Exporting Sweatshops? Evidence from Myanmar

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Abstract

I investigate the causal effect of exporting on working conditions and firm performance in Myanmar. This analysis draws on a new survey of manufacturing firms from 2013 to 2015. I use the rapid opening of Myanmar to foreign trade after 2011 alongside identification strategies that exploit product, geographic, and industry variations to obtain the causal estimates of the impact of trade. Exporting has large positive impacts on working conditions in terms of fire safety, healthcare management, freedom of negotiation, and wages. It also increases firm sales, employment, and management practices as well as the likelihood of receiving a labor audit.

Keywords: Labor Standards, Trade, Economic Development, Myanmar

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1 Introduction

In the press and in trade policy debates, concerns have repeatedly been raised about the unsafe and exploitative working conditions of firms in low-income countries that export their products to developed countries (Elliot and Freeman, 2003). Fundamentally, these concerns are based on the supposed weakness of governmental labor and occupational safety regulations in industrial sectors in developing countries. However, in theory, trade might even worsen working conditions in the factory if the cost-cutting management technologies adopted for exporting are harsh on workers, such as ratcheting up employee discipline and skimping on fire safety and employee healthcare[1]. Moreover, higher export demand can lead to increasing injuries by lengthening working hours and forcing workers to undertake more intensive job tasks, as recently observed in Denmark (Hummels, Munch and Xiang, 2016). These concerns raise a question that has important policy implications: Does improving access to the markets in high-income countries undermine working conditions in developing nations?

Empirical progress in answering this question is challenged by the lack of data and wide array of endogeneity problems. Understanding the effect of trade on working conditions requires data on working conditions in both exporting and nonexporting firms. Such data are rarely found in developing countries. Moreover, the self-selection of exporters makes it difficult to identify the causal effects. As the literature shows, for example, more productive firms are likely to be exporters, and productivity is likely to be correlated with working conditions.

This study investigates how international trade affects working conditions, firm performance, and management practices in low-income countries by collecting and analyzing new survey data on garment and processed food firms in Myanmar. Myanmar offers an interesting case through which to examine the causal effects of trade liberalization. In the mid-2000s, Myanmar was under US and European Union (EU) trade sanctions because of concerns about human rights violations by the military government. In addition, the government imposed 10 percent taxes on earnings from exported goods. These trade barriers significantly limited the export profitability of manufacturing firms in the country. In the late 2000s, as demand for Myanmar apparel products from Japan gradually increased owing to the absence of Japanese sanctions, some Myanmar firms started to export to Japan. Then, in 2011, the Myanmar government suddenly initiated democratic and economic reforms including the reduction and abolishment of its export tax in 2011 and 2012, which substantially increased the value of apparel exports to Japan. The United States and EU

[1] Models can be constructed based on standard technology adoption models with trade such as Yeaple (2005) and Bustos (2011).

then lifted their trade sanctions in late 2012 and 2013, respectively, creating access to new profitable markets for Myanmar exports. Hence, Myanmar quickly transitioned from almost an autarky into an open economy in the late 2000s.

To investigate the impact of this rapid entry into the global trading system, I collect measures of firm-level working conditions and management practices by carrying out a field survey in Myanmar. This survey comprises three waves (2013–2015) of face-to-face interviews with plant managers in an unbalanced panel of 381 garment and 316 processed food firms. To understand the level of working conditions in Myanmar, I evaluate whether plant labor practices comply with the international labor standards advocated by several major initiatives providing certification and auditing services. In particular, I examine fire safety, health management, wages, and working hours. Additionally, I examine the presence of workers' representatives and their interactions with managers as well as measures of management practices based on the work by Bloom and Reenen (2007). I match my survey data with firm data in 2005 taken from the Survey of the Garment Industry in Myanmar (SGIM; conducted by the Japanese External Trade Organization), using certain firm characteristics in 2005 as firm-level variations in exposure to trade in the later years (from 2005 to 2015).

The empirical strategy used to estimate the causal impact of exporting on worker and firm outcomes is based on the fact that the requirements to qualify for Japan's preferential tariffs for low-income countries were stricter on knitted apparel than on woven products. The manufacturing process for making knitted and woven apparel from fabric is the same; indeed, according to data on garment firms in 2005, producers of knitted and woven apparel products resemble one another in terms of productivity and firm size. However, when Japanese demand rapidly expanded to Southeast Asian countries after 2005 as trade shifted from China following the Liancourt Rocks dispute, Myanmar exports of woven apparel grew rapidly compared with those of knitted apparel. Therefore, I use the production of woven apparel in 2005 as an instrumental variable (IV) to predict exporting in 2013–2015.

The baseline empirical results suggest that exporting has large positive impacts on working conditions. In particular, exporting leads to the adoption of better fire safety and health management, improvements in negotiation freedom (including allowing unions to form), and increases in wages. The magnitude of these effects is also large: exporting improves the measure of working conditions adopted herein (an index evaluating fire safety, healthcare, and freedom of negotiation) by 125 percent, which is similar to the difference between local plants and multinational plants operating in Myanmar. The effect of exporting on hours of work is found to be negative and statistically insignificant. Furthermore, the results indicate that exporting increases sales and employment.

Finally, exporting also leads to the adoption of management practices that are recommended in developed countries.

As robustness checks, I use two alternative identification strategies to assess the impact of exporting. One uses an alternative IV that measures plants' proximity to international airports in 2005 when Myanmar was autarkic. Travel time is likely to influence export demand and transaction costs (Giroud, 2013; Giroud and Mueller, 2012; Sheard, 2014), and indeed I find that airport distance in 2005 is a strong predictor of exporting from 2013 to 2015. Secondly, by using the panel structure of the data, I run a difference-in-difference (DID) test from 2013 to 2015 to compare the time trends of the outcomes in the garment sector, which had an export boom following the lifting of US and EU trade sanctions, with those in the processed food sector, which had no export boom because of international food regulations. These two alternative identification strategies generate mostly similar results to the main baseline outcomes.

The results can be explained in three possible ways. One channel is that international buyers such as H&M require the working conditions in their supplier firms to meet international labor standards before they start to trade. In recent years, many human rights activists have pressured retail companies into implementing labor standards along their supply chains[2] (Harrison and Scorse, 2010). Therefore, these retailers typically import products from developing countries' firms on the condition that their suppliers pass labor compliance audits. Indeed, my data show that exporting significantly increases the chance of receiving such an audit. Another possible channel is that access to foreign markets improves the return of firms upgrading their quality standards, which may involve paying higher compensation and providing a safer workplace to workers (Verhoogen, 2008). As a simple example, firms may use working conditions as a means to elicit higher effort from workers in order to produce higher quality products (Shapiro and Stiglitz, 1984). In such cases, assuming that quality-upgrading and exporting are strategic complements, firms that start to export would be more likely to invest in improving working conditions. Finally, the increasing firm size resulting from exporting might contribute to the improvement in working conditions if investment in working conditions exhibits an increasing return to scale[3].

This study makes three principal contributions to the empirical literature regarding the extent to which access to foreign markets affects worker and firm performance. First, it contributes to the

[2]For instance, when the Bangladeshi Rana Plaza collapsed in 2013, causing more than 1000 casualties, mostly among garment workers, multinational retailers that imported from the collapsed factories were blamed for the tragedy.

[3]For example, the cost of introducing fire safety equipment is likely to be the same for large and small firms, while the benefit would be higher for firms with more employees and larger inventory. In addition, in many countries, local regulations on occupational safety apply only to larger firms, imposing on them a higher cost of operating under unsafe conditions.

large empirical literature on the impacts of exporting on firm performance by providing evidence in a low-income country based on a natural experimental setting. Many empirical studies compare export starters with nonstarters by using panel data and show mixed results (Bernard and Jensen, 1999; Clerides, Lach and Tybout, 1998; Aw, Chung and Roberts, 2002; Wagner, 2002, 2005; Blalock and Gertler, 2004; Alvarez and Lopez, 2005; Biesebroeck, 2005; DeLocker, 2007; Fafchamps, Hamine and Zeufack, 2008). More recently, studies have more carefully disentangled the impact of exporting on firm performance from selection effects by using natural experimental settings or randomized controlled trials that generate firm-level exogenous variations in exposure to foreign demand. These studies provide evidence that better market access facilitates technology adoption and productivity and quality upgrading (Lelieva and Trefler, 2010, in Canada, Park, Yang, Shi and Jiang, 2010, in China, Bustos, 2011, and Brambilla, Lederman and Porto, 2012, in Argentina, Verhoogen, 2008, in Mexico, and Atkin, Khandelwal and Osman, 2014, in Egypt). My study is different to these in that it focuses on a much lower-income country and examines working conditions.

Second, this study contributes to the literature on globalization and firms' compliance to international labor standards by providing the first evidence in a developing country of the impacts of trade on occupational safety, negotiation, and working hours based on firm-level data. One closely related paper is Harrison and Scorse (2010), which uses Indonesian manufacturing firm panel data and finds that US anti-sweatshop campaigns in the 1990s led to an increasing wage premium in the targeted apparel sector as well as in regions that hosted firms trading with major US retail companies targeted by the campaign. This study differs from Harrison and Scorse (2010) in that instead of looking at the impact of exposures to anti-sweatshop campaigns, I examine the impact of exposures to foreign demand. Another difference is that I evaluate various outcomes of working conditions not only wages, such as fire safety, health management, negotiation, and working hours, which have been paid little attention in the literature on globalization and labor markets (Robertson, Brown, Pierre and Sanchez-Puerta, 2009; Brown, 2009). Another related paper is Alam, Amin and Rives (2013) that compares occupational illness and injury among Bangladeshi children based on whether the child worked in the export sector and finds no systematic differences in their outcomes. This study is also related to a set of studies using unique data on working conditions among Cambodian exporting firms collected under the Better Factories Cambodia program (Polaski, 2006; Oka, 2010; Ang, Brown, Dehejia and Robertson, 2012; Brown, Dehejia and Robertson, 2014; Warren and Robertson, 2011). A contribution of this study to this stream of the literature is to provide evidence on the causal effect of trade on working conditions measures by obtaining such data on nonexporting firms, which are not available in the Cambodian data. In addition, several studies

have used cross-country panel data to investigate the relationships between exposure to trade and labor conditions (Busse, 2004; Edmonds and Pavcnik, 2006; Neumayer and Soysa, 2006; Mosley and Uno, 2007; Greenhill, Mosley and Prakash, 2009; Flanagan, 2006). These cross-country studies mainly examine the associations of trade activities with changes in countries' labor regulations, which is a channel I exclude in this study. Finally, this study adds to studies using labor audit data to examine the efficacy of companies' voluntary initiatives Locke (2013); Locke, Qin and Brause (2007); Distelhorst, Hainmueller and Locke (2016); Distelhorst and Locke (2016) that have provided mixed results.

Third, this research is the first study to investigate the causal impact of exporting on management practices. How firm managers organize the production process is a key part of production technology that determines firm performance (Bertrand and Schoar, 2003; Bloom and Reenen, 2007; Bloom, Eifert, Mahajan, McKenzie and Roberts, 2013)[4]. Although previous empirical studies have examined the impact of trade on productivity and the composition of skilled workers, and technology upgrading (Lelieva and Trefler, 2010; Park et al., 2010; Bustos, 2011; Brambilla et al., 2012; Verhoogen, 2008; Atkin et al., 2014), the impact of trade on managerial input remains largely uninvestigated[5].

The rest of the paper is organized as follows. Section 2 introduces the unique data that I collected in Myanmar. Section 3 describes my main identification strategy, followed by the empirical results in section 4. Then, I summarize the results of the robustness checks using alternative identification strategies in section 5, and conclude in section 6.

2 Data

2.1 Survey data from 2013–2015

My main data source is the garment plant panel data that I collected in three waves of field surveys conducted in 2013, 2014, and 2015. Given the absence of an enterprise census in Myanmar, at the beginning of the first wave in May 2013, I assembled a population list of garment plants in

[4]The effect on the direct measures of organizational practices helps us understand the *real* effect of exporting on firm performance for several reasons. First, as pointed out by Bernard, Eaton, Jensen and Kortum (2003), the correlation of standard productivity measures and trade performance differs according to market structure. Second, assuming, as Melitz and Ottaviano (2008) do, non-CES preferences, markups can differ as a function of market size and they can influence estimates of productivity. Third, in a model that allows firms to choose their product mix, as Bernard, Redding and Schott (2010) propose, exporting induces a reoptimization of product varieties, which can change the measured firm-level productivity (Loecker, 2011).

[5]Some recent studies have shown that export performance is positively associated with production hierarchies (Caliendo, Monte and Rossi-Hansberg, 2015) and with management practices (**?**Bloom, Manova, Reenen, Sun and Yu, 2017).

Yangon and Mandalay, the two major industrial regions in Myanmar, by combining information from industry directories, lists of manufacturers provided by industry associations, and firm registration records. I also asked local wholesalers for information about their supplier firms. A research company in Myanmar helped me conduct face-to-face interviews in Burmese with garment plant managers. Between June and August 2013, we contacted all 238 garment plants in our population list, and we were granted interviews in 176 plants. During the second season, in May 2014, I repeated the population database construction and found 305 plants. Between June and August 2014, I contacted these plants and was granted 201 interviews. By repeating the same exercise in May 2015, I found 351 plants and interviewed 209 of them. In all years, I asked about employment, export orientation, owner characteristics, management practices, and workplace conditions at the beginning of the fiscal year (April).

By using the same technique, I also surveyed the processed food sector. I first constructed a population database of manufacturers in the sector, and in 2013 and 2014 I collected the same set of data. Of the 316 processed food firms surveyed, only one exported its products, presumably because developed countries have stringent imported food security regulations. The processed food firm sample thus serves as a control group to check whether one of my IVs (proximity to airports) directly affects performance.

Survey instruments on workplace conditions were constructed to measure the level of compliance with international labor standards. To this end, I referred to the labor standards prescribed by the ILO and globally recognized initiatives that provide auditing and certification programs on labor compliance for private companies[6].

The international labor standards of the ILO and above initiatives typically have eight major areas of labor standards[7]: forced labor, child labor, wages, working hours, discrimination, harassment, freedom of association, and health and safety. Given the sensitivity of some of these topics, I spoke with managers about five areas of compliance: fire safety, health management, freedom of association (termed freedom of negotiation herein), wages, and working hours. A consultant who works in the certification industry helped me construct the questionnaire to address the practices that auditors typically check in the garment industry.

Regarding *fire safety*, I asked, "What kinds of measures do you have in case of fire?" and "Do you practice fire drills?" In countries with underdeveloped electric infrastructure such as Myanmar, unstable electricity can cause factory fires. In the garment sector, where workers come and go on

[6]These include the Fair Labor Association, Business Social Compliance Initiative (BSCI), and Worldwide Responsible Accredited Production (WRAP).

[7]An extensive summary of these standards is documented by Smith and Feldman (2003).

a monthly basis, it is important to practice fire drills and post visible and readily understandable evacuation maps.

Regarding *health management*, I asked the following questions: "Do you have a record of injuries at your plant?" "Do you have a list of hospitals to go to in case of emergency?" "Do you have a private contract with a health clinic?" and "Is there a nurse or a doctor at this plant?" Sewing for many hours sometimes leads to occupational injuries. For instance, working for more than 10 hours per day in the same posture can lead to chronic fatigue and cause injuries during sewing and cutting. In response to these concerns, international labor standards recommend easy access to a nurse's office and preparation for emergencies.

Questions on *freedom of negotiation* were asked to measure the ability of workers to negotiate with the firm over working conditions. The freedom to negotiate in Myanmar was required to be less direct. In Myanmar, unionized collective bargaining is very much in an early stage. Only after the government passed the 2011 labor law was collective bargaining by unions allowed, and thus many people were unfamiliar with the concept of a "union." Therefore, to comprehensively capture the existence of workers' representatives and their interaction with managerial teams, I asked, "Is a workers' leader appointed by this firm or by workers?" Where a leader was present, I asked how frequently the managers met with the leader on a regular basis. In addition, I asked whether the plant has a suggestion box, which could be another potential communication point.

Working hours were measured by plants' average weekly working hours including overtime hours. Workers in the garment sector typically work for scheduled hours (often eight hours) plus overtime. For *wages*, I used monthly wages including overtime payments. To minimize variation caused by the fact that different skill levels are required at different plants, my measure of wages is for an entry-level sewing operator.

For fire safety, health management, and freedom of negotiation, no consensus was reached on how to quantify these aspects. For my main empirical analysis, I thus construct scores on a scale from 0 to 1 and find the average within each dimension. The overall working conditions score is the average of three dimensions: fire safety, health management, and freedom of negotiation. Table A1 in the Appendix documents the scoring based on the survey questions. As shown in Figure 1, the overall working conditions score is distributed with a fat tail and large variation, implying that many of the firms in the sample have few safety and health measures as well as very little negotiation points with workers; however, some firms appear to be practicing high labor standards.

Complicating my examination of workplace conditions is the possibility that managers did not answer questions truthfully. To evaluate this possibility, survey teams arranged plant tours after

interviews had been concluded. During these tours, they observed and later recorded the presence of marked fire exits, light level, temperature, whether workers work in bare feet, and the presence of piles of fabric on the floor. The observations are correlated with the working conditions scores in the expected directions: fire exits are more likely to be observed in plants with higher fire safety scores, while a low light level, high temperature inside the plant, workers working in bare feet, and the presence of piles of fabric on the floor are negatively correlated with health scores and negotiation scores (see Table A2 in the Appendix for the results). In theory, factory tours may have only been provided by firm managers who were more concerned about compliance or buyers' pressure, in which case the results would suffer from attrition bias. However, there were no systematic correlations between the indicator of receiving a factory tour and the performance measures (working condition scores, export, employment) (for the results, see columns (7) and (8) of Table A2 in the Appendix). In addition, to investigate the possibility that managers' responses are systematically biased based on firm performance, I tested whether there are correlations between firm performance and the gaps between managers' responses and interview staff's observations. The gap is the sum of (1) the measurement error between the response and the truth and (2) the error between the truth and the observation. If there is a correlation between a performance measure and the first part of the measurement error, it is likely that the gap is correlated with the performance measure. As shown in Table A3 in the Appendix, the gaps are not statistically correlated with exporting or employment.

Following the standards outlined in the literature on management and business practices, I measured management practices by using some of the criteria specified in the World Management Survey (WMS)[8] initiated by Bloom and Reenen (2007) and in the US Census Bureau's Management and Organizational Practices Survey (MOPS)[9]. Managers were asked nine questions about three dimensions of work: production monitoring, quality control, and machine maintenance. Some of the questions were "Do you have boards to show the number of produced pieces and if so how frequently are they adjusted?" (production monitoring), "Are there records of defects by the types of defects?" (quality control), and "How frequently is machine downtime analyzed?" (machine maintenance). After the interviews, scores were constructed on a scale from 0 to 1 (Table A4 in the Appendix shows the ways of scoring based on the original questions). Then, I averaged the scores by dimension to construct management scores for production monitoring, quality control, and machine maintenance. The overall management score is the average of the scores across these

[8] `http://www.worldmanagementsurvey.com/`.

[9] The survey instruments and documents of the MOPS can be found at `http://www.census.gov/mcd/mops`.

three dimensions.

In 2014, the WMS was conducted in Myanmar and 50 garment firms in my sample were also interviewed in the WMS. Therefore, I compare my management score with the management score in the WMS among these 50 firms and find that the two scores are highly significantly correlated (see Table A5 in the Appendix). Among the four dimensions of management practices asked in the WMS (operation, monitoring, target, and human management), my overall management score is best predicted by the score on monitoring in the WMS, which makes sense considering the questions asked in my survey.

2.2 Survey data in 2005

The 2005 data on garment firms were obtained from the Survey on the Garment Industry in Myanmar (SGIM), which was collected by IDE-JETRO (Kudo, 2008). This survey targeted all Yangon garment firms in 2005 by constructing a list of existing garment firms in mid-2005 based on information from the garment industry association and a local market research company. Surveyors carried out interviews at 142 of the 165 firms found. The survey records detailed information about 2005 sales, assets, working capital, product categories, and managers' characteristics. They also contain detailed information on products as well as the plant addresses, which I use for my identification strategy, as I explain in the next section.

3 Baseline empirical strategy

The main empirical equation of interest is

$$Y_{it} = \xi_0 + \beta_E Export_{it} + \xi_x X_{it} + \eta_t + u_{it}, \tag{1}$$

where i indexes plants; t indexes the years from 2013 to 2015; Y_{it} is one of the plant performance measures (working conditions, management score, or firm size) in year t; $Export_{it}$ is the share of export sales relative to total sales in year t; X_{it} are a set of firm characteristics included as control variables; and η_t are the year fixed effects.

Since $Export_{it}$ is likely to be endogenous in the above equation, I use an IV strategy. The IV used in the baseline specification is a type of firms' apparel product in 2005, by which the increases in foreign demand from 2005 to 2015 differed substantially for the reason described more below.

3.1 Background: From a closed economy to market opening

Myanmar was almost autarkic in 2005. The estimated share of manufacturing exports in GDP was only 2 percent[10] owing to several institutional factors. Myanmar was under US import sanctions, which prohibited all imports from the country, and the EU's tariff sanction, which excluded Myanmar from the set of low-income nations that receive its preferential tariffs. Furthermore, the Myanmar government until 2011 imposed a 10 percent tax on all earnings from processing trade, which had been the principal means of exporting for manufacturing firms.

The only large economy that did not place any trade sanctions on Myanmar before 2011 was Japan, and it continues to grant a preferential tariff to Myanmar. Coinciding roughly with the start of the Liancourt Rocks disputes in 2005 and continuing through the late 2000s, Japanese demand on apparel shifted from products made in China to those made in Southeast Asia[11]. As shown in Figure 2, where apparel exports from Myanmar to Japan are plotted over time, exports of apparel from Myanmar to Japan gradually increased during the late 2000s (from 52 million USD in 2005 to 180 million USD in 2010)[12].

In 2011, the Myanmar government initiated democratization reforms, and during the next two years many trade barriers were lifted[13]. The process started in October 2010 with the election of Thein Sein, who represented the military party. The international community initially regarded the election as fraudulent; however, the new government started a number of political and economic reforms. It reduced export tax to 2 percent in 2011 and ended the tax altogether in 2012. The result was a large increase in the exports of apparel to Japan (in 2011, the value was 340 million USD, which was a 92 percent increase from the previous year). In 2011, apparel exports to Japan accounted for the largest share of total exports (41 percent of the total exports of apparel from Myanmar to the world). The new government also initiated political reforms that included the release of political prisoners and meetings with Aung San Suu Kyi, the leader of the opposition

[10] Appendix A.2 describes the calculation.

[11] Figure A1 in the Appendix illustrates the increase in apparel exports from Southeast Asia to Japan after 2007 and the decline in exports from China to Japan after 2011.

[12] These numbers are still small compared with those of neighboring countries. For example, Vietnam, a country with a similar population size as Myanmar, exported apparel to Japan worth 586 million USD in 2005 and 1.16 billion USD in 2010.

[13] These democratization reforms were somewhat unexpected. In 2009, the *New York Times* reported that "Secretary of State Hillary Rodham Clinton, frustrated over the junta's intransigence on human and political rights, ordered the policy review. 'Clearly, the path we have taken in imposing sanctions hasn't influenced the Burmese junta,' she said last month. 'Reaching out and trying to engage them hasn't worked either.' The reforms started with the election of Sein Thein in 2010. Regarding prospect of this election, the same article concludes as follows. The regime has pledged to hold 'multiparty, democratic elections' in 2010 as part of its 'road map to democracy.' The last previous election, in 1990, was a landslide victory for the opposition. The junta, however, refused to recognize the result and has remained in power ever since." (McDonald, March 26, 2009)

party who had previously been placed under house arrest by the military government. These political changes led the United States to lift its import ban in November 2012. Moreover, in May 2013, the EU lifted its sanction on GSP, meaning that most Myanmar products could now enter EU countries under preferential tariffs. The total value of Myanmar's apparel exports increased from 900 million USD in 2010 to around 1.56 billion USD in 2014[14].

In contrast to the increase in apparel exports, exports of processed food stayed negligible even after 2011. This is confirmed in Figure 3, which plots the values of apparel and processed food exports from Myanmar to the world over time. This figure presumably reflects foreign countries' food security policies accompanied by stringent regulations on food imports. As studied by Jongwanich (2009), regulations on food safety standards impose large constraints on food manufacturer exports in developing countries. Indeed, as noted earlier, in my sample of 595 processed food and beverage plants, only one plant exported its products.

3.2 Product variation in 2005 influencing later exporting decisions

To infer the impacts of this trade opening on local firms, I exploit a predetermined source of firm-level variation in 2005 that affected exporting from 2013 to 2015, the production of woven apparel products that qualify for Japanese preferential tariffs with fewer constraints.

After the mid-2000s, Japanese demand for woven apparel products (e.g., shirts and jackets) increased, whereas that for knitted apparel products (e.g., T-shirts and sweaters) did not. This is evident in Figure 2, which plots the values of these two types of apparel exports from Myanmar to Japan. The difference reflects the rule of origin requirements for Japanese preferential tariffs (GSP).

Under the preferential tariff regime, Japan allows a product from a beneficiary country to enter the Japanese market with a free tariff rate if the rule of origin requirements is met. In general, the requirements set the required conversions for each product in beneficiary countries. In the case of knitted apparel products (Harmonized System (HS) code 61), the products have to be processed in the beneficiary country from textile yarn (HS 50 to 59) to knitted fabric (HS 60) and from knitted fabric to knitted apparel (HS 61). In the case of woven products (HS 62), products are eligible for GSP if there is a conversion in the beneficiary country from woven fabrics (HS 50 to 59) to woven apparel (HS 62)[15]. For this reason, woven garment manufacturers can use low-cost fabric

[14] Figure 3 illustrates the total export value of apparel and processed food from Myanmar.

[15] It is unclear why the Japanese government sets the rule of origin. One possible reason is that the rule defines that all apparel products have to be converted from HS 5 to HS 6 within a country. For woven apparel, this means converting from fabric (HS 50 to 59) to apparel (HS 62); for knitted apparel, this means converting from textile yarn

imported from China to export to Japan under GSP, while knitted garment manufacturers cannot. This is a large constraint for the knitted apparel group because the Myanmar textile industry is significantly underdeveloped[16]. Without GSP, Japanese MFN (most favored nation) tariff rates on apparel range from 9 percent to 12 percent.

The manufacturing process from fabric to apparel is technically similar across these products (Figure A5 displays pictures of two factories producing woven and knitted apparel products in Myanmar). While knitted and woven apparel is distinguished by the types of fabrics they use (i.e., knitted fabric stretches more than woven fabric), the sewing technology is the same. For this reason, sewing workers need to be trained in either knitted or woven manufacturing. This makes switching products from knitted to woven difficult and therefore firms must retrain workers in addition to obtain knowledge about the production of new product types. This creates an analytically useful context for examining how the setting in 2005 affected the trajectories of exporting and firm outcomes thereafter.

In the main empirical specification, I use a firm-level measure of the production of woven apparel before 2005 as an IV for exporting from 2013–2015[17]. For the reasons described above, the production of woven apparel before 2005 is likely to have affected whether a firm exported to Japan in later years. In addition, this could have affected exporting to other countries as well, as the fixed cost of exporting to an additional country decreases in line with the number of countries to which the firm previously exported[18].

To construct a measure of woven production before 2005, I combined information from the SGIM data in 2005 and a question in the survey in 2014 asking whether the firm had produced woven products before 2005. For firms observed in the SGIM data, I define an indicator for "woven firm" as a variable that takes the value of 1 if the number of woven products divided by the number of all products exceeds half. Ten of the 20 product categories are classified as woven products in the SGIM data. Under the above definition, 62 percent of the firms in the SGIM data are categorized as woven firms. For firms not observed in the SGIM data, I use the indicator variable constructed

(HS 50 to 59) to apparel (HS 61).

[16] According to the field interviews conducted in 2014, most garment producers, including those that sell domestically, import fabric from China.

[17] In spirit, using the variations in the rules of origin by knitted and woven apparels as a natural policy experiment is close to the studies by Demidova, Kee and Krishna (2006); Kee and Krishna (2008), who examine the performance of Bangladeshi woven and knitted apparel producers based on the premise that the restrictive rules of origin for the EU GSP required all types of apparel products to be produced from domestic yarn and that Bangladesh had abundant production of domestic knitted fabric but not of woven fabric, resulting in the setting where only knitted apparel producers were able to easily export to EU countries. The EU GSP is unlikely to have influenced firms in Myanmar for two reasons: (1) the rules of origin for 2007 and (2) Myanmar has been granted the EU GSP since 2013. In addition, unlike in Bangladesh, domestic production of both knitted and woven fabric is limited in Myanmar.

[18] The data support this hypothesis, as described in Section 4.2.

from the survey question in 2014 asking whether the firm had produced mainly woven products before 2005. After the imputation, 56 percent of the plant-year observations in the main sample are identified as woven firms.

The samples used for my baseline analysis are domestically owned garment firms that started operation before 2005[19]. A total of 143 such plants (137 firms) were observed at least once during 2013, 2014, and 2015; of these, 98 plants were observed every year. Table 1 provides the basic statistics of the variables used for the baseline analysis.

3.3 Firm performance in 2005 by product variation in 2005

My key identifying assumption for this instrument is that had it not been for foreign demand from 2005 to 2013, there would have been no systematic differences in the outcomes from 2013 to 2015 by being woven firms or not. A potential threat to this identification strategy is the possibility that knitted and woven garment processes differ in terms of their optimal management styles or plant sizes. Another concern is that some firms might have expected the potential of the Japanese market and started to produce woven products before 2005 in readiness for exporting.

To address these concerns about the exclusion restriction on the instrument, I examined the garment firm data in 2005 to test whether observable firm performance was different for the production of woven or knitted products. The goal of this exercise is to address concerns about the exclusion restriction, an identifying assumption that instruments do not have direct effects on firm performance. In this specific setting of the Myanmar garment sector, the instruments should not be related to the firm performance variables in 2005 if the exclusion restriction is valid.

While the 2005 data do not share the same measures of working conditions and management as my survey data, I observe the basic firm performance variables: productivity, firm size, wages, labor share (the labor cost share in value added), managers' tenure, and the proportion of highly educated workers. Notably, many of these variables are positively correlated with the measures of working conditions and management in my survey data of nonexporting garment firms from 2013 to 2015 (Table A6 in the Appendix reports the results). Hence, if woven production and working conditions are correlated in the absence of trade, I expect to see positive correlations between woven production and the above variables in 2005.

By using the 2005 data, Table 2 reports the OLS estimates that regress each of the performance measures on woven production. The performance measures include total factor productivity (TFP),

[19]I exclude all firms that were partially or fully owned by a foreign entity for at least one of the years during 2013–2015.

the log of sales, employment, number of sewing machines, employment growth, capital intensity, wages, manager's years of experience in the garment industry, and manager's years of education. TFP is defined as log(value added)- 0.469*log(labor)-0.531*log(capital), where value added is defined as sales less the cost of fabric, labor is production hours, and capital is asset value. The factor weights are constructed from the labor cost share in value added and assuming a constant return to scale. Capital intensity is defined as log(capital)-log(labor). Wages are the log of hourly wages in Myanmar kyat.

A shortcoming of this analysis is the small sample size. That said, the directions of the signs are not systematic across measures. The sample size of the main two-stage least squares (2SLS) specifications ranges from 98 to 128 observations of firms in each year. Still, by separating the data by year, I observe the significant effect of woven production in 2005 on exporting and firm performance in every year. In addition, as a robustness check, I match the 2005 data with my survey data from 2013–2015 (resulting in a panel sample of 46 firms) and control for the 2005 firm characteristics in the 2SLS. Section 4.2 discusses the results of this exercise.

4 Baseline empirical results

4.1 Determinants of exporting status (first-stage results)

Table 3 shows the results of the OLS estimation of the first-stage equation where export intensity is regressed on the production of woven products in 2005. The standard errors are clustered at the firm level. Column (1) shows the baseline specification in which I only control for the year and Yangon and Mandalay region fixed effects. In columns (2)–(5), I add the control variables describing the owner's characteristics that could affect product choice. These indicators include whether the owner is ethnic Chinese or a university graduate as well as firm age.

The results in columns (1)–(3) show that woven production has the expected effects on exporting in the expected direction: woven production in 2005 has a positive effect on export share and export status from 2013–2015. Including all controls, the coefficient of woven production is positive and highly significant, implying that the production of woven products before 2005 increases the probability of exporting during 2013 and 2015 by 27 percentage points on average. I find that only a few exporting firms export less than 100 percent of their products. Therefore, the effect of woven production on the share of export sales relative to total sales is similar to that for the result using the exporting indicator variable. In the main IV specification shown next, I use the export share of sales to represent the intensity of exporting, although the main results are qualitatively the same

by using the exporting indicator.

The large and significant effect of woven production on exporting could have proceeded through two channels. In the first channel (described above), firms that produced woven products could apply for the Japanese preferential tariff, using Chinese fabric as an input, while firms that produced knitted apparel could not. For this reason, when Japanese demand increased in Southeast Asia in the late 2000s, woven product firms had a greater advantage in exporting to Japan than knitted product firms. The results in column (4) confirm this channel, showing that firms that produced woven products in 2005 were significantly more likely to have exported to Japan between 2013 and 2015. In the second channel, after woven product firms started exporting to Japan, they accumulated better management and technology, they achieved compliance, and they increased firm size. By the time EU and US import sanctions were lifted in 2012 and 2013, respectively, these firms had already paid the fixed costs of investment and they were more likely to export to western countries. Column (5) examines this possibility by running an OLS regression using exports to EU countries or the United States as the dependent variable. The result shows that woven production has a positive and significant effect on exporting to the EU or United States, suggesting that the exporting process is path-dependent.

4.1.1 Impact on working conditions

Table 4 reports the results of the second-stage estimates. The control variables are the same as those used in the first-stage regressions (see columns (1) and (2) in Table 3), and standard errors are again clustered at the firm level.

Panel A of Table 4 presents the baseline results for working conditions. Column (1) shows the 2SLS estimate of the working conditions score, which, as described earlier, is the average of the fire safety, health management, and freedom of negotiation scores. The estimated coefficient is positive (0.268) and significant (standard error = 0.086). Moreover, the magnitude of the effect is large compared with the means of the scores (0.214), while adding the control variables in column (2) influences the coefficient minimally. Columns (3)–(5) show that the 2SLS estimates for the fire safety, health management, and freedom of negotiation scores are all positive and large, and statistically significant for fire safety and negotiation scores. Column (6) shows that the estimated coefficient for the log of hourly wages is also positive and large, although marginally significant, implying that wages increase by 15 percent by becoming a full exporter[20]. Column (7) shows the

[20]Data on wages are missing in the 104 plant-year observations where firms did not hire any worker in the previous year (i.e., firms with no hiring of entry-level operators). These missing observations are not statistically correlated with the instrument (woven production in 2005) after controlling for the basic control variables used in the regressions.

estimate for working hours above 60 hours per week (taking a value 0 for firms where workers typically work less than or equal to 60 hours per week), which is a variable proxying for excessive working hours. The estimated coefficient is negative and insignificant. In summary, these results suggest that exporting leads to positive outcomes for workers. Indeed, the signs and magnitudes of the 2SLS coefficients are similar to the coefficients of the OLS estimates for most of the outcomes (see Panel A of Table A7 in the Appendix). This finding might occur because initial working conditions were relatively less important than the other aspects of firms for selecting into exporting.

The magnitude of the effects is shown to be large by comparing the scores of Myanmar firms with those of foreign-owned firms operating in Myanmar. Although not included in the sample used in the main analysis, my survey collected data on 45 foreign-owned firms in Myanmar (from 2013 to 2015), which are mostly owned by parent companies in Korea (47 percent), Japan (26 percent), and Hong Kong (9 percent). The average working conditions scores for the Myanmar and foreign-owned firms are 0.24 (Myanmar) and 0.50 (foreign), respectively, which imply that exporting raises working conditions in a low-income country to the levels of firms owned by parents in developed nations.

There may be multiple reasons why working conditions improve through exporting. Although it is difficult to draw conclusive evidence on the pathways, my survey data shed light on some of these mechanisms. One mechanism might be that foreign buyers pressure supplier factories to improve their conditions. In many interviews, managers stated that before a firm can initiate a new trading deal with a foreign buyer, compliance audits must be passed. Such audits are deemed to be necessary for a variety of reasons; for example, buyers might be concerned about the risk of being criticized for supporting "sweatshop" factories when unfavorable working conditions in local factories are disclosed in the media[21]. In the last column of Table 4, the dependent variable is a dummy that indicates whether a plant has ever been subjected to a labor or environmental compliance audit[22]. Only 15 percent of plants in the baseline sample indicated that they have been audited. The estimated coefficient of exports is positive, significant, and large (0.378). Given the audit requirements imposed by foreign buyers, it might be puzzling why firms with unfavorable working conditions survive if workers care about working conditions and can freely move across firms. One concern is that another aspect influencing workers' welfare unable to be measured

[21] Labor compliance audits are typically implemented by a third party. Several initiatives such as the BSCI and WRAP provide standardized sets of auditing, certifying, and consulting services for manufacturing firms and buyers. Auditing staff randomly choose a day to visit supplier firms to check fire safety equipment and health measures as well as talk with workers.

[22] This question is asked only in the survey waves in 2014 and 2015. The audits in the questions exclude government audits.

in my survey could be affected negatively by a firm's exporting behavior. Unfortunately, this possibility cannot be tested by using my data. Yet, according to my field interviews with garment workers, the current situation in the Myanmar garment sector is reasonably described by the models based on search and mobility costs. Many garment workers live nearby their workplaces and obtain information about other factories through their friends and relatives. Therefore, the transition to a steady state is likely to be slow.

4.1.2 Impact on firm production performance and management practices

The results on working conditions might also be explained by efficiency wage theory. The empirical trade literature finds extensive evidence that access to larger foreign markets improves a firm's return from investing in upgrading productivity or quality (Verhoogen, 2008; Lelieva and Trefler, 2010; Bustos, 2011; Atkin et al., 2014; Bloom et al., 2017). In theory, providing better working conditions may be a way in which to enhance productivity or elicit workers' effort to produce high-quality goods (Shapiro and Stiglitz, 1984; Verhoogen, 2008). To investigate such a channel, it is helpful to examine how exporting simultaneously affects other firm performance measures such as firm size, productivity, and management practices.

I find some evidence supporting the notion that exporting improves firms' production performance. Columns (1) to (6) in Panel B of Table 4 show the 2SLS estimates, using the logs of firm size, number of sewing machines, and sales (value added) as the dependent variables. The measure of sales was obtained only in the first survey wave in 2013; therefore, the sample sizes for sales and labor productivity are small (100 plants). The coefficients for plant size are large, positive, and significant, suggesting that exporting increases firm size by 3.5 times (= exp(1.5)-1). This is reasonable considering that exporting firms are 4.5 times larger than nonexporting firms in my sample (570 workers for exporting and 128 workers for nonexporting plants on average). Indeed, increasing firm size could explain the desire to improve working conditions. Upgrading fire safety (e.g., purchasing a fire alarm) serves as a type of fixed investment that exhibits an increasing return to scale. Therefore, increasing firm size by exporting might lead to upgrading working conditions. However, the scale effect does not explain the extent to which exporting affects wages and other working conditions such as hiring a nurse and meeting with workers' leaders, which are likely to be variable costs.

In columns (7) and (8), the dependent variable is labor productivity as measured by the logarithm of value added per worker. The estimated coefficient of labor productivity is large (suggesting

a 155 percent increase), but imprecisely estimated[23].

The 2SLS estimates for sales and labor productivity are lower than their OLS counterparts, showing that labor productivity is highly positively correlated with exporting (see Panel B of Table A7 in the Appendix). Taking these results together with the OLS estimates for working conditions discussed earlier, they are consistent with the hypothesis that selection into exporting was based on firm productivity rather than on working conditions.

An alternative explanation is that exporting improves firm performance by inducing managers' investment in acquiring better management practices. Panel C of Table 4 shows the results for management practices and the related dependent variables. Columns (1) and (2) report the 2SLS estimates of the coefficients of exporting on overall management practices score. The estimated coefficients of exporting with the control variables are positive and significant at the 1 percent level. Columns (3)–(5) show the estimates of the individual management scores in all three dimensions: production monitoring, quality control, and machine maintenance. All coefficients are positive and those for production monitoring and machine maintenance are statistically significant. A potential channel explaining the above results is that foreign buyers transfer knowledge or request that plant managers improve management practices. The dependent variable in column (6) takes the value of 1 if the plant's main buyer requests the plant's production data[24]. The dependent variable in column (7) takes the value of 1 if the plant's main buyer sends staff to suggest how to improve efficiency and quality. The estimated effect of exporting on these variables is large, positive, and significant.

These results suggest that garment firms in Myanmar have a higher incentive to upgrade production efficiency or quality when the chance of exporting is higher. Indeed, efficiency wage theory implies that firms improve working conditions to induce a higher effort from employees. In addition, better working conditions might help keep and attract skilled workers, which is another way for firms to improve productivity or quality. The survey data in the garment sector show that on average about 6 percent of workers voluntarily quit their jobs every month, typically without notifying their managers; by contrast, the turnover rate is less for firms with better working conditions (for the results, see Table A8 in the Appendix).

[23]For sales, employment, labor productivity, and wages, I observe these measures both in 2005 and after 2013. Therefore, as a robustness check, I match the sample over time and estimate a DID specification for woven production, using 2005 as the baseline year. This results in a sample of 62 domestic garment plants in Yangon both in 2005 and after 2013. As shown in the Appendix, the estimated coefficients of the interaction of woven production and years after 2013 are positive for all four outcome variables and statistically significant for sales and labor productivity.

[24]The main buyer is defined as the most important buyer in terms of plant sales. The variable was recorded during the 2015 survey only and thus the number of observations is comparatively small.

4.2 Robustness check

In the previous subsections, I presented evidence that several years after 2005, firms induced to export have on average significantly better working conditions, are larger, and adopt better management practices than other firms. However, next, I extensively test the robustness of the baseline findings.

First, the sample sizes in the balancing tests in 2005 on the instruments (Table 2) are small (126 firm observations). Therefore, the standard errors in the estimates might be too large to detect that some of these characteristics may have been directly affecting performance from 2013 to 2015. To address this concern, I restricted my samples to firms in the 2005 SGIM dataset and directly controlled for firm size (log of sales), TFP, and capital intensity. Although this reduces the sample size to 128 observations of 46 firms, the statistical power in the first stage was above 4 and the 2SLS results remained the same as the main results. In addition, redoing the baseline analysis by using only the sample in a single year in the 2013 survey with 119 plant observations generated qualitatively similar results to the baseline results. The results are shown in Table A9 in the Appendix. As an alternative way in which to examine the selection issue, I estimated the impact of exporting on firm size, productivity, and wages in the DID specification by comparing the changes in these variables between 2005 and the years after 2013 by woven production status in 2005 (see Table A10 in the Appendix). The results show that woven firms become statistically significantly larger in terms of both employment and sales as well as more productive. The estimated coefficients of the log of wages are also large and positive, consistent with the baseline results.

Second, given that the measures of working conditions are constructed from managers' responses, a potential concern is that the measurement errors in the variables may bias the results of the 2SLS estimations. To examine this possibility, I tested whether there are correlations between my IVs and the gap between a manager's response and my staff's observation of fire safety equipment. As described in the Data section, the gap between a manager's response and the interview staff's observation is a sum of (1) the measurement error between the response and the truth and (2) the error between the truth and the observation. If there is a correlation between an instrument and the first part of the measurement error, the gap is likely to be correlated with the instrument. However, there is no significant or systematic correlation with the gap for the woven production instrument (for the results, see columns (3) and (4) of Table A3 in the Appendix).

Third, woven or exporting firms may be clustered in different regions for such reasons as the existence of production knowledge spillovers. In that case, the increase in Japanese woven apparel demand might lead to a larger number of entries in that sector than in the knitted apparel sector,

which could affect regional labor market competition and working conditions. To investigate this channel, I controlled for the number of garment plants (found in my firm population list for 2015) within a 300-meter radius of the firm and within a 1-kilometer radius of the firm. I also estimated the equation by controlling for the 25 townships fixed effects to control for unobserved local time-invariant effects. In all of these exercises, the coefficients of exporting remained similar to the main results (for the results, see Table A11 in the Appendix).

Fourth, the ways of aggregating working conditions and management practices across questions may affect the results. As a robustness check, I converted the raw scores (from 0 to 1) into z-scores by normalizing by raw scores to mean zero and standard deviation one. The z-scores for fire safety were obtained as the averages of the z-scores within the dimension. I repeated this process to construct z-scores for health management and negotiation. Replicating Panels A and C of Table 4 with these z-scores generated estimates with mostly the same signs and significance levels (for the results, see Table A12 in the Appendix). In addition, the 2SLS results for each of the raw scores of working conditions imply that most of the coefficients for each outcome are positive, although the precision of the estimates varies (for the results, see Table A13 in the Appendix).

Fifth, the main specification assumes that in both the Yangon and the Mandalay regions, the impact of airport travel time and other geographical variables on firm performance is similar. However, these two regions are far from one another and could differ in many ways. For instance, Yangon is a coastal area, whereas Mandalay is landlocked, while Yangon International Airport has more direct flights to foreign countries than Mandalay International Airport. For this reason, I excluded Mandalay firms and reran the same regressions as in the main specification (for the results, see Panel A of Table A14 in the Appendix).

Sixth, my survey data might omit small firms that have not registered with the government, industry associations, or industry directories that are the source of my population database. As a precaution, I restricted my sample to firms that had more than 100 employees during the first year of observation (for the results, see Panel B of Table A14 in the Appendix).

Seventh, I imputed the measure of woven production in 2005 by using a retrospective survey question in 2014 in case the firm was not observed in the 2005 data. Two-thirds of firms in my baseline sample are not observed in the SGIM data in 2005. To measure woven production in 2005 of these firms, I used the retrospective survey question in 2014 asking whether the firm's main product was woven before 2005. This might have caused measurement errors in the instrument. To address this issue, I estimated the model with samples restricted to firms observed in the SGIM data in 2005. In all of these exercises, the main results for overall working conditions, audits,

management scores, and employment size stay the same, although some estimates of the individual working conditions scores lack precision because of the small sample sizes (for the results, see Panel C of Table A14 in the Appendix).

In these four experiments (the sixth to ninth robustness checks), the coefficients of exporting remained positive and significant with no major changes.

Finally, there is a concern that the firm survival rate from 2005 to 2013 depended on the IVs, which would lead to bias in my 2SLS estimates. Based on the 2005 SGIM data, I tested whether survival to 2013[25] is correlated with firm performance and the IVs. While survival was found to be positively correlated with initial firm size, it was not statistically significantly correlated with woven production or airport proximity (for the results, see Table A15 in the Appendix).

5 Alternative empirical strategies

As additional robustness tests of the main results, I examine the effect of exporting on firm outcomes, using two alternative identification strategies. In summary, even when using different exogenous variations, the main results are consistent with the baseline results.

5.1 Proximity to international airports in 2005

5.1.1 Proximity to airports: Empirical strategy

Plant proximity to international airports is another source of predetermined variation in exposure to trade. The identifying assumptions first require that proximity to airports affects firms' exporting decisions. The variation is likely to affect trade costs for three reasons. First, foreign buyers visit manufacturing plants when they first decide from which plants to purchase products. These foreign visitors are often the CEOs or sourcing managers of retail companies and they typically spend fewer than three days in Yangon. Many of these visitors are unfamiliar with Myanmar, which for many years had limited international trade activity. Supporting this view, during field interviews, some foreign buyers who visited Yangon said that they are most attracted to plants located within one hour of travel time to airports. Although they have ex-ante information about local firms, apparel buyers can easily access online directories[26] list the names, locations, and phone numbers of garment factories. Moreover, face-to-face communication through plant visits is important in

[25] Survival is defined as a dummy variable that takes 1 if the firm is observed either in the survey data from 2013–2015 or in the Myanmar Textile and Garment Industry Directories from 2013–2015.

[26] For example, the Yellowpage (`http://www.myanmaryellowpages.biz/`) and Yangon Directory (`http://www.yangondirectory.com/en/`)

Myanmar because phone and Internet connections are underdeveloped. In these settings, even an hour of difference in travel time could affect a buyer's decisions about exporting.

Second, proximity to an airport is also important because when trading starts buyers usually send technical staff to local plants every season to oversee product design changes. As noted in previous studies of flight distance in the United States (Giroud, 2013; Giroud and Mueller, 2012; Sheard, 2014), monitoring by trade partners is easier if the costs of visiting (i.e., flight costs) are low. The buyer is likely to consider this benefit when choosing a plant with which to place a first order. Third, some garment firms ship products by air rather than by sea, particularly during peak season, when final products are needed at short notice.

The mapping of the plants in Yangon in Figure 4 provides graphic evidence that plants far from airports were less likely to export during 2013–2015. I use the plant locations in 2005 to measure the proximity to the nearest airport. For firms in the Yangon region, the nearest airport is Yangon International Airport; for firms in the Mandalay region, it is Mandalay International Airport. Information on plant addresses in 2005 is obtained from the 2005 SGIM data. If the firm is not observed in the 2005 data and did not move plants after 2005, the address in 2005 is used for the address in the survey years. If the firm is not observed in the 2005 data and moved plants after 2005, I omit the observation from my baseline analysis. The baseline sample for the main analysis consists of domestically owned plants that operated before 2005 (the same criteria as the baseline sample using the woven production instrument) and has nonmissing information on addresses in 2005. It includes 120 plants (117 firms) observed at least in one of the three survey waves. The total number of plant-year observations during 2013–2015 is 298.

Since no measure of travel time can reliably account for traffic congestion in Myanmar, I conducted a traffic survey during May to July 2015. Eight locations in Yangon in which many garment firms are found were selected (see Figure A3). Local taxies were hired to drive to and from the international airport five times for each location. The Appendix summarizes the results from the traffic survey. Buyers are most plausibly concerned about the maximum time of travel because missing a return flight (on the way back to airport) or rescheduling meetings with plant managers (on the way from the airport) is costly. To incorporate this notion, I define travel time in my main specification as an estimate of the upper bound of the one-sided 95 percent confidence interval of travel time to airports. Appendix A.1 explains how the estimates were constructed based on the traffic survey as well as using Google Maps (2015).

The exclusion restriction for using airport proximity as an IV requires that the instrument affects firm performance only through its export status, conditional on the control variables. For five

principal reasons this condition is satisfied by proximity to airports. First, the Myanmar economy has long had limited access to foreign trade because of sanctions and the domestic export tax. When plants produced for the domestic market, proximity to international airports gave them no competitive advantage. Second, city congestion in Yangon has increased considerably since the 2011 reforms. The number of cars has increased because the government has deregulated the importing of cars. Without traffic, the travel distance would have had a weaker impact on choices of trade partner. For these reasons, it is unlikely that firms in 2005 chose locations closer to international airports in anticipation of this benefit. Third, I control for geographic and plant-specific factors that could be correlated with distance to the airport as well as with firm performance. For instance, airports require large areas of land, and governments often construct them in suburban areas where land is more abundant and relatively cheap compared with city centers. Large plants can be built in the same areas for the same reason. In addition, these areas are also likely to be developed by governments as industrial zones, which generally provide superior road and electricity services. Given that infrastructure conditions and proximity to cities can affect productivity, I control for (1) the location of plants within Yangon's industrial zones and (2) travel distance to the region's city center. Figure A2 in the Appendix shows the factories in industrial zones as well as the location of the city hall in Yangon. These geographical control variables are also measured for the plant locations in 2005.

Fourth, based on the garment firm data collected in 2005, Table 5 shows that there was no systematic correlation between distance to airport and firm performance in that year. In these regressions, I include two geographical control variables: travel time to city centers and a dummy variable that takes 1 for being located in an industrial zone. For consistency, I also restrict the sample to domestically owned firms, although including foreign-owned firms does not change the results. The results show that the correlations between the instruments and these performance variables in 2005 are not statistically significant. Finally, by using the survey data for the processed food sector, which produces goods that are not exported, I find no evidence that proximity to airports is correlated with firm performance. If the exclusion restriction underlying this second instrument is satisfied (e.g., no differences other than proximity to airport should affect firm performance), airport distance in these nonexporting industries should have no effect on firm performance.

5.1.2 Results of the airport IV estimation

This subsection reports the results of using airport proximity as an alternative IV to woven production.

Column (1) of Table 6 shows the result of regressing exports on airport proximity. I control for a dummy variable that indicates whether the plant is located in an industrial zone as well as the travel time to the city center. The coefficient of travel time to airports including all controls is negative and significant, suggesting that a reduction to below one hour of travel time leads to an increase in the probability of exporting by 27 percentage points on average.

The remaining columns in Table 6 report the 2SLS results, using airport time as an IV. All regressions include the geographical control variables used in the first-stage results. Columns (2)–(4) show the results of the 2SLS estimates for the working conditions variables. The estimate for the overall working conditions score is positive (0.19) and significant (standard error = 0.10). The level of the coefficient is also reasonably close to the earlier results using the woven production instrument. The estimated coefficient for the log of wages is positive as in the baseline results, although the level is slightly lower (0.066) and the standard error is higher (0.132). The coefficient for excessive working hours is positive but insignificant as in the baseline results. Column (5) shows that the estimated coefficient of the indicator of receiving a compliance audit is large (0.67), positive, and significant at the 1 percent level. Column (6) presents the effect on the overall management score, showing that the estimate is positive (0.34) and significant at the 5 percent level. Columns (7) and (8) report the estimates for the log of employment and log of sales (value added), which are large and positive, as in the baseline results. To summarize, the estimated coefficients are comparable to the baseline results using the woven production IV, although there are some differences in their magnitude possibly due to the low statistical power of the airport time instrument for predicting current export status and the difference in the samples because of missing addresses in 2005.

By estimating the 2SLS specification with both woven production and airport proximity in 2005 as the instruments for exports, I find that the estimated coefficients are similar to those where only one of the instruments is used. The results of the overidentifying restriction tests using both instruments (Hansen J statistics) suggest that the null hypothesis that the instruments are exogenous is not rejected for each of the main outcome variables (for the results, see Table A16 in the Appendix).

5.1.3 Placebo test for the airport IV, using the nonexporting (processed food) sector

Finally, by examining my survey samples in the processed food sector, I investigate concerns about the exclusion restriction, namely that airport distance could be a proxy for the unobserved differences in infrastructure or in local labor markets that affect firm performance directly. Processed food firms sell their products almost entirely in the domestic market. This practice reflects foreign

countries' food security policies, which in many countries are accompanied by stringent regulations on food imports. If proximity to airports affects only the performance of exporters, then this variable should have little or no impact on the performance of processed food firms, few of which export.

Table 6 reports the results of this exercise. In the processed food sector, the measures of sales and management practices are collected in 2013 and the data on working conditions scores are available for 2013 and 2014. Columns (1)–(3) show the estimates of the reduced-form regressions using the same control variables as above. All of the regression coefficients are insignificant and small, supporting the assumption of an exclusion restriction in the airport travel time instrument.

These results might not be informative about the exclusion restriction if the firms in two sectors are located in different regions, for example because of differences in industry clusters. To address this concern, I compare the garment sample with the processed food sample by excluding food firms located in townships that do not have a garment plant. In addition, to adjust for the differences in the regional distributions of food and garment plants, I construct a weight for each food plant based on the relative number of garment plants to the number of food plants in each township. All regressions include the same set of control variables outlined in the main specification (Section 5.1.2) and the standard errors are clustered at the township level. Columns (4)–(6) report the DID estimates using a matched sample of garment and food plants with the above weights for the latter (weight for the garment plants is 1). The estimated coefficients of airport travel time (for the processed food sector) are positive and insignificant, while those of airport travel time interacted with the dummy variable for the garment sector are negative and statistically significant.

5.2 Difference in the time trends of the garment and processed food sectors

5.2.1 Empirical strategy

As an alternative to the above IV approaches, I estimate a DID specification that exploits the differences in industries' exporting trends from 2013 to 2015. As described in Section 3.1, the trade sanctions of the United States and EU countries were lifted in 2012 and 2013, respectively. As a result, apparel exports to the world increased sharply from 2012 to 2014 owing primarily to increases in exports to EU countries and the United States. On the contrary, as shown in Figure 3, exports of processed food remained negligible even after 2011, presumably because of the stringent food security policies in developed countries. Therefore, by using the processed food sector as a control group, I can evaluate the impacts of these increases in exporting to the United States and

EU.

Specifically, I estimate the following DID specification:

$$Y_{it} = \beta_g Garment_i \times t + \theta_x X_{it} + \phi_t + \omega_i + \nu_{it}, \tag{2}$$

where t denotes the years from 2013 to 2015; Y_{it} is one of the plant outcome measures (the share of exports to the EU and United States, working conditions, management score, firm size) in year t; $Garment_i$ is an indicator variable for the garment sector; ω_i are the plant fixed effects; and ϕ_t are the year fixed effects. The coefficient of the interaction of $Garment_i$ and year t (i.e., β_g) captures the effect of increases in exporting to the United States and EU on outcomes Y_{it} under a parallel trend assumption: the means of Y_{it} for garment and processed food plants follow the same trend in the absence of the increase in exporting to the United States and EU from 2013 to 2015.

5.2.2 Results of the DID for the garment and processed food sectors

The sample is the domestic garment and processed food plants interviewed from 2013 to 2015, excluding new firms that started to operate in these industries after 2011[27]. This leads to a baseline sample of 486 plants (178 garment plants and 308 food plants) observed in one of the three years. In all specifications, I include the firm fixed effects and year fixed effects.

Column (1) of Table 8 reports the results for the share of exports to the EU and United States in terms of sales. Although the ideal measure of an exporting outcome in this setting would be the value of exports to the EU and United States, this information was not collected in the 2014 and 2015 waves. Instead, I thus use the regional share of sales relative to the plant's total sales, which is relatively less sensitive information than sales and therefore easier to collect. The estimated coefficient of the interaction of the garment sector and year is positive (0.0177) and statistically significant (standard error = 0.008), implying a 60 percent annual increase in the share of regional sales. By contrast, the share of exports to Japan did not increase in these periods as expected.

As shown in column (3), the DID estimate for overall working conditions is positive (0.0456) and significant (standard error = 0.009), suggesting a 30 percent annual increase in the working conditions scores in the garment sector compared with the processed food sector. The results mainly come from improvements in the fire safety and negotiation scores as shown in columns (4)–(6). The result for hourly wages is also positive and significant (coefficient = 0.172, standard

[27]The exclusion of newer plants aims to eliminate the endogeneity concern arising from the selection of industries after the trade liberalization in 2011. I also exclude processed food firms that have fewer than five employees to make the sample comparable to the garment plant sample, where the smallest firm size is six persons.

error = 0.054), and the result for working hours is negative and significant (coefficient = -1.07, standard error = 0.48). These results are consistent with those using the 2SLS specification in that exporting affects workers' welfare. The last two columns show the results for the employment and management practices scores. The coefficients are small, positive, and not statistically significant. This finding could be partly due to the short period of observations (e.g., management practices may not change in just one or two years).

Overall, these results are consistent with the earlier two sets of IV results. Nevertheless, two underlining factors that were absent in the previous IV specifications may influence the results in this sector-by-sector specification. First, the interpretation of the effect of exporting would differ from the earlier IV specification in that the effect can be attributed to increasing exporting toward EU countries or the United States, but not toward Japan, as confirmed in columns (1) and (2) of Table 8. A potentially important difference in the destinations is that anti-sweatshop concerns and human rights NGOs are presumably stronger in western countries than in Japan. Noting also that the changes in employment and management practices were similar by exporting and nonexporting industries in this period, the improvements in working conditions in the exporting sector are better explained by the increasing exposure to pressure from western buyers.

Second, in this specification, the results might be influenced by the differential levels of labor market tightness in these industries over time. During 2013–2015, there was a rapid increase in foreign demand for Myanmar apparel products that is likely to have increased demand for garment workers but not for processed food workers. On the contrary, the supply of workers might not easily increase in just three years, depending on the mobility of workers from rural areas and different kinds of occupations. Therefore, if labor markets are segregated between the two sectors, the results might reflect the effects of increasing the bargaining power of workers in the apparel sector in these periods.

6 Concluding remarks

Many developed nations grant preferential tariffs to low-income countries as a means of promoting economic development. Yet, despite their prevalence, there is little evidence that these trade policies benefit workers in beneficiary countries. On the one hand, as often claimed by anti-globalization activists, higher exposure to global trade might put firms under increasing cost-cutting pressure, which might result in lower wages, excessive working hours, or cutting costs on the measures needed to prevent injuries. On the other hand, access to markets in high-income countries may induce

firms to upgrade working conditions to improve production efficiency and quality. Trade could also improve conditions if the global anti-sweatshop movement is sufficiently strong to pressure international companies into imposing high labor standards in global supply chains.

To investigate the causal effects of exporting on working conditions in a low-income country, I collected measures on working conditions (fire safety, health management, freedom of negotiation, wages, working hours) and management practices in manufacturing firms in Myanmar through a unique field survey from 2013 to 2015. My baseline empirical results draw on a natural experimental setting in the Myanmar garment sector, where exporting from 2013–2015 was affected by firms' products in 2005 when trade was limited.

Overall, my baseline empirical results show that exporting to high-income countries positively and substantially affects working conditions: by exporting, the labor standards of Myanmar firms become comparable to those of multinationals operating in Myanmar. The positive effects on working conditions are observed in the areas of fire safety, health management, and worker–firm negotiation as well as wages. In addition, there is no evidence that exporting leads to excessive working hours. The baseline results were extensively tested to check their robustness. We find that employing two alternative identification strategies relying on the geographic and industry variation of firms provides similar results to the baseline results.

Looking at potential channels, I find that exporting induces local firms to be audited for compliance with international labor standards. Many global apparel companies in the United States and Europe demand these audits when they first contract with suppliers in developing countries, presumably because they are often blamed by activist groups for accidents and child labor incidents in their sourcing factories. Such pressure by foreign buyers may be coupled with incentives such as the better contract deals (prices and order size) offered by these buyers. In addition, this study finds that exporting has a positive effect on firm performance measured by firm size and management practices. Such evidence is consistent with standard trade models where access to larger markets provides firms with a higher incentive to upgrade efficiency and quality. Hence, efficiency wage theory, which suggests that firms provide better working conditions in order to enhance efficiency, may also explain the results. Investigating which channels play larger roles for exporting to improve working conditions is an important potential area of future research.

Another potential area of future research is to understand how the estimated effect differs by destination country. As shown by Brambilla, Lederman, and Porto (2012), the effects of exporting are likely to differ by destination country. Finally, further work could study how different channels of globalization such as foreign direct investment affect labor conditions. For example, do the

entries of multinationals affect labor conditions? Myanmar could be an ideal setting for analyzing this question because the country has attracted a large amount of foreign direct investment since its democratic reforms.

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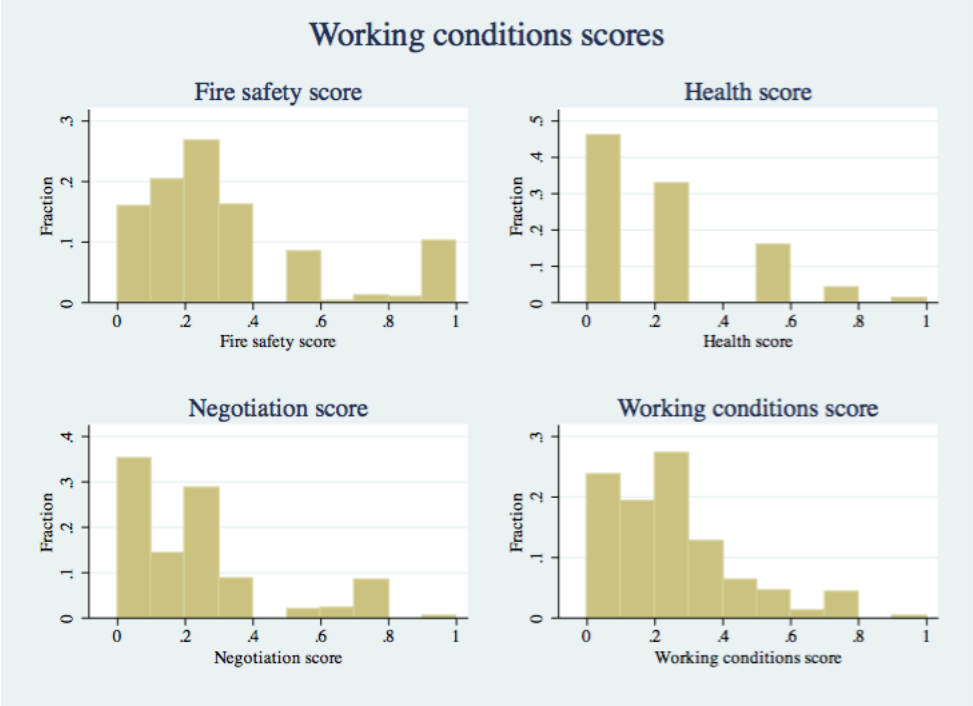
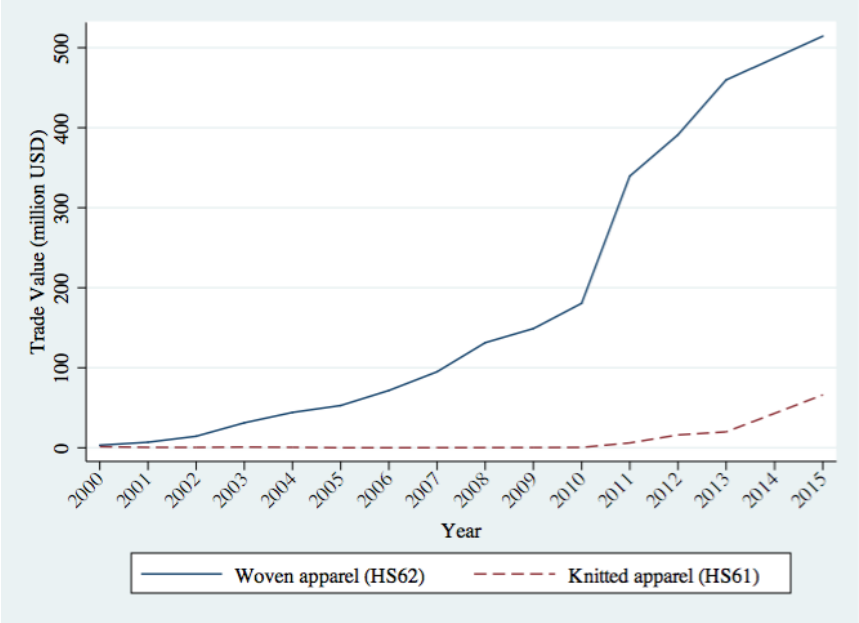
7 Figures and tables

Figure 1: Distribution of working conditions scores



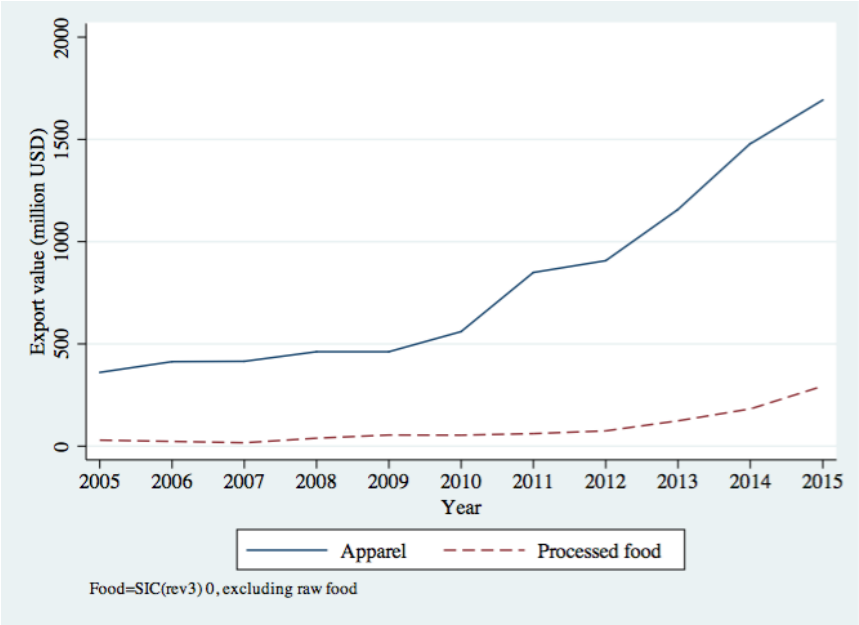
Notes: The figures show the histograms of the fire safety (fire safety equipment, fire drills), health management (practices to cope with occupational injuries), freedom of negotiation (allowance of and interaction with unions), and working conditions average score, which is the average of the three scores.

Figure 2: Value of apparel exports to Japan



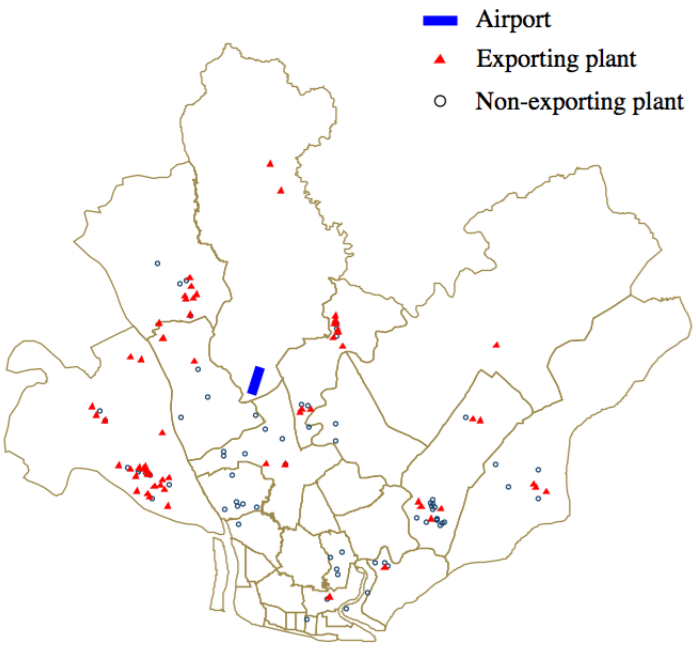
Notes: Total value of Japanese imports of HS 61 (knitted apparel) and HS 62 (woven apparel) from Myanmar reported by Japan. Data from UN Comtrade.

Figure 3: Exports of apparel and processed food from Myanmar



Notes: The value of apparel and processed food products exported from Myanmar to the world. The apparel products include those in SITC (revision 3) 84 and the food products include those in 0 (food and live animal) excluding 011, 012, 034, 036, 041, 042, 043, 044, 045, 046, 047, 054, 057, 0711, and 0721 (live animals and raw food material). Data from UN Comtrade.

Figure 4: Map of garment plants and Yangon International Airport



Notes: Map of the Yangon region with township boundaries. Plants exporting in the earliest years in 2012–2014 are marked with triangles and the other garment plants are shown with circles. Locations are measured with addresses in 2005.

Table 1: Basic sample statistics of the baseline garment sample

Variable	Mean	SD	Min.	Max.	N
Export (share of sales)	0.32	0.463	0	1	345
Export (indicator)	0.328	0.47	0	1	345
Export to Japan (indicator)	0.214	0.411	0	1	345
Export to Japan (share of sales)	0.107	0.255	0	1	345
Export to EU/US (indicator)	0.159	0.367	0	1	345
Export to EU/US (share of sales)	0.065	0.188	0	1	345
Employment	272.696	361.889	6	2000	345
Number of sewing machines	209.736	267.051	8	1520	345
Value added (USD)	689397	1942603	3301	18000000	108
Woven (2005)	0.551	0.498	0	1	345
Working conditions score	0.214	0.196	0	1	345
Fire safety score	0.314	0.284	0	1	345
Health score	0.207	0.232	0	1	345
Negotiation score	0.216	0.231	0	1	345
Fire exits	0.661	0.474	0	1	345
Fire extinguishers	1	0	1	1	345
Fire hoses	0.51	0.501	0	1	345
Fire alarms	0.446	0.498	0	1	345
Evacuation route maps	0.388	0.488	0	1	345
Practice fire drills	0.128	0.334	0	1	345
Nurse at plant	0.067	0.25	0	1	345
Record injury	0.157	0.364	0	1	345
List of hospitals for emergency	0.194	0.396	0	1	345
Contract with hospital	0.417	0.494	0	1	345
No workers' leader	0.357	0.48	0	1	345
Workers' leader appointed by workers	0.168	0.375	0	1	345
Hourly wage (USD)	0.292	0.069	0.137	0.594	241
Working hours above 60 hours/week	2.271	4.597	0	31	341
Management score	0.55	0.205	0.075	0.979	345
Management: production monitoring score	0.608	0.225	0.063	1	345
Management: quality control score	0.634	0.298	0	1	345
Management: machine maintenance score	0.409	0.324	0	1	345
Mandalay region	0.032	0.176	0	1	345
Owner university graduated	0.5	0.499	0	1	345
Owner is ethnic Chinese	0.072	0.26	0	1	345
Firm age	14.197	4.647	8	41	345
Ever received labor/environmental compliance audit	0.15	0.358	0	1	226
Travel time to airport (2005)	0.862	0.44	0.102	3.143	298
Travel time to city center (2005)	1.432	0.621	0.102	3.793	298
Plant in an industrial zone (2005)	0.678	0.468	0	1	298

Notes: N is the number of plant-year observations. Value added (USD) is observed only in 2013. "Ever received labor/environmental compliance audit (Audit)" is observed only in 2014 and 2015. Travel time to airport, travel time to city center, and plant in an industrial zone are measured for the plant address in 2005. My analysis using the airport proximity instrument excludes some plants for which the address in 2005 is missing.

Table 2: Firm performance in 2005

Panel A: Firm performance in 2005 by woven production

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dep Var.=	TFP	Sales	Num. workers	Num. machines	Growth	Wage	Labor share	Manager's tenure (years)	% univ. grad. workers
Woven	-0.0167	-0.0481	0.225	-0.0409	0.0546	-0.049	-0.0063	-0.614	-0.028
	(0.232)	(0.291)	(0.209)	(0.217)	(0.0941)	(0.0776)	(0.0451)	(1.487)	(0.0582)
Controls	No	No	No	No	No	No	No	No	No
Observations	122	126	126	126	122	126	126	102	112
Mean dep var	-0.676	11.01	5.050	4.916	-0.221	3.228	0.459	9.686	0.213

Notes: $* < 10 percent, ** < 5 percent, *** < 1 percent$. Robust standard errors are shown in parentheses. Data from the 2005 SGIM, excluding fully foreign-owned firms. Woven production is an indicator variable that takes the value of 1 if the number of woven products divided by the number of all products produced in the plant is above half. In Panel B, airport time is the estimated driving time to Yangon International Airport. All regressions in Panel B control for travel time to the city center and the dummy variable for being located in an industrial zone. Number of workers, number of sewing machines, and wages (hourly wages) are in logarithms. TFP = log(value added) −0.469*log(total hours work) −0.531*log(asset value), where 0.469 is the average of the cost share of labor in value added. Growth is the measure of employment growth defined by log(employment in 2005) - log(employment in 2004). Labor share is the cost share of labor in value added. Manager's tenure is the year of experience of the manager. "% univ. grad. workers" is the proportion of university graduate workers in the firm.

Table 3: First-stage results of exporting and woven production

Dependent variables	Exporting		Exporting	Exporting to Japan	Exporting to EU/US
	(share in sales)		(indicator)	(indicator)	(indicator)
Period	2013–15	2013–15	2013–15	2013–15	2013–15
	(1)	(2)	(3)	(4)	(5)
Woven (2005)	0.269***	0.273***	0.270***	0.180***	0.130**
	(0.0694)	(0.0658)	(0.0667)	(0.0618)	(0.0556)
Owner college graduate		0.238***	0.249***	0.154**	0.0359
		(0.0635)	(0.0638)	(0.0602)	(0.0534)
Owner ethnic Chinese		0.112	0.128	-0.0175	-0.00344
		(0.0986)	(0.101)	(0.122)	(0.0806)
Firm age		-0.00319	-0.00233	-0.00893*	-0.00344
		(0.00524)	(0.00528)	(0.00488)	(0.00421)
Observations	345	345	345	345	345
F test IV=0	15.02	17.22	16.42	8.453	5.440
Prob > F	0.000165	0.00006	0.00008	0.00426	0.0212
N firms	137	137	137	137	137

Notes: $* < 10 percent, ** < 5 percent, *** < 1 percent$. Observations are at the level of plant-years. All regressions include the year fixed effects and region fixed effects. Standard errors are clustered at the firm level and shown in parentheses. The exporting indicator takes 1 if the products are sold to a foreign country. Woven production is an indicator variable that takes the value of 1 if the number of woven products divided by the number of all products produced in the plant is above half in 2005 if observed in the 2005 SGIM data; otherwise, these data are imputed from the survey question in 2014 on whether the firm produced woven products before 2005. Owner ethnic Chinese is an indicator variable that takes 1 if the owner of the firm is Chinese Burmese or Chinese.

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Table 4: 2SLS results (IV= woven production in 2005)

Panel A: Impact on working conditions								
	Working		Individual scores			Log wages	Hours	Audit
	conditions score		Fire	Health	Negotiation		(>60/week)	
Period	2013–15		2013–15	2013–15	2013–15	2013–15	2013–15	2013–14
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Export share	0.268***	0.267***	0.363***	0.205*	0.230**	0.150*	-3.890	0.378**
	(0.0860)	(0.0837)	(0.134)	(0.118)	(0.0965)	(0.0909)	(2.632)	(0.187)
Controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	345	345	345	345	345	241	341	226
F (IV)	15.02	17.22	17.22	17.22	17.22	20.91	17.52	8.164
Mean	0.214	0.214	0.314	0.112	0.216	-1.259	2.271	0.150
N firms	137	137	137	137	137	135	137	117
Panel B: Impact on firm size and productivity								
Dependent var.	Log employment		Log sewing machines		Log sales		Log sales per worker	
Period	2013–15		2013–15		2013		2013	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Export	1.513***	1.552***	1.454**	1.470***	1.893***	1.926***	0.912	0.936
	(0.555)	(0.542)	(0.569)	(0.558)	(0.663)	(0.646)	(0.620)	(0.591)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	345	345	345	345	108	108	108	108
F (IV)	15.02	17.22	15.02	17.22	16.57	17.33	16.57	17.33
Mean	0.245	0.245	0.314	0.204	0.216	-1.259	2.271	0.150
N firms	137	137	137	137	106	106	106	106

Notes: $* < 10 percent, ** < 5 percent, *** < 1 percent$. Observations are at the level of plant-years. All regressions include the year fixed effects and region fixed effects. Standard errors are clustered at the firm level and shown in parentheses. Export takes 1 if the plant exports to a foreign country. The control variables include the owner college graduate dummy, owner ethnic Chinese dummy, and firm age. In Panel A, social audit takes 1 if the plant has ever received a labor or environmental compliance audit. The question on the social audit was asked only in the survey waves in 2014 and 2015, and therefore the sample size is smaller. All dependent variables are taken as logarithms in Panel B. Log sales per worker are defined by log sales - log employment. The values of sales are observed only in 2013; therefore, columns (5)–(8) restrict the sample to firms with nonmissing sales observations in 2013.

Table 4 (continued): 2SLS results (IV= woven production in 2005)

Panel C: Impact on management practices scores

	Management score		Individual scores			Buyers request record	Buyers make suggestions
			Production	Quality	Machine		
Period	2013–15		2013–15			2015	2015
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Export	0.293***	0.274***	0.164	0.174	0.485**	1.031***	0.942***
	(0.100)	(0.0968)	(0.107)	(0.152)	(0.198)	(0.341)	(0.323)
Controls	No	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	345	345	345	345	345	115	115
F (IV)	15.02	17.60	17.60	17.60	17.60	4.223	4.223
Mean	0.550	0.550	0.608	0.634	0.409	0.200	0.191
N firms	137	137	137	137	137	112	112

Notes: $* < 10 percent, ** < 5 percent, *** < 1 percent$. Observations are at the level of plant-years. All regressions include the year fixed effects and region fixed effects. Standard errors are clustered at the firm level and shown in parentheses. Export takes 1 if the plant exports to a foreign country. The control variables include the owner college graduate dummy, owner ethnic Chinese dummy, and firm age. "Buyer request record" takes 1 if the main buyer sends staff who request production data on the plant. "Buyer make suggestions" takes 1 if the main buyer sends staff who suggest how to improve production processes or quality. These two variables were observed only for the survey in 2015.

Table 5: Firm performance in 2005 by airport proximity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dep Var.=	TFP	Sales	Num. workers	Num. machines	Growth	Wage	Labor share	Manager's tenure (years)	% univ. grad. workers
Airport time	0.420	0.252	-0.0647	0.0351	0.0945	-0.104	-0.0178	-0.528	-0.0130
(hour)	(0.415)	(0.442)	(0.268)	(0.240)	(0.120)	(0.127)	(0.0628)	(2.147)	(0.0532)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	117	120	120	120	116	120	120	98	106
Mean dep var	-0.671	11.01	5.044	4.908	-0.218	3.228	0.462	9.713	0.214

Notes: $*<10percent, **<5percent, ***<1percent$. Robust standard errors are shown in parentheses. Data from the 2005 SGIM, excluding fully foreign-owned firms. Airport time is the estimated driving time to Yangon International Airport. All regressions in Panel B control for travel time to the city center and the dummy variable for being located in an industrial zone. The number of workers, number of sewing machines, and wages (hourly wages) are in logarithms. TFP = log(value added) −0.469*log(total hours work) −0.531*log(asset value), where 0.469 is the average of the cost share of labor in value added. Growth is the measure of employment growth defined by log(employment in 2005) - log(employment in 2004). Labor share is the cost share of labor in value added. Manager's tenure is the year of experience of the manager. "% univ. grad. workers" is the proportion of university graduate workers in the firm.

Table 6: 2SLS results (IV= airport proximity in 2005)

Dep var	Export	Working cond. score	Log wages	Hours (>60/wk)	Audit	Manage-ment	Log em-ployment	Log sales per worker
Method	OLS	IV	IV	IV	IV	IV	IV	IV
Period	2013–15	2013–15	2013–15	2013–15	2014–15	2013–15	2013–15	2013
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Time to airport	-0.27***							
(2005)	(0.0877)							
Export		0.186*	0.0657	2.342	0.665***	0.336**	1.245*	1.609*
		(0.102)	(0.132)	(2.921)	(0.246)	(0.141)	(0.651)	(0.896)
Observations	298	298	207	295	189	297	298	102
N firms	117	117	116	117	98	117	117	98
F test IV=0		9.507	9.509	9.876	4.244	9.614	9.507	8.820
Mean	0.354	0.257	-1.251	2.175	0.159	0.561	4.973	7.263

Notes: $*<10percent, **<5percent, ***<1percent$. Observations are at the level of plant-years. All regressions control for travel time to the city center, the dummy variable for being located in an industrial zone, the year fixed effects, and the Mandalay region dummy. "Export" is the share of sales from exports relative to the plant's total annual sales. Standard errors are clustered at the firm level and shown in parentheses. Airport time is the estimated driving time to Yangon International Airport. Observations are included only if the plant address in 2005 was identified.

Table 7: Placebo test for the airport IV using the nonexporting (processed food) sector

Sample	Processed food			Garment & matched sample of processed food		
	Working cond. score	Management score	Log sales	Working cond. score	Management score	Log sales
Period	2013–14	2013	2013	2013–14	2013	2013–14
	(1)	(2)	(3)	(4)	(5)	(6)
Time to airport (2005)	-0.0120	0.0200	-0.199	0.0567	0.0820	0.0838
	(0.0161)	(0.0168)	(0.340)	(0.0371)	(0.0509)	(0.517)
Time to airport (2005)				-0.105**	-0.162**	-1.278***
× Garment				(0.0405)	(0.0591)	(0.328)
Garment				0.220***	0.478***	1.259**
				(0.0485)	(0.0540)	(0.530)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	421	262	155	658	427	237
N garment plants				282	191	97
N food plants	421	262	155	376	236	140
Mean	0.269	0.384	11.21	0.271	0.392	11.18
N townships	27	27	18	17	17	16

Notes: $* < 10 percent, ** < 5 percent, *** < 1 percent$. Standard errors are clustered at the township level and shown in parentheses. The control variables are travel time to city center, the dummy variable for being located in an industrial zone, and the dummy variable for beverage firms. Columns (1)–(3) use the sample of processed food firms excluding the plants in Yangon townships where no garment plants were observed. Columns (4)–(6) use both garment and processed food firms, and the food sample is weighted by the relative sample sizes of garment to food plants within townships. Sales are the logarithm of value added.

Table 8: Time trends by the exporting (garment) and nonexporting (processed food) sectors during 2013–2015

	Export to EU/US (share)	Export to Japan (share)	Working conditions (score)	Individual scores			Log Wages (Log)	Hours (> 60/wk)	Employment (Log)	Management (score)
				Fire safety (score)	Health (score)	Negotiation (score)				
Period	2013–15	2013–15	2013–15	2013–15	2013–15	2013–15	2013–14	2013–15	2013–15	2013,2015
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Garment x Year	0.0177**	-0.00205	0.0451***	0.0738***	0.0124	0.0529***	0.172***	-1.073**	0.0112	0.00100
	(0.00812)	(0.00813)	(0.00906)	(0.0123)	(0.0132)	(0.0131)	(0.0545)	(0.481)	(0.0324)	(0.00903)
Observations	1,045	1,045	1,045	1,045	1,045	1,042	500	1,009	1,045	681
N firms	427	427	427	427	427	427	378	427	427	423
Mean	0.0293	0.0541	0.164	0.256	0.106	0.129	-1.321	2.940	3.831	0.365

Notes: $* < 10 percent, ** < 5 percent, *** < 1 percent$. All regressions include the firm fixed effects and year fixed effects. Standard errors are clustered at the firm level and shown in parentheses. "Export to Japan (share)" and "export to EU/US (share)" are the sales share of exports to Japan and to the EU/United States, respectively. Wages are the logarithm of hourly wages. Data on wages were not collected in 2015 for the processed food sector. Working hours are the logarithm of working hours per week including overtime hours.