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The Impact of Labor Regulations on Jobs and Wages in India: Evidence from a Natural Experiment¹

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¹ We thank Asha Sundaram for helpful discussions and Raginee Baruah for her diligent work on the coding of state-level labor regulations used in this paper. All errors are ours. The opinions expressed here are those of the authors and do not necessarily reflect the views of the institutions to which they belong.

1. Introduction

After three decades of generally low growth, the Indian economy experienced a growth acceleration that started in the 1980s.² While the acceleration coincided with market oriented economic reforms undertaken by India, there are two features of India's growth experience that are puzzling.³ First, unlike the growth accelerations experienced by its East Asian neighbors, services has been a bigger driver of India's growth than manufacturing. This is puzzling since a major component of India's economic reforms included industrial deregulation and the liberalization of the trade policy regime as it applied to the manufacturing sector.⁴ While a part of services growth has been driven by these manufacturing-centered reforms through both input-output linkages as well as demand side linkages working through income effects as demonstrated by the recent work of Dehejia and Panagariya (forthcoming), a larger response from Indian manufacturing should have been forthcoming. Second, within the manufacturing subsector, growth has been driven mainly by relatively capital- or skill-intensive industries, and not labor-intensive industries as one would expect given India's labor abundance (see Kochhar et al 2006). Accordingly, the manufacturing sector's contribution to employment in India has thus also been limited, especially when attention is restricted to the formal sector, where labor productivity and wages tend to be considerably higher than the informal sector and which has played an important role in generating "good" jobs in East and Southeast Asian economies.⁵

Various factors have been put forward for explaining one or both features of India's growth experience. These include deficiencies in India's infrastructure, especially in energy and transport; labor regulations,

² Growth in GDP per capita, only 1.3% annually from the 1950s through 1970s, increased steadily—from average annual growth rates of 2.4% in the 1980s, to 3.6% in the 1990s, and 5.7% in the decade that just ended.

³ The exact timing of India's growth acceleration and its causes are the subject of debate. For example, while Rodrik and Subramiam (2005) have emphasized "pro-business" reforms of the early 1980s, and thus downplayed the importance of the dramatic trade liberalization and industrial policy delicensing that took place in 1991, Panagariya (2008) shows that unsustainable increases in public expenditures and foreign borrowings were important drivers of growth in the 1980s, and thus that without the reforms of 1991, India's growth acceleration of the 1980s would have proved to be short-lived.

⁴ The key element of industrial deregulation involved the dismantling of the industrial licensing regime, or "industrial delicensing". Under the Industries Development and Regulatory Act of 1951 every investor over a very small size needed to obtain a license before establishing an industrial plant, adding a new product line to an existing plant, substantially expanding output, or changing a plant's location. Over time, many economists and policymakers began to view the licensing regime as generating inefficiencies and rigidities that were holding back Indian industry. The process of delicensing started in 1985 with the dismantling of industrial licensing requirements for a group of manufacturing industries. Delicensing reforms accelerated in 1991, and by the late 1990s virtually all industries had been delicensed.

⁵ See Baruah et al (2015) and ADB (2009) on the comparison of employment and wages across the manufacturing sector of various Asian economies including India, and breakdowns by size/formality.

especially those which make it difficult for Indian manufacturing firms operating in the formal sector to adjust employment levels and service conditions in response to changing economic conditions (e.g., Panagariya 2004, Krueger 2007 and Panagariya 2008); the “reservation” of entire product lines, especially labor-intensive ones, for firms with plant and equipment values below a given threshold; a host of complex and time-consuming regulations that govern entry and, especially, exit, notwithstanding the industrial deregulation of the 1980s and 1990s (e.g., OECD, 2007); credit market imperfections that constrain small and medium-sized firms from expanding (e.g., Banerjee and Duflo 2014); land related regulations that restrict the availability or increase the cost of land for industrial purposes; limited availability of skills required for modern manufacturing; and even path dependence or hysteresis—the argument being that while the reforms of the mid-1980s and early 1990s had removed the most important policy-based impediments on Indian manufacturing, the relative profitability of capital-and skill-intensive activities has remained higher than that of labor-intensive activities (Kochhar et al. 2006).

Which of these alternative constraints on the growth of Indian manufacturing firms, and especially employment growth in the formal sector, really matter? The argument that infrastructure deficits have adversely affected manufacturing performance is fairly uncontroversial. In contrast, the role of labor regulations has been much more controversial. While several empirical studies, starting with Besley and Burgess (2004) and followed by Aghion et al. (2008) and Ahsan and Pages (2007) among others, utilize cross state and time series variation in India’s labor regulations and find that industrial performance (in terms of various parameters such as output, employment, and labor productivity) has been weaker in states with pro-worker labor laws, skeptics have been unconvinced. Concerns have been raised on mainly three grounds. First, the coding of state-level amendments to labor regulations as pro-worker, neutral, or pro-employer by these studies has been critiqued (Bhattacharjea 2006). Second, it has been claimed that the growing use of contract labor in Indian manufacturing has enabled firms to adjust employment levels quite easily thereby resulting in de-facto flexibility of labor regulations. Third, the results of the studies noted above have been criticized for inadequately controlling for other factors that may be driving industrial performance, such as infrastructure or skills, for example, or the role of the policy of reserving particular product lines for small enterprises.

While some recent work has tried to address these concerns by considering alternative approaches for capturing state-level variation in labor regulations, exploiting industry-specific characteristics for more credible identification of the effects of labor regulation, and introducing additional state-level controls to tackle concerns about omitted variables bias—see, in particular, Dougherty, Robles, and Krishna (2011;

DRK) and Gupta, Hasan, and Kumar (2009; GHK)—our paper brings additional evidence to bear on the role of labor regulations in influencing industrial performance, and employment and wages, in particular, in India.⁶ We focus on employment and wages given that India’s success in creating productive and well-paying jobs may well be central for meeting policymakers’ objective of inclusive growth; and in this endeavor, India’s formal manufacturing sector may well hold the key.

Specifically, we use plant-level panel data from the Annual Survey of Industry (ASI) for various years from 1998-99 to 2010-11 to examine the impact of labor regulations on employment and wages in India’s apparel and textiles sector across states, before-and-after 2005, and relative to other labor-intensive industries.⁷ Like GHK and DRK before us, we address some of the concerns raised about the coding of state-level labor regulations developed by Besley and Burgess (2004). However, our focus on the apparel and textiles sector presents some important advantages in uncovering the effects of labor regulations.

First, and most significantly, it allows us to exploit the 2005 abolition of quota restrictions on exports of apparel and textiles from developing countries to the developed world as a “natural experiment” for identifying the effects of labor regulation. The quotas had been imposed by the international Multi Fiber Agreement (MFA) of 1974 and sought to protect developed country producers from growing imports of apparel products. Under the Agreement on Textile and Clothing (ATC) negotiated in 1994, the quotas were to be abolished through bilateral negotiations by January 2005 through “phase-outs” in 1995, 1998, 2002 and 2005. The last phase-out was significant. As noted by Harrigan and Barrows (2006 and 2009), “Like most big importers, the U.S. delayed the bulk of MFA liberalization until literally the last moment,

⁶ Industrial performance is measured in terms of firm level TFP in the case of DRK and state-wide measures of output, value-added, and employment at the three digit industry level in the case of GHK.

⁷ Though, in principle, we could have also looked at the impact of labor regulation on productivity, we do not do so for several reasons. First, our central interest in this paper is to look at the relationship between regulation and employment in the manufacturing sector, a fundamental policy concern in India. Second, recent literature has highlighted a number of problems with the measurement of productivity when relying on the type of data available to us. As Syverson (2011) notes, and is confirmed in the ASI data, many firms produce more than one output and it is not very clear how to aggregate them into a single measure. Furthermore, output is not measured in terms of quantities but is reported in the data as revenue. As Syverson has argued, if the quality of output differs across firms, the price of firms’ products will vary and the usual strategy of using a price deflator to deflate revenue and arrive at a measure of output will not be desirable. This is because price variations typically reflect differences in market power so that measured productivity levels may not capture how efficient firms are, but market conditions instead. To make matters more complicated there are also measurement issues associated with estimating value added production functions. Similar to the issue associated with using revenue as output measure, intermediate inputs are reported in terms of total expenditures on inputs and not quantities. Hence, it is not very clear how the intermediate inputs should be handled. For all these reasons, we have not analyzed the relationship between regulation and productivity and focus instead on employment, which is perhaps the cleanest measure of a key input available in the data.

with hundreds of binding quotas still in place until midnight on December 31 2004.” Accordingly, we treat our period of analysis which runs from 1998-99 to 2010-11 as consisting of two sub-periods, one in which the Indian apparel and textile industry was constrained in export markets (prior to January 2005) and one in which it was not (after January 2005). Since the phase-out of quotas were negotiated bilaterally (and on a product-by-product basis), splitting our overall sample using 2005 as a cut-off has the added benefit of mitigating possible endogeneity of quota phase-outs.

Given the apparel sector’s high labor intensity and the relative volatility of demand for its products, the sector (and thus the textiles sector as well) should be particularly susceptible to regulations that constrain flexible adjustment of employment levels. By comparing employment and wages across three dimensions—namely, prior and subsequent to 2005⁸, across states with differing labor regulations, and with the decisions of manufacturers of other labor-intensive products—the paper provides more robust evidence on the impact of labor regulations on Indian manufacturing.

Second, the focus on labor-intensive industries allows us to narrow down the set of possible constraints on manufacturing sector performance, especially employment. For example, potential inadequacies in skills among production workers are much less likely to be a constraint on the apparel sector than other manufacturing industries given the speed with which workers with just a primary education can be trained in carrying out core production related tasks such as sewing (Baruah et al. 2015). Similarly, while many of the alleged constraints on manufacturing sector performance emphasize the effects of the “heavy-hand” of government regulation, some researchers have stressed the lack of an effective “industrial policy” (whereby the government intervenes to correct market failures on account of learning related externalities and the need to coordinate the investments of disparate private agents to promote the growth of any given industry) as a factor responsible for the relatively lackluster performance of Indian manufacturing. Given India’s long history of producing apparel, and the presence in India of every segment of the overall apparel-textiles supply chain including production of textiles, processing of fabric, and design capabilities in apparel, arguments for its underperformance based on learning related externalities and coordination issues carry less weight than sectors such as, say, electronics. Finally, we also control for the local availability of power supply in our empirical analysis. In this way, we are able to arrive at a more robust assessment of the effects of labor regulation.

Our “difference in difference” estimates indicate that apparel and textiles manufacturers in states with flexible labor regulations see a statistically significant increase of 12 workers per firms on average relative to apparel and textiles manufacturers in inflexible states in the post-2005 period. Within flexible states, employment in the apparel and textiles industry increases relative to other labor-intensive industries in the post-2005 period. As for wages, these increase in both the apparel and textiles industry as well as other labor intensive industries in flexible states relative to their counterparts in inflexible states in the post-2005 period. These results are found to hold up to a variety of robustness checks. Our results thus lend considerable support to the argument that inflexible labor regulations have acted as a constraint to the growth of good jobs by limiting the growth of India’s labor-intensive manufacturing industries in the formal sector.

It may be noted that our use of ASI data to uncover the effects of labor regulation on employment and wages using the approach just described is appropriate for two reasons. First, the ASI covers establishments operating in the registered or formal manufacturing sector, where the full force of India’s labor regulations apply. Second, while there are many apparel and textiles producers that operate in the informal sector, they operate at very small scales of production. Excluding own-account enterprises — i.e., microenterprises who do not hire even a single wage employee on a regular basis — 95% of informal sector apparel enterprises have less than 10 workers (84.5% had 5 or less workers in 2010-11 as noted in Baruah et al). With the size of orders placed by global purchases of apparel increasing and delivery times shrinking, it is larger establishments who are best placed to respond to international orders. Thus the effects of the abolition of the MFA should be seen primarily on firms captured in the ASI data. Nevertheless, since subcontracting relationships may link informal and formal sector firms, we include data on the former from the National Sample Survey Organisation’s approximately quinquennial surveys of unregistered manufacturing enterprises (NSS-SUME for short) for the years 2000-01, 2005-06 and 2010-11 in some of our analysis.

In this way, we are able to arrive at a more robust assessment of the effects of labor regulation. The remainder of our paper is organized as follows. Section 2 describes some important features of India’s apparel sector, including the policy regime under which firms in the sector have operated, domestic and international. Section 3 describes the data we use to identify the impact of labor regulations on job creation in India’s apparel sector. Section 4 covers the empirical framework we employ and describes our results. Section 5 concludes.

2. India's apparel and textiles sector⁹

In order to understand the role of labor regulations in explaining why India's formal manufacturing sector has failed to generate jobs in a big way, a focus on the apparel and textiles sector has several attractive features. Employing around 14 million workers in 2010-11 (split roughly equally between apparel and textiles production), or around 31 percent of total manufacturing employment, the apparel and textiles sector is India's largest employer in manufacturing. Apparel, in particular, is also one of the most labor-intensive segments of manufacturing and one in which the skills required by new entrants in the sector, such as sewing operations, are relatively basic, can be acquired over a relatively short period of time, and where a primary level education seems sufficient for trainability purposes (Baruah et al). At the same time, India is among the few countries in the developing world in which the entire supply chain for manufacturing apparel products—encompassing the production of fibers (natural and synthetic), spinning, weaving, processing, and finally, design and production of ready-made garments—exists. Not surprisingly then, it is also one of India's leading exporters of manufactured products.

By most accounts, however, the apparel sector has not lived up to its potential in terms of exports and the quality of employment. India's performance in the global apparel market has been disappointing in the last decade, vis-à-vis leading Asian comparators, showing no significant improvement in its market share. Table 1 shows the ranking of various countries in US apparel imports in terms of market share.¹⁰ It shows that India's rank initially improved with the abolition of the MFA quota system in 2005, but then kept falling steadily post-2006. This performance is well aligned to the perceptions of global apparel buyers who feel that India is uniquely suited to export *fashion* garments¹¹; however, when it comes to issues such as productivity, lead time, price, quality, and reliability, India is perceived to have one of the region's lowest levels of performance (Birnbaum 2013), making it a poor contender in the basic garments segment where design does not change from year to year and large scales of production confer advantages. Finally, the sector is also characterized by the concentration of large numbers of very small sized firms, most of which operate in the informal sector (Hasan and Jandoc 2013). Informal sector firms accounted for 88 percent of total employment in apparel in 2010-11 and paid roughly half the wages paid by formal sector firms (Baruah et al).

⁹ This section draws on Baruah et al.

¹⁰ US imports are considered because no preferential treatment is given to any of these countries by US, as opposed to the European market where Vietnam and Bangladesh receive preferential treatment in the form of subsidized duties.

¹¹ India is perceived to have considerable capabilities in product design and development. It has a variety of materials available, is skilled at ornamentation and can produce garments in different styles. These features make India a desired supplier for fashion garments.

The relative underperformance of the Indian apparel and textiles sector is all the more puzzling when one considers the policy liberalization, domestic and international, that the sector has experienced. In terms of the domestic policy environment, the policy of “reserving” various product lines for small sized firms (i.e., with fixed assets below Rs.10 million in 2004-05) was much diminished by 2000-2001. Readymade garments were taken out of the reserved list in 2001; moreover, while remaining textile products were finally taken out by 2005, large firms were allowed to produce reserved items under an obligation to export at least 50% of their output starting in March 2000 (Panagariya 2008). On the external front, the abolishment in 2005 of the international quota system set in place by the MFA of 1974 represented an increase in demand for previously quota constrained developing country producers of apparel and textiles, especially those from India and other Asian economies (Harrigan and Barrows 2006 and 2009).

A brief description of the 2005 liberalization is in order. Under the MFA, export quotas were allocated to developing countries for apparel and textile products made of cotton or synthetic fiber or wool. The quotas were negotiated bilaterally and limited imports of textile and apparel products into developed country markets. Negotiations at the Uruguay Round of trade talks under the WTO led to an agreement in 1994 to phase out the MFA. As per the Agreement on Textiles and Clothing (ATC), the MFA quotas would be gradually eliminated through “phase-outs” in (the first month of) 1995, 1998, 2002, and 2005.

The last phase-out seems to have been particularly important. In their detailed analysis of the evolution of quota restrictions under the MFA and ATC, Evans and Harrigan (2005) note that many of the required changes in quota restrictions were delayed until the January 2005 phase-out.¹² Consistent with this observation, the final removal of quotas on apparel and textile products on January 1 2005 led to a surge in imports of these products into previously protected markets of advanced economies such as the United States, European Union and Canada (Edwards and Sundaram 2015). India-specific information on quota “fill rates” from the US also suggest that the January 2005 phase-out was quite important for Indian firms. Edwards and Sundaram report that as of 2004, 58% of apparel and textile products produced by firms in the CMIE Prowess database of mainly publicly listed companies were subject to binding quotas in the US.¹³ Moreover, for the all-important category of cotton apparel products, the average fill rates were as

¹² Based on an assessment of data available between 2002 and 2005, Evans and Harrigan point out that nearly 50 percent of the planned phase-outs in the US would have to occur on January 1, 2005.

¹³ Edwards and Sundaram use data from the Office of Textile and Apparel (OTEXA; a division of the US Department of Commerce that administered the US’s MFA quotas) to compute “fill rates” for quotas specific to India and pertaining to various product categories. A fill rate is an indicator of a quota’s restrictiveness and is

high as 94% in 2004.¹⁴ In other words, 2005 marked a year in the Indian apparel and textiles industry experienced a major and positive demand shock.

Taken together, the above features strongly suggest that India's apparel and textiles sector should have experienced a boom in production and exports since 2005. However, as already noted from Table 1, India's rank in terms of apparel exports to the US initially improved with the removal of the quota system in 2005, but then kept falling steadily post-2006. This was because even though India's exports did manage to show positive growth, its growth rate was lower than that of its Asian competitors like Bangladesh and Vietnam.

In light of all that India's apparel and textiles sector has going for it, and the domestic and international policy changes noted above, why has India's apparel sector not performed better? Some recent case studies of the apparel and textiles sector, drawing upon a mix of surveys of entrepreneurs and key informant interviews (including those of global buyers), point to two sets of issues. The first originate upstream in the textiles-apparel supply chain and affect the variety, quantity, quality, and price of processed fabric available to Indian producers of apparel—typically 40% to 60% of the cost of an apparel product. Insofar as apparel products based on synthetic fabrics are concerned—around 45% of the global and domestic market, respectively—a structure of excise duties that favor cotton over synthetic fabrics coupled with nontariff barriers on the import of the latter leave Indian apparel producers at a disadvantage in the growing global market for synthetic apparel products (Jordan, Kamphuis, and Setia, 2014).

India's position as one of the world's largest producers of raw cotton coupled with the presence of spinning and weaving industries do give it an advantage in the production of cotton fabric. However, some of this natural and historical advantage is lost due to the fragmented nature of the weaving industry where historical and policy factors have served to sustain large numbers of small, informal enterprises which rely on traditional production and organizational technologies to produce fabric of uneven quality and in relatively small quantities. This constrains apparel firms from meeting global buyers' demands on quality, quantity, and timelines for finished apparel products.¹⁵

defined as the percentage of a quota that is actually used. A fill rate that is much less than 100 percent suggests that the quota is not binding. Edwards and Sundaram classify products whose fill rates are 70 percent or more in 2004 as 'bound' or quota-restricted.

¹⁴ We thank Asha Sundaram for this observation. The average is based on weighting quota fill rates of OTEXA product groups by product-specific Indian exports to the US in 2007-08.

¹⁵ Additionally, and more recently, the introduction of zero liquid discharge environmental standards in the processing of fabric (as of February 2011) cause severe disruption in the textile-apparel supply chain in the state

As regards the apparel part of the supply chain, entrepreneur complaints about the availability and/or costs of power, labor regulations, worker turnover, and absenteeism loom large, as do concerns about corruption, tax rates, and macroeconomic conditions (especially volatility in the exchange rate). On power, for example, Tewari and Singh (2011) note that erratic supply of power affects the productivity and quality of sewing by interrupting the operation of electric sewing machines. Firms have the option of operating diesel generators, but the unit cost of this power is more than twice the cost of power when supplied by the public grid. A cost benchmarking by them shows that that India's power rates are 62% higher than Bangladesh and 32% higher than China, which erodes India's competitiveness in the global market.

It should be noted, however, that one way for apparel firms to deal with the power problem would be to operate at larger scales where the fixed costs of installing diesel generators could be spread over larger production volumes. Here, however, India's labor regulations may be getting in the way of operating running large plants with several hundreds, if not thousands of workers. As an examination of the World Bank's enterprise survey data reveals, labor regulations are listed by entrepreneurs/managers as among the top five constraints to operations and growth for Indian apparel firms, but not textiles (rank 6) or the other remaining manufacturing industries (rank 9). Similarly, labor regulations are more of a concern for firms with 50-99 employees and least so for firms with less than 10 employees. They are also more of a concern for Indian apparel firms as compared to their Bangladeshi and Chinese counterparts (Baruah et al).

Qualitative interviews with apparel exporters and global buyers operating in India reinforce the survey results (Baruah et al). Broadly speaking, labor regulations are pointed to as a major constraint on firms and difficulty in disciplining or managing labor was cited as problematic, especially the larger the workforce (and independent of whether a formal union existed or not). As a respondent who works at one of the leading global buying houses stated, "Firms are wary of putting too much labor under one roof. There has been an incentive to remain small. Also managing small enterprises is relatively easier than large ones." This sentiment echoes that of virtually all other respondents.

of Tamil Nadu, one of India's most dynamic producers and exporters of apparel products. See Jordan et al for a detailed analysis.

What is it about India's labor regulations that may be incentivizing firms to keep their operations small? While Indian manufacturing firms operate under a large number of labor regulations passed by both the central government as well state governments, a few elements of the regulatory regime are likely to be serious constraints for firms, especially those in labor-intensive industries such as apparel where labor costs are a major component of total production costs and where volatility in demand (especially in global markets) puts a premium on the ability of firms to adjust employment levels and/or reassign workers across tasks or plants.¹⁶

Among the most important of these are Chapters V and VB of the Industrial Disputes Act (IDA), which lays down procedures for the investigation and settlement of industrial disputes. Chapters V and VB govern the conditions under which layoff, retrenchment, and closure of firms can take place. Chapter VB, introduced as an amendment by the central government in 1976, made it compulsory for employers with more than three hundred workers, subsequently lowered to 100 workers in 1982, to seek the prior approval of the appropriate government before workers could be dismissed.¹⁷ Some states, such as West Bengal, further reduced the 1982 threshold of one hundred workers to fifty workers. In contrast, Uttar Pradesh retained the previous threshold of 300 workers. Since government approval for retrenchments or layoffs can be difficult to obtain, Chapter VB of the IDA is believed to have incentivized formal manufacturing firms in India to conserve on hiring labor and gravitate toward capital-intensive sectors and capital-intensive production processes and product lines within sectors (see Bhagwati and Panagariya, 2013 for a detailed discussion).¹⁸

However, the Chapter VB provisions of the IDA are not the only ones that may have created disincentives to expand employment and production—and enter export markets in the case of apparel. The IDA also prescribes the terms under which employers may change “conditions of service” (dealt with in Section 9A of Chapter IIA). Section 9A of the act requires that employees be given at least twenty-one days’ notice before employers modify wages and other allowances, hours of work, rest intervals, and leave. According

¹⁶ Under the Indian constitution, issues related to labor fall under the “concurrent list” of subjects, giving both the central government and state governments legislative authority on labor. States also typically have the authority to decide on the specific administrative rules and procedures for enforcing legislations passed by the center.

¹⁷ Until 1976, the provisions of the IDA on retrenchments or layoffs were fairly uncontroversial. The IDA allowed firms to lay off or retrench workers according to economic circumstances as long as certain requirements—such as the provision of sufficient notice, severance payments, and the order of retrenchment among workers (last in, first out)—were met. A further amendment in 1982 widened the scope of the 1976 amendment by making it applicable to employers with one hundred or more workers.

¹⁸ Consistent with the idea that India's labor regulations have encouraged capital-intensive production processes and sectors, Hasan, Mitra, and Sundaram (2013) find that capital–labor ratios are higher in India than other countries with similar levels of development and factor endowments for a majority of manufacturing industries.

to some observers, including the Government of India's Task Force on Employment Opportunities, the "requirement of a 21 day notice can present problems when units have to redeploy labor quickly to meet the requirement, for example, for time bound export orders" (Planning Commission 2001, p. 156).

Further restrictions on changing the conditions of service (including modifying job descriptions, moving workers from one plant to another, etc.) in response to changing market conditions come from the Industrial Employment (Standing Orders) Act and the Factories Act. The latter, which applies to manufacturing units with 10 workers using power and 20 workers without power, and governs, among others, the maximum hours of work per day and week (9 hours and 48 hours, respectively), extent of overtime (a maximum of 50 hours per quarter), payments for overtime (twice the normal wage rate and higher than the quarter extra as per ILO standards), and timings of work for female employees (not after 7 p.m.) is frequently noted by apparel producers as especially limiting.

An additional complication is that aspects of India's Trade Union Act makes it difficult to obtain the worker consent needed to execute changes in service conditions. The Trade Union Act allows any seven workers in the enterprise to form and register a trade union, but has no provisions for union recognition (for example, by a secret ballot).¹⁹The result has been multiple unions within the same establishment, with rivalries between unions so common that a requirement of workers' consent for enacting changes "can become one of consensus amongst all unions and groups, a virtual impossibility" (Anant 2000, p. 251).

Not all analysts agree, however, that the regulations described above have introduced serious rigidities for firms. One key argument is that the regulations have been circumvented through the increased usage of temporary (casual) or contract workers (Ramaswamy 2003).²⁰Since many provisions of Indian labor regulations, including those of the IDA, cover only "regular" workers, firms have an incentive to hire temporary and contract workers instead. While the Contract Labour (Regulation and Prohibition) Act, which regulates the employment of contract labor, provides for the abolition of contract labor in work that is of a perennial nature and is carried out by regular workers in the same or similar establishments (under

¹⁹ An amendment to the Trade Union Act in 2001 raised the minimum number of workers that can form a trade union in the case of enterprises with one hundred or more workers. In such enterprises, the minimum has been set at 10 percent of the total number of workers up to a maximum of one hundred workers. Additionally, one-third or five officers of the trade union, whichever is less, are permitted to be outsiders in the case of organized sector enterprises as per the 2001 amendment.

²⁰ For a detailed review of Indian labor regulations and the debate surrounding the issue of rigidity, see Anant et al. (2006).

Section 10 of the act), the share of contract labor in Indian manufacturing has increased considerably over time and may have served to reduce the bite of labor regulations (Ahsan and Pages 2007).^{21,22}

However, it needs to be recognized that some major industrial disputes have arisen over contract labor (regarding “regularization” and union recognition, for example), and some amount of uncertainty accompanies the use of contract labor for getting around other labor regulations. Moreover, the use of contract labor may reduce the incentives of both firms and workers to develop long-term relationship with one another. A lack of investment in training workers and the high degrees of absenteeism and worker turn over in Indian apparel relative to comparators noted above may well be one of the consequences. Of course, whether or not India’s labor regulations have constrained the growth of Indian manufacturing, especially labor-intensive segments like apparel, is an empirical issue.

3. Data

Our analysis requires two sets of information: (i) a measure of labor regulations across India’s states, and (ii) data on output, employment, and wages for the apparel and textiles sector and comparator labor-intensive industries.

Labor regulations

Since our empirical strategy is partly based on exploiting cross state variation in labor regulations, we require a measure of this variation. We consider two alternative measures. The first comes from Gupta, Hasan and Kumar (2009, henceforth GHK). GHK’s starting point is the state-level indexes of labor regulations developed by Besley and Burgess (2004) and OECD (2007) and the work of Bhattacharjya (2009).^{23 24}

²¹ The act applies to all establishments employing at least twenty workers as contract labor on any day in the preceding twelve months, and to every contractor employing twenty or more contract workers in the same period. The act provides for the registration of establishments of the principal employer employing contract labor and the licensing of contractors. The principal employer must provide facilities such as rest room, canteens, first aid, etc., if the contractor fails to do so. The principal employer must also ensure that the contractor pays the wages due to the laborers.

²² The share of contract labor in manufacturing has increased from around 12 percent in 1985 to 23 percent in 2002 (Ahsan and Pagés 2007). Certain states have seen a particularly sharp rise in the use of contract labor. Andhra Pradesh, which has seen the largest increase, passed a law in 2003 permitting contract labor employment in so-called core activities of firms and widening the scope of non-core activities (Anant et al. 2006).

GHK assign scores of 1, 0, and -1 (denoting flexible, neutral, and inflexible regulations, respectively) to each state based on information from the three studies and then adopt a simple majority rule to come up with a composite index of labor regulations.^{25, 26} The advantage of this approach is that if a particular methodology or data source used by one of the underlying studies is subject to measurement error, it will be ignored due to the majority rule. Indeed, as GHK note, diametrically opposite classifications of labor regulations for a given state across the studies—such as a state classified as having flexible (inflexible) regulations by one measure and inflexible (flexible) by another—are unusual. Five states are deemed to have flexible labor regulations: Andhra Pradesh, Karnataka, Rajasthan, Tamil Nadu, and Uttar Pradesh. Seven states are deemed to have neutral labor regulations: Assam, Bihar, Gujarat, Haryana, Kerala, Madhya Pradesh, and Punjab. The remaining three states are deemed to have inflexible labor regulations: Maharashtra, Orissa, and West Bengal.

We also consider a second measure of state level labor regulations in this paper. Given the primacy of Chapter VB in the debate on the effects of labor regulation on Indian manufacturing, we start with the index of state-level regulations GHK developed based on Bhattacharjea's analysis of Chapter VB. According to this index, three states are characterized as flexible labor regulation states: Karnataka, Tamil Nadu, and UP. Maharashtra and Orissa are deemed to be inflexible labor regulation states. The rest are

²⁵ While the Besley and Burgess (2004) measure relies on coding state-level amendments to the IDA from 1958 to 1992 as pro-employer, pro-employee, or neutral, the OECD study is based on a survey of experts and codes progress in recent years in introducing changes not only to regulations dealing with labor issues but also to the relevant administrative processes and enforcement machinery (covering, for example, the role of inspectors, the maintenance of registers, the filing of returns and union representation). The regulations covered by the OECD survey go well beyond the IDA and include the Factories Act, the Trade Union Act, and Contract Labour Act, among others (see Dougherty (2009) for details on the OECD study). Within each major regulatory area, a number of issues are considered and scores are assigned on the basis of whether or not a given state has introduced changes that have reduced the transaction costs associated with labor regulations or their administration. A higher score is given for changes that are deemed to reduce transaction costs (i.e., pro-employer as per Besley and Burgess' terminology). The responses on each individual item across the various regulatory and administrative areas are aggregated into an index that reflects the extent to which procedural changes have reduced transaction costs vis-à-vis labor issues. The Bhattacharjea study focuses on characterizing state level differences in two elements of Chapter VB of the IDA: regulatory changes pertaining to the employment threshold beyond which permission for retrenchments, layoffs, or closures is required; and those on the requirement of obtaining permission (for example, whether permission is needed for closure or for both closure and retrenchment). In addition to the content of legislative amendments, he also analyzes judicial interpretations to Chapter VB in assessing the stance of states vis-à-vis labor regulation. Bhattacharjea's detailed account of legislative and judicial interventions affecting Chapter VB enables him to identify points at which one or more states has diverged from the rest of the country. Based on this account, GHK partition states in terms of having flexible, neutral, or inflexible stance on Chapter VB.

²⁶ For the purpose of their study, GHK consider time-invariant measures of state-level labor regulations. They also make two important changes to the original coding of Besley and Burgess (2004). First, based on the arguments of Bhattacharjea (2006), they treat labor regulations in Gujarat as neutral rather than pro-worker. Second, they deem Madhya Pradesh's labor regulations to be neutral rather than mildly pro-employer.

deemed to be ‘neutral’. Next, based on the argument that firms have responded to regulations such as IDA’s Chapter VB by hiring contract labor, we use information on contract labor regulations from Dougherty (2009). Dougherty identifies 50 issues across distinct major legal areas including the Industrial Disputes Act (IDA), Factories Act, State Shops and Commercial Establishments Acts, Contract Labour Act, the role of inspectors, the maintenance of registers, and the filing of returns and union representation. Within each major area, scores are assigned a “1” if any reform/amendment was introduced that reduced transaction costs, “2” for those reforms that further reduced the transaction cost, and “0” if it did not (or no reforms were introduced in that area). The scores on each individual item across the various regulatory and administrative areas are then aggregated (and normalized into a proportional index to adjust for the uneven number of issues in the eight major areas).²⁷ Using Dougherty’s work, we identify those states that have introduced the most flexible practices (from the perspective of firms) in regulating contract labor.²⁸ These states, which include Assam, Madhya Pradesh, Andhra Pradesh, Gujarat and Maharashtra are assigned a “step up” to the Chapter VB index. For example, if one of these states was coded as ‘inflexible’ as per GHK’s Chapter VB index, it gets a step up to ‘neutral’ status. Similarly a ‘neutral’ state becomes ‘flexible’; a ‘flexible’ state remains so.

In the same manner, we incorporate information provided by Dougherty on the Factory Act and consider states’ scores on the Act. As noted above, the Act regulates provisions on working hours, shifts, and the employment of women, among others. These are all areas of considerable importance to labor-intensive industries and especially apparel firms. States which are deemed flexible on the Act, namely Tamil Nadu, UP and Punjab are assigned a “step up”.²⁹

We then make a final adjustment to our labor regulation index by incorporating information on administrative processes across states provided in Dougherty. In particular, many Indian states have

²⁷ The number of cases where reform had occurred was taken as a proportion of the number of possible subjects for reform in a given reform area.

²⁸ Specifically, Dougherty considers and scores 9 elements of contract labor regulations on a scale of 0 to 9. However, for our analysis, we drop the scores on ‘contract employment allowed in IT/BPO’ as our focus is on the manufacturing sector alone and so, we aggregate across the remaining 8 elements. Next, we create a best practices index by taking the individual aggregate score (out of 8) as a proportion of the maximum aggregate score obtained by any state and normalize it on a scale of 0 (minimum) to 100 (maximum). We deem states that score 80 or more out of 100 as having the most flexible provisions for hiring contract labor.

²⁹ We deviate from Dougherty’s coding in assigning an extra score (“2” instead of “1”) to the state of Tamil Nadu on account of a reform, in 1996, which extended the time frame for license renewal from 5 years to 10years. We have assigned a score of “0” to those states with a time frame of 1 year, “1” to those with a time-frame of more than 1 year and up to 5 years (including), and “2” to those with a time-frame of more than 5 years (10 years in case of Tamil Nadu). We deem states with scores of 80 and above (out of 100) as flexible states..

made dealing with regulatory inspectors easier and streamlined business processes (such as those associated with filing of various forms and returns and maintaining inspection books). However, some have not done so and we assign a ‘step-down’ to all those states which fare poorly on this account, namely West Bengal, Assam, Kerala, Maharashtra and Punjab.³⁰ This leaves us with six states classified as flexible: Andhra Pradesh, Karnataka, Gujarat, Madhya Pradesh, Tamil Nadu, and Uttar Pradesh.³¹ Four states are deemed to have inflexible labor regulations: Kerala, Maharashtra, Orissa, and West Bengal.³² The remaining five states are deemed to have neutral labor regulations: Assam, Bihar, Punjab and Rajasthan.

For expositional convenience, Table 2 describes how states are coded for the GHK index as well as ours. In much of our analysis, we consider only two distinct groups of states: flexible and inflexible labor regulation states. That is, as India’s central level labor regulations are widely accepted as among the more inflexible to begin with in an international perspective, we subsume the states coded as neutral in the inflexible category. We make use of the finer neutral/inflexible distinction to perform robustness tests for the main results that we report.

Plant level data

As noted earlier, our focus is on the response of formal sector firms to the phase out of the MFA. For data on employment and wages across industries, we use plant level data for the years 1998-99 through 2007-08, and 2010-11 from the Annual Survey of Industries (ASI). The survey, which is conducted by India’s Ministry of Statistics and Program Implementation, is nationally representative and covers all factories employing 10 or more workers and using electricity, and those employing 20 or more workers without using electricity. The survey frame used is based on the list of registered manufacturing enterprises available with the Chief Inspector of Factories in each state. As such, the ASI covers only registered manufacturing firms, specifically those covered by Sections 2m(i) and 2m(ii) of the 1948 Factories Act and by the 1966 Bidi and Cigar Workers Act. The ASI is a statutory survey, in that firms that receive the survey are required to submit returns. In spite of this, the sampling frame is also divided into census and survey sections. The definition of these sections has varied with time, so that firms with between 50-200

³⁰ In particular, we consider scores on 6 issues- if authorization is required for specific complaints, provision for single inspection book, allowing filing on a consolidated form, allowing single format of various returns, provision for single window procedure, and provision for self-certification. States with a score of 0 on 100 are deemed to be inflexible.

³² If we incorporate Dougherty’s scores on “Union Representation” and give a ‘step-up’ to best practices, Maharashtra would go from being an inflexible to neutral state.

workers have been part of the census section. The details of all these plants are collected by the ASI, and the remaining plants are randomly sampled. However, each plant level observation is probability weighted to make it representative at the state-industry level. We use these probability weights in all of our calculations.

The ASI data allow us to compute mean worker wages by dividing the worker wage bill of a plant by the average number of workers reported by the plant. We use poverty lines based on the Tendulkar committee recommendations to construct a price index and deflate nominal wages to 2004-05 prices. The poverty lines are constructed separately for each state, and thus our price index based on it accounts for spatial variation in prices in addition to temporal variation. Since the Tendulkar poverty lines are available only for three time periods (1993-94, 2004-05, and 2009-10), we take the implicit price indexes based on these three years and assume linear changes to arrive at deflators for the remaining years. ‘Total workers’ are those employees of the firm classified as ‘workers’, i.e. excluding employees holding supervisory or managerial positions, and working proprietors. Total workers include both workers directly employed by the firm and those hired through contractors.

We control for the provision of electricity in our analysis to proxy for infrastructure quality. As noted above, power shortages in India are widely regarded as a major constraint on the growth of Indian manufacturing, including the apparel sector. We exploit the fact that the ASI survey asks firms to report the amount of electricity they had to generate themselves along with the total electricity they used. Shukla et al. (2004) show that captive plants in India can be broadly attributed to the need for backup power arrangement, requirement for a better quality supply and the need to generate electricity at costs lower than the high industrial tariffs set to cross subsidize other categories of consumers.³³ In effect, a unit would need to generate power on its own if the public provision of power is not good enough, or is priced too highly, both of which would indicate an infrastructure environment that is not industry friendly. This enables us to use the average ratio of power that units generate on their own to the total power they consume in each state-year combination as a control for the public provision of infrastructure to industry.

The total number of observations available in the data over the period 1999-2011 are 523,548. For our analysis, we restrict the data to labor intensive sectors which are comparable to apparel and textiles. These sectors include manufacture of food, tobacco, leather, wood products and paper products. Over the period we consider, there are 208,567 plant level observations available in the data in these sectors. Table 3

provides summary statistics for our main variables of interest for the pre- and post-2005 period and by state type.

4. Empirical framework and results

A. Empirical framework

Our strategy for capturing the effects of labor regulation relies on comparing outcomes pertaining to Indian apparel and textile manufacturers across three dimensions—namely, prior and subsequent to 2005, across states with differing labor regulations, and with the decisions of manufacturers of other labor-intensive products (other manufacturers, for short).³⁴ The basic specification we use is of the form:

$$y_{ist} = \alpha + apparel_textile_i + flexible_s + apparel_textile_i \times flexible_s + \beta_0 postMFA_t \\ + \beta_1 (apparel_textile_i \times postMFA_t) + \beta_2 (flexible_s \times postMFA_t) \\ + \beta_3 (apparel_textile_i \times flexible_s \times postMFA_t) + year_t + state_s + \varepsilon_{ist}$$

where y_{ist} is the number of workers, or mean wages for firm i in year t and state s . $apparel_i$ is an indicator for whether the firm was classified as an apparel or textile producer, $flexible$ for whether the firm was in a state with flexible labor regulations, and $postMFA$ for whether it was affected by the 2005 trade liberalization.³⁵ $year$ and $state$ represent state and time fixed effects. The error term, ε_{ist} is assumed to have the standard properties, but we account for any correlations at the industry and state levels by clustering standard errors along those two dimensions. In some of our estimations we also introduce a control for the local availability of power supply. In one specification we also calculate the effect on the total number of workers at the state-industry level, instead of at the firm level.

The measure of flexibility that we use is interacted with the indicators for apparel and textiles and the trade liberalization effect to help us take advantage of the change that affected the apparel industry while the industry sectors that were not affected can act as control groups.

³⁵ We define our 'post-MFA' years to be 2004-05 onwards (i.e., April 2004-March 2005 onwards). The main reason for this that as the phase-outs were common knowledge, we would expect some degree of change to take place before the actual phase-out itself. Moreover, some part of the 2004-05 fiscal year itself was after the final January 2005 phase-out of quotas. Thus, it makes sense for us to include 2004-05 as a post-MFA year.

We report the various coefficients (β s) of the flexibility measure, and its interactions with the other indicators allow us to create estimates of the differential response of the apparel and textiles industry in the flexible and inflexible states when faced with trade liberalization. For instance, to estimate the difference in effects between apparel producers in flexible states and inflexible states (referred to as “Apparel & Textile, Flexible-Inflexible” in our tables), we would sum β_2 and β_3 . β_3 is the triple difference — the effect of the trade liberalization on the difference between apparel and textile producers and other producers in flexible states relative to the difference between them in inflexible states.

The advantage of using the difference-in-differences strategy is that it allows us to isolate the effect of the treatment, because common factors across flexible and inflexible states that may be correlated with the treatment — for instance, the faster economic growth experienced pan-India post-2005 — are removed. Similarly, common factors that affected both apparel and textiles manufacturers as well as other manufacturers are also differenced out. For this advantage to hold, we must satisfy the parallel trends assumption, i.e., that before the treatment was introduced, producers of both sets of products in both flexible and inflexible states were not already responding differentially to the economic environment they faced. To test this assumption we also provide additional results using our treatment variables limited to the period before the treatment occurred.

In looking at differences in the response of apparel and textiles producers between flexible and inflexible states, our identification assumption is that there are no factors that are correlated with the 2005 liberalization that only affect the flexible states. If we examine only the difference in response in the gap between apparel and textiles producers and other producers in flexible states relative to inflexible states, the assumption is further reduced to there not being any factors that are correlated with the liberalization and that affect only apparel and textiles producers only in flexible states.

We further control for state and year fixed effects, to control for any unobserved state specific characteristics and any time trends.

B. Results

To provide some basic intuition with which to view our results, consider Table 3, which as noted earlier reports summary statistics on our variables of interest — employment and wages — for the periods before and after the liberalization. In the period before the MFA, the flexible states employed 59 percent of the apparel and textile workforce, and in the period after, this percentage increased to 64 percent. Mean

wages were lower in the flexible states in both periods.

Table 4 describes the estimates of equation (1) based on data from the ASI (or, formal sector) — the β coefficients from equation (1). Columns (1) and (2) report the results for mean wages and workers, respectively, and when the unit of analysis for estimating equation (1) is the firm. Column (3) reports the results for the number of workers by industry. Given the many interaction effects, Table 5 describes the various marginal effects of interest based on these coefficients, along with their standard errors. Two sets of marginal effects are reported. The first set, reported in the upper panel of Table 5, comprises differences between the post- and pre-liberalization periods for each of the four groups of manufacturers under consideration: apparel and textiles manufacturers in flexible and inflexible states, and our comparator other labor-intensive manufacturers (i.e., food, tobacco, leather, wood products and paper products) in flexible and inflexible states. The second set consists of the difference-in-difference estimates, i.e., involving differences between flexible state apparel and textiles manufacturers and inflexible state apparel and textiles manufacturers; flexible state other manufacturers and inflexible state other manufacturers; flexible state apparel and textiles manufacturers and flexible state other manufacturers; and inflexible state apparel and textiles manufacturers and inflexible state other manufacturers.

As reported in the upper panel of column (1) of Table 5, we find a large, statistically significant rise in real wages across all sectors in flexible states between the pre- and post-2005 periods, with the wages in the apparel and textiles sector experiencing a larger increase. The inflexible states do not show a significant rise in real wages. However, in column (2), which pertains to employment, we note that of the four groups under consideration, only apparel and textiles manufacturers in flexible states have seen a significant increase (at the 10 percent level), of 20.2 workers in the average number of workers employed in each plant, an increase of 23 percent.

Our difference in difference estimates are reported in the lower panel of Table 5. As noted earlier, these estimates enable us to look at the differential impact of the 2005 abolition of the MFA quotas across flexible versus inflexible states by removing the effect of trends that are common across both sets of states. We see in column (1) that wages in flexible states increase when compared to inflexible states for both apparel and textiles as well as other sectors, though the rise is larger in apparel and textiles. The number of workers per plant however, increases only for apparel and textiles manufacturers in flexible states by a statistically significant 12 workers, an increase of approximately 15 percent. If the labor

supply is viewed as relatively inelastic over the short term, an increase in demand for labor by apparel and textiles manufacturers and a subsequent shift in the labor market equilibrium can explain the increase in wages in the flexible states for both apparel and textiles and other manufacturers, compared to inflexible states. Column (3) reports the effect on the total workers employed in each state, in each two digit industry division. Here, too, the MFA phase out increases the total number of workers employed in the apparel and textiles sector in flexible states compared to inflexible states by approximately 35 percent.

C. Robustness checks

We now turn to several robustness checks of different aspects of our analysis. First, as a test of the parallel trends assumption, we run the same analysis on a data sample restricted to observations before 2004. These results are included in Table 6. We find no statistically significant results, and conclude that the parallel trends assumption is a reasonable one.

Second, we check whether our results in Table 5 hold up to alternative measures of state-level flexibility. Table 7 reports the various analogues of the marginal effects reported in Table 5 when we exclude the neutral states from our analysis, comparing only the states classified as flexible with those classified as inflexible. We would expect this sub-sample to exhibit stronger effects compared to our main results insofar as the estimates involving differences between flexible and inflexible state manufacturers are concerned, and especially for the apparel and textiles industry. This is indeed what we find for employment as a comparison of the estimated marginal effects across Tables 5 and 7 reveals (i.e., an estimate of 33.96 in Table 7 compared to 12.34 in Table 5). Table 8 describes the results when we use the GHK-based partition of states in terms of flexible or inflexible regulations instead of ours. The results are smaller in economic magnitude, but retain statistical significance.

Finally, we examine whether our results change in any significant way if we incorporate data from the informal sector. Doing so makes all estimates of marginal effects statistically insignificant. Given that there are many more informal sector firms than formal sector firms, this may be driven by the fact that the phase-out of the MFA would mainly be expected to affect formal sector firms. We thus check what happens if we use only data from the NSS SUME to estimate equation (1) and the various marginal effects of interest. As may be seen from Tables 9 and 10 (which are analogues of the ASI-based Table 4 and 5), we find no differential impact of the 2005 liberalization on the unorganized sector. Considering that the division of states into flexible and inflexible matters only to the formal manufacturers, this result is along expected lines.

5. Conclusions

India's growth acceleration since the 1980s was unlike the more 'conventional' experience of its East and Southeast Asian neighbors, which was primarily driven by growth in the manufacturing sector and resulted in many jobs being created. Instead, India's growth acceleration was driven more by its services sector. And, while formal manufacturing did contribute to growth, it did not add much to employment.

It is widely accepted that one factor behind this pattern of growth was India's infrastructure deficit, which arguably was more of a constraining factor on manufacturing than services. The role of Indian labor regulations has also been much discussed. However, analysts have been divided on how important they have been in constraining the growth of India's manufacturing sector, and especially the growth of employment in the formal segment of manufacturing. While some previous research finds labor regulations to have been a significant constraint, there remains some skepticism based on measurement and methodological grounds. In this paper, we introduce some refinements to state-level measures of labor regulations and exploit an industry-specific policy change that applied only to the apparel and textiles industry. This allows us to use a difference-in-difference approach to identify the effects of labor regulations on employment and wages.

Our analysis strongly suggests that an increase in demand resulting from the abolition of the international quota system under the Multi Fiber Agreement led to economically and statistically significant employment and wage gains in states that maintained more flexible labor regulations relative to those states that had comparatively inflexible regulations. Our results add to the evidence that inflexible labor regulations have acted as a constraint to the growth of good jobs by limiting the growth of India's labor-intensive manufacturing industries in the formal sector.

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Table 1: Rank (and share) of countries in terms of their export share to US apparel market (top 10)

Rank	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1	PRC (13.8%)	PRC (16.0%)	PRC (23.7%)	PRC (27.1%)	PRC (31.7%)	PRC (32.8%)	PRC (37.9%)	PRC (39.7%)	PRC (38.2%)	PRC (38.1%)
2	Mexico (11.3%)	Mexico (10.2%)	Mexico (8.8%)	Mexico (7.4%)	Mexico (6.1%)	Vietnam (7.0%)	Vietnam (7.8%)	Vietnam (8.0%)	Vietnam (8.3%)	Vietnam (9.0%)
3	Hong Kong, China (5.9%)	Hong Kong, China (5.8%)	Hong Kong, China (5.0%)	Indonesia (5.0%)	Vietnam (5.7%)	Mexico (5.6%)	Indonesia (6.0%)	Indonesia (6.1%)	Indonesia (6.4%)	Indonesia (6.4%)
4	Honduras (4.1%)	Honduras (4.1%)	India (4.3%)	India (4.4%)	Indonesia (5.3%)	Indonesia (5.5%)	Mexico (5.4%)	Bangladesh (5.3%)	Bangladesh (5.6%)	Bangladesh (5.6%)
5	Vietnam (3.7%)	Vietnam (3.7%)	Indonesia (4.1%)	Vietnam (4.3%)	India (4.3%)	Bangladesh (4.6%)	Bangladesh (5.2%)	Mexico (5.1%)	Mexico (5.0%)	Mexico (4.9%)
6	Indonesia (3.4%)	Indonesia (3.6%)	Honduras (3.8%)	Hong Kong, China (3.8%)	Bangladesh (4.0%)	India (4.3%)	India (4.5%)	India (4.4%)	India (4.3%)	India (4.0%)
7	Dominican Republic (3.3%)	India (3.4%)	Vietnam (3.8%)	Bangladesh (3.8%)	Honduras (3.4%)	Honduras (3.7%)	Honduras (3.3%)	Honduras (3.4%)	Honduras (3.4%)	Honduras (3.4%)
8	India (3.3%)	Dominican Republic (3.0%)	Bangladesh (3.2%)	Honduras (3.4%)	Cambodia (3.2%)	Cambodia (3.2%)	Cambodia (2.9%)	Cambodia (3.1%)	Cambodia (3.3%)	Cambodia (3.2%)
9	Philippines (2.9%)	Guatemala (2.9%)	Thailand (2.6%)	Cambodia (2.9%)	Hong Kong, China (2.7%)	Thailand (2.3%)	Pakistan (2.1%)	El Salvador (2.3%)	El Salvador (2.2%)	El Salvador (2.4%)
10	Rep. of Korea (2.8%)	Bangladesh (2.8%)	Dominican Republic (2.6%)	Philippines (2.7%)	Thailand (2.4%)	Hong Kong, China (2.1%)	El Salvador (2.0%)	Pakistan (2.1%)	Pakistan (2.1%)	Sri Lanka (1.9%)

Source: Baruah et al. (2015) based on import data from Otexa database.

Table 2: State-level indices of labor regulation

State	Gupta, Hasan, and Kumar	This paper (AHMP)
Andhra Pradesh	Flexible	Flexible
Assam	Neutral	Neutral
Bihar	Neutral	Neutral
Gujarat	Neutral	Flexible
Haryana	Neutral	Neutral
Karnataka	Flexible	Flexible
Kerala	Neutral	Inflexible
Madhya Pradesh	Neutral	Flexible
Maharashtra	Inflexible	Inflexible
Orissa	Inflexible	Inflexible
Punjab	Neutral	Neutral
Rajasthan	Flexible	Neutral
Tamil Nadu	Flexible	Flexible
Uttar Pradesh	Flexible	Flexible
West Bengal	Inflexible	Inflexible

Table 3: Summary statistics by state type (by stance on labor regulation)

	Pre 2005			Post 2005		
	Overall	Flexible	Inflexible	Overall	Flexible	Inflexible
Mean worker wages, Apparel & Textiles	33686.1	29882.8	39910.9	33891.1	31187.4	38638.9
Mean worker wages, Others	25103.5	23983.7	26790.9	25348.8	25216.7	25538.3
Mean workers per firm, Apparel & Textiles	91.3	87.1	98.3	109.1	109.2	108.9
Mean workers per firm, Others	56.3	55.7	57.2	55.4	55.4	55.5
Total units, Apparel & Textiles	15242	9531	5712	16631	10675	5955
Total units, Others	32793	19853	12940	36864	21784	15080
Total workers, Apparel & Textiles (millions)	1.25	0.74	0.51	1.63	1.04	0.59
Total workers, Others (millions)	1.67	0.99	0.67	1.86	1.09	0.76
Total workers per NIC two digit code per state – Apparel & Textiles	45375	61898	32719	54469	86830	32896
Total workers per NIC two digit code per state – Others	23164	33197	16054	25113	36561	17342

Notes: “Others” includes manufacture of food, tobacco, leather, wood products and paper. Total in this table represent the total in an average year during the pre- or post-period. Summary statistics use probability weights, and nominal values are deflated using poverty lines to 2004-05 prices.

Table 4: Effects of MFA abolition on employment and wages in flexible and inflexible labor regulation states

	(1) Real worker wages (mean by firm)	(2) Workers (total by firm)	(3) Workers (total by state- industry)
β_0	-1246.64** (627.14)	-4.84** (2.28)	5235.76 (3462.76)
β_1	-263.90 (783.22)	12.25 (11.19)	544.07 (2963.25)
β_2	2428.95*** (784.12)	2.08 (2.55)	2185.08 (2610.03)
β_3	587.30 (990.69)	10.74** (4.84)	21024.43** (10264.84)
Self-generated electricity to total	4677.53 (6531.87)	32.70*** (10.00)	9181.78 (10510.00)
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	139829	140074	1121
R^2	0.024	0.003	0.108

Notes: Standard errors are clustered at the state and two digit industry level.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Estimates of difference in differences

	(1)	(2)	(3)
(Post - Pre)	Real worker wages (mean by firm)	Workers (total by firm)	Workers (total by state- industry)
Apparel & Textile, Flexible	2098.57*** (496.51)	20.23* (11.07)	28989.34*** (7763.44)
Others, Flexible	1775.17*** (435.02)	-2.76 (4.98)	7420.84 (5151.28)
Apparel & Textile, Inflexible	-917.68 (1130.40)	7.41 (11.87)	5779.83* (3178.13)
Others, Inflexible	-653.77 (639.39)	-4.84 (6.38)	5235.76 (3220.20)
Difference in difference			
Apparel & Textile, Flexible-Inflexible	3065.70*** (607.87)	12.34*** (4.20)	23209.51** (9669.03)
Others, Flexible-Inflexible	2277.37*** (634.37)	1.61 (3.85)	2185.08 (2588.93)
Apparel & Textile-Others, Flexible	323.40 (456.38)	22.99** (11.23)	21568.50** (10443.69)
Apparel & Textile-Others, Inflexible	-263.90 (728.82)	12.25 (11.19)	544.07 (2924.94)
Self-generated electricity to total	4677.53 (5696.00)	32.70*** (10.00)	9181.78 (10448.38)
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	139829	140074	1121
R ²	0.024	0.003	0.108

Notes: "Others" includes manufacture of food, tobacco, leather, wood products and paper. Standard errors are clustered at the state and two digit industry level.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Robustness test – 1999-2003

	(1)	(2)
(Post - Pre)	Real worker wages (mean by firm)	Workers (total by firm)
Apparel & Textile, Flexible	1232.75** (497.69)	1.49 (3.13)
Others, Flexible	1258.39*** (108.82)	-2.42 (3.49)
Apparel & Textile, Inflexible	1269.74*** (328.56)	-1.81 (3.30)
Others, Inflexible	984.46*** (284.22)	7.96 (5.59)
Difference in difference		
Apparel & Textile, Flexible-Inflexible	44.75 (420.96)	3.82 (4.18)
Others, Flexible-Inflexible	241.23 (327.32)	-10.69 (9.15)
Apparel & Textile-Others, Flexible	-25.64 (875.89)	3.91 (4.59)
Apparel & Textile-Others, Inflexible	285.28 (650.83)	-9.77* (5.63)
Self-generated electricity to total	1141.22 (5616.47)	-0.33 (.)
State FE	Yes	Yes
Year FE	Yes	Yes
Observations	139829	140074
R^2	0.074	0.004

Notes: “Others” includes manufacture of food, tobacco, leather, wood products and paper. Sample includes observations from 1999-2003, 2002 onwards as treatment. Standard errors are clustered at the state and two digit industry level.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Estimators of differences after excluding neutral states

	(1)	(2)
(Post - Pre)	Real worker wages(mean by firm)	Workers (total by firm)
Apparel & Textile, Flexible	1909.36** (900.07)	20.81* (11.11)
Others, Flexible	1600.49 (1188.82)	-2.05 (4.15)
Apparel & Textile, Inflexible	-289.11 (1054.24)	-13.84 (11.07)
Others, Inflexible	-355.94 (997.21)	-5.26 (9.17)
Difference in difference		
Apparel & Textile, Flexible-Inflexible	2355.36 (1494.17)	33.96*** (6.51)
Others, Flexible-Inflexible	2327.55*** (887.99)	-2.22 (5.21)
Apparel & Textile-Others, Flexible	308.87 (555.97)	22.86** (11.15)
Apparel & Textile-Others, Inflexible	66.83 (916.80)	-8.58 (11.14)
Self-generated electricity to total	4677.53 (5696.00)	32.70*** (10.00)
State FE	Yes	Yes
Year FE	Yes	Yes
Observations	139829	140074
R ²	0.024	0.003

Notes: "Others" includes manufacture of food, tobacco, leather, wood products and paper. Standard errors are clustered at the state and two digit industry level.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Estimators of differences using GHK classification

	(1)	(2)
(Post - Pre)	Real worker wages(mean by firm)	Workers (total by firm)
Apparel & Textile, Flexible	1990.96* (1021.69)	21.01* (12.56)
Others, Flexible	1939.01* (1139.07)	-2.30 (5.15)
Apparel & Textile, Inflexible	-121.95 (1454.67)	9.03 (7.78)
Others, Inflexible	-382.05 (707.74)	-4.49 (5.07)
Difference in difference		
Apparel & Textile, Flexible-Inflexible	2569.35*** (442.58)	11.37** (5.04)
Others, Flexible-Inflexible	2189.85*** (607.97)	0.14 (5.15)
Apparel & Textile-Others, Flexible	51.94 (660.21)	23.31* (12.88)
Apparel & Textile-Others, Inflexible	260.11 (986.32)	13.52* (7.10)
Self-generated electricity to total	4677.53 (5696.00)	32.70*** (10.00)
State FE	Yes	Yes
Year FE	Yes	Yes
Observations	139829	140074
R^2	0.024	0.003

Notes: "Others" includes manufacture of food, tobacco, leather, wood products and paper. Standard errors are clustered at the state and two digit industry level.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Effects of MFA expiry on unorganized sector in flexible and inflexible states

	(1) Real worker wages (mean by firm)	(2) Workers (total by firm)
β_0	-9098.23*** (1094.38)	0.05 (0.15)
β_1	-1885.91 (1631.39)	0.09 (0.19)
β_2	1215.13*** (248.00)	0.09 (0.18)
β_3	-814.67 (1018.64)	-0.08 (0.23)
Self-generated electricity to total	-10350.27*** (3644.16)	-2.57*** (0.26)
State FE	Yes	Yes
Year FE	Yes	Yes
Observations	66360	66753
R^2	0.319	0.006

Notes: "Others" includes manufacture of food, tobacco, leather, wood products and paper. Standard errors are clustered at the state and two digit industry level.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Estimators of differences

	(1)	(2)
(Post - Pre)	Real worker wages(mean by firm)	Workers (total by firm)
Apparel & Textile, Flexible	-10736.72*** (1793.91)	-0.21 (0.26)
Others, Flexible	-8036.14*** (904.44)	-0.22 (0.28)
Apparel & Textile, Inflexible	-11137.18*** (1367.55)	-0.22 (0.18)
Others, Inflexible	-9251.27*** (1065.89)	-0.31*** (0.11)
Difference in difference		
Apparel & Textile, Flexible-Inflexible	411.93 (1103.67)	-0.00 (0.24)
Others, Flexible-Inflexible	1270.57*** (316.31)	0.09 (0.17)
Apparel & Textile-Others, Flexible	-2700.58 (1895.49)	0.01 (0.25)
Apparel & Textile-Others, Inflexible	-1885.91 (1631.39)	0.09 (0.19)
Self-generated electricity to total	4677.53 (5696.00)	32.70*** (10.00)
State FE	Yes	Yes
Year FE	Yes	Yes
Observations	139829	140074
R^2	0.024	0.003

Notes: "Others" includes manufacture of food, tobacco, leather, wood products and paper.

Standard errors are clustered at the state and two digit industry level.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$