance levels across all 468 factories, and that compliance trends are very specific to the country of operation. This is probably explained by the heterogeneity of labor laws native to the country, since all the factories under investigation were subject to the same Nike Code of Conduct. Locke, Qin and Brause also find that factory size and age are significant factors, with larger factories having relatively lower levels of compliance. The relationship with Nike is also an important differentiating factor. Factories with a shorter relationship with Nike actually perform better in labor law compliance, which is somewhat unexpected. These interesting points are discussed further in 7.1 as possible directions for future research.

3.3   The Buyer Effect

A large majority of the papers written on BFC focus on the success of the trade quota incentive in encouraging labor law compliance in factories. Buyer pressure was the answer to what observers feared would be a missing trigger once the Multi-Fiber Agreement ended in 2005. The literature describes why scholars believe that a buyer can contribute positively to labor law compliance in the absence of a quota system. From Fung, O'Rourke and Sabel's book, "Can We Put an End to Sweatshops?" [16]:

> Seventy-five percent of Americans say they would avoid retailers whom they knew sold goods produced in sweatshops. And almost 90 percent said they would pay at least an extra dollar on a twenty-dollar item if they could be sure it had not been produced by exploited workers.

Gatchell et al. (2005), in a paper on the garment industry in El Salvador, state that the paramount takeaway from Cambodia's experience is to involve buyers in labor law compliance [17]. Few scholars have rigorously tested the hypothesis that the buyer can affect the working conditions in far-flung factories, but few doubt the possibility.

The concept of reputation sensitive buyers is not far removed from the anti-sweatshop activism that began in the 1990s. Harrison and Scorse's paper on "Multinationals and Anti-Sweatshop Activism" describes how such anti-sweatshop campaigning was mainly targeted at textile, footwear and apparel factories in Southeast Asia [19]. Household names like Nike, Reebok and Adidas were drawn into the media fray. Harrison and Scorse find that there were appreciable increases in worker wages as a result of legislative changes in minimum wage laws, which in turn were a result of the intense pressure placed on buyers and their working conditions record. The authors question the sustainability of such a movement, and posit that employment levels will suffer in place of higher wages. This was not the situation faced by Cambodia with the introduction of BFC, which can be attributed to the high level of participation from multi-national buyers which increased Cambodian orders because of, and not in spite of, the program. On the other hand, many factories which were targets of anti-sweatshop campaigns in Harrison and Scorse's study started with rock bottom wages, and the effectiveness of buyer-targeted activism is unclear if significant progress had already been made. This describes the present situation in Cambodia quite well. The importance and mechanism of the buyer effect hence warrants additional research.

There is a great deal of research on the effectiveness of corporate codes of conduct in improving the situation of factory workers. Connor and Dent (2006) describe the importance of sportswear production companies and the pressure they exert on factories to encourage free association and collective bargaining for higher wages [11]. They conclude that sportswear companies have not been very effectual thus far, and cooperation from the local government is equally crucial in constructing an environment for workers, especially female workers, to join trade unions. Bartley (2005) argues that private codes of conduct should never be viewed as perfect substitutes to public regulation, as the two are intertwined in very complex ways [3]. Nonetheless, there is a consensus that private codes of conduct are not altogether useless. This is an important consideration in the methodology of categorizing buyer types in the data analysis section of this thesis.

In the particular case of Cambodia's apparel industry, a number of scholars have

confirmed that the prevailing conventional wisdom in the industry places great importance on the buyer's role. This is consistent with Weil's findings (2005) on the American apparel industry [37]. Weil concludes that the potential loss of business from a buyer is more effective in motivating factories to comply with labor law than the monetary fines levied by the government when non-compliance is detected. Wells (2006) quotes the Cambodian Minister of Commerce as saying (p19)[38],

> We are extending our labor standards beyond the end of the quotas because we know that is why we continue to have buyers. If we didn't respect the unions and the labor standards, we would be killing the goose that lays the golden eggs.

Kolben, in his 2004 paper on the theory behind BFC's monitoring, finds the same buyer influence as well (p27)[22]:

> Instead of the pressure falling primarily on the quota allocation system, weight has shifted to foreign buyers, who are subject to consumer pressure to source from labor compliant factories. A local compliance office of the Gap clothing company told me, for example, that Gap requires all the factories in which they source to provide it with ILO monitoring reports. An official connected to an international organization informed me that Nike, after leaving Cambodia due to a BBC report on child labor in one of its factories, agreed to return to two factories, provided they would show Nike their ILO monitoring report. One factory owner told me that it is not the ILO that has the cane, but rather the buyers. Ray Chew of the Garment Manufacturers Association of Cambodia noted that the buyers ask for the reports and that orders can be lost or acquired because of their content.

In addition to his findings on the importance of the buyer in American apparel factories, Weil also finds better levels of labor law compliance in factories which demand a more advanced skill set from its workers, presumably for output of higher quality [37]. This is explored in the data analysis portion of this research (5.2.3), and this "quality effect" is tested in the Cambodian context.

3.4 The Public Disclosure Effect

A considerable amount of literature has been dedicated to ascertaining the effect of international buyers on working conditions, but the effect of public disclosure

is relatively untested. As Polaski writes in her overview of BFC, information sharing is a crucial aspect of the program's success [31]. She calls "internationally credible workplace inspection and reporting of results" a "necessary but missing function" before the ILO stepped in. The Synthesis Reports prior to 2006 were unprecedented in the level of detail they contained, and there is proof that academics were in fact using the information for research purposes. Sibbel and Bormann (2007) and Wells (2006) make direct reference to the early reports that contained specific violations. Furthermore, the information in the Synthesis Reports formed the basis from which quota increases were decided on, when the Multi-Fiber Arrangement was still in effect. Sibbel and Bormann point out that the naming of factories in the reports are a noteworthy feature, [35] and Wells calls the data contained in these reports crucial for the operations of the program [38]. Clearly, the significance of the factory-specific information in the original format of Synthesis Reports was not lost on a number of readers.

There are other papers that discuss the importance of public disclosure and labor law compliance, but the authors skim the issue instead of testing it. Polaski (2006) states that the transparency in BFC is a key element if the program is to be replicated elsewhere, because readily available information facilitates a nexus for mutual interests on the parts of the government, buyers, trade unions and factories [32]. This leads to effective planning to achieve common objectives. Marston (2007) sees transparency as a means to maintain the program's own reputation [27]. This in turn will encourage participation in the program if buyers start to view BFC's auditing as a prerequisite for its suppliers. Kolben (2004) describes briefly the tension surrounding the public disclosure in the reports. Fears that the information in the reports would legitimize strikes are one possible reason for withholding compliance information from workers [22]. Kolben debunks this by explaining that workers have a good picture of their own working conditions if they have grounds for a strike, and that the reports would help encourage dialogue with the management on how to improve on the factory's shortcomings. Therefore, these papers point to a general consensus that public disclosure is vital to encouraging higher levels of compliance.

Ferraz and Finan's paper on public auditing and its effect on corruption is an example of testing the effect of public disclosure on decision-making (2008). The authors find that the release of public audits in randomized localities significantly hinders the reelection of a corrupt politician [14]. This is empirical evidence that more informed individuals generally lead to more desirable decision-making. Ferraz and Finan also examine the mode by which public information was disseminated, and find that radio broadcasting had a similar effect on electoral outcomes.

Ostensibly, public information has a significant effect on voting behavior. Ferraz and Finan's methodology applies econometric regression analysis to linear, quadratic and semiparametric models. A number of specification checks ensure that the results are robust. Though this paper does not deal with labor law compliance, it is conceivable that the causal mechanism of public disclosure in political elections would resemble that of the reporting format being researched in this thesis. Public disclosure that exposes violating parties is taken seriously by others, and can have compelling effects. Ferraz and Finan show that voters respond significantly, and this thesis will investigate if the exposed parties themselves, i.e. noncompliant firms, will react to this disclosure.

Chapter 4

Theoretical Framework

4.1 Theoretical Framework

The theoretical framework (4.1) for this research follows Robertson et al. (2010), and provides the economic background from which we examine factory behavior [7]. There are two maximization problems and one bargaining function. Workers are assumed to maximize utility, and factories are assumed to maximize profits. Both face constraints such as technology and information parameters.

4.1.1 Worker's utility maximization

The worker's utility is given as:

$$u = c(z_1, z_2, \ldots, z_n) + g(e_q, e_n) \qquad (4.1)$$

The variable, u, is worker's expected utility; $(z_1, z_2, \ldots, z_n)$ is a vector of working conditions; e_q is worker effort directed at quality ($e_q \in [0,1]$); and e_n is worker effort directed at quantity ($e_n \in [0,1]$). The partial derivatives of c are expected to be positive, since workers have higher utility as working conditions improve. The partial derivative, g_1, could be either negative or positive, depending on whether there is intrinsic value to producing high quality goods, whereas the partial derivative, g_2, is negative. Worker's utility should unambiguously decrease with more effort directed at quantity (we exclude the possibility of overachieving workers).

4.1.2　Firm's profit maximization

The factory's profit function is:

$$\pi = p(e_q)Shf(e_n, z_1, z_2, \ldots, z_n; I) - (w_n e_n + w_q e_q)h - \sum a_i(I)z_i \qquad (4.2)$$

The variable, π, is expected profits; p is output price; S is the premium on complying with labor law; h is the number of hours worked; I is the manager's information set regarding production technology; $f(e_n, z_1, z_2, \ldots, z_n; I)$ is a production function; w_n and w_q are wages for effort directed at quantity and quality respectively; and $a_i(I)$ is the perceived marginal cost of a working condition (z_i) as perceived by the manager with his/her information set. The output price depends on the worker effort directed at quality, and higher quality should demand higher prices. The production function is the expected hourly output based on worker effort directed at quantity, working conditions chosen, and the information set. S indicates whether a factory is deemed to be at a minimum level of labor law compliance, $\bar{s}$, as required by buyers or external agent such as the government or an overseeing program. We take $S = 1$ if $s(z_1, z_2, \ldots, z_n) < \bar{s}$ and $S > 1$ if $s(z_1, z_2, \ldots, z_n) \geq \bar{s}$. This captures the binary nature of how compliance is coded in the dataset and allows the compliance premium to vary.

Firms may induce work effort directed at either quality or quantity by paying efficiency wages, or improving working conditions. The effort schedule is upward sloping, and the gradient depends on working conditions. This is given by:

$$e_q = e_q(z_1 - w_n, z_2 - w_q, z_3, \ldots, z_n) \qquad (4.3)$$

$$e_n = e_n(z_1 - w_n, z_2 - w_q, z_3, \ldots, z_n) \qquad (4.4)$$

We also assume that motivational incentives for effort directed at quantity will serve to reduce effort directed at quality, and vice versa. The partial derivatives are as such:

$$\frac{\partial e_q}{\partial z_1} < 0, \frac{\partial e_q}{\partial z_2} > 0, \text{and } \frac{\partial e_q}{\partial z_3} < 0, \qquad (4.5)$$

$$\frac{\partial e_n}{\partial z_1} > 0, \frac{\partial e_n}{\partial z_2} < 0, \text{and } \frac{\partial e_q}{\partial z_3} < 0. \qquad (4.6)$$

For other working conditions such as machine safety and maternity benefits, the positive or negative signs on the partial derivatives are ambiguous. Maternity benefits may reduce effort directed at quantity (a pregnant worker receives more rest days and hence produces less output), but may increase or decrease effort directed at quality (a well-rested pregnant worker may be motivated to produce better quality goods). Machine safety may increase or decrease effort directed at both quantity and quality, depending on the specifics of the safety implements that could either hamper or facilitate production. Nonetheless, if workers perceive working conditions to be degrading and unbearable, effort directed at both quantity and quality will be reduced. Examples of this include forced labor and discrimination.

4.1.3 Bargaining function

Working conditions can be seen as an outcome of bargaining between workers and the factory. The bargaining function is given by:

$$B = \pi^\delta u^{1-\delta}, \text{where } \delta = \delta(z_1, z_2, \ldots, z_n) \tag{4.7}$$

The variable, δ, is a decreasing function of working conditions. The better the working conditions, the lower the value of delta, and the greater the bargaining power of workers. In the extreme case, $\delta = 1$ and the factory will set working conditions only high enough to fulfil a reservation wage requirement, $u \geq \bar{u}$. In factories where management-worker communication is encouraged and workers are conferred bargaining rights, these features are manifested in working conditions and also become factors that alter the bargaining parameter. A greater sense of worker autonomy will decrease δ.

4.1.4 Better Factories Cambodia

Working conditions and the monitoring efforts of BFC play into the profit and utility maximization problems in a number of ways. For the utility maximization problem, better working conditions from human resource innovations and positive motivational techniques can increase worker effort. For the profit maximization problem, working conditions come into play in the following ways:

1. Worker effort, which itself is a function of working conditions, is a factor of expected revenues and expected costs.

2. Better working conditions may intrinsically affect the production function. They reflect the human resource management system in the firm. Each sign of the partial derivative of the production function, f, on a particular working condition, z_i, depends on the level of other working conditions and the information set, I, as well.

3. a_i refers to what factory managers view as the opportunity cost of providing a working condition, and BFC facilitates accurate perceptions.

4. The program also allows factories to fully realize S, which is the premium on labor law compliance. This is achieved through the numerous benefits provided to participating factories. Examples include an affordable auditing service, information sharing with buyers, training services for factory managers, and in the early stages of the program, benefits were concretely accrued in the form of a larger export quota to the U.S.A.

This empirical study seeks practical evidence for the signs of the partial derivatives of the production function on working conditions. If a better working condition raises (lowers) productivity, the signs on the partial derivative of the production function on that working condition is positive (negative). Most of the literature on labor standards has found that productivity gains from improving working conditions are challenging to pin down. This research does a cross-study of different types of working conditions, and through the phenomenon of retrogression (4.2.1), determines which compliance point types appear to be the most counter-productive.

4.2   Analytical Framework

The theoretical framework now calls for a cohesive analytical framework with which we can approach the data to confirm or disconfirm the hypotheses. Two auxiliary concepts are introduced here — retrogression and irreversibility.

4.2.1   Retrogression

By definition, a compliance point is either

a) efficient, and complying with this point increases the productivity of the firm; or

b) non-efficient, and complying with this point decreases the productivity of the firm.

It has been noted that there is no definitive knowledge whether labor law compliance unambiguously raises or lowers productivity, and there is a strong likelihood that the answer varies across compliance points. Hence, factory managers find out if a compliance point is efficient (productivity enhancing) or inefficient (productivity hampering) only after they have either tried complying with it, or have seriously considered doing so. If managers find a compliance point to be efficient, they will continue to be in compliance, given that we assume profit-maximizing firms. If managers find a compliance point to be inefficient, the factory may choose not to comply subsequently. This phenomenon of compliance and subsequent noncompliance is termed retrogression. A factory will hence retrogress only on inefficient compliance points, *ceteris paribus*.

4.2.2 Irreversibility

Irreversibility refers to a characteristic of a compliance point, and a point is said to be irreversible if there are significant barriers to retrogression. The efficiency of a labor law is unknown or ambiguous prior to compliance, but reversibility can be identified by the definition of the compliance point, independent of implementation. In this research, irreversibility is considered to be a result of one of three reasons:

a) Compliance with this point involves incurring **high sunk costs**.
   e.g. the purchase of safer but expensive machinery, or major changes in the physical environment to improve ventilation for workers.

b) Compliance with this point involves a **contract with an external party**, and not just a factory's internal management.
   e.g. ensuring that a policy meets the approval of the Labor Inspector.

c) Compliance with this point involves **empowering** and conferring rights on workers, which are difficult to renounce.
   e.g. paying workers on time, managing disputes in sophisticated ways.

It then follows that there are four categories of compliance points:

1) Efficient and reversible

2) Efficient and irreversible

3) Inefficient and reversible

4) Inefficient and irreversible

We expect retrogression from points in Categories **3)** and **4)** because profit-maximizing factories will not want to remain in compliance on inefficient points. Concurrently, compliance for Categories **1)** and **2)** should persist even the in the absence of additional pressure to curb retrogression. In fact, no retrogression is expected for efficient compliance points. If retrogression is found among irreversible points (Category **4)**), on the other hand, this is an indication of extremely high inefficiency. Table 4.1 represents the expected relative levels of retrogression for these four categories of compliance points.

Retrogression	Efficient	Inefficient
Reversible	*Low*	*Very High*
Irreversible	*Very Low*	*High*

Table 4.1: Expected levels of retrogression for different compliance points.

There will be various tables constructed like the one above as we hypothesize on the relative levels of retrogression under different scenarios. The data analysis section will ascertain the change in retrogression levels under two effects: the buyer's reputation sensitivity effect, and the public disclosure effect. The two original research questions can be modified to pertain to labor law retrogression and effects that inhibit it, as opposed to a general statement on the factors that boost labor law compliance. The updated research questions should then read:

1. Does having a reputation sensitive buyer inhibit retrogression on labor laws in factories?

2. Does publicly disclosing working conditions inhibit labor law retrogression on labor laws in factories?

4.2.3 Mechanisms of reputation effects

We hypothesize that having a reputation sensitive buyer will decrease δ, i.e. improve working conditions and hence curb retrogression. The buyer can exert pressure on factories to comply with labor law in a number of ways. For example, a buyer can provide a positive incentive for labor law compliance by increasing

the volume of orders for compliant factories. Buyers may also implement punitive measures like transferring production away from a noncompliant firm towards a compliant firm. Buyers may also pay higher prices for merchandise that was produced under more favorable working conditions. Buyers can thereby offset the costs of labor law compliance through several avenues. Many reputation sensitive buyers have written Supplier Codes of Conduct as well, which can provide a concrete set of guidelines for factories to set working conditions. These buyers often audit their supplying factories independent of BFC too.

The public disclosure mechanism is not as straightforward, and some flexibility is called for especially regarding such a novel aspect of labor law compliance. If the public disclosure of working conditions improves labor standards, this decreases δ, similar to the buyer effect. A probable theory is that factories are "named and shamed" under the public disclosure format whenever they are noncompliant with labor law. Firstly, this may decrease their chances of attracting new buyers who are looking for compliant firms to be suppliers. Factories will want to avoid ill repute by attempting to comply with labor laws regardless of their effect on productivity. Secondly, managers may also fear losing workers to competing firms with better working conditions, and sensitive compliance information may provide grounds for workers asking for more benefits or legitimize grounds for a strike. Thirdly, factories could be responding out of fear of punitive measures implemented by the government after their labor law violations are made public. It is also conceivable that the sheer embarrassment of full disclosure is sufficient to encourage firms to remain in compliance.

Chapter 5

Data

5.1 Data Description

The data analyzed in this thesis has four constituents. The first and primary component is the compliance data gathered via BFC's monitoring activities. Secondly, a dataset on factory characteristics was collated as part of the background research leading up to this analysis. Specifically, the buyer of each participating factory was identified where possible, using numerical buyer codes to maintain anonymity. Thirdly, data on buyer characteristics were gathered, with particular emphasis on corporate social responsibility, brand value, and the type of retail market the buyer caters to. The first three constituents were manipulated and merged in a multi-step process, and a form suitable for analysis was eventually attained. Lastly, the compliance points were categorized into reversible and irreversible point types, and coded into the merged data. The details of the multi-step process are included in the Appendix. A guide to understanding the individual datasets is also included in the Appendix.

5.1.1 Compliance data

The compliance data consist of the findings from unannounced factory visits conducted by a team of at least two monitors from BFC. The program refrains from sending the same team to a factory more than once in order to avoid monitor bias. By Cambodian law, all apparel manufacturers have to participate in the program in order to obtain an export license. Since the apparel industry in Cambodia is heavily export-oriented, this ensures a high level of participation among factories. As of July 2008, the dataset includes compliance data from 362

factories. A factory is visited every six to eight months, which results in multiple visits showing up for each factory. There are 1154 visit-per-factory observations in the compliance dataset.

A noticeable rift in the data occurs in 2003 to 2005, where very few factory visits are coded. The reason is that between the first wave of monitoring in 2001 and 2002 (which reached 119 factories), and the second wave starting in 2006 (which reached more than 300 factories), monitors practiced very informal data collection techniques. Labor law compliance was not measured in a standardized format, and results were not carefully recorded. The documentation of visits from 2006 onward is relatively more rigorous because of the advent of the Information Management System (IMS). The questions posed to factory managers and workers also underwent an overhaul in 2006, but an effort was made to match the new question scheme and the previous one. There is compliance data on approximately 406 compliance points for factory visits after 2006. Standardization and objectivity is achieved since each compliance point has only two possible observable outcomes: compliant or noncompliant. This facilitates binary coding for the data as well.

The compliance phenomenon under investigation, "retrogression", refers to an event where a factory was in compliance with a certain point, but slipped into noncompliance in the subsequent monitoring visit. This was measured by comparing compliance across two visits and the compliance data was manipulated to find instances of retrogression. If there was no change in compliance across the format change, or the factory went into compliance after the format change, this was considered as "not an instance of retrogression". The highly technical process is detailed in the Appendix as well. We would expect that retrogression is relatively uncommon. Out of 122,388 observations, there were only 4593 instances of retrogression and 117,795 instances of no retrogression. This was a crude indicator that the manipulation process was accurate.

5.1.2   Data on factory characteristics

Independent of the data in 5.1.1 is another set of data that was consolidated from primary sources over May to June 2009. This dataset covers 365 factories, not all of which are BFC participants. Information on 33 different features of a factory was collected, including a factory's former name (where applicable), owner nationality, number of machines, number of workers, the training services purchased from BFC, and most importantly, their primary buyers. BFC provided most of this information, and the data was supplemented with additional

research. However, buyer information was not available for all the factories registered with BFC. It should be noted that all factories have a buyer by definition, but not all buyers participate in the program. These are the factories for which we have no buyer information, and their buyers are the ones that slip through the cracks. These buyers are most likely uninterested in or cannot afford the information contained in the program's database and hence do not participate.

5.1.3 Data on buyer characteristics

In order to investigate the impact of buyer reputation sensitivity on labor law compliance, data had to be collected on the buyers participating in the program. A separate dataset on buyer characteristics was consolidated, with an emphasis on a buyer's commitment to Corporate Social Responsibility, the quality of its apparel (apparel retailers versus mass merchandisers) and other measures of brand value as researched by reputed consulting firms. Examples include Inter-Brand's Best Global Brands Ranking and *Fortune*'s "Most Admired Companies" scoring system. Other buyer characteristics were also included in the data for reference purposes. A buyer was then categorized into one of four buyer types, based on two levels of dichotomization.

Level 1: Nature of the buyer's business
A buyer was either an Apparel Retailer or a Mass Merchandiser. 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. There tends to be a overall discrepancy in the quality of the clothes produced by these two different types of retailers. Apparel Retailers tend to have higher quality products in terms of the quality of materials used, exclusivity of design, and greater care in construction.

Level 2: Reputation sensitivity
The categorization of reputation sensitive buyers was based on whether the company showed evidence of a policy on Corporate Social Responsibility, in the form of a website or public report. It has become a common industry practice for major corporations and recognizable brands to publish a Corporate Social Responsibility report. The contents of the report often articulate the company's commitment to community involvement, charitable giving, environmental sustainability, and human rights. Human rights reports often include a

Supplier Code of Conduct, which specifically pertains to labor law compliance in supplying factories. There is a wide range of specificity and standards among these Codes of Conduct, hence the simple presence of a CSR report was taken as an indicator that the buyer was concerned with its reputation, and was willing to make significant investments towards the maintenance of its public image.

Hence, all buyers were categorized as one of four buyer types:

Type 1 Apparel Retailers with significant evidence of Corporate Social Responsibility.

Type 2 Apparel Retailers with little evidence of Corporate Social Responsibility.

Type 3 Mass Merchandisers with significant evidence of Corporate Social Responsibility.

* (There were no buyers in the dataset which fulfilled the classifying criteria for Mass Merchandisers with little evidence of Corporate Social Responsibility.)

Type 4 Non-participant buyers.

As mentioned previously, not all monitored factories have buyers who are also participants in BFC (**Type 4**). It would follow intuitively that these are buyers which do not make significant investments in their public image or reputations as retailers. Hence, Types **1** and **3** were classified as reputation sensitive buyers, whereas Types **2** and **4** were classified as non-reputation sensitive buyers.

5.1.4   Compliance point types

The compliance points monitored by BFC fall into 27 distinct question groups. These follow the groupings in the Robertson et al. working paper [7]. The groups are as follows:

1. Child Labor

2. Discrimination

3. Forced Labor

4. Collective Agreements

5. Strikes

6. Shop Stewards

7. Liaison Officers

8. Unions

9. Information about Wages

10. Payment of Wages

11. Contracts

12. Discipline/Management Misconduct

13. Disputes

14. Internal Regulations

15. Health/First Aid

16. Machine Safety

17. Temperature/Ventilation/Noise/Light

18. Welfare Facilities

19. Workplace Operations

20. Occupational Safety and Health Assessment/Recording/Reporting

21. Chemicals

22. Emergency Preparedness

23. Overtime

24. Regular Hours/Rest Days

25. Compensation for Accidents/Illness

26. Holidays/Annual leave

27. Maternity Benefits

Not all 406 compliance points were allocated to a question group. Some were not coded like the other compliance points (compliant/noncompliant) and others were minor questions with unnecessary detail for the intents and purposes of this research. Approximately 293 compliance points were identified as essential and were allocated to question groups. The 27 compliance groups were then classified as either reversible or irreversible. Irreversibility refers to the characteristic of a compliance point, where there are high barriers to retrogression. I examined every question in each group to determine overall irreversibility for the whole group. The rationale for the categorization of each compliance group is detailed in the Appendix. The taxonomy of compliance points is as follows:

Reversible compliance points:

- Child Labor

- Discrimination

- Forced Labor

- Strikes

- Information About Wages

- Occupational Safety and Health Assessment/Recording/Reporting

Irreversible due to high sunk costs:

- Health/First Aid

- Machine Safety

- Temperature/Ventilation/Noise/Light

- Welfare Facilities

- Workplace Operations

- Chemicals

- Emergency Preparedness

Irreversible due to contracts with an external party:

- Collective Agreements

- Shop Stewards

- Liaison Officers

- Unions

- Contracts

- Internal Regulations

Irreversible due to the empowerment of workers:

- Payment of Wages

- Discipline/Management Misconduct

- Disputes

- Overtime

- Regular Hours/Rest Days

- Compensation for Accidents/Illness

- Holidays/Annual Leave

- Maternity Benefits

5.1.5   Final form

The final form of data has 122,388 observations. Each observation is a combination of "compliance point" and "factory" and "pair of visits". The instances of non-retrogression significantly outnumber the instances of retrogression as mentioned in 5.1.1, but this has no effect on the statistical significance of the results. However, a large majority of the compliance points are categorized as irreversible. Though this has no effect on a simple regression model, we can expect to see collinearity issues once interaction terms are included in the model.

5.2   Regressions

We use ordinary least squares to run regressions on the outcome variable, ret-rogression. Since most, if not all, of the variables involved are binary, it may seem beneficial to use logit or probit as the econometric approach. However, the volume of observations in the final dataset is very large at 122,388. Ordinary least squares was therefore the more efficient and straightforward method in this first foray into investigating the retrogression phenomenon. The first regression should test that irreversibility ($irrevtype = 1$) results in less retrogression. This is executed with **Regression A**.

Regression A:
$retro = \beta_0 + \beta_1 irrevtype + \varepsilon$

5.2.1   Reputation effects which curb retrogression

If a buyer's or a factory's considerations about its reputation play a role in encouraging labor law compliance, there should be a negative correlation with retrogression and factories with reputation sensitive buyers, and visits occurring before the Synthesis Report format change in 2006.

If a reputation sensitive buyer ($buyer\_rs = 1$) truly curbs retrogression, we would expect less retrogression than if there was no buyer. This correlation is tested in **Regression B**.

Regression B:
$retro = \beta_0 + \beta_1 buyer\_rs + \varepsilon$

To test whether this effect is similar across irreversible and reversible compli-ance points, retrogression is regressed on buyer reputation and irreversibility. The table below depicts the expected levels of retrogression for different combi-nations of buyer type and point type.

Regression D:
$retro = \beta_0 + \beta_1 buyer\_rs + \beta_2 irrevtype + \beta_3 (buyer\_rs \cdot irrevtype) + \varepsilon$

Retrogression	Reputation Sensitive	Not Reputation Sensitive
Reversible compliance points	*High*	*High*
Irreversible compliance points	*Low*	*Medium*

Similarly, if public disclosure of labor law compliance ($public = 1$) truly curbs retrogression, less retrogression is expected during the time period for which there was public disclosure. This correlation is tested in **Regression C**.

Regression C:
$retro = \beta_0 + \beta_1 public + \varepsilon$

To test whether the public disclosure effect is similar across irreversible and reversible compliance points, retrogression is regressed on public disclosure and irreversibility. The table below depicts the expected levels of retrogression for difference combinations of point type and the time periods for which there were different levels of public disclosure.

Regression E:
$retro = \beta_0 + \beta_1 public + \beta_2 irrevtype + \beta_3 (public \cdot irrevtype) + \varepsilon$

Retrogression	Public Disclosure	No Public Disclosure
Reversible compliance points	*High*	*High*
Irreversible compliance points	*Low*	*Medium*

To compare the relative effects of buyer reputation sensitivity and public disclosure, retrogression is regressed on a consolidated model with interaction terms.

Regression F:
$retro = \beta_0 + \beta_1 buyer\_rs + \beta_2 public + \beta_3 (buyer\_rs \cdot public) + \varepsilon$

The table below depicts the expected levels of retrogression if the buyer effect is *stronger* than the effect of public disclosure.

Retrogression	Reputation Sensitive	Not Reputation Sensitive
Public Disclosure	*Very Low*	*High*
No Public Disclosure	*Low*	*Very High*

The table below depicts the expected levels of retrogression if the buyer effect is *weaker* than the effect of public disclosure.

Retrogression	Reputation Sensitive	Not Reputation Sensitive
Public Disclosure	*Very Low*	*Low*
No Public Disclosure	*High*	*Very High*

Similarly, we test if the relative effects of the two reputation factors are different when we bifurcate the compliance points into irreversible and reversible groups.

Regression G:

$retro = \beta_0 + \beta_1 buyer\_rs + \beta_2 public + \beta_3 irrevtype + \beta_4(buyer\_rs \cdot public) + \beta_5(buyer\_rs \cdot irrevtype) + \beta_6(public \cdot irrevtype) + \beta_7(buyer\_rs \cdot public \cdot irrevtype) + \varepsilon$

		Reputation Sensitive	Not Reputation Sensitive
Reversible	Public Disclosure	*Very Low*	*High*
	No Disclosure	*Low*	*Very High*
Irreversible	Public Disclosure	*Very Low*	*High*
	No Disclosure	*Low*	*Very High*

5.2.2 Subcategories of Irreversibility

In order to determine which subcategory of irreversibility results in the most retrogression (highest level of inefficiency), retrogression is regressed on the three different subcategories and interacted with irreversibility. Both the buyer effect and the public disclosure are interacted, but separately in two different regressions. $irrevtype1 = 1$ if the compliance point is irreversible due to high sunk costs, $irrevtype2 = 1$ if the compliance point is irreversible due to contracts with an external party, and $irrevtype3 = 1$ if the compliance point is irreversible due to empowerment of the worker.

Regression H:

$retro = \beta_0 + \beta_1 buyer\_rs + \beta_2 irrevtype1 + \beta_3 irrevtype2 + \beta_4 irrevtype3 + \beta_5(buyer\_rs \cdot irrevtype1) + \beta_6(buyer\_rs \cdot irrevtype2) + \beta_7(buyer\_rs \cdot irrevtype3) + \varepsilon$

		Reputation Sensitive	Not Reputation Sensitive
Reversible		$\beta_0 + \beta_1$	β_0
Irreversible	Sunk Costs	$\beta_0 + \beta_1 + \beta_2 + \beta_5$	$\beta_0 + \beta_2$
	External Contracts	$\beta_0 + \beta_1 + \beta_3 + \beta_6$	$\beta_0 + \beta_3$
	Empowerment	$\beta_0 + \beta_1 + \beta_4 + \beta_7$	$\beta_0 + \beta_4$

Regression I:

$retro = \beta_0 + \beta_1 public + \beta_2 irrevtype1 + \beta_3 irrevtype2 + \beta_4 irrevtype3 + \beta_5(public \cdot irrevtype1) + \beta_6(public \cdot irrevtype2) + \beta_7(public \cdot irrevtype3) + \varepsilon$

The subcategory that results in the least retrogression should have the least positive coefficient. This represents the compliance points on which the effects are most effective in curbing retrogression.

		Reputation Sensitive	Not Reputation Sensitive
Reversible		$\beta_0 + \beta_1$	β_0
Irreversible	Sunk Costs	$\beta_0 + \beta_1 + \beta_2 + \beta_5$	$\beta_0 + \beta_2$
	External Contracts	$\beta_0 + \beta_1 + \beta_3 + \beta_6$	$\beta_0 + \beta_3$
	Empowerment	$\beta_0 + \beta_1 + \beta_4 + \beta_7$	$\beta_0 + \beta_4$

5.2.3 Reputation vs. quality effects

Within reputation sensitive buyers, there exists a dichotomy between pure Apparel Retailers, which mainly sell apparel, and Mass Merchandisers, which sell a variety of products. Apparel Retailers generally purchase higher quality garments due to the more exclusive and targeted nature of their business, and this difference in quality may have a stronger inhibiting effect on labor law retrogression as in Weil's findings [37]. In the data manipulation process, reputation sensitive Apparel Retailers (high quality) were categorized as *buyertype1* and reputation sensitive Mass Merchandisers (low quality) were categorized as *buyertype3*. In order to extract the hypothetical effect, retrogression is regressed on Apparel Retailers, and Mass Merchandisers, interacted with irreversibility. The table below depicts expected levels of retrogression if the quality effect exists.

Regression J:
$retro = \beta_0 + \beta_1 buyertype1 + \beta_2 buyertype3 + \beta_3 irrevtype + \beta_4 (buyertype1 \cdot irrevtype) + \beta_5 (buyertype3 \cdot irrevtype) + \varepsilon$

Retrogression	High Quality	Low Quality
Reversible compliance points	*High*	*Very High*
Irreversible compliance points	*Low*	*Medium*

The compliance points are then disaggregated on subcategories of irreversibility to find if the quality effect has a distinct influence on different types of compliance points. For example, a high quality buyer may have a stronger impact on the empowerment of workers. This would prove that placing greater technical demands on workers will lead to innovative human resource management through agency-sharing with workers. Higher quality orders may, in a sense, trigger a more modern management-worker relationship in factories by empowering workers with more autonomy. In this case, the coefficient for the Apparel Retailer and empowerment, β_8, will be more negative than the coefficient for the Mass Merchandiser and empowerment, β_{11}.

Regression K:

$retro = \beta_0 + \beta_1 buyertype1 + \beta_2 buyertype3 + \beta_3 irrevtype1 + \beta_4 irrevtype2 + \beta_5 irrevtype3 + \beta_6(buyertype1 \cdot irrevtype1) + \beta_7(buyertype1 \cdot irrevtype2) + \beta_8(buyertype1 \cdot irrevtype3) + \beta_9(buyertype3 \cdot irrevtype1) + \beta_{10}(buyertype3 \cdot irrevtype2) + \beta_{11}(buyertype3 \cdot irrevtype3) + \varepsilon$

Regressions A through **K** were run with the statistics program, Stata 11/IC.

Chapter 6

Results

This chapter presents the results from the regressions described in Chapter 5. Findings are divided into four sections: Irreversibility (6.1), Reputation Effects (6.2), Subcategories of Irreversibility (6.3), and Quality Effects (6.4). The results have implications for BFC's operations and depict a compelling picture of the factors that aid factories in staying compliant with labor laws. Each regression on the final data was run twice: once with non-robust standard errors, and a second time with robust standard errors. There were insignificant differences between the two types of standard errors in all cases, and only robust standard errors are reported in the tables. Thus, we can safely assume homoskedasticity and a good measure of fit. The main conclusions are ***emphasized*** and summary tables are found in the Appendix (7.3).

6.1   Irreversibility

There is (unexpectedly) more retrogression on irreversible points.
The variables in all regressions generally turn out coefficients with reasonable signs, with the exception of the irreversibility variable. In all specifications, the *irrevtype* variable consistently has a positive and statistically significant coefficient, which is contrary to what was theorized (see Table 6.1). This implies that irreversibility may actually *promote* retrogression, when we would expect irreversibility to *curb* retrogression. This result, though unexpected, is consistent over all specifications; hence irreversibility truly has a strong positive correlation with retrogression in many cases.

There are two possible explanations for the positive correlation between irre-

	A
Irreversible points	0.0243473***
	(0.0010923)
Constant	0.0174731***
	(0.000892)
Observations	122,388
R-squared	0.0024

Note: Standard errors in parentheses
Asterisks denote statistical significance *** p<0.01, ** p<0.05, * p<0.1

Table 6.1: Correlation between retrogression and irreversibility.

versibility and retrogression. Firstly, the correlation could be due to a poorly constructed taxonomy of reversible and irreversible points, such that certain points are not under the accurate category. Secondly, the positive correlation might be an indication that the compliance points defined as irreversible are in fact compliance points that factories find very difficult to come into compliance with. Since we take retrogression on compliance to be an indication that the particular compliance is unproductive, the unexpected positive sign on *irrevtype* could mean that the irreversible points are very inefficient for the factory's operations or exceedingly complex to implement. Notice that the reversible compliance groups deal with the most basic labor standards of Child Labor, Forced Labor, Discrimination, Strikes, Information about Wages, and Occupational Safety and Health Reporting. On the other hand, the irreversible compliance groups involve secondary labor standards of Machine Safety, Workplace Operations, and Emergency Preparedness as a few examples. The taxonomy of compliance point types resulted in 21 out of 27 compliance groups being defined as irreversible, which is a significant majority of all the compliance points. These "irreversible" working conditions involve a higher level of training and technological knowledge on the part of factory managers. Hence, the positive sign on *irrevtype* might actually be highlighting the fact that more demanding compliance points are so unproductive, that in spite of their irreversibility, factories that have attempted compliance on these points have subsequently retrogressed anyway. Perhaps alternative dichotomies will be more appropriate, such as "productive vs. costly", or "core vs. innovative", since "reversible vs. irreversible" are inapt labels.

In light of this result, the interaction terms on *irrevtype* are additionally important when considering the reputation effects. More attention should be placed on

the buyer or public disclosure effect on irreversible points, since these points refer to possibly unproductive, very challenging, but nonetheless ethically motivated labor laws. This adds another layer of nuance to the concept of retrogression. The buyer and public disclosure effects are especially powerful if they discourage retrogression on "irreversible" compliance points that are bad for business, but good for workers. If the two reputation effects are particularly useful in holding factories to higher labor standards, there should be negative correlations on interaction terms involving the effect and irreversibility.

6.2   Reputation Effects

Both the buyer effect and public disclosure effect exist.
The findings on the buyer effect and public disclosure effect are particularly fascinating. The two reputation effects are examined in **Regressions B** and **C**, and the coefficients show that both effects have a statistically significant negative correlation with retrogression (see Table 6.2). These results support the hypothesis that reputation effects curb retrogression on compliance. The public disclosure coefficient, -0.0074938, is just slightly more negative than the -0.0074083, but both numbers are very similar. Since the public disclosure variable is basically a time dummy for pre- November 2006, the result that more retrogression occurs post- November 2006 is intriguing because compliance generally <u>increases</u> across time [7]. The negative coefficient on public disclosure means that while compliance is increasing over time, retrogression is <u>increasing</u> as well. In the most optimistic case, we would hope for compliance to increase and retrogression to decrease over time. The empirical evidence suggests that even though the general level of compliance is rising in the industry, factories are truly facing challenges in *persisting* with labor law compliance.

As additional specifications will show, the similar coefficients on the buyer variable and public disclosure variable do not imply that the effects of a reputation sensitive buyer and public disclosure are equivalent. The distinction between these two effects is explored in subsequent models. Nonetheless, both reputation factors have an unambiguous negative correlation with retrogression.

An interesting development occurs when we investigate the effects on irreversible points which, as proposed in 6.1, are the compliance points that factories find very challenging. **Regressions D** and **E** show the difference between the buyer and public disclosure effects when the factors are interacted with irreversible compliance points (see Table 6.3). Once again, the coefficients on irreversible

	B	C
Reputation sensitive buyer	-0.0074083***	
	(0.0011049)	
Public disclosure		-0.0074938***
		(0.0011313)
Constant	0.0416505***	0.0398448***
	(0.0008575)	(0.0006727)
Observations	122,388	122,388
R-squared	0.0004	0.0003

Note: Standard errors in parentheses
Asterisks denote statistical significance *** p<0.01, ** p<0.05, * p<0.1

Table 6.2: Correlation between retrogression and two reputation effects.

compliance points are 0.0296 and 0.0250, which are both positive and statistically significant. This result, which is contrary to what was hypothesized, has already been discussed in 6.1.

The buyer and public disclosure effects are independent of each other.
From Table 6.3, it is clear that having a reputation sensitive buyer and public disclosure effect are **not** twin effects. Within reversible compliance points, the presence of a reputation sensitive buyer has an insignificant effect on retrogression (0.000416 with a low t-statistic). This supports the above hypothesis that reversible compliance points represent low-hanging fruit for which the factory requires little "buyer assistance" with compliance. It is hence reasonable that the buyer effect is not pronounced among such points.

However, the opposite is true for public disclosure. The coefficient of -0.00576 is both negative and statistically significant, indicating that public disclosure curbs retrogression on easily reversible points. This is the first indication that the two reputation effects may both curb retrogression, but they operate very differently. Public disclosure curbs retrogression on compliance points dealing with the most basic working conditions, whereas the buyer effect is absent on these same points.

The two reputation effects diverge among irreversible points as well. Reputation sensitive buyers interacted on irreversible points gives a negative sign of -0.00950, which relative to other coefficients in other regressions, is a large magnitude. This indicates that the presence of a reputation sensitive buyer curbs

	D	E
Reputation sensitive buyer	0.000416	
	(0.00179)	
Public disclosure		-0.00576***
		(0.00181)
Irreversible points	0.0296***	0.0250***
	(0.00166)	(0.00137)
Reputation sensitive on irreversible	-0.00950***	
	(0.00221)	
Public disclosure on irreversible		-0.0021
		(0.00223)
Constant	0.0172***	0.0193***
	(0.00133)	(0.00133)
Observations	122,388	122,388
R-squared	0.003	0.003

Note: Standard errors in parentheses
Asterisks denote statistical significance *** p<0.01, ** p<0.05, * p<0.1

Table 6.3: Correlation between retrogression and reputation effects interacted with irreversible compliance points.

retrogression among irreversible points quite significantly. This is a statistically significant and very encouraging result because it implies that the buyer effect exists among a good majority of compliance points. Moreover, this majority of points potentially represents the most technologically challenging compliance points. There is empirical evidence that there is human capital transfer from the buyer to the factory, thereby promoting sustained labor law compliance on such points. The buyer effect is hence operating in an environment where it is most necessary.

The public disclosure effect interacted with irreversible points, on the other hand, actually yields an insignificant result (-0.0021). The two reputation effects thus have diagonally opposite influences on reversible and irreversible compliance points. A reputation sensitive buyer curbs retrogression on irreversible (challenging) compliance points, whereas public disclosure does not; public disclosure inhibits retrogression on reversible (basic) compliance points, whereas a reputation sensitive buyer does not. The two effects lead to different compliance outcomes on disaggregated points.

The theoretical framework pertaining to how the two effects may curb retrogression does not disaggregate compliance point types (see 4.2.3), and hence does not account for this interesting mirror-image scenario. Though it is good news that there is more than one way to encourage factories to remain in compliance, i.e. apart from using quotas or buyers as an incentive, the results show that public disclosure works through a different mechanism and only on basic compliance points. It is apparently not sheer embarrassment from the detailed reports that is encouraging firms to stay compliant, because this effect is absent on irreversible points. In terms of the number of compliance points, irreversible points constitute majority of the labor laws faced by the firms, and the "name and shame" explanation fails to account for this large group of points.

It has been established that the presence of the buyer effect or public disclosure effect is different for different compliance points, and **Regressions F** and **G** proceed to examine the *relative strength* of the two effects (see Table 6.4).

Public disclosure is the stronger effect.
We find that even though the buyer effect is present in majority of the compliance points, public disclosure is the stronger effect overall. **Regression F** excludes the interaction terms on irreversibility, and focuses on the two reputation effects on all compliance points as a whole. As opposed to **Regressions B** and **C**, which were with single variables (see Table 6.2), there is a clearer difference in the magnitude of the negative coefficients on the two effects. The coefficient on public disclosure (-0.00914) has a larger magnitude than the coefficient on the reputation sensitive buyer variable (-0.00815). This is interesting because from a free market perspective, the buyer is expected to be the main motivation to comply, and the buyer is expected to have a stronger effect. However, the data suggests that the buyer is actually a weaker effect than the public disclosure effect in general.

Interacting the public disclosure and buyer variables leads to statistically insignificant results of 0.00347 in **Regression F** and 0.00152 in **Regression G**, which is consistent with the inference that these two effects are not identical. The insignificant interaction term indicates that factories with a reputation sensitive buyer are indifferent to the presence or absence of public disclosure. The buyer is probably not so concerned with the exposés from the initial reporting format. Buyer names are, after all, not disclosed in the Synthesis Reports, nor are buyers publicly linked to specific factories. Since the Synthesis Reports are not the binding constraint for buyers, buyers are possibly promoting compliance due to

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	F	G
Reputation sensitive buyer	-0.00815***	0.000209
	(0.00136)	(0.00226)
Public disclosure	-0.00914***	-0.00667**
	(0.00181)	(0.00269)
Irreversible points		0.0305***
		(0.00205)
Buyer and public disclosure	0.00347	0.00152
	(0.00232)	(0.00363)
Buyer on irreversible		-0.0101***
		(0.00275)
Public disclosure on irreversible		-0.003
		(0.00343)
Buyer and public on irreversible		0.00238
		(0.00452)
Constant	0.0443***	0.0191***
	(0.00104)	(0.00166)
Observations	122,388	122,388
R-squared	0.001	0.003

Note: Standard errors in parentheses

Asterisks denote statistical significance *** p<0.01, ** p<0.05, * p<0.1

Table 6.4: Correlation between retrogression and two reputation effects interacted with each other.

the awareness that recalcitrant suppliers may be publicized in other ways. **Regression F**, nonetheless, reinforces the notion that reputation sensitive buyers and public disclosure will discourage firms from retrogressing on compliance, and public disclosure seems to have greater effectiveness in controlling overall retrogression. Since public disclosure describes the pre-2006 format of the Synthesis Reports, this suggests a strong case for reverting to the old format to discourage factories from reneging on points they have attempted to comply with.

From another perspective, the statistically insignificant interaction term also indicates that with public disclosure, the presence or absence of a reputation sensitive buyer does not make an appreciable difference on retrogression. This is logical because the initial format of Synthesis Reports was a leveler; these reports exposed all labor law violations regardless of which buyer a factory was

supplying to. As long as a factory was participating in BFC, their violations were specified in the reports. It then makes sense that the buyer profile does not shift the level of retrogression on compliance points because the whole industry faced uniform levels of exposure.

Regression G is a more fleshed-out version of **Regression F**, and takes interactions with irreversibility. The results in **Regression G** are consistent with the earlier regressions, where the buyer effect on reversible points is insignificant (0.000209), and the public disclosure effect on reversible compliance points is significant (-0.00667). This is similar with what was found in **Regressions D** and **E**. Also similar to **Regressions D** and **E**, the buyer effect is strongly pronounced among irreversible points (-0.0101 in the **Regression G** specification), whereas the public disclosure effect is not statistically significant (-0.003).

As for the relative strength of the two effects among reversible points, there is more evidence that public disclosure is the stronger effect. The sum of coefficients for having a reputation sensitive buyer but no public disclosure is 0.019309. The sum of coefficients for public disclosure but a non-reputation sensitive buyer is 0.01243. The latter result has a smaller positive magnitude, suggesting, once again, that the public disclosure effect is the stronger of the two. Among irreversible points, the sum of coefficients for no public disclosure but having a reputation sensitive buyer is 0.039709, and no reputation sensitive buyer but with public disclosure is 0.03993. Since 0.03993<0.039709, this reinforces the idea that the public disclosure effect is stronger. This corroborates the interaction term result from **Regression F**, which also indicates that public disclosure was more effective in inhibiting retrogression. The level of consistency in these results yields a strong case about the relative effectiveness of the buyer and public disclosure.

6.3   Subcategories of Irreversibility

The results regarding subcategories of irreversibility shed light on *which* labor laws are influenced by the buyer or public disclosure. **Regressions H** and **I** examine the three subcategories of irreversibility among compliance points, and there is additional evidence that two reputation effects of public disclosure and the buyer are not complementary (see Table 6.5).

Both effects inhibit retrogression on compliance points involving high sunk costs, but the similarities end there.

	H	**I**
Reputation sensitive buyer	0.000416	
	(0.00179)	
Public disclosure		-0.00576***
		(0.00181)
Sunk costs	0.0462***	0.0412***
	(0.00233)	(0.00187)
External contracts	0.00852***	0.00591***
	(0.00207)	(0.00169)
Empowerment	0.0263***	0.0209***
	(0.00201)	(0.00161)
Buyer or public effect on sunk costs	-0.0127***	-0.00668**
	(0.00304)	(0.00308)
Buyer or public effect on external contracts	-0.00669**	-0.00360
	(0.0027)	(0.00267)
Buyer or public effect on empowerment	-0.00817***	0.00275
	(0.00264)	(0.00272)
Constant	0.0172***	0.0193***
	(0.00133)	(0.00113)
Observations	122,388	122,388
R-squared	0.007	0.007

Note: Standard errors in parentheses
Asterisks denote statistical significance *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 6.5: Correlation between retrogression and subcategories of irreversibility.

The buyer is particularly effective in keeping factories in check for irreversible points in all subcategories. **Regression H** looks at the subcategories interacted on the buyer effect. Once again, as in **Regressions D** and **G**, the buyer reputation sensitivity does not have a statistically significant effect among reversible points (0.000416), and irreversibility has a positive correlation with retrogression for all three subcategories (0.0462 for high sunk costs, 0.00852 for contracts with external parties, and 0.0263 for empowerment).

There are slight differences among the three subcategories in the extent of the buyer effect. Once these subcategories are interacted with buyer reputation sensitivity, the correlations flip to negative while maintaining statistical significance (-0.0127 for high sunk costs, -0.00669 for contracts with external parties, and -

0.00817 for empowerment). The flip corroborates the negative sign for reputation sensitivity interacted with irreversibility in **Regressions D** and **G**. This shows that the buyer effect is present among all three categories of irreversibility, and especially in compliance points with high sunk costs (-0.0127) and compliance points which empower workers (-0.00817). This result is compatible with the intuition that factories are generally more compliant once they make long-lasting investments that involve significant changes in the physical working environment or the psyche and morale of workers. It is logical that a reputation sensitive buyer is helping with compliance most successfully on these points. Furthermore, the positive correlation of points involving high sunk costs with retrogression may be an indication that factories are buying expensive equipment, but may not have the expertise to actually use the purchased equipment. The result that the buyer effect is strongest for such points suggest that there is some knowledge transfer from buyer to factory in terms of actively implementing safer technology and equipment. Contracts with external parties, on the other hand, are often superficial and bureaucratic laws that may not trickle down to impact the worker. The buyer effect has a relatively smaller effect of inhibiting retrogression on points involving external contracts (-0.00669).

Public disclosure, unlike the buyer effect, does not operate on irreversible points in the same way. **Regression I** paints a different picture than **Regression H**, and the results have a smaller degree of statistical significance. This is also consistent with the earlier result that public disclosure does not inhibit regression on irreversible points very effectively. Public disclosure is still negatively correlated with retrogression on reversible points (-0.00576), and irreversibility is still positively correlated with retrogression across all three subcategories (0.0412, 0.00591, 0.00169 respectively). Exposing working conditions hence does little to keep factories compliant with difficult labor laws. Public disclosure does not fulfill the same training role that a buyer may play.

Public disclosure seems to inhibit retrogression only on compliance points with high sunk costs (-0.00668). The effects of public disclosure on compliance points due to external contracts (-0.00360) and worker empowerment (0.00275) are not statistically significant. The fact that public disclosure controls retrogression on compliance points with high sunk costs is the single point of confluence with the buyer effect. Both effects inhibit retrogression on points that involve the factory making large investments in improving the working environment. These compliance points tend to accrue long-term benefits for workers because of the permanent nature of the changes involved. For example, a reinstallation of a ventilation system, or machinery that can be operated safely, all serve to im-

prove the quality of the working environment in the long-run. It is tenable that the fear of losing buyers restrains factories from reneging on these laws despite their high costs. Public disclosure also inhibits retrogression because factories are unlikely to want to incur both the cost of compliance the cost of a damaged reputation if they retrogress.

6.4 Quality Effects

Similar to Weil's findings in American apparel factories [37], there is evidence that the quality effect exists in Cambodia's apparel industry. The quality effect is investigated in **Regressions J** and **K** (see Table 6.6), and the positive correlation of retrogression and irreversibility is maintained in these specifications as well (0.0296 for **Regression J**, and positive coefficients on all subcategories of irreversibility for **Regression K**).

Apparel Retailers inhibit retrogression better than Mass Merchandisers.
The first hint of a quality effect is found when Apparel Retailers and Mass Merchandisers are interacted with irreversible points. Like all previous regressions, reputation sensitive buyers, regardless of whether they are mass merchandisers, do not have a significant effect on reversible points. In **Regression J**, the buyer effects on reversible points are not statistically significant at all (0.000917 and 0 respectively), but on irreversible points, the buyer effect is very significant and pronounced. This echoes earlier findings about the effectiveness of a reputation sensitive buyer on irreversible points only. If we follow the hypothesis that irreversible points are the points that are unproductive, these buyer effects are extremely important. Both buyer types inhibit retrogression on unproductive points, as indicated by the negative signs on the interaction terms with irreversibility, but the interaction term with Apparel Retailers has a larger magnitude of -0.0115 compared to the -0.00785 on the interaction term with Mass Merchandisers. This suggests that Apparel Retailers inhibit retrogression more effectively than Mass Merchandisers. This is evidence for a quality effect in promoting compliance. There exists, quite definitively, a lower rate of retrogression among factories producing higher quality garments for their buyers.

Apparel Retailers inhibit retrogression on empowerment points better than Mass Merchandisers.
The difference in having an Apparel Retailer or Mass Merchandiser for a buyer is even more apparent when irreversibility is disaggregated into subcategories.

	J	K
Apparel retailer	0.000917	0.000917
	(0.00225)	(0.00225)
Mass merchandiser	0	0
	(0.00209)	(0.00209)
Irreversible points	0.0296***	
	(0.00166)	
Apparel retailer on irreversible	-0.0115***	
	(0.00272)	
Mass merchandiser on irreversible	-0.00785***	
	(0.00257)	
Sunk costs		0.0462***
		(0.00233)
External contracts		0.00852***
		(0.00208)
Empowerment		0.0263***
		(0.00201)
Apparel retailer on sunk costs		-0.0148***
		(0.00371)
Apparel retailer on external contracts		-0.00930***
		(0.00326)
Apparel retailer on empowerment		-0.00975***
		(0.00324)
Mass merchandiser on sunk costs		-0.0110***
		(0.00353)
Mass merchandiser on external contracts		-0.00452
		(0.00316)
Mass merchandiser on empowerment		-0.00684**
		(0.00307)
Constant	0.0172***	0.0172***
	(0.00133)	(0.00133)
Observations	122,388	122,388
R-squared	0.003	0.007

Note: Standard errors in parentheses

Asterisks denote statistical significance *** p<0.01, ** p<0.05, * p<0.1

Table 6.6: Correlation between retrogression and high quality buyers.

Regression K produces consonant results with **Regression J**, and for every subcategory of irreversibility, Apparel Retailers have a stronger negative correlation with retrogression than Mass Merchandisers. Of special note is the fact that Apparel Retailers are better at inhibiting retrogression on compliance points that empower workers (-0.00975 as opposed to -0.00684 for Mass Merchandisers). This is reconcilable with the idea that higher quality buyers provide expertise and technical information that encourage power sharing with factory workers. Instead of constant vigilance on the part of factory managers, compliance with labor laws that empower workers means that workers operate more independently and organize themselves. The existence of innovative work relationships on the factory floor can, in turn, reap quality advantages, leading to a self-perpetuating cycle of quality and empowerment. Higher quality demands from the buyer can empower workers, and empowered workers produce higher quality output.

Chapter 7

Conclusion

The research in this thesis provides statistically significant evidence that having a reputation sensitive buyer and publicly disclosing working conditions can lead to less retrogression on labor law compliance in apparel factories. This is congruous with theoretical projections, but this thesis finds an interesting divergence between the two reputation effects. Firstly, public disclosure (the firm's reputation) is the stronger overall effect compared to the buyer's sensitivity, which is contrary to what market theory predicts. Secondly, the buyer effect is present only in points for which remaining in compliance is probably unproductive for factories. The converse is true for the public disclosure effect, which is present in core compliance points or basic labor laws. These two effects are helping factories remain in compliance with two mutually exclusive groups of labor laws, and therefore, are not equivalent. Evidence for the quality effect is also found, and there are indications that mass merchandisers and apparel retailers, even if they are all reputation sensitive, exert different influences on labor law compliance in their supplying factories. This chapter contains some directions for future research and recommendations to BFC in light of these results.

7.1 Directions for Future Research

The rare opportunity to investigate labor law compliance directly means that there are even more questions to be answered regarding the firms decision-making calculus when it comes to managing its workers and responding to legislation. It is conceivable that reputation sensitive buyers are placing orders with already compliant factories at the outset. Ostensibly, there are a number of different explanations for the results of this analysis. Controlling for variations in plant size

may also be introduced into econometric models. Cambodia's apparel industry is large relative to other less developed countries of comparable size, and Cambodian apparel factories are dynamic and important to the global supply chain. Further research on this industry regarding factors besides reputation concerns will definitely be welcomed by a variety of interested parties.

The unexpected positive correlation between irreversibility and retrogression deserves further study. The statistically significant and consistent result that "irreversibility" — as defined by this thesis — leads to more retrogression, is contrary to the theory, and a substitute interpretation or labeling of the irreversible variable is necessary. Some possibilities were mentioned in 6.1. Furthermore, alternative taxonomies of the compliance points may well lead to very different results, since the regression coefficients will be very sensitive to the binary coding of point types. This would be interesting material for future research.

As with all linear regression models, correlation does not imply causality, and this thesis only provides evidence of negative correlations between a reputation sensitive buyer or public disclosure with retrogression on compliance. The proposed mechanism by which a reputation sensitive buyer directly results in factories remaining in compliance with labor laws is confirmed by interviews with key individuals [22]. The mechanism for the public disclosure effect (see 4.2.3) is theoretical but now has supporting empirical evidence. There may have been other factors that were not considered in the different specifications, and an expanded model may improve the R-squared values. Furthermore, a more comprehensive investigation into the evolution of BFC may be able to uncover exogenous events which allow for the natural experiment method, in lieu of the format change of the Synthesis Reports. As discussed in Robertson et al. (2010), a possible identifying event is the expiration of the Multi-Fiber Arrangement in 2005 [7].

The 2008 financial crisis is another key event worth further research. From the recent literature and my visit to BFC headquarters in Phnom Penh, I noticed a growing concern that apparel factories were especially hard-hit as a result of the global recession. Chandrarot, Dasgupta and Williams (2009) conducted a separate survey among Cambodian factory workers in light of the changing economic landscape, and find a striking impact on women in particular [9]. Factory workers in Cambodia's apparel industry are without question, overwhelmingly female. Gender-specific studies may be more challenging given the limitations of the compliance data and collection techniques, but future researchers may consider using the compliance data in conjuction with survey data such as the

findings of Chandararot et al. (2009) [9] and Chansamphors (2008) [10].

A possible method of obtaining more evidence for the causality of public disclosure is to use a Chow test on the monthly compliance data. If there is a structural break in retrogression (i.e. suddenly more retrogression) right around October or November 2006, this will yield even stronger evidence that the Synthesis Report format change had a significant impact on compliance decisions. One can argue that there were many economic differences before and after November 2006 that caused the results described in Chapter 6, but the format change does the best in accounting for an abrupt shift occurring in the narrow period of a month. There are few alternative explanations which occurred specifically in October 2006. The econometric strategy in this thesis only used a pre- and post- November 2006 dummy variable, but a Chow test may be able to introduce greater specificity and stability into the model.

Locke, Qin and Brause put forth some very fascinating avenues to consider in their study of Nike suppliers (2006). They find significant differences in code compliance across a variety of factory characteristics [24]. A higher level of code compliance is found in smaller factories compared to larger ones, and a connection with labor standards and profitability may be drawn here. A factory can only expand on condition of profitability, and this profitability in turn could have been made possible by poorer working conditions. Also, the more frequently a factory is visited by personnel from the buying company, the better the code compliance. However, the longer the relationship a factory had with Nike, the poorer the level of code compliance. Poorer code compliance also resulted if a factory had a large proportion of their production volume dedicated to Nike orders. Ostensibly, the nature of the relationship between the factory and buyer is not a simple factor influencing labor code compliance. In Locke and Romis (2006), the nature of the relationship between the factory and the buyer is seen to be exceedingly important too [25]. Higher compliance is found if the said relationship is collaborative and characterized by more frequent visits with technical specialists from the company. Frenkel and Scott (2002) have similar findings for Chinese factories [15]. A more sophisticated buyer-supplier relationship with an emphasis on cooperation and communication leads to better outcomes than a distant, formal one. BFC provides the opportunity to delve into similar questions for a range of apparel buyers and factory sizes in Cambodia's garment industry.

7.2 Recommendations

For BFC to revert to the initial format of Synthesis Reports seems to be a logical strategy to inhibit retrogression overall. The data is unambiguous in suggesting the presence of a public disclosure effect. The program definitely has the technological and administrative capabilities to do so. In fact, with the advent of the Information Management System in 2006 (which actually precipitated the format change), the program's data management capacity increased substantially. The findings in this research show that public disclosure inhibited retrogression in the early stages of the program with the initial reporting format, together with the rising rates of compliance across time. Since there are few technical barriers to the publication of such reports, BFC has an incentive to continue publishing non-anonymized, detailed compliance data through their Synthesis Reports.

The findings on the buyer effect have served to confirm the intuition that having a reputation sensitive buyer will result in better working conditions in a factory. From the literature and conversations with BFC staff, this is not a groundbreaking development, but the statistical evidence that there exists a *quality* effect has certain implications. Between two reputation sensitive buyers, the buyer which orders higher quality garments is likely to command better labor law compliance. Therefore, BFC can tailor their training programs to emphasize quality training, or encourage factory behavior geared towards producing higher quality goods. Not only will this pave the way for Cambodia's garment industry to raise quality levels and worker productivity, the empirical results in this thesis suggest that workers will reap rewards in improving their working conditions too.

BFC should also bear in mind the productivity and implementation issue behind labor law compliance. The fact that retrogression is increasing over time suggests that factories do not consider compliance a sustainable practice. A possible explanation is that labor law compliance involves high opportunity costs, and factory managers may not have sufficient motivation, expertise or experience to manage their human resources in innovative ways. For factories with reputation sensitive buyers, there is evidence that the buyers are meeting the need for more training and the transmission of technological knowledge. This is where the training aspect of BFC's operations proves to be crucial and complementary to monitoring efforts for factories *without* such buyers. With adequate training, factory managers can learn strategies to fully realize the benefits of labor law compliance, such as organizing workers in shifts instead of enforcing illegal overtime, or paying workers their promised wages to elicit better worker effort. The caveat to this recommendation is that rising retrogression should not

be exaggerated, because this study shows that there are relatively low levels of retrogression in the first place.

7.3 Concluding Remarks

Reputation matters in Cambodia's apparel industry. Public disclosure of working conditions and having a reputation sensitive buyer correspond with better labor law compliance in factories. This research provides heartening evidence on two accounts. Firstly, investments in Corporate Social Responsibility and buyer participation in programs like *Better Factories Cambodia* are indeed translating into better working conditions for garment factory workers. Secondly, monitoring and publicizing labor law violations can successfully inhibit subsequent infringement. The public disclosure effect is important for compliance with core labor standards; the buyer effect is especially pronounced for the laws a factory deems more costly. Though detailed monitoring and reporting may not be an easily replicable practice across other industries and countries, the case of Cambodia's garment factories is testament to the importance of buyer involvement, public auditing and the good management the two effects foster. The flow of information which *Better Factories Cambodia* engenders has reaped benefits for factory workers, and the practice should be continued and encouraged for years to come.

Appendix

Summary Tables

	A	B	C
Irreversible points	0.0243473***		
	(0.0010923)		
Reputation sensitive buyer		-0.0074083***	
		(0.0011049)	
Public disclosure			-0.0074938***
			(0.0011313)
Constant	0.0174731***	0.0416505***	0.0398448***
	(0.000892)	(0.0008575)	(0.0006727)
Observations	122,388	122,388	122,388
R-squared	0.0024	0.0003	0.0003

Note: Standard errors in parentheses
Asterisks denote statistical significance *** p<0.01, ** p<0.05, * p<0.1

Table 1: Summary of regressions for single variables.

	D	E	F	G
Buyer	0.000416		-0.00815***	0.000209
	(0.00179)		(0.00136)	(0.00226)
Public disclosure		-0.00576***	-0.00914***	-0.00667**
		(0.00181)	(0.00181)	(0.00269)
Irreversible points	0.0296***	0.0250***		0.0305***
	(0.00166)	(0.00137)		(0.00205)
Buyer/public disclosure			0.00347	0.00152
			(0.00232)	(0.00363)
Buyer/irreversible	-0.00950***			-0.0101***
	(0.00221)			(0.00275)
Public disclosure/irreversible		-0.0021		-0.003
		(0.00223)		(0.00343)
Buyer/public/irreversible				0.00238
				(0.00452)
Constant	0.0172***	0.0193***	0.0443***	0.0191***
	(0.00133)	(0.00133)	(0.00104)	(0.00166)
Observations	122,388	122,388	122,388	122,388
R-squared	0.003	0.003	0.001	0.003

Note: Standard errors in parentheses

Asterisks denote statistical significance *** p<0.01, ** p<0.05, * p<0.1

Table 2: Summary of regressions for reputation effects.

	H	**I**
Reputation sensitive buyer	0.000416	
	(0.00179)	
Public disclosure		-0.00576***
		(0.00181)
Sunk costs	0.0462***	0.0412***
	(0.00233)	(0.00187)
External contracts	0.00852***	0.00591***
	(0.00207)	(0.00169)
Empowerment	0.0263***	0.0209***
	(0.00201)	(0.00161)
Buyer or public effect on sunk costs	-0.0127***	-0.00668**
	(0.00304)	(0.00308)
Buyer or public effect on external contracts	-0.00669**	-0.00360
	(0.0027)	(0.00267)
Buyer or public effect on empowerment	-0.00817***	0.00275
	(0.00264)	(0.00272)
Constant	0.0172***	0.0193***
	(0.00133)	(0.00113)
Observations	122,388	122,388
R-squared	0.007	0.007

Note: Standard errors in parentheses

Asterisks denote statistical significance *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 3: Summary of regressions for subcategories of irreversibility.

	J	K
Apparel retailer	0.000917	0.000917
	(0.00225)	(0.00225)
Mass merchandiser	0	0
	(0.00209)	(0.00209)
Irreversible points	0.0296***	
	(0.00166)	
Apparel retailer on irreversible	-0.0115***	
	(0.00272)	
Mass merchandiser on irreversible	-0.00785***	
	(0.00257)	
Sunk costs		0.0462***
		(0.00233)
External contracts		0.00852***
		(0.00208)
Empowerment		0.0263***
		(0.00201)
Apparel retailer on sunk costs		-0.0148***
		(0.00371)
Apparel retailer on external contracts		-0.00930***
		(0.00326)
Apparel retailer on empowerment		-0.00975***
		(0.00324)
Mass merchandiser on sunk costs		-0.0110***
		(0.00353)
Mass merchandiser on external contracts		-0.00452
		(0.00316)
Mass merchandiser on empowerment		-0.00684**
		(0.00307)
Constant	0.0172***	0.0172***
	(0.00133)	(0.00133)
Observations	122,388	122,388
R-squared	0.003	0.007

Note: Standard errors in parentheses

Asterisks denote statistical significance *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 4: Summary of regressions for quality effects.

Coding for Buyer Type

This section describes the process of categorizing buyer types, which allows for the data analysis to examine the effect of a reputation sensitive buyer. The reputation sensitivity of a factory's buyer is believed to have an effect on labor law compliance. There were 22 buyers identified in the compliance data, and where possible, a factory's principal buyer was identified as well. The 22 buyers were the focus of the buyer categorization, and another dataset on buyer characteristics was collated. Specifically, a buyer's commitment to Corporate Social Responsibility and the scope of its business were the two factors under consideration. All the variables in the dataset on buyer characteristics are listed here.

- Market: the nature of goods retailed by the buyer (mainly apparel or general merchandise)

- CSR website/report: the absence/presence of a Corporate Social Responsibility website or report

- Rank in top U.S. importers from Cambodia

- Imports 2008 from Cambodia to the U.S.A.

- Imports 2007 from Cambodia to the U.S.A.

- Market Capitalization

- *Fortune*'s "Most Admired Companies" score

- Status: whether the buyer is still in business or bought out etc.

- Supplier Code of Conduct: the absence/presence of a Supplier Code of Conduct

- Number of Google hits with sweatshop and company name

- Rankabrand score

- Fair Labor Association participation

- UN Global Compact participation

- Interbrand Best Global Brands 2006 rank

- Interbrand 2006 Brand Value

- Interbrand Best Global Brands 2008 rank

- Interbrand 2008 Brand Value

- Social Accountability International membership

- Other names/subsidiaries of the buyer

For simplicity, buyers were dichotomized on two levels, based on the data on the CSR website/report and Market. These two aspects were considered the most appropriate for the nature of the regressions in the data analysis.

1. The nature of the buyers business:
   - Apparel Retailer: a buyer primarily retailing apparel
   - Mass Merchandiser: a buyer retailing apparel and other merchandise

2. Evidence of corporate social responsibility (CSR):
   - Significant evidence of CSR, indicated by a public CSR report/website
   - Little evidence of CSR, indicated by the absence of a public CSR report

Hence, buyers were assigned 1 of 4 buyer types:

buyertype1 refers to Apparel Retailers with significant evidence of CSR.

buyertype2 refers to Apparel Retailers with little evidence of CSR.

buyertype3 refers to Mass Merchandisers with significant evidence of CSR.

* (There are no Mass Merchandisers with little evidence of CSR in the dataset)

buyertype4 refers to buyers who do not participate in BFC.

Buyer types were coded into the data as four dummy variables. A buyer was coded as reputation sensitive if it was categorized as **buyertype1** or **buyertype3**. This dummy variable was labeled as $buyer\_rs$.

Coding for Compliance Point Type

The point types, referring to the type of compliance point (labor law), was coded based on the question groups by Professor Raymond Robertson. A dataset with the question groups were merged with the compliance data. Not all the compliance points were allocated question groups, and were hence dropped from the dataset. A large majority (293 out of 406 original compliance points) were coded successfully.

	Group	Reversible	Irreversible	Sunk costs	Contracts	Empowerment
1	Child Labor	Yes	No	No	No	No
2	Discrimination	Yes	No	No	No	No
3	Forced Labor	Yes	No	No	No	No
4	Collective Agreements	No	Yes	No	Yes	No
5	Strikes	Yes	No	No	No	No
6	Shop Stewards	No	Yes	No	Yes	No
7	Liaison Officers	No	Yes	No	Yes	No
8	Unions	No	Yes	No	Yes	No
9	Information about Wages	Yes	No	No	No	No
10	Payment of Wages	No	Yes	No	No	Yes
11	Contracts	No	Yes	No	No	No
12	Discipline/Management Misconduct	No	Yes	No	No	Yes
13	Disputes	No	Yes	No	No	Yes
14	Internal Regulations	No	Yes	No	Yes	No
15	Health/First Aid	No	Yes	Yes	No	No
16	Machine Safety	No	Yes	Yes	No	No
17	Temperature/Ventilation/Noise/Light	No	Yes	Yes	No	No
18	Welfare Facilities	No	Yes	Yes	No	No
19	Workplace Operations	No	Yes	Yes	No	No
20	OSH Assessment/Recording/Reporting	Yes	No	No	No	No
21	Chemicals	No	Yes	Yes	No	No
22	Emergency Preparedness	No	Yes	Yes	No	No
23	Overtime	No	Yes	No	No	Yes
24	Regular Hours/Rest Days	No	Yes	No	No	Yes
25	Compensation for Accidents/Illnesses	No	Yes	No	No	Yes
26	Holidays/Annual Leave	No	Yes	No	No	Yes
27	Maternity Benefits	No	Yes	No	No	Yes

Table 5: Categories of each compliance group.

	Group	Category	Rationale
1	Child Labor	Reversible	Firm can stop verifying age through negligence.
2	Discrimination	Reversible	Firm can reverse its own employment policies.
3	Forced Labor	Reversible	Firm can start using forced labor even if it did not initially.
4	Collective Agreements	Irreversible	Firm is unlikely to retract a registered collective agreement.
5	Strikes	Reversible	Firm can change its own policies regarding strikes.
6	Shop Stewards	Irreversible	Firm cannot easily change registered shop steward policies.
7	Liaison Officers	Irreversible	Firm cannot easily change registered liaison officer policies.
8	Unions	Irreversible	Firm cannot easily stop momentum achieved by unions.
9	Information about Wages	Reversible	Firm can stop providing accurate information.
10	Payment of Wages	Irreversible	Firm cannot easily change registered wage policies.
11	Contracts	Irreversible	Firm is unlikely to change its own contract terms.
12	Discipline/Management Misconduct	Irreversible	Firm is unlikely to revert to primitive management methods.
13	Disputes	Irreversible	Firm is unlikely to revert to primitive dispute policies.
14	Internal Regulations	Irreversible	Firm is unlikely to renege on registered regulations.
15	Health/First Aid	Irreversible	Firm is unlikely to remove equipment already purchased.
16	Machine Safety	Irreversible	Firm is unlikely to remove equipment already purchased.
17	Temperature/Ventilation/Noise/Light	Irreversible	Firm is unlikely to remove equipment already purchased.
18	Welfare Facilities	Irreversible	Firm is unlikely to remove equipment already purchased.
19	Workplace Operations	Irreversible	Firm is unlikely to remove equipment already purchased.
20	OSH Assessment/Recording/Reporting	Reversible	Firm can change its own health policies.
21	Chemicals	Irreversible	Firm is unlikely to remove equipment already purchased.
22	Emergency Preparedness	Irreversible	Firm is unlikely to remove equipment already purchased.
23	Overtime	Irreversible	Firm cannot easily enforce illegal overtime again.
24	Regular Hours/Rest Days	Irreversible	Firm cannot easily increase hours without worker opposition.
25	Compensation for Accidents/Illnesses	Irreversible	Firm cannot easily reduce existing compensation.
26	Holidays/Annual Leave	Irreversible	Firm cannot easily reduce leave without worker opposition.
27	Maternity Benefits	Irreversible	Firm cannot easily stop maternity benefits for new mothers.

Table 6: Rationale for taxonomy of irreversibility.

Data Manipulation

This section is a guide to the data manipulation process for this thesis. The data primarily consists of the compliance data from *Better Factories Cambodia*, and the consolidated data on factory characteristics described which was collated by Debra Ang. Additional data on buyers was collected as described in 7.3. "CaelReadMe" was written by Cael Warren of Macalester College. Many thanks to Cael Warren and Professor Raymond Robertson for their assistance in understanding the compliance data.

The merged and cleaned data were not in a form suitable for econometric analysis, especially when the focus of the research shifted towards investigating the retrogression phenomenon instead of just straightforward compliance. In order to run regressions on the outcome variable, *retro*, the data was manipulated in a multi-step process. Each step of data collection and manipulation resulted in an edited or new dataset in Stata in order to optimize usage of computer memory. All .do files and the progression of the first to the final dataset were recorded in order to ensure the process can be entirely replicated.

CaelReadMe

A document written by Cael Warren was crucial in understanding the compliance data. The following are key sections that were essential before the data could be used in a meaningful way. The paragraphs below were written by Cael Warren:

> ...The dataset is organized by the unique firm-visit date identifying variable called "firmcode." Firmcode is a 9-digit code comprised of the 3-digit firm code (F), the 4-digit visit year (Y), and the 2-digit visit month (M) in the form of FFFYYYYMMM. All variables that are numbers with a "c" in front of them are 0/1 compliance variables, with 1 indicating noncompliance on the applicable question. All variables that are numbers with a "q" in front of them are 0/1 question responses, with 1 indicating a "yes" and 0 indicating a "no."...

> Variable Definitions
> - visit: number of completed visits for the given factory (including current visit) using the IMS
> - estdate: the factory's date of establishment (available only for the

original factories)

- union_number: number of unions in the factory

- strike_number: number of strikes since the last visit

- quota: dummy variable indicating whether the factory participates in the U.S. export quota system (available only for the original factories)

- countryown: factory's country of ownership

- signupday: day the factory signed up with BFC (date is a reasonable proxy for the factory's establishment date)

- signupmonth: month the factory signed up with BFC

- signupyear: year the factory signed up with BFC

- location: Cambodian province in which the factory is located

- namechange: a dummy variable indicating whether the factory has undergone a name change since its establishment

- Monitor Dummy Variables (17 total): a series of dummy variables that take on a value of 1 if the given monitor conducted the visit, 0 if not. There are typically two monitors per visit, but occasionally one or three.

> boran_teang
> kimlong_kuch
> malika_ok
> molyaneth_heng
> narith_nang
> phearun_va
> pichmalika_yim
> samol_ork
> sokna_te
> sophy_thea
> sovannara_eang
> ty_cheng
> vibol_sim
> vina_am
> youhong_lay
> nov_dara
> sotin

Consolidated Factory Characteristics

Independent of the compliance data is another set of data that was consolidated from primary sources over May to June 2009. The consolidated data is

an Microsoft Excel file with the name "Consolidated BFC factories [last date updated].xls". Every individual cell in this file is color-coded according to the primary source of information. Debra Ang proofread the consolidated once independently, and the second check was completed with the help of Jarrod A. Smith. An overview of this dataset is provided below.

Number of factories: 365.
Number of variables: 33.
- Code - factory code corresponding to the compliance data.
- Factory names - full name of the factory and branch number.
- Former name - previous name of the factory, if any.
- Status - open/close status of the factory as of March 2009, and the date of closure (if known). Factories that were closed purely due to the 2008 financial crisis (and not for tax exemption or other purposes) are also noted.
- Status code - 0 for closed factories, 1 for open factories.
- Close reason - 0 for open factories, 1 for closure due to non-crisis reasons, 2 for closed due to crisis reasons.
- GMAC - membership with the Garment Manufacturers Association in Cambodia (GMAC).
- GMAC code - 0 for non-members, 1 for members of GMAC.
- Owner Nationality - nationality of factory owner.
- Number of workers - total number of workers and number of female workers.
- Machines - number of machines.
- Buyers - factory buyers, anonymized.
- Services paid for (in U.S. dollars, from 2006 to part of 2009) - income received by BFC from factories, for particular services such as:
> Modular training
> Factory-based training
> Induction Kit
> Single-issue training
> Supervisor training
> First Aid training
> Others

Sources:

1. GMAC website at http://www.gmac-cambodia.org/

2. names[1].xls containing factory names and their corresponding codes, from Professor Raymond Robertson

3. Various data files from *Better Factories Cambodia.*

Merged Data and Coding Errors

The factory data in 7.3 was converted to .csv format, and merged with the compliance data, based on the factory code. The result was the merged dataset in .dta format. The merger was conducted smoothly with negligible missing values.

From the following .do files from Professor Raymond Robertson:

      cw010.do
      cw011.do
      cw012.do
      cw012a.do
      cw013.do
      cw014.do
      cw015.do
      cw016.do
      cw017.do
      cw020.do,

it was inferred that two types of data cleaning had to be performed.

1. Dropping variables that were unique to the original data in the first wave of visits in 2001-2002

2. Fixing coding errors described in Professor Robertson's .do files

The process of cleaning the data was written into one .do file and applied to the merged data.

Extracting Retrogression

Isolating necessary factory visits

The format change of BFC's Synthesis Reports occurred on 31st October 2006. For a factory to be included in the data analysis, there had to be compliance data on at least four visits to the factory: three before and one after 1st November 2006. Factories not satisfying this condition were dropped from the dataset. This process was executed with a number of Stata commands, but was done manually (by hand) for the most part.

The phenomenon under investigation, "retrogression", is measured by comparing compliance across two visits before the format change and two visits across the

said change. The pre-change visits were simply taken to have occurred before 1$^{\text{st}}$ November 2006. To compare compliance from two visits spanning the format change, the latest visit prior to 1$^{\text{st}}$ November 2006 and the latest visit coded in the dataset (which had to be after 1$^{\text{st}}$ November 2006) were compared. This was to give the factory sufficient time to realize that there was no longer factory-specific public disclosure taking place. The process of selecting the particular visits per factory was also accomplished manually.

We are interested in whether factories stopped complying on laws they previously complied on before the format change. The phenomenon of slipping from compliance to non-compliance is termed retrogression. Retrogression is indicated by a factory being in compliance with the labor law before the format change, but then went into non-compliance after the format change. If there was no change in compliance across the format change, or if the factory went into compliance after the format change, this was considered a non-instance of retrogression. The variable, *retro*, was coded into the compliance data by the following logic.

The process of coding *retro* from the isolated pre-change and post-change data was executed in Microsoft Excel. For each factory and each labor law, the compliance in the first visit was subtracted from the compliance in the second visit, generating a new variable called $\Delta compliance$.

$$\Delta compliance = compliance_{visit2} - compliance_{visit1} \tag{1}$$

Compliance data from the two visits being compared were pasted into two Microsoft Excel spreadsheets, ensuring that the factories and compliance points matched up. The subtraction was done using a formula that spanned two spreadsheets. Since *compliance* $= 0$ indicates compliance with the labor law, and *compliance* $= 1$ indicates non-compliance with the labor law (from 7.3),

$$retro = \begin{cases} 0 & \text{if } \Delta compliance \leq 0 \\ 1 & \text{if } \Delta compliance = 1 \end{cases}$$

A Microsoft Excel formula using the **=IF** logic function was used to find *retro*. We would expect that retrogression is relatively uncommon. Factories are unlikely to fall out of compliance with a particular labor law if they have already made the effort to comply. Out of 122,388 observations, there were only 4593 instances of retrogression and 117,795 instances of no retrogression. This was a crude indication that the manipulation process was accurate.

Using R for final form

In order to run regressions on *retro* as the outcome variable using Stata, a dataset with a different format had to be constructed. The *retro* data from the manipulation in the Microsoft Excel .csv file was in this arrangement:

Compliance Point\Factory	Factory A	Factory B	Factory C	...
Point 1	0	0	0	
Point 2	1	1	1	
Point 3	0	1	0	
...				

Table 7: Example of table with *retro* in each cell

Each cell in this table represented the retrogression data for a specific factory and point combination. However, Stata requires the table to feature each value of retrogression as an individual row if *retro* was to be the outcome variable. This means that each row in the new table would be specific to a factory, a pair of visits, and a compliance point. This explains the large number of observations (122,388). The new table would look something like this example:

retro	Factory	Compliance Point	...
0	Factory A	Point 1	
0	Factory A	Point 2	
0	Factory A	Point 3	
1	Factory B	Point 1	
1	Factory B	Point 2	
1	Factory B	Point 3	
0	Factory C	Point 1	
1	Factory C	Point 2	
0	Factory C	Point 3	
...			

Table 8: Example of table with *retro* in each row

The process of obtaining the new table from the .csv table was executed using the statistics language, R. This was the script used to generate the new table:

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```
    #Function to read in retrogression table and arrange data.

data = read.table("filename.csv", sep=",");
data = as.matrix(data);

#Remove the first column from the data
laws = data[,1]
data = data[,2:ncol(data)]

#Remove the first row from the data
laws = laws[2:length(laws)]

#Remove the first row from what's left of the data (factory code)
facCode = data[1,1:ncol(data)]
data = data[2:nrow(data),]

#While loop to change all the rows into columns and join into one
column.
mastercol = NULL
mastercount = 1
while(mastercount < nrow(data)+1){
    mastercol = c(mastercol, matrix(data[mastercount,],byrow=FALSE))
    mastercount = mastercount + 1}

#While loop to repeat the factory codes to fill the entire second
column.
factorycol = NULL
facCount = 1
while(facCount < nrow(data)+1){
    #Create a column of the factory codes, loop as many times as
there are laws.
    factorycol = c(factorycol, matrix(facCode,byrow=FALSE))
    facCount = facCount + 1}

#While loop to repeat the laws so that they fill the entire third
column.
lawcol = NULL
lawCount = 1
while(lawCount < nrow(data)+1){
    #Create a column of the same law code, as long as the number
```

```
of factories, loop as many times as there are laws.
    templawcol = matrix(laws[lawCount], nrow=length(facCode), ncol=1)
    lawcol = c(lawcol, templawcol)
    lawCount = lawCount + 1}

#Combine all three columns.
mastercol = cbind(mastercol, factorycol, lawcol)

write.table(mastercol, file="mastercol.csv", sep=",", row.names=FALSE,
col.names=FALSE);
write.table(mastercol, file="mastercol.xls", sep=" ", row.names=FALSE,
col.names=FALSE);
```

The .csv file from the R process was then exported to Stata using the `insheet` command. The resulting dataset had three variables: *retro*, *code* (factory code), and *point* (unique compliance point number). The dataset was re-labeled and merged with buyer information (matched according to *code*) and corresponding compliance groups (matched according to *point*) before running regressions. Buyer types and point types could thus be coded into the dataset, as well as other interaction terms for the various specifications.

This was the final dataset on which all regressions were run.

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