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Regulating Labour Standards via Supply Chains: Combining Public/Private Interventions to Improve Workplace Compliance

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Abstract

Concern over global labour standards has led to a profusion of non-governmental forms of regulation. Systematic evaluation of these systems has been very limited to date. This article empirically explores an innovative system to regulate labour standards in the US garment industry combining public enforcement power and private monitoring, thereby drawing on different elements of global labour standards systems. We examine the impact of this system over time and in two distinct markets on employer compliance with minimum wage laws and find that these initiatives are associated with substantial reductions in minimum wage violations. The system therefore offers a useful model for international labour standards regulatory systems.

1. Introduction

The advisability and impact of efforts to regulate global labour standards remain extremely contentious topics. Fundamental aspects of that debate remain open including the appropriate definition of labour standards, the merits of linking standards to trade agreements and the determinants of who actually wins and loses after the imposition of standards. A second set of questions revolves around the efficacy of the largely private, non-governmental systems that have emerged for regulating labour standards. Do these systems — ranging from voluntary codes of conduct created by individual companies or groups representing different stakeholders, to privatized monitoring and inspection systems — ultimately improve conditions at covered factories and workplaces? Do they have spillover effects on non-covered workplaces? Are they sustainable over the long term?

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The latter questions are particularly compelling given the proliferation of non-governmental systems of global labour standards over the past decade. Most approaches involve private organizations and non-governmental organizations (NGOs) operating in a variety of ways to monitor factories and suppliers. The absence of detailed or comparable data from these efforts has, for the most part, precluded a systematic evaluation of relative effectiveness, so the debate regarding the merits of different approaches has been limited to comparing cases on a more qualitative basis or looking at outcome measures only for suppliers overseen by those systems.

This article provides insight into these questions by empirically examining the impact of an innovative form of regulation in the US garment industry that combines government enforcement and private monitoring. Controlling labour standards in apparel has been a perennial problem in the US as it has been throughout the world. In the mid-1990s, the US Department of Labor's Wage and Hour Division (WHD), the government agency in charge of enforcing the federal minimum wage and overtime law, began an initiative that uses the agency's ability to interrupt the flow of goods from manufacturers to retailers as a means of establishing private, manufacturer-level monitoring of those companies' network of subcontractors.

The Department of Labor's effort to regulate labour standards offers a unique model of combining the benefits of private monitoring with the virtues of a public enforcement system. Even though it is a US-based system, this novel arrangement sheds light on the larger problem of regulating global labour standards in a number of ways. First, it provides a unique case of a system that utilizes both public and private regulatory mechanisms. Second, the approach has been applied to the same industry — apparel — that has been the focus of international efforts to regulate labour standards. Third, the effort has continued over a number of years and in several different markets. Finally, evaluations of global labour standards have been unable, for the most part, to quantitatively gauge their impacts on workplace outcomes. In this article, we measure the impact of monitoring carried out by manufacturers on contractor-level compliance with minimum wage standards. We analyse these monitoring effects in two different markets and over several years, using data from a random survey of apparel contractors that includes both contractors that are monitored and not monitored by the manufacturers.

We begin with a brief discussion of the spectrum of non-governmental mechanisms currently employed to regulate global labour standards. We then place the regulatory strategy employed by the US Department of Labor within that spectrum. After a description of the datasets and methodology, we estimate the effects of the monitoring system on the behaviour of subcontractors in two different apparel markets and over time. We then evaluate how two factors — (1) the direct effect of manufacturer monitoring on contractor behaviour and (2) the effect of manufacturer selection of subcontractors — contribute to the overall monitoring effects. We conclude with a discussion of the implications of our findings for future global monitoring efforts.

2. The problem of regulating global labour standards

Concern over regulating labour standards at the international level can be traced back at least to discussions at the time of the founding of the International Labour Organization in 1919 (Lee 1997). The debate became particularly active, however, in the 1990s, in reaction to the promulgation of liberalized trade policies under the World Trade Organization, the International Monetary Fund and other international bodies involved in trade and development.

As part of that reaction, a variety of mechanisms addressing global labour standards emerged over the past decade. Due to the absence of international regulatory institutions, all of these efforts rely on private organizations (for-profit as well as not-for-profit). Some forms of monitoring involve companies or groups of companies agreeing to certain codes of conduct and then monitoring their covered supply base internally on their own. Other forms also draw on codes of conduct agreed upon by stakeholders, but then use external, third-party groups — NGOs, private companies, not-for-profit groups or labour unions — to monitor adherence to codes. Finally, some systems draw upon combinations of these two methods.

O'Rourke (2003) provides a useful discussion of three general forms of these systems. Under a regulatory model, firms or delegated third parties engage in the traditional government role of monitoring and to some extent are policing compliance with codes of conduct or other agreed upon standards. This model, which may use internal or external monitoring, is represented by multiparty systems like the Fair Labour Association (FLA) or by the efforts of individual companies like The Gap Inc. and Nike.

A second model, pursued by groups like Social Accountability International (SAI), creates and administers voluntary codes of conduct that are built into certification-based systems (modelled after ISO 9000). Third-party auditors, following guidelines drafted by multiparty organizations like SAI, audit and certify factories that meet standards. Companies with a desire to meet those standards can choose to source from 'approved' factories, rather than committing to ongoing internal or external monitoring.

A third model operates via international labour unions or independent organizations like the Workers Rights Consortium (WRC) that respond to complaints lodged by workers. Based on complaints, unions or groups like the WRC initiate public campaigns to raise public understanding and pressure on those brands and/or on the retailers drawing on those suppliers. This pressure is used, via private negotiations with the parties, to change conditions within those factories and their associated supply chains.

Although their approaches differ, these different non-governmental regulatory systems have several common strengths (see Mamic 2003; O'Rourke 2003). First, they have emerged in an international setting where no governmental body or organization has authority to regulate workplace conditions and, in fact, where the explicit linkage between trade and labour standards has been resisted (Moran 2004). Second, privately-based systems allow

innovation and flexibility to deal with the inherent complexities involved in regulating international supply chains (see, generally, Ayers and Braithewaite 1992). The non-governmental approach allows parties to fashion a system that meets the needs of often complex and dispersed supply chains. For example, in 2004, Nike drew on over 600 different factories located around the world for its apparel lines alone (Locke 2006). Decentralized supply chains co-ordinated by powerful buyers (whether brands or retailers) are potentially more amenable to non-governmental institutions. Third, these systems provide a means of translating consumer preferences about labour standards into mechanisms that can potentially influence workplace conditions (Elliott and Freeman 2003).

Yet private systems of labour standards regulation also suffer from several fundamental limitations. The first weakness is linked to the final strength noted above: they rely to varying degrees on consumer preferences for goods produced under acceptable labour conditions. If consumer preferences for these goods diminish, so too does the pressure on companies to participate in the system (Hiscox and Smyth 2006). Although this is not to say that incentives entirely disappear — the possibility of future public embarrassment remains and some companies like Nike have used their monitoring systems as part of their branding efforts — the monitoring apparatus is contingent on continuing consumer pressure. Second, these systems are usually detached from the traditional regulatory mechanisms in the nations where they operate and consequently do not complement — and at worst undermine — those governmental systems (Haufler 2001; Piore and Schrank 2006).

In many ways, the strengths and weaknesses of non-governmental systems are mirror images of those of traditional government regulation. National government regulatory systems tend to be far less flexible than those that have emerged on the international scene and often are premised on large and fixed sites of work rather than the smaller, more diffuse and informal organization of many international supply chains (Sparrow 2000; Von Richthofen 2002). On the other hand, unlike the voluntary nature of private systems, government-based systems provide monitoring and enforcement agents with the force of law to change the behaviour of non-compliant employers. Their ability to impact behaviour does not, therefore, ebb and flow with changing public attention to labour conditions.

What if the advantages of the flexible monitoring types of arrangements characteristic of global labour standards mechanisms were linked to the 'stronger' forms of public intervention available under traditional regulation? How might such a system perform if it employed some form of public enforcement pressure as a means of increasing the incentives for parties to engage in private monitoring?

A Public/Private Enforcement Model in the Apparel Industry

The apparel industry is characterized by a splintered production system. Larger firms — typically branded manufacturers — undertake design,

marketing and relations with retail customers, and sometimes some manufacturing activities. Manufacturers, in turn, use a large network of small, independent subcontractors to assemble and package products. Regulatory activity in the US historically focused at the contractor and subcontractor level of the apparel industry.[1] The primary means of inducing compliance was through direct inspection activity, initiated either by the government or via worker complaints and the deterrent effects of civil penalties for those found in repeated violation of standards.[2]

This regulatory model was altered substantially in the mid-1990s, partly in response to changes in the larger apparel industry. New forms of retailing — sometimes referred to as 'lean retailing' (Abernathy *et al.* 1999) — take advantage of information technology to use real-time information to reduce exposure to changing consumer tastes. Lean retailing reduces the need for retailers to stockpile large inventories of a growing range of products, thereby reducing their risks of stock-outs, markdowns and inventory carrying costs. In contrast to the infrequent, large bulk shipments between apparel manufacturers and retailers under traditional retailing, lean retailers require frequent shipments made on the basis of ongoing replenishment orders by their suppliers. Apparel suppliers, in turn, must operate with far greater levels of responsiveness and accept a great deal more risk than in the past. Suppliers must replenish products within a selling season, with retailers now requiring replenishment of orders in as little as three days. This makes lean retailers vulnerable to any disruptions of the weekly replenishment of retail orders; such interruptions can lead to late-delivery penalties, cancellation of orders and even loss of retail customers. The increasing importance of time translates into a potential tool of regulatory enforcement.

Beginning in the mid-1990s, the Department of Labor's WHD, which is charged with enforcing the primary workplace standards statute, the Fair Labor Standards Act (FLSA), shifted focus from targeting individual contractors to exerting regulatory pressure on the supply chain itself. It did so by invoking a long-ignored provision of the FLSA, Section 15(a). Under Section 15(a) (the 'hot cargo' provision), WHD can embargo goods that have been manufactured in violation of the Act. This provision had limited impact in the traditional retail–apparel relationships, where long delays in shipments and large retail inventories were expected. Use of the hot goods provision today raises the costs to retailers and their manufacturers of delayed shipments and lost contracts given the short lead times of retailers. This potentially creates significant penalties that quickly exceed the value of expected civil penalties.

Current WHD policy uses the threat of embargoing goods to persuade *manufacturers* to augment the regulatory activities of the WHD. Manufacturers enter into direct agreements with the WHD after they have faced an embargo of their goods arising from a violation of the FLSA at one of the contractors that undertakes assembly work for that manufacturer. Manufacturers therefore enter into monitoring arrangements as a result of an enforcement action instigated by a Wage and Hour investigator. The agreements

between the manufacturer and the WHD requires that it undertake a monitoring programme (entailing a variety of practices regarding information provision, agreement to observe FLSA standards and various forms of periodic compliance inspections) for all of its current and future contractors. The agreement also requires that the manufacturer take immediate and ongoing action to remediate violations among its contractors by (1) ensuring payment of back wages to workers if they discover non-compliance in their ongoing monitoring efforts and (2) notifying the WHD of such a finding. The WHD can unilaterally revoke the agreement if it determines that the manufacturer has failed to actively monitor its subcontractors (US Department of Labor 1998, 1999; Weil 2005; Ziff and Trattner 1999).

The use of government authority to interrupt the flow of goods therefore creates incentives to induce more extensive private policing of contractors via manufacturer monitoring. Since contractors typically work for multiple manufacturers at any time, private monitoring may have significant spillover effects. Private monitoring by manufacturers might lead to greater regulatory presence at the contractor level than would be possible by relying solely on government inspectors. Using supply chain dynamics as a regulatory lever in this way combines elements of traditional government-based regulatory authority with elements of the non-governmental systems discussed above.

3. Data and descriptive statistics

Survey Data

The data for this study consists of four surveys of apparel contractors, two in Los Angeles/Southern California in the years 1998 and 2000 and two in the New York City area, in the years 1999 and 2001. The surveys were conducted by the US Department of Labor WHD using a randomly selected set of establishments in the Southern California and New York area apparel markets. The universes for the four surveys are all apparel manufacturing and contractor firms appearing on the California and New York manufacturing registration lists for each of the sample years.[3] This selection procedure means the sample is random with respect to monitoring and compliance status. Randomly selected contractors received an 'inspection-based survey' conducted by WHD investigators (and not through an employer-completed survey). Because WHD investigators conduct the survey, computation of compliance measures are consistent and in accordance with WHD procedures, and problems related to non-response are minimized.[4] Although the size of the samples in each year and market are relatively small, they are sufficient to estimate the key relationships of concern. We pool results for the two time periods in Los Angeles and the two time periods in New York to increase the sample size for some estimations.

The inspection-based survey includes a review of all payroll records of the contractor for the prior three-month period, using the same payroll review procedure of a regular WHD investigation. All workers, regardless of

immigration status, are included in the investigation-based survey data used for this study. In addition, investigators gather information on the contractor's current customers, characteristics of monitoring (if any) maintained by those customers, and a variety of other data regarding business characteristics including business size, years in operation and types of products assembled.

Compliance Measures

The garment industry is characterized by extremely competitive product markets, with high penetration of imported products and labour markets characterized by an elastic supply of low-skilled, immigrant and often undocumented workers. One would therefore expect there to be significant incentives to violate minimum wage levels. Becker's seminal article and the subsequent literature on the economics of crime argues that individuals and firms weigh the relative costs and benefits of obeying laws in making decisions regarding compliance (Becker 1968; Polinsky and Shavell 2000). In a world of limited inspection resources, low penalties and potentially high benefits for employers paying below the minimum wage, the incentives for non-compliance may be high particularly in settings with large numbers of low-wage workers (Ashenfelter and Smith 1979; Chang and Erlich 1985; Grenier 1982; Lott and Roberts 1995; Yaniv 2001).

The upper portion of Table 1 presents summary statistics regarding contractor compliance with the minimum wage in Los Angeles and New York.[5] A significant percentage of employers in both markets were not in compliance during the time periods under study, although employer compliance was higher in New York than in Los Angeles: less than half of all employers were in compliance in Los Angeles in 1998 and 2000, whereas 65 per cent of contractors complied in 1999, rising significantly to 87 per cent in 2001. Both the federal and state minimum wage requirement was unchanged during the entire study period.

Rather than relying on employer compliance as the dependent variable, we employ two alternative measures of regulatory compliance (rows in bold in Table 1). The *incidence* of violation is measured as the number of violations per 100 workers employed and is calculated by dividing the total number of violations found at the contractor by the reported size of its workforce, then multiplied by 100. The *severity* of violation is measured as back wages owed per worker per week and is calculated by the total back wages owed by the contractor for the survey period divided by the number of workers employed and then the number of weeks of the investigation period (12).

These compliance measures are preferable because they depict how widespread violations are at a contractor (incidence) and the amount of wage loss sustained by workers on average (severity). This provides a more comprehensive measure of the state of compliance and the impact of monitoring than employer compliance which simply measures the presence of any violations, regardless of how widespread or severe they may be. In addition, since it is possible for interventions to affect the incidence of violations

TABLE 1
Regulatory Compliance Measures and Contractor Characteristics
Los Angeles 1998/2000 and New York City 1999/2001

	Los Angeles means (standard deviations)		*New York City means (standard deviations)*	
	1998	*2000*	*1999*	*2001*
Regulatory compliance measures (dependent variables in bold)				
% of employers in compliance with minimum wage	0.49 (0.50)	0.44 (0.50)	0.65 (0.48)	0.87 (0.34)
Average number of workers paid in violation per contractor	6.70 (9.42)	7.00 (11.77)	6.21 (12.20)	2.19 (6.82)
Average back wage owed per affected worker, per week ($)	23.22 (26.59)	22.66 (23.60)	44.41 (31.73)	24.69 (23.65)
Number of workers paid in violation of minimum wage per 100 employees	**32.07 (38.34)**	**29.53 (34.59)**	**23.08 (38.66)**	**9.76 (26.99)**
Average back wage owed per worker, per week ($)	**8.41 (16.40)**	**7.03 (12.49)**	**12.50 (26.02)**	**2.87 (10.97)**
Contractor characteristics (independent variables)				
Pricing power (=1 if contractors reports it can successfully renegotiate price if manufacturer changes delivery date)	0.14	0.11	0.32	0.27
Dresses (=1 if contractor produces dresses; 0 otherwise)	0.56	0.35	0.53	0.46
Number of manufacturers that contractor worked for in past 6 months (% of contractors)				
1	31.0%	48.6%	55.4%	61.2%
2	33.8	22.6	25.3	22.4
3	16.9	11.3	13.3	16.4
4	9.9	6.5	3.6	0
5 or more	8.4	10.6	2.4	0
Age dummy (=1 if contractor in business for two or more years)	0.45	0.47	0.34	0.40
Employer size (number of workers)	29.1 (26.8)	31.9 (32.04)	27.0 (15.7)	29.1 (20.1)
N	71	62	79	67

differently than the severity of violations, we examine the impact of monitoring on both outcomes in our empirical analysis.

Table 1 indicates a high degree of employer non-compliance in both markets measured in terms of either incidence or severity. Both the incidence and the severity of violations decreased in Los Angeles between 1998 and 2000 and in New York City between 1999 and 2001, although only the improvements in New York are statistically significant (based on a two-sample *t*-test assuming unequal population variation). The lower half of Table 1 displays the frequencies, means and standard deviations of other contractor characteristics that are potential correlates with compliance and are discussed below.

Monitoring Variables

The frequencies of different types of monitoring arrangements are presented in Table 2. The upper part of the table compares the presence of seven core monitoring features conducted by one or more of the manufacturers that the contractors did work for in the past six months. The incidence of the seven different types of monitoring features is somewhat lower among New York City than Los Angeles contractors. The middle portion of Table 2 shows the distribution of the number of monitoring features across the samples.

Although there are many permutations of monitoring features, we define three states of monitoring under which a contractor might be operating in order to estimate monitoring effects on compliance. 'No monitoring' means that none of the manufacturers for which a contractor worked at the time of the random survey engaged in any form of monitoring. 'Any' monitoring denotes that *at least* one manufacturer for which the contractor worked conducted at least one of the seven types of monitoring activities listed in Table 2. It therefore captures the threshold effect of having any type of manufacturer monitoring on contractor compliance. Finally, comprehensive monitoring indicates that a contractor's current set of manufacturers undertake a specific combination of oversight — payroll review coupled with unannounced inspections. Therefore 'any monitoring' captures the effect produced by having some type of manufacturing monitoring present versus not being monitored. 'Comprehensive' monitoring measures the incremental effect beyond the presence of 'any' monitoring features. This set of monitoring practices represents a particularly strong and effective means of oversight, as we discuss below. Differences in the detail of survey collection methods on monitoring in the two geographic areas requires us to define 'comprehensive' monitoring as payroll review and unannounced inspections by *all* manufacturers in data from Los Angeles versus the presence of both practices by at least one of its manufacturers' customers in data from New York.[6]

Other Contractor Characteristics

We include other contractor characteristics in our empirical analysis because of their potential correlation with compliance and the presence of monitoring

TABLE 2
Types of Monitoring Agreements and Arrangements
Los Angeles 1998/2000; New York City 1999/2001

Monitoring activity	*LA1998*	*LA2000*	*NYC1999*	*NYC2001*
Monitoring activity employed by manufacturer				
Manufacturers review payroll	0.66	0.53	0.43	0.52
Manufacturers review time cards	0.73	0.60	0.43	0.54
Manufacturers conduct employee interviews	0.62	0.50	0.30	0.40
Manufacturer requires contractor to provide minimum wage information to workers	0.65	0.52	0.28	0.37
Manufacturer discloses problems with practices to contractor	0.32	0.42	0.11	0.25
Manufacturer recommends corrective action to contractor	0.31	0.42	0.16	0.27
Manufacturer may conduct unannounced visits	0.55	0.58	0.29	0.42
Number of monitoring features				
0	0.211	0.29	0.443	0.403
1	0.070	0.113	0.076	0.03
2	0.042	0.016	0.127	0.105
3	0.042	0.048	0.063	0.06
4	0.113	0.081	0.126	0.06
5	0.211	0.065	0.063	0.119
6	0.113	0.081	0.038	0.045
7	0.197	0.307	0.063	0.179
Type of monitoring				
No monitoring: No monitoring activity among any of the manufacturers that the contractor currently works for	0.211	0.29	0.443	0.403
Any monitoring: One or more monitoring activities by one or more manufacturers	0.789	0.71	0.557	0.597
Comprehensive monitoring: Payroll review and unannounced inspections[a]	0.239	0.307	0.241	0.373
Number of observations	71	62	79	67

[a] Because of differences in the survey questions used, comprehensive monitoring is measured as the presence of both features at all manufacturers that a contractor currently works for (Los Angeles) or at least one current manufacturer (New York).

at a manufacturer. Pricing power measures the self-reported ability of a contractor to renegotiate delivery price with manufacturers if the terms of delivery are changed by the manufacturer. Contractors able to exert some pricing power (e.g. because of their superior reputation) may be better able to comply with labour standards than those lacking such ability. A minority of contractors in the four samples report that they are able to affect the price of goods.

Skill levels required to complete garment assembly differ across apparel contractors and may affect compliance. The direction of their effect, however, is ambiguous. On the one hand, more skilled workers with higher marginal productivity will receive a higher predicted wage — more likely

exceeding the minimum wage — than a lower-skilled worker. In this respect, the likelihood of compliance is positively correlated with skill. However, if employers exercise some monopsony power, they will have a greater incentive to violate the minimum wage as the supply of labour becomes less elastic making compliance negatively correlated with skill level (assuming that the minimum wage is high enough to represent a binding constraint).[7]

Although we do not have direct information on the specific skill level of a contractor's workforce, we have measures of the product(s) it produces which we use as a proxy for skill requirements. For example, the production of dresses or suits generally requires greater skill levels than the production of T-shirts or casual pants (Abernathy *et al.* 1999). We include a dummy variable for the garment with the highest skill requirement in the sample — dresses — to control for these effects.

We include the number of manufacturers for which a contractor worked in the previous sixth-month period as a control variable in the empirical analysis. The potential impact of this variable is ambiguous: on the one hand, a contractor that works with a large number of manufacturers may do so because of its superior performance or comparative cost advantage. On the other hand, a large number of manufacturing customers may indicate significant customer dissatisfaction, low quality and high turnover. Depending on which story is true, the number of manufacturers may be positively or negatively correlated with compliance. In any event, the number of manufacturers is also potentially correlated with monitoring, where the probability of having 'comprehensive' level of monitoring decreases with the number of manufacturers served by a contractor.

Finally, we include variables measuring the age and size of contractors in the empirical analysis. The number of years of contractor operation is an important correlate with compliance, in part, because of the high rate of turnover in the industry. About 50 per cent of contractors in the sample have been in business for two years or less. Older contractors may have different characteristics correlated with their longevity that are also correlated with compliance (e.g. developed market niche, management capability, reputation). We use employer size (measured in terms of total employment at the time of the survey) in our models given its positive correlation with regulatory compliance found in other studies (e.g. Brown *et al.* 1988).

4. Estimated effects of monitoring on compliance

Table 3 compares compliance given the three different levels of monitoring described above for the two geographic markets over time. For each market and time period, it compares compliance as measured by the overall percentage of contractors in compliance given different levels of monitoring as well as the average incidence and severity of non-compliance. In all cases except for New York in 2001, the results indicate that higher levels of monitoring by

TABLE 3
Contractor Compliance, Minimum Wage Violations
per 100 Workers and Back Wages per Worker per Week as a Function of Monitoring Levels

	No monitoring	*Any monitoring*	*Comprehensive monitoring*
Los Angeles 1998			
% in compliance	33	54	65*
Minimum wage violations per 100 workers	52	27**	22**
Back wages owed per worker per week	$12.89	$7.21	$1.60**
Los Angeles 2000			
% in compliance	11	57**	74**
Minimum wage violations per 100 workers	44	23**	9**
Back wages owed per worker per week	$10.26	$5.72	$0.93**
New York City 1999			
% in compliance	54	73*	84**
Minimum wage violations per 100 workers	31	17*	3**
Back wages owed per worker per week	$16.46	$9.36	$0.77**
New York City 2001			
% in compliance	78	92*	96*
Minimum wage violations per 100 workers	14	7	4
Back wages owed per worker per week	$4.53	$1.75	$1.53

Note: Significance for 'Any monitoring' and 'Comprehensive monitoring' is measured against the 'No monitoring' base category.
* Significant at the 10 per cent level; ** Significant at the 5 per cent level.

manufacturers are associated with substantially improved and statistically significant levels of minimum wage compliance relative to the case of no monitoring among contractors.

It should be reiterated that contractors do not choose to be monitored. They are monitored because one or more of the manufacturers for whom they currently work are under an agreement with the Department of Labor. As a result, the large compliance effects in Table 3 cannot be attributed to a simple story of 'good' contractors choosing to be monitored. Nonetheless, Table 3 effects could reflect associations between the set of manufacturers for which a contractor provides services, the type of monitoring arrangement present among those manufacturer partners and correlates of contractor compliance.

To deal with this problem, we estimate a series of Tobit regressions on the relation of monitoring and the incidence and severity of minimum wage outcomes.[8] We include controls for contractor characteristics (in particular pricing power, skill, contractor longevity and size) that might be potentially confounding for reasons described in the previous section. We also control for other characteristics including ownership type and more detailed product characteristics in other modelling work. These factors do not affect the key relationships. In addition, we undertook Probit estimates of the effect of monitoring on employer-level compliance (defined as a 0/1, 'comply' or 'not comply' variable) and found consistent evidence of monitoring effects as those reported below. Because we believe that incidence and severity are better measures of compliance, we do not include the results here, but they are available from the authors.

Table 4 provides the results of Tobit regressions for the Los Angeles market in 1998 and 2000. Tobit coefficients for the models are presented in columns 1–4 and we use those coefficients to estimate the implied marginal effects conditional on the dependent variables being greater than 0 in columns 5–8 (setting other variables in the model at their sample means).

The results in Table 4 indicate that the presence of any monitoring ('Any monitoring') is associated with lower incidence and severity of minimum wage violations in 1998 and 2000. The coefficients, however, are not significant in either time period. Comprehensive monitoring is associated with a lower incidence and severity of violations in both 1998 and 2000. In the case of the severity of violations in 1998, contractors subject to comprehensive monitoring owed an average of $6.44 less in back wages per worker per week relative to contractors that had any degree of monitoring present, holding other factors constant. The marginal effects of comprehensive monitoring on both compliance incidence and severity are particularly large and statistically significant for 2000. Contractors that are subject to comprehensive monitoring have 20.2 violations fewer per 100 workers than contractors subject to any form of monitoring and close to 30 violations fewer per 100 workers than contractors without monitoring.

The coefficients for control variables for 1998 lack significance and in the case of pricing power are of opposite sign than expected. Coefficients for most of the control variables have their expected signs in the regressions for 2000, but also lack statistical significance. Pseudo-R^2 levels are low for the models, but these are not the best measure of goodness of fit for limited dependent variable models (Hardin and Hilbe 2001; Long and Freese 2003). We therefore also report the McKelvey and Zavoina R^2 which provide a better goodness-of-fit measure for Tobits (Veall and Zimmerman 1996). These measures indicate that the model has good explanatory power for both measures of compliance in 2000. The models have far less explanatory power for 1998.

Table 5 presents estimated monitoring effects for the New York City area for 1999 and 2001. Overall monitoring impacts for New York City are similar to those found in Los Angeles: the threshold effect of having any level of monitoring on the incidence and severity of violations are large and negative, but not statistically significant. However, in 1999, the effects of comprehensive monitoring on both incidence and severity are significant and are associated with incremental reductions in the incidence of violations of 20.3 per 100 workers beyond what would be predicted for having no monitoring and with an additional reduction in back wages owed per worker per week of $12 (equal to about 1.5 times average hourly earnings for this group of workers). Although the monitoring variables have their expected signs for 2001, they are not statistically significant.

Control variables for New York for the most part have their expected signs, although only a subset of them are statistically significant. Pricing power is negatively and significantly associated with compliance in 1999 although it is positive (but not significant) in 2001. The dress dummy variable has a negative sign in two cases but is positive and significant in one

TABLE 4
Monitoring Effects, Tobit regressions
Los Angeles 1998/2000

	Tobit coefficients				*Marginal effect: conditional on being greater than zero*			
	Minimum wage violations per 100 employees		*Minimum wage back pay per worker per week*		*Minimum wage violations per 100 employees*		*Minimum wage back pay per worker per week*	
	1998	*2000*	*1998*	*2000*	*1998*	*2000*	*1998*	*2000*
Any monitoring	–25.80	–19.55	–5.63	–4.73	–10.79	–8.63	–1.96	–1.73
	(20.93)	(15.71)	(8.61)	(6.07)	(8.15)	(6.55)	(2.88)	(2.13)
Comprehensive monitoring	–17.87	–50.52**	–20.81**	–18.37**	–8.47	–20.15**	–6.44*	–6.08**
	(22.35)	(17.93)	(9.88)	(7.00)	(11.0)	(8.03)	(3.44)	(2.58)
Size	–18.53	–2.81	–3.40	–0.84	–7.21	–1.17	–1.14	–0.30
	(12.90)	(9.30)	(5.33)	(3.60)	(5.02)	(3.88)	(1.78)	(1.27)
Dresses	6.81	–19.32	6.30	–4.62	2.64	–7.78	2.09	–1.59
	(17.88)	(14.30)	(7.46)	(5.53)	(6.96)	(5.96)	(2.50)	(1.95)
Age dummy	3.15	–11.91	–0.93	–4.00	1.23	–4.94	–0.31	–1.40
	(19.21)	(15.13)	(8.02)	(5.86)	(7.48)	(6.31)	(2.68)	(2.06)
Pricing power	2.19	–52.40	0.49	–15.16	0.86	–16.86	0.16	–4.36
	(27.33)	(33.48)	(11.40)	(12.83)	(10.64)	(13.97)	(3.81)	(2.91)
No. of manufacturers	–0.45	–7.14	–1.75	–1.63	–0.18	–2.98	–0.58	–0.57
	(5.71)	(4.41)	(2.46)	(1.67)	(2.22)	(1.84)	(0.82)	(0.58)
Constant	84.58**	81.79**	17.50	19.41*	32.92**	34.11**	5.85	6.83*
	(42.54)	(26.80)	(17.71)	(10.31)	(16.56)	(11.18)	(5.92)	(3.63)
Prob > χ^2	0.39	0.00	0.31	0.01				
Pseudo-R^2	0.0162	0.065	0.0220	0.057				
McKelvey and Zavoina R^2	0.122	0.447	0.155	0.363				
Log likelihood	–224.3	–197.1	–184.3	–161.6				
N	71	62	71	62				

Note: Standard errors are shown in parentheses. Marginal effects (columns 5–8) are derived from the reported Tobit coefficients (columns 1–4).
* Significant at the 10 per cent level; ** Significant at the 5 per cent level.

TABLE 5
Monitoring Effects, Tobit Regressions
New York 1999/2001

	Tobit coefficients				*Marginal effect: conditional on being greater than zero*			
	Minimum wage violations per 100 employees		*Minimum wage back pay per worker per week*		*Minimum wage violations per 100 employees*		*Minimum wage back pay per worker per week*	
	1999	*2001*	*1999*	*2001*	*1999*	*2001*	*1999*	*2001*
Any monitoring	−18.87	−24.90	−8.63	−15.48	−5.36	−3.58	−2.33	−2.09
	(23.32)	(52.27)	(15.65)	(18.03)	(6.56)	(7.40)	(4.19)	(2.36)
Comprehensive monitoring	−78.24**	−83.08	−48.81**	−22.54	−20.33**	−12.22	−12.00*	−3.44
	(34.10)	(68.28)	(22.81)	(23.39)	(10.27)	(10.53)	(6.45)	(3.74)
Size	8.35	−24.66	3.91	−10.51	2.35	−3.49	1.05	−1.37
	(17.87)	(40.69)	(12.02)	(14.28)	(5.02)	(5.76)	(3.22)	(1.87)
Dresses	39.80*	−94.01*	21.20	−39.38*	11.12*	−13.25*	5.65	5.15**
	(22.46)	(56.49)	(15.06)	(20.22)	(6.31)	(8.00)	(4.04)	(2.65)
Age dummy	8.58	60.88	−2.35	23.20	2.44	8.99	−0.63	3.18
	(23.22)	(44.23)	(15.74)	(15.14)	(6.53)	(6.26)	(4.22)	(1.98)
Pricing power	−51.51**	58.61	−35.96**	9.96	−13.49*	9.06	−8.96*	1.36
	(25.64)	(45.57)	(17.45)	(15.55)	(7.21)*	(6.45)	(4.68)	(2.03)
No. of manufacturers	13.89	65.29**	8.19	25.20**	3.90	9.25**	2.20	3.30**
	(9.52)	(31.35)	(6.38)	(10.79)	(2.68)	(4.44)	(1.71)	(1.41)
Constant	−59.43	−121.77	−33.35	−35.25	−16.70	−17.24	−8.94	−4.61
	(61.54)	(142.22)	(41.16)	(49.26)	(17.30)	(20.14)	(11.03)	(6.44)
Prob > χ^2	0.01	0.01	0.01	0.01				
Pseudo-R^2	0.0519	0.1186	0.0487	0.1513				
McKelvey and Zavoina R^2	0.335	0.523	0.313	0.579				
Log likelihood	−183.3	−64.4	−170.9	−53.66				
N	79	67	79	67				

Note: See Table 4.

specification. This instability may arise because of the ambiguous effects of skill on compliance (particularly as measured by product type) as noted above. The number of manufacturers a contractor worked for is positively and significantly correlated with the two dependent variables in the 2001 sample, implying that the higher the number of manufacturers with which a contractor worked, the lower their predicted level of compliance. The McKelvey-Zavoina R^2 values, ranging from 0.31 to 0.58, indicate that the models have good explanatory power.

Changing Effects of Monitoring Over Time

The US Department of Labor monitoring programme was initiated in New York beginning in late 1995 and in Los Angeles in 1997. Part of the differences in the measured effects of monitoring found in Tables 4 and 5 may reflect the time lags between the initiation and implementation of the programmes in each market. Monitoring agreements take time to have an effect on contractor behaviour such that the marginal effect of monitoring on a contractor may grow for some period, reflecting the increased ability of manufacturers to monitor and/or contractors' awareness of that oversight. After they have been in place for some time, monitoring might exhibit diminishing effects as contractors adjust to the new regulatory regime and employers approach higher levels of compliance.

In order to test for changing monitoring effects over time, we combined the Los Angeles samples for 1998 and 2000 and the New York samples for 1999 and 2001 and estimated Tobit regressions using the same variables as above.[9] The combined samples yield overall monitoring coefficients of comparable sign, size and significance as in Tables 4 and 5. However, for Los Angeles, the magnitude of the monitoring effects did not change significantly between 1998 and 2000 (as measured by an interaction term for monitoring and the time period of the observation). Similarly, the results for New York implied that the size of the overall monitoring effects did not change significantly between 1999 and 2001 once other factors were controlled.

We also used the combined samples to test for overall changes in compliance levels across the two time periods — that is, whether the average level of compliance improved between 1998 and 2000 in Los Angeles and 1999 and 2001 in New York, after holding constant monitoring effects and the other factors in the model. The results for Los Angeles indicate small but statistically insignificant improvements in overall compliance. In contrast, for New York, we find very large and statistically significant improvement in overall compliance even after accounting for the monitoring and the other variables in the model. The incidence of minimum wage violations fell by an estimated 11 violations per 100 workers between 1999 and 2001 and back wages owed per worker by about \$6.50 (both significant at below a 0.05 level), after controlling for other factors. This improvement in aggregate compliance is notable since the total number of WHD investigations undertaken in New York in 2001 was less than half of those undertaken in Los Angeles in 2000

(251 vs 705). One interpretation is that there were significant deterrent effects of the monitoring system on the market as a whole, leading to a significant decrease in the overall incidence of violations. We investigate reasons why this might be the case in the next section.

5. Monitoring, sorting and the entry and exit of contractors

One would expect manufacturers averse to future embargos of their goods to engage in two activities: (1) seeking to change the behaviour of contractors so that they become more compliant with minimum wage provisions and (2) selecting contractors that have a higher probability of paying their workers the minimum wage. As a result, part of the effect of monitoring at the contractor level (the direct effect) could arise from changes in behaviour of contractors who have been paired through the luck of the draw with manufacturers that happen to have such an agreement. But another part of the effect (the sorting effect) could be due to manufacturers matching themselves with contractors that have a higher probability of complying with the law *ex ante*.

The sorting effects of monitoring can improve contractor behaviour, provided that it changes the distribution of complying and non-complying contractors. This could occur if a growing percentage of manufacturers decide to monitor over time. If the ratio of manufacturers requiring monitoring relative to non-monitoring manufacturers increases, the potential 'dance partners' for non-compliant contractors diminishes and sorting further improves overall compliance, by raising the probability that existing non-compliers will go out of business (due to diminishing business opportunities) and by raising the incentives for compliers to enter the market.[10]

In fact, the overall incidence of stronger forms of manufacturer monitoring increased in both markets over the time period studied: the prevalence of comprehensive monitoring increased from 0.24 to 0.31 in Los Angeles between 1998 and 2000 and from 0.24 to 0.37 in New York between 1999 and 2001 (see Table 2). A 2004 Department of Labor report indicates that the percentage of manufacturers engaging in monitoring has increased even further since the time of the later New York City and Los Angeles surveys (US Department of Labor, Wage and Hour Division 2004).

The increasing prevalence of manufacturer monitoring may, in turn, change the benefit/cost analysis of contractors entering the industry such that new entrants have better compliance than those leaving the industry. If so, the average level of compliance in the industry will improve over time. Although we do not have measures of compliance of exiting firms, our data indicate that regulatory performance of *new* contractors improved between earlier and later time periods, particularly in the case of New York.

Table 6 presents comparative regulatory compliance for older contractors (operating for more than two years) versus new contractors. Changes in compliance over time within each market for both groups indicate what has

TABLE 6
Regulatory Compliance among New Contractors:
Los Angeles 1998/2000, New York City 1999/2001

	Los Angeles Means (Standard deviations)		*New York City Means (Standard deviations)*	
	1998	*2000*	*1999*	*2001*
Regulatory compliance — (old contractors)				
Number of workers paid in violation of minimum wage per 100 employees	28.53 (37.50)	17.41 (29.61)	17.43 (32.92)	17.60 (34.59)
Average back wage owed per worker per week	6.38 (13.71)	4.22 (9.18)	6.45 (16.58)	5.37 (15.42)
N	36	34	32	27
Regulatory compliance — (new contractors)				
Number of workers paid in violation of minimum wage per 100 employees	35.6 (39.53)	37.75 (35.71)	26.5 (41.84)	4.5** (19.06)
Average back wage owed per worker per week	10.84 (20.10)	8.87 (14.36)	19.66 (43.15)	1.18** (6.16)
N	41	33	59	40

* Significant at the 10 per cent level of the difference in means between 1998 and 2000 (1999 and 2001); ** Significant at the 5 per cent level.
Note: 'Old' contractors have been in business for more than two years; 'new' contractors for two years or less.

driven some of the overall improvement in compliance. In Los Angeles, regulatory compliance among older contractors improved modestly between 1998 and 2000. For new contractors, the incidence of violations actually rose slightly between the two time periods, although the severity of violations fell by $2.00 owed per worker per week — a relatively large (but not statistically significant) change.

New York City shows more dramatic changes in mean compliance level for new contractors over time. Although compliance changed little among older contractors between 1999 and 2001, violation incidence among contractors with less than two years of operation fell from 26.5 per 100 workers in 1999 to only 4.5 per 100 workers in 2001 and average back wages owed fell from $19.66 per worker per week in 1999 to a scant $1.18 in 2001. This major change among incoming contractors is consistent with the impact of sorting on contractor behaviour. As more manufacturers in the market put in place monitoring systems, entrants will have a greater incentive to comply with labour standards in order to find customers. Given the significant turnover of contractors, these incentives can drive the market towards the higher levels of compliance observed in both markets, but strikingly so for New York.

The combined effects of monitoring and sorting help to explain the modest decrease in the incidence and severity of minimum wage violations in Los Angeles and the major decreases in New York, shown in Table 1. The more

systemic effects in New York City found throughout this study may arise from the longer existence of the monitoring programme there. If so, the findings here might portend greater system-wide effects for Los Angeles in the years following the 2000 survey. Structural features of the two markets may also account for some of the difference in effects. For example, New York manufacturers typically work with a smaller number of contractors (Table 1) which may heighten the incentives to find compliant partners.

6. Conclusions

Despite long-standing forces that push towards high non-compliance, this study indicates that the use of a combination of public enforcement and private market leverage is associated with a reduction in the frequency with which violations occur among garment workplaces as well as the average level of underpayment to workers. These results indicate the robustness of combining public enforcement with private monitoring found in earlier studies of these efforts (Weil 2005).

Does the US effort provide a model for international efforts to regulate labour standards? It would be easy to answer 'no' given the absence of an international statute that provides for anything comparable to the embargo authority of the FLSA and the lack of an international body with comparable enforcement authority as the WHD. But that too quickly dismisses its implications.

Three features of the WHD system are potentially applicable to the global labour standards case. First, the WHD example demonstrates the impact of using substantial private penalties (interruption of the flow of goods) to change employer behaviour. The global system of apparel distribution and production of apparel is also extremely sensitive to supply chain disruptions (Evans and Harrigan 2005). An international authority vested with a regulatory mechanism to interrupt the timely flow of goods could have significant impacts on adherence to broad regulatory policies. In one form, the mechanism could be used to bring economic pressure on a national government. For example, an international body could invoke its embargo authority if a signatory nation pursued policies that supported systemic violations of their own labour standards as a form of trade policy (a form of international labour standard proposed by Elliott and Freeman 2003: 136–37). Alternatively, the mechanism might augment a national government's efforts to enforce its own labour policies, such as a regional trade agreement with an embargo mechanism to ensure that signatory nations enforced core International Labour Organization principles at covered workplaces.

However, given current resistance to the linking of trade and labour standards at the World Trade Organization or regional trade pact levels, creation of an embargo mechanism with such sweeping authority over national policies seems unlikely. The only exception is Article XX(e) of the General Agreement on Tariffs and Trade that allows countries to block the entry of

goods into a country if produced by prison labour. However, even this provision has seldom been invoked in recent times.

A more plausible application of the WHD model might be its integration into the activities of NGO and third-party monitoring agents like the FLA. Here, multiparty agreements could provide a designated agent with the authority to embargo products of a major signatory party if there was evidence of significant violation of agreed upon codes of conduct within covered supply chains. The aim here would not be the constant exercise of this authority, but using the threat of such embargoes to significantly raise the incentives for establishing effective and ongoing monitoring arrangements on the ground. An important caveat to these ideas is that given the very high costs associated with supply chain interruptions, private, public, or NGO institutions empowered to apply them would have to invoke this authority responsibly and judiciously. At the same time, the threshold for invoking embargo authority could not be so high as to make the *de facto* probability of interruption near zero, thereby undercutting the incentives for effective private monitoring.

A second implication of the WHD model is that private monitoring can take on multiple forms and still be effective. The WHD did not (nor could it statutorily) impose a single type of monitoring in its agreements with manufacturers, nor mandate a specific form of monitoring between manufacturers and their subcontractors. Not all forms of monitoring work equally well — in the case of Los Angeles and New York City, significant monitoring impacts were associated with the use of a threshold set of practices — payroll review and unannounced inspections. Nonetheless, these basic monitoring features appear in a variety of forms. Given sufficient underlying incentives to create a monitoring system, it can then take on many different forms. Because of the significant variation in conditions across countries in terms of labour standards, workforces, nature of manufacturing and other fundamental conditions, variation in forms of monitoring are inevitable and probably desirable.

A final implication of the WHD case is the need to design labour standards systems that are sustainable over time. The WHD monitoring efforts appear to have sustained their effects over time in both Los Angeles and New York. What is more, that effect seems to have changed the behaviour of established firms as well as those entering the industry. A weakness of current non-governmental forms of regulation is their dependence on continuing consumer or other forms of public pressure (Hiscox and Smyth 2006; Rodrik 1996). Although some companies may stay committed to monitoring because of a growing commitment and institutionalization of those systems, others may lose interest if pressure dissipates. What is more, many factories have multiple customers, some of whom engage in monitoring, and others that do not. The results from Los Angeles and New York City show that if a significant number (not all, but also more than one) move under monitoring, it starts to have greater effects. If the percentage of work covered by monitoring increases, the system becomes more effective in changing behaviour of current as well as prospective participants. If various parties with the

authority to interrupt the flow of goods grow and the incentives spread, the effects of monitoring can spill over to a wider circle of employers. Given the range of sourcing options at the global level, any long-term effort to affect international labour standards will need to find a means to influence workplace conditions beyond the bounds of those directly participating in those systems.

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Notes

1. Minimum wages (as well as regulation of child labour and overtime compensation) are set out in the FLSA of 1938. Enforcement of FLSA is carried out by investigators of the WHD, located in 400 offices around the country. The FLSA minimum wage standard applies to 'any employee who is engaged in commerce, or is employed in an enterprise engaged in commerce or in the production of goods for commerce' (Sec. 6(a)), and the law defines 'commerce' as 'trade, commerce, transportation, transmission, or communications' (Sec. 3(b)).
2. The basic remedy under FLSA is payment of back wages to compensate workers for underpayment (pay below minimum wage or overtime payments for work beyond 40 hours in the workweek). First-time violators are only required to pay back wages owed to underpaid workers. Employers owe civil penalties only if found in continued violation of minimum wage provisions in subsequent inspections. Lott and Roberts (1995) argue that the ability of individuals to also press their claims through private litigation make penalties for first-time offenders potentially higher than back pay alone, since they may recover double their back wage claims in this manner.
3. The registration lists for apparel consists of 'all persons or firms engaged in the business of apparel manufacturing' where apparel manufacturing is defined as 'sewing, cutting, making, processing, repairing, finishing, assembling or otherwise preparing any garment or any article of wearing apparel or accessories designed

or intended to be worn by any individual'. Registration lists are a census of businesses kept by separate state-level agencies in California and New York for purposes of taxation and other regulatory requirements.

4. The random, inspection-based surveys were instituted by the Department because of the need to benchmark and measure programme progress in low-wage initiatives as part of annual reporting to the Office of Management and Budget and to the US Congress. Initiated in the mid-1990s, the Department continues to use random, inspection-based surveys to analyse a variety of programme initiatives.
5. The two markets accounted for about 40 per cent of US apparel employment in 2000, based on estimates from the Current Employment and Statistics Survey conducted by the Bureau of Labor Statistics. Total employment in the apparel sector was 496,800; the number of workers in New York was 65,600 and in California 122,600.
6. Other definitions of monitoring were also employed, including a variable measuring how many of the seven different monitoring features listed in Table 2 a contractor is covered by and an alternative measure of 'comprehensive' monitoring defined as the contractor being covered by all seven features by its manufacturers. These measures yield compliance effects similar in sign and significance as those reported here. They are available from the authors upon request.
7. See Chang and Erlich (1985) and Manning (2003) for a discussion of this issue. Employers producing garments requiring higher skills may have other incentives to retain their workforce and act as 'good employers'. Product-level measures like 'dresses' may also be picking up these effects which we cannot empirically separate from skill effects.
8. Ordinary least squares estimates of the determinants of minimum wage compliance will be biased because a significant number of contractors have not committed any violations of the minimum wage. As a result, the variables — minimum wage violations per 100 employees and minimum wage back pay owed per worker per week — are left-censored and therefore subject to bias.
9. For each combined sample, we ran similar regressions as in Tables 4 and 5, but also including an interaction term for the two monitoring variables to test for changes in the size of monitoring effect as well as a separate dummy variable controlling for the latter year in each geographic area (2000 for Los Angeles; 2001 for New York). These results are available from the authors.
10. Manufacturers have a variety of means to assess the underlying compliance probability of contractors. Government records provide one source of information regarding existing contractors. Records of past investigations and their findings are publicly available, and the Wage and Hour Division published throughout the study period a 'Garment Enforcement Report' listing the names of contractors that had violated the FLSA in the prior quarter. The propensity to comply can also potentially be assessed in the course of pre-contract visits that manufacturers frequently conduct to assess the quality and business standards of potential contractors.

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