Lean Retailing and Supply Chain Restructuring: Implications for Private and Public Governance

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Paper prepared for "Observing Trade: Revealing International Trade Networks,"
Princeton Institute for International and Regional Studies, Princeton University.

March 9-11, 2006

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I. Introduction

Beginning in the early 1990s, a new form of retailing diffused across that major sector of the United States economy. This method of retailing—which a group of us based at the Harvard Center for Textile and Apparel Research[1] dubbed "lean retailing"—fundamentally transforms how risk is borne among the distributors and suppliers of apparel and textile products. Lean retailing changes how all parties on a channel of distribution and production make decisions regarding core business decisions. It also changes the performance characteristics for evaluating supply relationships and in judging potential competitors. Finally, it alters the potential for third parties—government, labor unions, NGOs, and other representatives of civil society—to affect policy outcomes of concern including labor standards.

This paper examines how lean retailing and supply chain restructuring has affected two different outcomes related to the larger policy debates about trade. First, I examine the factors influencing trade flows between a major consumer market (the U.S.) and suppliers around the world, particularly now that we have entered an era where quota protections have been eliminated.[2] Second I look at how the presence of lean retailing and its emphasis on replenishing products on an ongoing basis affects tools available for regulating labor standards. I draw on two different sets of microdata for undertaking these evaluations.

The ultimate impact of lean retailing on the global network of firms supplying the U.S. (and other major consumer markets) rests on volitional choices taken by private players along the supply chain and public entities in developed and developing nations in light of these complex factors. Rather than a preordained future driven by inexorable forces, informed choices taken at the private and public level powerfully affect the ongoing effects of international restructuring. But those choices must be based on a clear understanding of supply chain dynamics and their impacts on firm- and industry-level behavior.

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[1] The Harvard Center for Textile and Apparel Research (HCTAR) was one of the early industry study centers established by the Alfred P. Sloan Foundation. Begun in 1991, HCTAR was originally intended to focus on competitive and public policy factors directly related to apparel and textile production. In early stages of our research, however, it became clear that major changes underway in the retail sector were going to profoundly affect the strategies and outcomes of apparel and textile suppliers. Our research focus therefore turned early on to documenting and measuring the impacts of lean retailing. I have served as a co-principal investigator at HCTAR since its founding along with Frederick Abernathy, the late John T. Dunlop, and Janice Hammond.

[2] In 1995 a World Trade Organization (WTO) Agreement on Textiles and Clothing (ATC) was signed creating a ten-year plan phasing out quotas in four discrete steps, the last step to be taken on January 1, 2005 with the elimination of all quotas among WTO member nations. On January 1, 2005, the quota system that restricted textile and apparel imports into the United States and other nations ended for all member countries of the WTO. In late 2005, quota protections were reestablished between the U.S. and China under "surge" provisions that had been negotiated into the agreement allowing China accession to the WTO. Among the major studies regarding the end of quotas, see Applebaum 2005; Gereffi 2003; Knappe 2003; Nordas 2004.

II. Lean Retailing and the Impact of Replenishment

Modern retailers no longer have warehouses full of apparel products ready for the selling floor. Rather they have become "lean retailers" owning just the products on the selling floor (Abernathy et al. 1999). As a result, suppliers' warehouses and distribution centers act in many ways as virtual warehouses and distribution centers for the retailers. At least once a week, most often on Sunday evening after the weekend sales are known, retailers have their computer inventory system order replenishment products from their suppliers. Products are ordered at the stock keeping unit (SKU) level.

In a typical transaction under lean retailing, an order will be placed with a manufacturer for a specific number of men's jeans of a given style, color, fabric weight and finishing treatment, waist size and inseam length. The order goes to the manufacturer's computer and is generally received on that Sunday evening. The retail order requires that the jeans be placed in identified cartons for each of the retailer's stores, and the order is to be delivered to the appropriate retailer's distribution center by Wednesday of the same week. The cartons must be identified with the appropriate bar codes identifying the specific store to which it is to go. The jeans must be floor-ready, that is, they must be ready to be placed on the retailer's floor with appropriate price marked as they are taken from the packing carton. In all likelihood the jeans will not be touched from the time they are placed in the shipping container at the manufacturer's distribution center until they arrive at the store ready to be placed on a table for sale on Thursday morning. In fact, the outside of the carton will be touched only when truck trailers are loaded and unloaded. The sorting from supplier's trailer to trailer destined for specific stores is fully automatic.

As we have argued extensively elsewhere, lean retailing fundamentally changes the dynamics driving relations between different levels of the supply chain. We focus on two different aspects of that change. First, it shifts the decisions driving the location of production and the balancing of direct versus risk related costs arising from sourcing. Second, it creates new points of leverage that can be used as part of public enforcement strategies that seek to improve labor standards.

III. Lean Retailing and Evolving Global Sourcing and Trade Trends

The sourcing decisions facing textile and apparel manufacturers are daunting and far more complicated than commonly acknowledged. With expanding global trade, there are more potential producers in a wider variety of countries. With consumers demanding more variety, more fashion, more product access and lower prices, pressure on suppliers to search for new sources of supply will only increase. Modern retailers place greater risk arising from added variability of product demand further up the supply chain, forcing suppliers to balance the direct costs of sourcing against the indirect consequences of being left "holding the bag" of inventory. Compounding these industry specific issues, decision makers are confronting currency volatility (for example, the movement away

from a fixed exchange rate by China in July 2005), impacts of changing policies regarding terrorism, the potential threats to location posed by transnational diseases (e.g. SARS; avian flu), and ongoing uncertainty caused by changes in the political climate between trading partners (Arnold 2005).

For the supplier, supply chain restructuring has led to an increased focus on inventory carrying costs and risks, and manufacturers making global sourcing decisions have begun to account for these expenses (Abernathy *et. al*. 2000). Table 1(a) and 1(b) portray differences in direct- and supply chain-related factors. We use total landed cost *less quota cost* as the basis of comparison since we are concerned about the post-2005 period. The total cost for landing garments on U.S. soil are compared for two different types of products across multiple potential sources of production in Tables 1(a) and 1(b). The total cost for a garment consists of direct costs associated with production (e.g. fabric, labor, shipping) and policy-related costs, chiefly related to the continuing presence of tariffs. These result in different comparative costs for sourcing products close to the U.S. market (e.g. in Mexico) versus more distant sources like China. As can be seen in Table 1(a), on the basis of combined direct costs of sourcing and policy-related costs, China's relative costs are lowest for jeans, and Mexico's the lowest for T-shirts.

The picture looks quite different when comparing supply-chain related factors for the same products (lower panel, Table 1(b)). First, consider men's jeans, where the typical Mexican, Caribbean and Coastal Chinese supplier will have lead times of three, five, and eleven weeks, respectively. Assuming shipments arrive at the manufacturer's distribution center from all three candidates with the same or nearly the same frequency, the variation in cycle time surface in three important operating metrics.

The most obvious of these is the work-in-process inventory (WIP), which increases with the lead time on a direct basis. WIP costs are carried by the supplier and represent capital tied up in the production process itself. Given the low capitalization of many apparel suppliers, the consequences of large amounts of WIP can be substantial, and born increasingly by companies upstream of retailers and branded apparel producers. As a result, the associated WIP carrying costs for sourcing the Chinese producer will be nearly three times those incurred when using the Mexican producer ($.11 per garment for Mexico versus $.30 for China).

Next, when planning safety stocks necessary for insuring against inevitable fluctuations in demand, a longer cycle time translates into larger finished-goods inventories (FGI). To illustrate this, consider the branded jeans manufacturer supplying products to a number of retail outlets, where from week to week, demand may vary from expected volumes. Depending on the producer's lead time, special orders aimed at replenishing a particularly popular SKU may or may not arrive in time for the manufacturer to achieve the negotiated fill rates with the retailer. So to assure high service levels, the manufacturer is forced to hold FGI in amounts adequate to service these fluctuations. In other words, longer cycle times equate to delayed responsiveness to the market, which ultimately necessitates higher safety stocks. Hence, a decision to

contract the Chinese producer in Table 4 means keeping two or three additional weeks worth of FGI than if the western suppliers were chosen.

Inventory-at-risk is the final operating metric to reflect the variance in cycle times. Unlike WIP cost and FGI cost, it does not easily translate to the total cost buildup in Table 1(b) (see also Abernathy et al. 2000; Bouhia and Abernathy 2004). But the potential costs represented by inventory at risk are considerable, perhaps larger than many of the more direct costs. This is because the possibilities of unanticipated product obsolescence or cancellation at any time during a product life-cycle means that the current inventory, or some part of it, must be sold at a deeply discounted level or, in the worst case, may never be sold at all. A sudden drop in the demand for a line of goods means that a supplier faces liquidating 15 or more weeks of product, simply because it cannot "turn off the tap" of supply instantaneously. For the decision-making manufacturer who stands to lose in this situation, lower inventory-at-risk is an added incentive to choose the shorter-cycle producers in Mexico or Nicaragua.

In the comparative analysis in Table 1(b), the value at risk for a supplier of jeans is substantial. For example, if a retailer's weekly order of 10,000 units of a specific line of jeans is abruptly terminated, the manufacturer is left holding $650,000 of inventory that must be liquidated if sourced from Mexico versus $1.42 million if sourced from China.

For a manufacturer or sourcing agent seeking producers of jeans bound for the U.S., the sourcing decision may seem ambiguous when looking only at factor costs. As the example suggests, the preferred producer for this product does not surface until the impact of proximity is taken into account by determining the work-in-process and finished-goods inventory costs, as well as the inventory at risk. What may have gone unnoticed, though, are the specific characteristics of jeans that played such a vital role in this result.

The above discussion highlights the importance of taking product characteristics into account when projecting future sourcing patterns. More specifically, a product's fashion content, which is highly correlated with its level of replenishment, is a very influential factor in manufacturers' production decisions. For fashion products like the dress, the decision will lean more heavily on factor and policy costs. This means low wage nations, and especially those with access to inexpensive textiles, have the potential for major market gains as quotas are removed. On the other hand, for replenishment products, it would seem that producers in close proximity to the world's major markets remain on solid footing even without the lowest wage rates. These trends are reflected in current international sourcing patterns.

Global Sourcing Patterns in 2003 and 2005

The forgoing argument implies that the prospects for apparel sourcing into the U.S. market will be driven by two sets of forces. For products with single seasons and limited prospect for replenishment such as dresses, women's blouses, and fashion

sensitive clothing in general, traditional cost factors, and the continuing cost of tariffs will frame sourcing decisions. For these goods, future competitiveness will change dramatically for those countries whose garment industry depended on quota-driven advantages (for example as a low-cost portal for quota-constrained suppliers), or whose cost advantages were only somewhat above the costs of purchasing quotas. For these countries, the end of quotas implies the kind of head-to-head competition implied by the conventional wisdom, albeit along a broader set of factors than just labor costs. For example, quota-constrained producer nations like India, already successful in the market due to lower combined manufacturing and policy costs, stand to expand market share (Tewari 2005).

For products where retailers and suppliers seek ongoing replenishment—either throughout the year (men's jeans) or within a season, direct costs related to labor, textile inputs, shipping, and tariffs are balanced against the costs associated with lead times, inventory, and their attendant risks. As such, proximity of suppliers matters too, and post-2005 sourcing decisions may shift less—or in different ways—than predicted by the conventional wisdom.[3]

A comparison of the replenishment content of all garment products shipped for major sources of production provides evidence consistent with the importance of replenishment products for sources of production more proximate to the U.S. and E.U markets.[4] The lists of top twenty sources of men's jeans into the U.S. for 2003 and the first half of 2005 both have high concentrations of supplier-nations proximate to the respective market. (Tables 3(a) and 3(b)). As predicted, the leading source of imports into the U.S. market came from suppliers based in Mexico, which enjoys a beneficial policy position through NAFTA (no tariffs) and the closest proximity. Additionally, a number of regional CBPTA countries were high-volume partners. China was well down the list, and its focus for the category was on more fashionable styles as evidenced by its higher unit cost ($ per dozen). Since quotas were lifted to begin 2005, it is clear from Table 3(b) that China made considerable gains in the U.S. import market for jeans. In the same way, Bangladesh, absent from the 2003 list of top suppliers, now appears on the current list. However, the volume derived from these two distant supplier-nations is very low relative to the volume coming from Mexico and the Caribbean nations. For example, from January to August 2005, jeans from Mexico constituted 48 percent of all imports in that

[3] Of course, there are other factors affecting sourcing decisions. These include quality of the basic fabric (e.g. cashmere), specialization in production and design (e.g. Italian suits), and certain highly skilled sewing details (e.g. complex stitching patterns). These characteristics tend to arise from historic specialization not easily replicated. We focus here on more generic factors.

[4] The import data are taken from the U.S. Department of Commerce, Bureau of the Census, Administrative and Customer Services Division, *U.S. Imports / Exports History, International Harmonized System Commodity Classification by Country*, by Customers District. The data is based on information collected by the U.S. Customs Service in its Custom Service Entry Summary forms that are filed with the Customs Service at the time that merchandise is released to the importer and used to assess tariffs. The data is organized under the Harmonized Tariff Schedule of the United States Annotated (HTUSA or often termed "HS codes"), which provides a unique 10-digit reporting number for each product imported into the U.S. We used annual data on the value of imports (in current dollars) for the different countries of origin.

category versus 5 percent from China. This pattern is likely to continue in the market for men's jeans.

A similar story can be seen for the sourcing of T-shirts into the U.S. (Tables 4(a) and 4(b)). For 2003, the top 4 sources of T-shirts into the U.S. market, comprising 60 percent of all imports of that category, were neighboring countries (Honduras, Mexico, El Salvador and Dominican Republic). A number of nations with comparable or lower unit prices for T-shirts (Bangladesh, Egypt, Thailand) fell low in the list of sources even though they were not quota constrained for that product category. The 2005 year-to-date data (Table 4(b)) reflects a quota-free market, and yet, Western nations are still responsible for more than 80% of the T-shirts imported into the U.S.

In contrast, consider sourcing for dresses. Fashion items, which are expensive to produce and not typically replenished, would presumably have similar supply patterns into the U.S. This is due to the fact that factor costs play a large role and the inventory and risk considerations are non-discriminating. Tables 5(a) and 5(b) support this assertion. None of the proximate nations that dominate the men's jeans list appear in the top 10 of sources for cotton dresses, and many countries that do not even appear in Table 3(a) appear near the top of 5(a) (e.g. India and Sri Lanka). Furthermore, Table 5(b) shows that the U.S. supply base thus far in 2005 looks much the same as it did two years earlier. It will become increasingly difficult for suppliers in the Caribbean to compete in fashion markets.

IV. Lean Retailing and Labor Standards Enforcement in Global Supply Chains

Concern over regulating labor 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 labor 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 labor unions—to monitor adherence to codes. Finally, some systems draw upon combinations of these two methods.

Lean retailing not only has substantial impacts on the factors driving global sourcing and trade. It also potentially impacts the methods of regulating labor standards in supply chains increasingly affected by lean retailing.

Regulatory activity in the U.S. historically focused at the contractor and subcontractor level of the apparel industry.[5] 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.[6] This regulatory model was altered substantially in the mid-1990s, also in response in part to lean retailing (Weil 2002, 2005; Weil and Mallo 2006). The basic model of lean retailing and its supply chains makes 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 1996, the WHD shifted its focus from targeting individual contractors to exerting regulatory pressure on the supply chain itself 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 potentially 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. It does so by making the release of embargoed goods contingent on *the manufacturer's* agreement to create a compliance program for all of its subcontractors. The manufacturer agrees to sign two types of agreement: (1) an agreement between itself and the Department of Labor, and (2) an agreement that the manufacturer signs with each of its contractors (Ziff and Trattner 1999; Weil 2005). The agreement between the Department of Labor and the manufacturer stipulates the basic components of a monitoring system that will be operated by the manufacturer. The agreement between the manufacturer and all of its contractors establishes the methods that the manufacturer will use to monitor the wage practices and related compensation policies of its network of contractors.

The agreements at both the manufacturer and contractor level lay out a method of formal monitoring that will be undertaken by the manufacturer or its designated third party. The model language include (1) the use of unannounced monitoring visits "…at

[5] Minimum wages (as well as regulation of child labor and overtime compensation) are set out in the Fair Labor Standards Act (FLSA) of 1938. Enforcement of FLSA is carried out by investigators of the Wage and Hour Division (WHD), located in 400 offices around the country.

[6] 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 work week). First-time violators are only required to pay back wages owed to under paid 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 press their claims through the private bar make penalties for first-time offenders potentially higher than back pay alone, but the number of such claims are very low.

least once every 90 days..." where the monitor may review contractors' payroll records and timecards; (2) private employee interviews conducted by the monitor; (3) meetings between monitors and contractors to advise them of compliance problems; and (4) training for contractors and / or their employees (U.S. DOL, 1998; 1999a, b).

The use of government authority to interrupt the flow of goods therefore is designed to create incentives to induce the creation of more extensive private monitoring systems. Since contractors typically work for multiple manufacturers at any time, private monitoring may have significant spillover effects. Private monitoring 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.

Impact of Monitoring on Minimum Wage Enforcement[7]

The apparel industry in the U.S. has a splintered production system where different enterprises carry out the design, cutting, and sewing and pressing / packaging of apparel products. For example, a "jobber" may sell a design to retailers, and then contract with a manufacturer for delivery of the product. The manufacturer, in turn, may purchase and cut the product, but then contract out sewing to one or more companies (which may, in turn further contract out sub-assembly). Contractors compete to pre-assemble bundles of cut garment pieces in a market where there is little ability to differentiate services except for some sewing operations that require higher levels of skill content. Sewing contractors compete in a market with large numbers of small companies, low barriers to entry, and limited opportunities for product differentiation, which all contribute to intense price-based competition. Because labor costs represent the vast majority of total costs for a sewing contractor, the pressure to strike deals in the short run with jobbers and manufacturers that would not be economically sustainable were the contractor to comply with wage and hour laws is high.

Although there are many permutations of monitoring features created under agreements between manufacturers and the WHD, certain combinations of activities have potentially larger impacts on contractor behavior than others. We focus below on particular combinations of monitoring, grouped as "low," "medium," and "high," to capture different levels of oversight under which a contractor operates. "Low" monitoring implies that contractors operated under at least one monitoring feature with at least one manufacturer. A contractor is classified as operating under a "medium" level of monitoring when one or more of the manufacturers for which they work review the contractor's payroll and at least one has the authority to conduct unannounced visits. This combination of monitoring provisions places the contractor under a greater chance of having minimum wage violations detected.[1] A contractor is classified as being subject to "high" monitoring if *all* of its manufacturing customers conduct *both* payroll review and unannounced visits, placing the contractor under the most stringent form of

[7] A more extensive discussion of these empirical results can be found in Weil (2005); and Weil and Mallo (2006).

oversight. We construct the "low" monitoring variable to represent the marginal effect of any monitoring relative to no monitoring and the "medium" or "high" monitoring variables as equaling the marginal effect of that more stringent method relative to having any monitoring present. Because of incomplete information for the New York City sample in 2001, we use "medium" monitoring as the more stringent form of monitoring for that geographic area, and use "high" monitoring to capture stringent monitoring for the Los Angeles sample.[8]

Given the incentives for contractors to not comply with minimum wage standards, can one or more manufacturer monitoring feature provide sufficient incentives to contractors to improve their compliance with the law? We examine this question by estimating separate equations for each geographic area and year and then by pooling data for Los Angeles and New York across time periods.[9]

Table 5 presents the results of Tobit regressions for the Los Angeles market in 1998 and 2000. For the empirical analysis that follows, we focus on two measures of regulatory compliance as dependent variables: *incidence* of violation, as measured by the number of violations per 100 workers employed; and *severity* of violation as measured by back wages owed per worker per week. Since it is possible for interventions to affect the incidence of violations differently than the severity of violations, we examine the impact of monitoring on both outcomes in our empirical analysis. "Low" monitoring represents the lowest level of monitoring activity, when at least one of the manufacturers the contractor works for performs at least one of seven different possible monitoring activities. "High" monitoring is the highest possible degree of monitoring activity, and requires that every manufacturer for whom the contractor works perform payroll review *and* conduct unannounced visits. We control for a number of other contractor characteristics that might confound measured effects of monitoring on the two compliance outcomes.

[8] The data for this section 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 U.S. Department of Labor Wage and Hour Division (WHD) using a randomly selected set of establishments in the Southern California and New York area apparel markets. The universes for the four surveys from which the samples were drawn were all apparel manufacturing and contractor firms appearing on the California and New York manufacturing registration lists for each of the sample years.[8] Contractors randomly selected from the list received an "inspection-based survey" by WHD investigators that included a review of all payroll records for a designated time period (Wage and Hour Division, 2001). The random basis of the survey therefore provides an unbiased sample of underlying compliance behavior for contractors that were monitored by one or more of their manufacturing customers as well as for those that were not monitored by manufacturers. See Weil (2005) for additional detail on the data and survey methods.

[9] OLS 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 in estimates of the various in variables. We correct for this problem by estimating a series of Tobit regressions for the two types of minimum wage outcomes.

The first four columns in Table 5 show the coefficients obtained from running a Tobit model. However, given that by construction the dependent variables must be greater than or equal to zero, we also present the marginal effects conditional on the dependent variable being uncensored. The latter coefficients provide a more useful estimate of the marginal effect of the regressors on the dependent variable because we are interested in the *change* in behavior of those who do not comply (variable greater than zero) and because the dependent variables cannot have a negative value.

The results in Table 5 indicate that the presence of any monitoring ("low") is associated with lower incidence and severity of minimum wage violations, although the coefficients are not significant for either 1998 or 2000. However, the marginal effect of more stringent monitoring ("high") has large and significant effects on both incidence and severity. Minimum wage compliance increases with the stringency of monitoring and the estimated effect grows markedly between 1998 and 2000: the presence of high monitoring is associated with a reduction in the incidence of violations by 8.5 per 100 workers in 1998 and by 20.2 per 100 workers in 2000, holding other factors constant. We look more closely at the changing impact of monitoring over time below. The coefficients for most of the control variables have their expected signs in the regressions for 2000 although the results are more mixed in 1998. However, few of the variables other than those relating to monitoring reach statistical significance.

Table 6 presents estimated monitoring effects for the New York City area for 1999 and 2001. Monitoring impacts for New York City are similar to those found in Los Angeles: the estimated effect of low monitoring variables on the incidence and severity of violations are large and negative, but are not statistically significant. However, the marginal effects of "medium" monitoring on both incidence and severity are large and, for 1999, statistically significant. The presence of medium monitoring is associated with an additional reduction in the incidence of violations of 20.3 per 100 workers beyond what would be predicted for having any monitoring present. Medium monitoring is also associated 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).

The effects of monitoring help to explain the overall decrease in the incidence and severity of minimum wage violations in Los Angeles and particularly in New York between the late 1990s and early 2000 period. Although the problem of minimum wage noncompliance remains, the public / private monitoring system appears to have had a significant impact in reducing the extent of those problems. We turn in the final section to the implications of this system for future efforts at regulating international labor standards.

V. Lean Retailing and Supply Chain Restructuring: Implications for Private and Public Choices in Integrated Supply Chains

Private Choices

In work with Abernathy and Volpe, I have argued that competitive strategies and choices of retailers, apparel manufacturers, and textile producers will have a major impact on the location of production for different types of products (Abernathy, Volpe, and Weil 2006). The continuing importance of logistic connections between the manufacturing and distribution of clothing mean that supply chains will reflect a blend of considerations regarding factor prices, transportation costs and increasingly adjustments to the risks associated with sourcing products in different locations. As supply chain decision-makers adopt better means of pricing these risks as has happened in other markets, it will play an even larger role in sourcing activities. The fact that innovative firms like Li & Fung have brought risk considerations into their core strategies is indicative of this latter trend.

With the elimination of quotas, survival of the remaining-- but still sizeable-- apparel sector in U.S. and EU markets depend on using the benefits of proximity from a design, marketing, and production point of view to respond to increasingly volatile market demand. The persistence of apparel production in Southern California cannot be explained away by low wages arising from slack enforcement of labor standards (Weil 2005), but arises from the responsiveness of those firms that have survived. Yet the pressures to find new means to further expand the advantages from proximity are significant and will intensify. This requires new means of restructuring the way that networks of contractors manage supply chain risks (see Tan and Gershwin 2004; Bouhia and Abernathy 2004).

Similarly, the apparel industries in Mexico, Central America, and the Caribbean will only maintain their position—even with tariff advantages—by continually improving the advantages arising from proximity. The quantity of shipments from Mexico and to a lesser extent from CBI nations has decreased since 2002, arising from the U.S. recession, trade-related impacts of the 9/11 attacks, and some substitution from other countries. It may also reflect, however, the lack of improvement in short cycle responsiveness among Mexican suppliers. Intrinsic advantages arising from physical proximity can be lost if those producers do not adjust manufacturing, information, and distribution practices to allow them to be responsive.

The private choices facing developing nations are therefore more complex than suggested by the common wisdom. Bair and Gereffi (2001, 2003) advocate that Mexico and other developing nations should focus on the design and marketing phases of apparel operation as a critical step towards survival. Although this strategy is very tempting, particularly because (as they point out) a great deal of the profits captured by the supply chain occur at the design and marketing end, it is not clear that they will successfully wrest these functions from retailers and major brands for this very reason. Instead, we believe that Mexican suppliers in Torreon and elsewhere will need to be able not only to

provide the full package of product and services demanded by their powerful customers, but also do so in a manner that is sustainable for the companies. There is evidence that this has in fact happened in Mexico in recent years, leading to a very competitive but substantially restructured industry that contributes to Mexico's continuing supply of almost 50 percent of jeans imported into the U.S. (Rosenberg 2005). Yet adjustments of this kind are far from simple: We have seen many U.S. firms whose domestic operations were undermined as much by factor prices disadvantages as they were from their incapacity to manage risk effectively. Opportunities for countries in Eastern Europe, North Africa, and Turkey for taking advantage of proximity advantages into the EU require similar types of competitive strategies and adjustments (e.g. Pickles et al, 2005).

The impact of replenishment and risk shifting in supply channels also alters the traditional role apparel and textile industries can play in developing nations. Apparel and textile sectors remain attractive industries in terms of economic development. But assuring the success of those industries has become more complex. It will be difficult for many nations with inadequate infrastructure, distant location from major consumer markets, or political (or even climactic) instability, who will be at a considerable competitive disadvantage for many apparel products, even if they have low wage rates. Further, for those categories of apparel where replenishment is not a major factor in sourcing, the presence of a large number of countries with extensive apparel capacity means more intense competition among these nations for a smaller market of non-replenishment products. Together, these forces will make the future of apparel industries reliant solely on low wages as the source of competitive advantage (e.g., Bangladesh) increasingly bleak and vulnerable to the removal of quotas.

Public Choices on Trade

> "The death of distance is exaggerated. Trade costs are large, even aside from trade-policy barriers and even between apparently highly integrated economies." (Anderson and Wincoop 2004, p. 691; See also Coughlin 2004; Evans 2003; Evans and Harrigan 2005).

Trade costs consist of transport, border-related, local distribution costs that stand between foreign suppliers and final users. Many of these are directly affected by explicit public policy (tariffs, exchange rate systems like pegged currencies) as well as implicit policies such as investments in transportation infrastructures, the efficiency, variability, and integrity of administrative mechanisms affecting trade relations, and regulations affecting flows of goods.

National public policies will therefore continue to have a major impact on a quota-free trading system. For nations hoping to expand their capacities, public policies that impact the links between their markets and U.S., EU, and other major consumer markets will be critical. For example, the port infrastructures in Bangladesh suffer from problems arising from physical geography, climatologic uncertainty, and enormous administrative problems. While the country has remained competitive due to its favorable trade status with the EU and low wages, Bangladesh's long term viability as a

source of apparel and textiles rests on the adoption of public policies that appreciably lower trade costs associated with the administrative problems (including a significant problem of the integrity of those processes) and investments in infrastructures that dramatically reduce the time required to move goods in and out of the country. Movement along these lines has been very limited in the view of a number of analysts (Rahman 2002; Bhattacharya and Rahman 2002; Rose 2005).

The very different fates of Bangladeshi T-shirts in the European and U.S. markets serve as a reminder of the continuing role that public policies will play in shaping sourcing patterns. Bangladesh, due to its status as a "Least Developed Nation", enjoys free entry into the EU on apparel that undergoes two stages of production. In the case of T-shirts, this is knitting and sewing, both well within the capability of Bangladeshi producers. As shown above, this competitive advantage allows the country to be the leading source of T-shirts into the EU, a status unrealized in the U.S. market where Mexico and Caribbean nations enjoy duty free T-shirt imports and Bangladesh does not. Clearly, then, through the forging of bi-lateral and regional trade agreements that reduce or eliminate tariffs for certain trade partners, governments will retain the opportunity to impact global retailers' sourcing decisions.

Regional trade policies will also be important sources of public choices after 2005. Tariffs will remain in place for the foreseeable future. In fact, despite the reduction of tariffs that are part of the WTO, the end of quotas will further reduce national interest in removing those tariffs. Because they will continue to represent significant costs, regional agreements that provide tariff relief for signatory countries like NAFTA, CBTPA and AGOA for the U.S. and the Euro-Mediterranean Partnership for the EU will remain important instruments of public policies. Proximity effects further raise the ongoing benefits that may arise from regional arrangements.

Although traditional factors and the ending of the quota system will impact the sourcing of products, we believe that mainstream predictions miss the mark in several respects—even in light of the immediate, post-quota surge of apparel imports from China. Even the most sophisticated efforts to forecast the post-2005 impacts have left out the replenishment dynamic. The USITC models of the effects of China's accession to the WTO on U.S. apparel production and employment are indicative. These models are run at the aggregate rather than commodity level, and therefore fail to capture compositional changes in the products traded between countries. The USITC report indirectly acknowledges this problem: "Finally, the simulations reflect the assumption that the purchasers' willingness to substitute imports for domestic production remains constant throughout the 12-year period [1998-2010]. This may not be the case. For example, if domestic producers were to shift production to specialized sub-sectors, imports could become less viable substitutes and, as a result, purchasers would be less responsive to changes in import prices." (USITC 1999, p. 8-20).

Replenishment considerations arising from the new economics of distribution and production channels explain an important portion of the shifts in sourcing over the past decade. As lean retailing becomes even more widespread and suppliers more

sophisticated in thinking about managing risk, replenishment considerations will factor even more heavily into sourcing decisions. This will make the countries with proximity more competitive for those goods where replenishment is important, and will subject those countries competing along traditional lines to greater competition over a smaller set of apparel products. As these economic factors will not disappear in coming years-indeed, they will intensify-- this driver of sourcing location will persist.

Public Choices on Labor Standards

The economics of trade and sourcing also create new opportunities for regulation of labor standards. Despite the decline in overall U.S. employment in apparel and the intense competitive pressure on the sector, the U.S. Department of Labor has had an effect on conditions at apparel contractors in Southern California and New York City. It has had this impact by explicitly using retail restructuring as its device to exert influence on contractor behavior. Although this program is possible because of the distinctive "hot goods" featured of the Fair Labor Standards Act, the concept of using supply chain pressure as a regulatory tool can be applied elsewhere.

Three features of the WHD system are potentially applicable to the global labor standards case. First, the WHD example demonstrates the impact of using substantial private penalties (interruption of the flow of goods) to change employer behavior. Because 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 labor standards as a form of trade policy (a form of international labor standard proposed by Elliott and Freeman 2003, pp. 136-137). Alternatively, the mechanism might augment a national government's efforts to enforce its own labor policies, such as a regional trade agreement with an embargo mechanism to ensure that signatory nations enforced core ILO principles at covered workplaces.

However, given current resistance to the linking of trade and labor standards at the WTO or regional trade pact levels, creation of an embargo mechanism with such sweeping authority over national policies seems unlikely.[10] 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, multi-party agreements could provide a delegated 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

[10] 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 it was produced by prison labor. However, even this provision has seldom been invoked in recent times.

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 LA and NYC, 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 labor standards, workforces, nature of manufacturing, and other fundamental conditions, variation in forms of monitoring are inevitable and probably desirable (see, for example, the most recent report on monitoring by The Gap Inc. 2005).

A final implication of the WHD case is the need to design labor standards systems that are sustainable over time. The WHD monitoring efforts appear to have sustained their effects in both Los Angeles and New York over an extended period of time. What is more, that effect seems to have changed the behavior 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. 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 LA and NYC 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 behavior 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 labor standards will need to find a means to influence workplace conditions beyond the bounds of those directly participating in those systems.

Acknowledgements

Support for this research comes from the Alfred P. Sloan Foundation and the U.S. Department of Labor. I am grateful to my fellow researchers Fred Abernathy and Anthony Volpe who I have worked closely with regarding the post-MFA world of apparel sourcing and to Carlos Mallo for his work with me on studies of domestic labor standards regulation in apparel.

References

Abernathy, Frederick H., John T. Dunlop, and Janice H. Hammond, and David Weil. 1999. *A Stitch in Time: Lean Retailing and the Transformation of Manufacturing—Lessons from the Apparel and Textile Industries.* (New York: Oxford University Press).

Abernathy, Frederick H., John T. Dunlop, and Janice H. Hammond, and David Weil. 2000. "Control Your Inventory in a World of Lean Retailing." *Harvard Business Review*, November/December, pp. 169-176.

Abernathy, Frederick H., John T. Dunlop, and Janice H. Hammond, and David Weil. 2004. "Globalization in the Apparel and Textile Industries: What is New and What is Not?" in Martin Kenney and Richard Florida, eds., *Locating Global Advantage: Industry Dynamics in the Global Supply Chain*, (Stanford, CA: Stanford University Press), pp. 23-51.

Abernathy, Frederick H., Anthony Volpe, and David Weil. 2006. "The Future of the Apparel and Textile Industries: Prospects and Choices for Public and Private Actors." *Environment and Planning A*, Forthcoming.

Anderson, James E. and Eric van Wincoop. 2004. "Trade Costs." *Journal of Economic Literature*. V. 42 (September), pp. 691-751.

Anderson, James E. and Eric van Wincoop. 2002. "Borders, Trade, and Welfare.." *Brookings Trade Forum*. Susan Collins and Dani Rodrik, eds., Washington, D.C.: Brookings Institution, pp. 207-244.

Appelbaum, Richard. 2005. *TNCs and the Removal of Textiles and Clothing Quotas*. New York and Geneva: United Nations Conference on Trade and Development.

Arnold, Dennis. 2005. "Textile and Apparel Sourcing: The Complexity Behind Low-Cost Labour in Supply Chains." *Asian Labour Update*, Issue No. 54, pp. 1-8.

Bair, Jennifer and Gary Gereffi. 2003. "Upgrading, Uneven Development, and Jobs in the North American Apparel Industry." *Global Networks*, v. 3, no. 2, pp. 143-169.

Bhattacharya, Debapriya and Mustafizur Rahman. 2002. "Experience with Implementation of WTO-ATC and Implications for Bangladesh." Centre for Policy Dialogue Occasional Paper Series No. 7.

Bouhia, Soundouss and Frederick Abernathy. 2004. "Scheduling and Ordering Production Policies in a Limited Capacity Manufacturing System: The Multiple Replenishment Products Case," Working Paper, Harvard Center for Textile and Apparel Research, http://www.hctar.org/pages/pubs.html.

Chiron, Claire. 2004. "An Overview of Apparel and Textile Quota, Tariff and Trade Agreements," Working Paper, Harvard Center for Textile and Apparel Research.

Coughlin, Cletus. 2004. "The Increasing Importance of Proximity for Exports from U.S. States." *Federal Reserve Bank of St. Louis Review*, v. 86, no. 6, pp. 1-18.

Elliott, Kimberly and Richard Freeman. 2003. *Can Labor Standards Improve Under Globalization?* Washington, DC: Institute for International Economics.

Evans, Carolyn. 2003. "The Economic Significance of National Border Effects." *American Economic Review*, v. 93, no. 4, pp. 1291-1312.

Evans, Carolyn and James Harrigan. 2005. "Distance, Time, and Specialization." *The American Economic Review*, v. 95, no. 1, pp. 292-313..

Feenstra, Robert. 1998. "Integration of Trade and Disintegration of Production in the Global Economy." *Journal of Economic Perspectives*. v.12, no. 4, pp. 31-50.

Gap Inc. 2005. *Facing Challenges, Finding Opportunities*. Gap Inc. 2004 Social Responsibility Report.

Gereffi, Gary. 1998. "The Transformation of the North American Apparel Industry: Is NAFTA a Curse or Blessing?" in *Integration and Trade*. v. 4, no. 11, pp. 47-95.

Gereffi, Gary. 1999. "International Trade and Industrial Upgrading in the Apparel Commodity Chain." *Journal of International Economics*, v. 48 no. 1 pp. 37-70.

Gereffi, Gary. 2003. "The International Competitiveness of Asian Economies in the Global Apparel Commodity Chain." *International Journal of Business and Society*, v. 4, no. 2, pp. 71-110.

Hagel, John and John Seely Brown. 2001. "Cut Loose from Old Business Processes," *Optimize Magazine*, pp.

Haufler, Virginia. 2001. *A Public Role for the Private Sector: Industry Self-Regulation in a Global Economy*. Washington, DC: Carnegie Endowment for International Peace.

Jassin-O'Rourke Group. 2002. "Global Competitiveness Report: Selling to Full Package Providers." Report. New York, NY.

Knappe, Matthias, 2003 "Textiles and clothing: what happens after 2005?" International Trade Forum, Issue 2/2003, International Trade Center.

Krishna, Kala M. and Ling Hui Tan. 1998. *Rags and Riches: Implementing Apparel Quotas under the Multi-Fiber Arrangement*. (Ann Arbor, MI: The University of Michigan Press).

Lee, Eddy. 1997. "Globalization and Labour Standards: A Review of Issues." International Labour Review, v. 136, no. 2, pp. 173-189.

Locke, Richard. 2002. "The Promise and Perils of Globalization: The Case of Nike." Working paper. Massachusetts Institute of Technology.

Loveman, Gary and O'Connell, Jamie 1996. *Li & Fung (Trading) Ltd*, Harvard Business School Case Program, .9-396-075.

Moran, Theodore. 2004. "Trade Agreements and Labor Standards." *The Brookings Institution Policy Brief*, No. 133, May.

Nordås, Hildegunn Kyvik. 2004. "The Global Textile and Clothing Industry post the Agreement on Textiles and Clothing." Discussion no. 15, World Trade Organization, Geneva, Switzerland.

Office of Textile and Apparel, International Trade Administration. 2004. "Export Market Report 2004." Available at http://otexa.ita.doc.gov/scripts/exphist.exe.

O'Rourke, Dara. 2003. "Outsourcing Regulation: Analyzing Nongovernmental Systems of Labor Standards and Monitoring." *The Policy Studies Journal*. v. 31, no. 1, pp. 1-29.

Pickles, John, Adrian Smith, P. Roukova, M. Bucek, and R. Begg. 2005. "Upgrading the European Apparel Supply Chain and the Embedded Geographies of the East European Apparel Industry." Manuscript.

Rahman, Mustafizur. 2002. "U.S.A. Trade and Development Act 2000: A Response from the Bangladesh Perspective." Centre for Policy Dialogue Occasional Paper Series No. 6.

Rose, Jonathan. 2005. "The Garment Industry of Bangladesh Post-MFA: A Survey of Buyers." Working Paper, MIT Department of Political Science.

Rosenberg, H. Michael. 2005. "Dreams, Denim, and Destiny: Competitive Responses in the Blue Jeans Maquiladoras of Mexico's La Laguna Region. Manuscript. Harvard University.

Tan, Baris and Stanley Gershwin. 2004. "Production and Subcontracting Strategies for Manufacturers with Limited Capacity and Volatile Demand." *Annals of Operations Research*, v. 125, pp. 205-232.

Tewari, Meenu. 2005. "Post-MFA Adjustments in India's Textile and Apparel Industry: Emerging Issues and Trends." Working Paper 167. Indian Council for Research on International Economic Relations.

U.S. Department of Labor, Wage and Hour Division. 2004. *Report on Initiatives.* Washington, D.C.: Department of Labor.

United States International Trade Commission. 1999. *Assessment of the Economic Effects of China's Accession to the WTO.* Investigation No. 332-403, Publication 3229. Washington, DC: USITC.

United States International Trade Commission. 2004 *Textiles and Apparel: Assessment of the Competitiveness of Certain Foreign Suppliers to the U.S. Market.* (Publication 3671. Washington, DC: USITC.

Weil, David. 2002. "Regulating Labor Standards in the United States: New Tools for an Old Problem." *Challenge* (January / February), v. 45, no. 1, pp. 47-74.

Weil, David. 2005. "Public Enforcement / Private Monitoring: Evaluating a New Approach to Regulating the Minimum Wage." *Industrial and Labor Relations Review*. v.58, no.2, pp. 238-257.

Weil, David and Carlos Mallo. 2006. "Regulating Labor Standards via Supply Chains: Lessons from a Public / Private Approach to Intervention." Boston University, Manuscript.

Ziff, Laura and John Trattner. 1999. "Shutting Down Sweatshops." in Donahue, John, ed. *Making Washington Work: Tales of Innovation in the Federal Government.* Washington, D.C.: Council for Excellence in Government / Brookings Institution Press, pp. 47-58.

Table 1(a): Comparison of Suppliers' Total Landed U.S. Cost for Men's Cotton Jean and Cotton Ring Spun T-Shirt

	Single Pair of Men's Jeans			***Cotton Ring-Spun T-Shirt***		
Garment Producer / Exporter	Mexico	Nicaragua	Coastal China	Mexico	Honduras	Coastal China
Fabric Source	Mexico	U.S.	China	Mexico	U.S.	China
Manufacturing & Shipping Cost per Garment	$7.96	$8.32	$6.75	$1.88	$1.93	$1.75
Relevant Trade Agreement	NAFTA	CBPTA	None	NAFTA	CBPTA	None
2003 Quota Cost	0.00	0.00	4.00	0.00	0.00	2.17
2003 Duty Cost into U.S.	0.00	0.00	1.80	0.00	0.00	0.67
2003 Total Landed Cost	$7.96	$8.32	$12.55	$1.88	$1.93	$4.59
Duty Cost into U.S. (Absent Quota Cost)	$0.00	$0.00	$1.12	$0.00	$0.00	$0.29
Total Landed Cost (Absent Quota Cost)	$7.96	$8.32	$7.88	$1.88	$1.93	$2.04

Source**:** *Estimates based on Jassin O'Rourke Group 2002 and data on current tariffs.*

* The U.S. tariff on men's and boys' blue denim jeans is 16.6% of the landed value, and 16.5% for cotton T-Shirts.

Table 1(b): Comparison of Suppliers' Inventory Related Costs for Men's Cotton Jeans and Cotton Ring-Spun T-Shirt

	Single Pair of Men's Jeans			***Cotton Ring-Spun T-Shirt***		
Garment Producer / Exporter	Mexico	Nicaragua	Coastal China	Mexico	Honduras	Coastal China
Fabric Source	Mexico	U.S.	China	Mexico	U.S.	China
Total Landed Cost Absent Quota Cost	$7.96	$8.32	$7.88	$1.88	$1.93	$2.04
Relevant Trade Agreement	NAFTA	CBPTA	None	NAFTA	CBPTA	None
Average Cycle Time (in Weeks)	4	5	11	3	5	11
Inventory Carrying Cost Rate	18%	18%	18%	18%	18%	18%
WIP Inventory Carrying Cost	$0.11	$0.14	$0.30	$0.02	$0.03	$0.08
Finished-Goods (FG) Inventory (in Weeks)	4	5	6	3	4	5
FG Inventory Carrying Costs	$0.11	$0.14	$0.16	$0.02	$0.03	$0.04
Total Cost	$8.18	$8.60	$8.34	$1.92	$1.99	$2.16
Value of Apparel at Risk (Dollars/Weekly Single Unit Demand)	$65	$86	$142	$11	$18	$35

Source: *Landed cost estimates based on O'Rourke 2002. Cycle time, inventory cost, WIP and apparel risk estimates based on HCTAR models (see Abernathy et. al. 2000; Bouhia and Abernathy 2004).*

Table 2(a): Top 20 Exporters to U.S. in Men's and Boys' Denim Jeans* (Jan-Aug 2005, Volume)

#	Country	Volume (000 Doz)	#	Value ($000)	Unit Price (per Dz)
1	Mexico	7,054	$	687,269	$ 97
2	China	1,048		78,005	74
3	Costa Rica	776		41,218	53
4	Columbia	720		66,584	92
5	Honduras	616		34,380	56
6	Guatemala	604		70,640	117
7	Lesotho	574		43,023	75
8	Dominican Rep.	527		45,251	86
9	Nicaragua	497		33,925	68
10	Bangladesh	472		30,586	65
11	Phillipines	337		28,439	84
12	Hong Kong	317		43,518	137
13	Egypt	317		18,070	57
14	Cambodia	301		20,236	67
15	Madagascar	229		16,471	72
16	Pakistan	222		12,608	57
17	Indonesia	156		12,443	80
18	Swaziland	152		8,602	57
19	Jordan	147		11,136	76
20	Haiti	104		8,865	86
	Sub-Total	15,169		$ 1,311,269	$ 86
	Pct of Total	94%		92%	

* HTS Codes 6203424010 and 6203424035.

Source: *OTEXA, compiled by HCTAR*

Table 2(b): Top 20 Exporters to U.S. in Men's and Boys' Denim Jeans* (2003 Volume)

#	Country	Volume (000 Doz)	#	Value ($000)	Unit Price (per Dz)
1	Mexico	10,309	$	993,344	$ 96
2	Costa Rica	1,169		68,697	59
3	Guatemala	1,082		113,602	105
4	Colombia	801		73,304	92
5	Honduras	694		35,060	50
6	Cambodia	509		44,479	87
7	Nicaragua	508		34,137	67
8	Dominican Rep.	487		45,447	93
9	Hong Kong	449		63,681	142
10	Lesotho	400		28,360	71
11	Egypt	397		28,391	72
12	Vietnam	375		23,446	63
13	South Africa	349		23,433	67
14	Philippines	316		30,828	97
15	El Salvador	305		30,758	101
16	Russia	264		14,189	54
17	Canada	209		33,590	161
18	China	176		23,629	134
19	Pakistan	161		10,710	67
20	Mauritius	130		13,593	105
	Sub-Total	19,091		$ 1,732,677	$ 91
	Pct of Total	92%		93%	

* HTS Codes 6203424010 and 6203424035. Aggregated together, there is a perfect correspondence to the EU 8 digit CN code 62034231, which is represented at right.

Source: *OTEXA, compiled by HCTAR*

Table 3(a): Top 20 Exporters to U.S. in T-Shirts, Singlets & Other Vests of Cotton, Knitted or Crocheted* (2003 Volume)

#	Country	Volume (000 Doz)	Value ($000)	Unit Price (per Dz)
1	Honduras	39,098	$ 606,700	$ 16
2	Mexico	32,203	703,916	22
3	El Salvador	26,668	349,022	13
4	Dominican Rep	9,260	159,259	17
5	Haiti	4,107	62,620	15
6	Guatemala	4,072	104,000	26
7	Canada	3,959	142,189	36
8	Jamaica	3,812	52,516	14
9	Vietnam	2,626	60,584	23
10	Turkey	2,312	75,396	33
11	Pakistan	1,992	47,860	24
12	Bangladesh	1,929	28,708	15
13	Peru	1,882	73,735	39
14	Russia	1,845	30,535	17
15	Brazil	1,765	31,730	18
16	Hong Kong	1,373	39,978	29
17	Egypt	1,215	20,276	17
18	China	1,104	35,740	32
19	Turkmenistan	1,089	11,018	10
20	Thailand	1,053	20,077	19
	Sub-Total	143,362	$2,655,859	$ 19
	Pct of Total	91%	87%	

*HS Code 610910

***Source:** OTEXA, compiled by HCTAR*

Table 3(b): Top 20 Exporters to U.S. in T-Shirts, Singlets & Other Vests of Cotton, Knitted or Crocheted* (Jan-Aug 2005, Volume)

#	Country	Volume (000 Doz)	Value ($000)	Unit Price (per Dz)
1	Honduras	27,414	$ 448,380	$ 16
2	El Salvador	22,290	274,105	12
3	Mexico	19,671	389,698	20
4	China	8,433	155,761	18
5	Dominican Rep	7,138	120,774	17
6	Haiti	4,578	66,032	14
7	Guatemala	4,554	109,585	24
8	Pakistan	2,635	54,917	21
9	Peru	2,504	102,509	41
10	Bangladesh	2,411	31,785	13
11	India	2,314	63,432	27
12	Canada	2,186	72,936	33
13	Nicaragua	1,310	24,607	19
14	Thailand	1,182	26,083	22
15	Turkey	1,148	33,864	29
16	Vietnam	957	31,665	33
17	Cambodia	935	23,370	25
18	Jamaica	918	17,453	19
19	Macau	912	36,017	40
20	Indonesia	873	23,438	27
		114,363	$2,106,411	$ 18
		91%	87%	

*HS Code 610910

***Source:** OTEXA, compiled by HCTAR*

Table 4(a): Top 20 Exporters to U.S. in Women's & Girls' Cotton Dresses, Not Knitted or Crocheted* (2003 Volume)

#	Country	Volume (000 Dz)	Value ($000)	Unit Price (per Dz)
1	India	551	$ 39,915	$ 72
2	Philippines	491	29,220	60
3	Bangladesh	319	14,564	46
4	Sri Lanka	288	17,847	62
5	Thailand	164	8,668	53
6	China	164	22,130	135
7	Indonesia	146	8,975	62
8	Pakistan	134	3,999	30
9	Vietnam	126	5,734	46
10	Hong Kong	121	16,364	135
11	UAE	84	4,535	54
12	Cambodia	83	5,093	61
13	Mexico	57	3,787	67
14	El Salvador	32	2,671	83
15	Qatar	30	1,313	44
16	Macau	27	3,022	111
17	Nepal	27	1,086	40
18	South Africa	24	1,223	52
19	Taiwan	22	2,728	121
20	Turkey	22	1,681	75
	Sub-Total	2,912	$ 194,554	$ 67
	Pct of Total	93%	88%	

* HS Code 620442

Source: *OTEXA, compiled by HCTAR*

Table 4(b): Top 20 Exporters to U.S. in Women's & Girls' Cotton Dresses, Not Knitted or Crocheted* (Jan-Aug 2005, Volume)

#	Country	Volume (000 Dz)	Value ($000)	Unit Price (per Dz)
1	India	623	$ 45,525	$ 73
2	China	619	54,469	88
3	Phillipines	278	17,783	64
4	Bangladesh	256	10,608	41
5	Vietnam	239	12,254	51
6	Sri Lanka	155	10,653	69
7	Indonesia	123	8,357	68
8	Thailand	120	6,348	53
9	Pakistan	76	2,371	31
10	Cambodia	75	4,011	54
11	Mexico	63	4,070	64
12	Hong Kong	27	3,794	139
13	UAE	23	1,143	50
14	El Salvador	22	2,160	97
15	Colombia	21	2,752	133
16	Guatemala	12	794	65
17	Malaysia	12	874	73
18	Italy	12	6,616	559
19	Korea	12	2,211	191
20	Dominican Rep.	9	215	24
	Sub-Total	2,776	$ 197,008	$ 71
	Pct of Total	98%	96%	

*** HS Code 620442**

Source*: OTEXA, compiled by HCTAR*

Table 5:
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*
Low 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)
High 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)
# 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 > Chi^2	0.39	0.00	0.31	0.01				
Pseudo R^2	0.0162	0.065	0.0220	0.057				
Log likelihood	-224.3	-197.1	-184.3	-161.6				
N	71	62	71	62				

Standard errors are shown in parentheses. An asterisk after the Tobit coefficient denotes significance at the 10 percent level and a double asterisk for 5 percent.

Table 6:
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*
Low 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)
Med. 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)
# manufact.	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 > Chi^2	0.01	0.01	0.01	0.01				
Pseudo R^2	0.0519	0.1186	0.0487	0.1513				
Log likelihood	-183.3	-64.4	-170.9	-53.66				
N	79	67	79	67				

Standard errors are shown in parentheses. An asterisk after the Tobit coefficient denotes significance at the 10 percent level and a double asterisk for 5 percent.

[1] We arrive at this particular combination of monitoring activities as the focus of subsequent empirical analysis through a factor analysis of the seven attributes as predictors of compliance behavior.