Environmental Costs of Foreign Market Access: Firm-Level Evidence from Pakistan

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Abstract

The abolition of the Multifibre Agreement (MFA) in 2005 and China's subsequent free trade agreement (FTA) with Pakistan in 2006 resulted in opposite demand shocks for Pakistan's textile industry. While the MFA's end opened U.S. markets to Pakistani firms, it also exposed them to intense Chinese competition or the “third-party” effects. The Pakistan-China FTA provided new opportunities, particularly in lower value-added goods and intermediate inputs. We examine how these policy changes affected both trade patterns and environmental outcomes. Our findings reveal a stark contrast: The FTA with China encouraged Pakistani firms to upgrade product quality and expand exports, leading to higher total emissions but unchanged emission intensity. Conversely, post-MFA competition in U.S. markets forced Pakistani firms to shift towards lower-quality, more polluting products outside their core expertise. While the FTA appeared to be a better bargain for Pakistan, things were far more complex. China, in an attempt to establish itself as a global leader, ensured a consistent supply chain of raw materials or intermediate inputs (finishing and spinning) by giving Pakistan and many other countries access to its own markets while capturing their share of high-value products (clothing and interior) in the US market. Our findings demonstrate how trade liberalization can have unexpected "third-party" implications that affect not just economic outcomes but also the environment via complex market dynamics and firm-level adaptations.

JEL: F10, F14, F18, Q37, Q53

Key words: Carbon Emissions, Trade, Multifibre Agreement, Free Trade Agreement, Pakistan.

I. Introduction

Climate change is a critical global issue, and international trade—comprising the production and transportation of manufactured goods—is responsible for 20 to 30 percent of greenhouse gas (GHG) emissions worldwide (WTO, 2021). Energy resources are utilized at every step of the manufacturing process, and reliance on fossil fuels results in a notable rise in carbon dioxide (CO2), a major greenhouse gas (GHG) (Govindan et al., 2013; Tseng et al., 2013). For example, by 2010, China contributed roughly 25% of worldwide CO2 emissions, with manufacturing activities responsible for about 60% of this share (Cao et al. 2012). Growing concerns about carbon emissions tied to production-related energy use are driving a worldwide movement toward sustainable manufacturing practices. Minimizing resource usage, especially through more efficient manufacturing processes, has become an increasing priority.

Understanding how demand (or consumption) shocks to the manufacturing sector affect carbon emissions intensity is crucial as incomes—and consequently demand—grow worldwide. This issue is particularly significant in developing countries with relatively weak environmental protection. Using firm-level data from Pakistan, we examine the effects of two major trade policy changes on emissions from its textile sector: the conclusion of the Multifibre Arrangement (MFA) in 2005 and the Pakistan-China Free Trade Agreement (FTA) in 2006.

When the MFA agreement ended in 2005, the United States and Europe removed quota restrictions on importing textiles and apparel from developing countries. This was expected to alter trade patterns, with Pakistan anticipating benefits from increased access to major markets like the US and EU. Around the same time, Pakistan and China established a Free Trade Agreement (FTA), in which both countries reduced their tariff rates, gaining more access to each other's markets.

While both policies were anticipated to increase Pakistan's market access in the US and China, they differed in terms of how they exposed Pakistani firms to foreign market competition. The Pakistan-China FTA was an exclusive bilateral agreement granting Pakistan preferential access to Chinese markets (and vice versa). In contrast, the MFA expiration simultaneously opened US and European markets to all developing countries, not just Pakistan, creating intense competitive pressure for Pakistani exporter. Therefore, for Pakistan, the advantages of lifting the MFA restrictions were mostly countered by the intense competition from other nations (often referred to as "third party" effects), particularly China; as a result, Pakistan's market share in US and EU imports declined (Whalley, 2006).

With the end of the MFA, Pakistan lost its market share in high-value-added garment and interior segments in the US to China[1]. However, the gains for Pakistani firms in Chinese markets due to the FTA were mainly in the low-value-added spinning and finishing segments (Jamil et al., 2022), which served as intermediate inputs into China's garment and interior sectors. *In other words, China strategically opened its market to Pakistani firms for lower-value raw materials and intermediate goods (spinning and finishing), while simultaneously capturing Pakistan's share of higher-value products (interior goods and clothing) in the American market. By importing these intermediate inputs from Pakistan, China secured a*

[1] Refer to Section III for more detailed discussion on this.

reliable supply chain of raw materials necessary for manufacturing premium products destined for US consumers.

Given the different nature of these demand shocks (due to their varied nature of competitive pressure or the exposure to "third party" effects), we empirically analyze the effects of these policy changes on the carbon emissions from the textile manufacturers in Pakistan. This study provides firm-level evidence on how trade policy-related demand shocks affect emission intensity in a developing country context. It moves beyond the common focus on macroeconomic aggregates found in environmental emissions literature, offering instead a microeconomic perspective. Notably, while most research examines individual demand shocks in isolation, this study disentangles the effects of two concurrent shocks within Pakistan's textile sector i.e., more anticipated access within the US (end of the MFA) and the Chinese (Pak-China FTA) markets.

Our analysis reveals that the Pakistan-China FTA expanded exports in low value-added segments, encouraged firms to concentrate on core products, and enhanced output quality. While this led to higher overall emissions, emission intensity (emissions per output unit) remained largely unchanged. In contrast, the MFA expiration caused Pakistan's exports to decline and pushed firms away from their core products as they faced intensified competition from other countries. Competition or the strong "third-party" effects had a far greater impact than the increased US market access. While total emissions decreased, emission intensity rose substantially, with Pakistani manufacturers producing inferior, more polluting products and losing market share in high-value segments. Our findings demonstrate that different demand shocks affect emissions in distinct ways, highlighting that any market access assessment must carefully consider the competitive pressures that accompany it.

II. Literature Review

The impact of trade on carbon emissions through exporting firms can be grouped into three main categories. The first, known as the scale effect, increases emissions when production increases to meet foreign demand. On the other hand, the technological or technique effect tends to lower emissions per unit by encouraging adoption of cleaner, more energy-efficient technologies. Finally, the composition effect reflects changes in a firm's product mix, which can either increase or decrease emissions intensity depending on whether trade pushes production toward dirtier or cleaner products. When firms focus on their core product varieties, emissions intensity generally decreases as firms are usually more efficient in their specialized production (Barrows & Ollivier, 2018).

Exporting firms in developing countries tend to be larger, more capital-intensive, and more productive, offering higher wages and typically producing higher-quality outputs (Jamil et al., 2022; Brambilla et al., 2015; Verhoogen, 2008; Wagner, 2007). Despite this well-documented pattern, rigorous research examining firm-level environmental performance remains relatively limited. The most compelling evidence currently available comes from studies focused on China and India.

Rodrigue et al. (2022) found that in China, during its WTO accession in the early 2000s, exporters demonstrated lower emissions intensity and continuously improved this metric over time. Export activities reduced sulphur dioxide (SO2) intensity by more than one-third, primarily through changes in energy sourcing, product scope, and capital vintage effects. Initially, high-pollution producers expanded rapidly before eventually decreasing their

emissions intensity. Similarly, Pei et al. (2020) found that Chinese firms' export intensity correlates with reduced SO2 emissions intensity and greater pollution abatement efforts among exporters[2]. Using matching and difference-in-difference methodologies, Lin & He (2022) examined this relationship with more mixed results; export intensity enhanced environmental performance only for specific firm types (private, foreign-funded) and geographic locations (coastal regions). Nevertheless, China's dramatic export growth increased overall pollution intensity, elevating infant mortality rates (Bombardini & Li, 2020). The technique effect—whereby rising incomes facilitate adoption of pollution-reducing technologies—proved insufficient to counterbalance the massive export expansion's scale, resulting in negative health consequences for children.

In India, export growth was associated with declining emissions intensity, primarily driven by changes in product mix and pricing rather than technological advancements (Barrows & Ollivier, 2014a). However, when considering both domestic and export sales, foreign demand accelerated emissions growth rates among Indian exporters through the scale effect, despite technological improvements moderating this increase (Barrows & Ollivier, 2021). Conversely, the Multifibre Agreement (MFA) termination prompted quality deterioration and higher emissions intensity as Indian manufacturers lost market access (Barrows & Ollivier, 2014b). Throughout 1990-2010 in India, emissions intensity declined through two mechanisms: production shifted toward cleaner firms, and technological progress reduced emissions intensity for specific products over time. Nevertheless, these positive trends were outweighed by a third, more influential factor that made firms slightly more pollution-intensive overall: the elimination of export taxes *reduced* competition among Indian firms, allowing them to diversify beyond their core competencies (Barrows & Ollivier, 2018).

Institutional development in wealthy countries, amplified by trade policy, can also be a source of cross-country differences in emissions. Shapiro (2023) notes that strong institutions tend to promote cleaner industries (and their export) while shifting pollution-intensive production to countries with weaker regulatory frameworks. In addition, trade policy in most countries enables the import of “dirty” inputs at lower tariff rates and indirectly subsidizes carbon emissions (Shapiro, 2021). There is, however, a mitigating effect when multinationals from environmentally conscious “clean” countries establish operations in higher-emission “dirty” countries. These companies typically implement more energy-efficient practices from their home countries, reducing industrial emissions in host nations (Garcia-Lembergman et al., 2024). This occurs despite the fact that these multinational affiliates generally maintain higher emission levels abroad than in their home countries. The relationship between exporting and emissions efficiency varies drastically by industry even within developed economies like the United States (Cui & Qian, 2017)[3].

Given the exigencies of the climate crisis (in addition to trade protection considerations), the European Union is moving to implement carbon taxes through the Carbon Border Adjustment Mechanism (CBAM). From 2023 to 2026, a transitional phase requires importers to report the greenhouse gas emissions embedded in EU-bound goods. Starting in 2026, importers must purchase certificates for carbon-intensive products entering the EU market. Currently, the mechanism applies to specific carbon-intensive sectors: cement, iron and steel, aluminium, fertilizers, electricity, and hydrogen.

[2] They hypothesize (but do not test) that this stems from a combination of government regulations, VAT export subsidies (inversely related to emissions), and pressure from international buyers.
[3] Cui and Qian (2017) found that exporters demonstrated notably lower emissions intensity in sectors such as petroleum and coal, furniture, rubber, transport equipment, fabricated metals, and chemicals. However, this environmental advantage was absent in paper, printing, stone/clay/glass, and metals.

The EU is also implementing another initiative, the Corporate Sustainability Due Diligence Directive ("CS3D"), to mitigate climate change. Large companies (both EU and non-EU) will need to "adopt and implement effective (and extensive) due diligence policies for identifying, preventing, mitigating, and bringing to an end actual and potential human rights and environmental harms in their own operations, those of subsidiaries, and of their business partners relating to their 'chain of activities' (i.e., specific parts of the value chain)" (Baker McKenzie, 2024). The initial CS3D proposal included leather and textiles, but at the last minute, these sectors were excluded.

The Carbon Border Adjustment Mechanism (CBAM) or Corporate Sustainability Due Diligence Directive (CS3D) are anticipated to eventually extend to the textile industry, which is a critical export sector for numerous developing economies. Pakistan, ranking as the world's seventh-largest textile exporter as of 2021, depends heavily on this sector, with cotton-based textiles representing approximately 60% of the country's exports and 46% of its manufacturing output. Given this economic significance, understanding how international demand for Pakistani textile exports relates to firm-level emissions have become increasingly important.

III. The End of the Multifibre Arrangement (MFA) and the Pakistan-China FTA

End of the Multifibre Arrangement (MFA)

The end of the Multifibre Arrangement (MFA) marked a significant shift in the global trade of textiles and clothing. Adopted in 1974, the MFA had set quotas on the quantity of textiles and clothing that developing nations could export to developed countries to safeguard developed countries' domestic industries.[4] A significant milestone in reversing these protections occurred with the signing of the Agreement on Textile and Clothing (ATC) during the Uruguay Round (1994), which ended the MFA. The ATC initiated the process of incorporating textile and clothing products into the General Agreement on Tariffs and Trade (GATT) and the World Trade Organization (WTO). The ATC rolled back the quotas over ten years in four phases, with the complete elimination of quotas by January 1, 2005 (WTO, 2024).

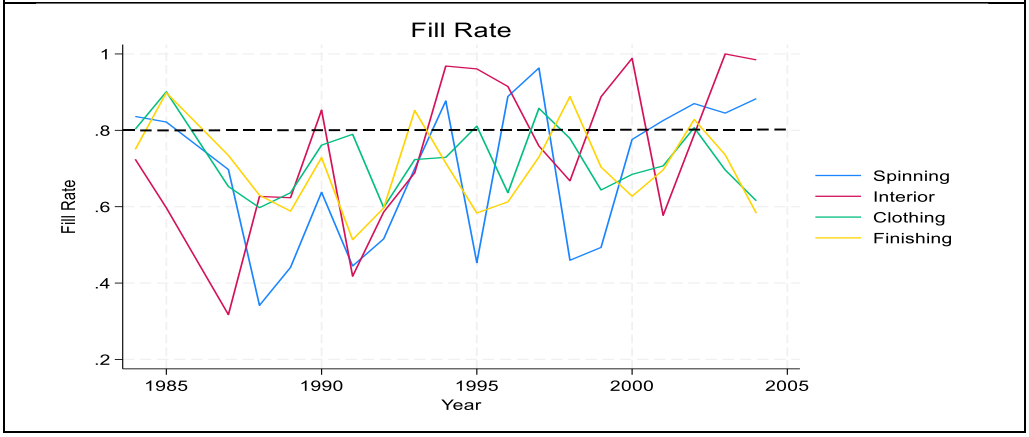
The restrictiveness of quotas under the MFA was typically determined by "fill rates," used to gauge the extent to which countries utilized their allocated export quotas for textiles and clothing.[5] The fill rate represents the percentage of a quota allowance used by an exporting country, where higher fill rates indicate that the quota was restrictive and binding. According to estimates by Khandelwal et al. (2010), Bangladesh, China, Indonesia, Pakistan, India, and Sri Lanka had fill rates exceeding 80% under U.S. textile and clothing quotas.

[4] Although the MFA was officially signed in 1974, its origins date back to the 1930s when Japan emerged as the top exporter of cotton textiles during a period of global economic turmoil. As a result, the United States and Europe limited imports from Japan to protect their local textile industries. By the 1960s, these protections were extended to cover Hong Kong, Pakistan, and India. Initially, the agreements covered only cotton, but they gradually evolved into "multifiber" arrangements incorporating clothes and textiles made from all fibers (MacDonald, 2006). By restricting imports under the MFA, the United States and the European Union hiked domestic clothing prices. Domestic production increased, while domestic consumption decreased. Outside of these two markets, the impacts were more complex, since restrictions on one group of countries provided opportunities for others, resulting in changes in global textile markets.

[5] Fill rates are defined as exports as a percentage of adjustable base quota. The base quota is the original quota level agreed upon at the start of the contract term, whereas the adjusted level is the ex-post quota that exporting countries can apply to a product category in place of the base quota by using flexibility adjustments in the MFA.

Figure 1 below shows the segment-wise fill rates for Pakistan under U.S. textile and clothing quotas from 1985 to 2005[6]. The black dashed line indicates the 80% fill rate threshold, which indicates when a quota is binding. While the fill rates fluctuated over the years, the spinning and interior segments were the most restricted and binding segments under the MFA. Pakistani exporters, therefore, welcomed reductions in quotas on their goods when the MFA ended in 2005.

Figure 1: Segment Wise Fill Rates for Pakistan under U.S. Textile and Clothing Quotas

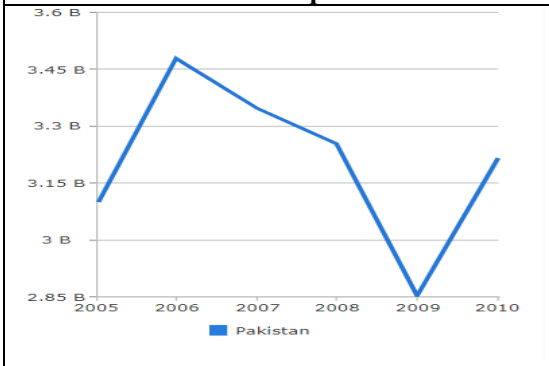


Data Source: US Commerce Department's Office of Textile and Apparel (OTEXA)

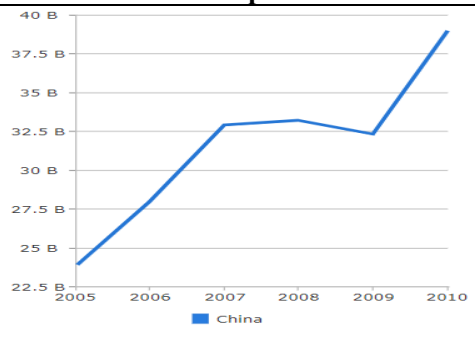
When the quotas were removed in 2005, they were eliminated worldwide. Pakistan's increased access to the US was accompanied by heightened competition from other countries, particularly China. In fact, Khandelwal et al. (2010) suggest that China's gains from the end of the MFA came almost exclusively at the expense of other American trading partners rather than domestic firms.[7] As a result, Pakistan, like many other countries, including the Philippines, Nepal, Korea, Taiwan, and Bangladesh, lost market share in the US due to competition (Whalley, 2006). Figure 2 illustrates the aggregate export of textiles and clothing from China and Pakistan to the US from 2005 to 2010, shortly after the end of the MFA. Pakistan's market share declined while it surged for China.

Figure 2: Pakistan and China's Export of Textile and Clothing to USA (US $ Thousand)

Pakistan's Export to USA



China's Export to USA

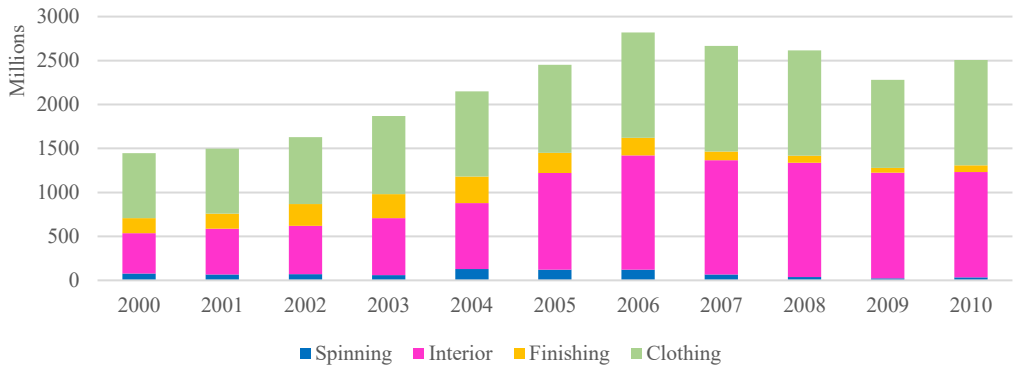


Data Source: World Integrated Trade Solution by the World Bank

[6] Based on De Loecker (2011) we divide the textile sector into four major segments i.e., spinning, finishing, clothing and interior.
[7] China had not been eligible for the first two rounds of quota elimination under the ATC in 1995 and 1998. However, upon entering the WTO, China's average export quantity of the items covered by the first two stages increased by 111 and 151 percent in the first year, respectively. Once a WTO member, China took part in the third round of quota removals in 2002, where its exports to the US markets increased by 145 percent (Khandelwal et al., 2010), with some product categories seeing increases of over 1,000% (Rivoli, 2005).

Furthermore, these losses affected high-value-added segments such as clothing and interior. Before 2005, Pakistan's primary exports to the US were concentrated in these areas, but their market shares declined following the end of the Multifibre Agreement (Figure 3). Appendix C provides a selected list of high-value-added products under HS codes 61 (articles of apparel and clothing accessories, knitted or crocheted) and 62 (articles of apparel and clothing accessories, not knitted or crocheted) for which Pakistan's export value (in US dollars) to the US decreased after 2005.

Figure 3: Pakistan's Segment Wise Exports to USA ($US Millions)



Source: UN Comtrade Data

Pakistan-China FTA

China and Pakistan began lowering tariffs on each other's exports in the early 2000s, culminating in the signing of the Pakistan-China Free Trade Agreement (FTA) in 2006, which outlined the phased implementation of additional tariff reductions. Over the next decade, trade between the two nations more than tripled, with China becoming Pakistan's second-largest import partner (Xin et al., 2014). Although the FTA seemed to present an opportunity for both countries, the trade balance heavily favored China. China has utilized 57% of the FTA's tariff line reductions, while Pakistan has only taken advantage of 5% (Mukhtar, 2019). Despite an increase in Pakistani exports to China, imports from China grew even more rapidly, leading to a significant trade deficit. Nonetheless, the two countries sought to further liberalize trade in a second phase of the FTA through an Amending Protocol that took effect on December 1, 2019 (Ministry of Commerce, 2019).

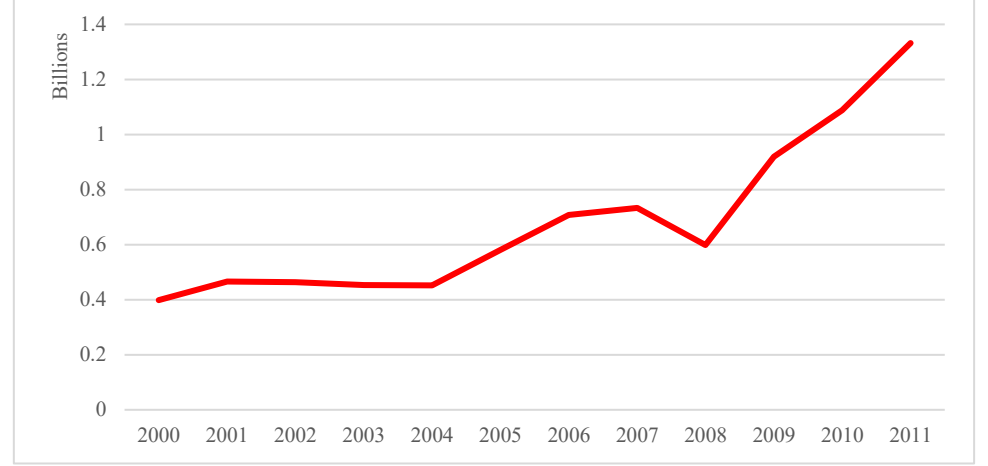
Pakistan's largest export sector is textiles, which serves as an illustrative case. The four textile segments, ranked by value added from least to greatest, are spinning, finishing, interior, and clothing. While tariffs fell across all segments, China's concessions to Pakistan were more substantial in low-value-added sectors like spinning and less generous in higher-value-added clothing and garments. Consequently, only the spinning segment saw a significant increase in exports to China. Jamil et al. (2022) have already discussed the details of the FTA and its impact on the productivity of the textile sector extensively, so we will not delve further into the details here.

Linkages between the MFA and Free-Trade Agreements

In its effort to become a global leader in world trade, China aimed to purchase low-value-added intermediate inputs (raw materials) from developing countries to seize high-value-added segments in developed nations like the U.S. Other factors, including China's comparative advantage in cheap, labor-intensive products (Khandelwal et al., 2010), low prices (Rivoli, 2005; Whalley, 2006), and its establishment of science parks for high-tech products (Berger & Martin, 2011), certainly contributed to its increase in U.S. market share. However, ensuring a reliable supply of raw materials and intermediate inputs was a key factor into its low prices.

As mentioned, China's concessions to Pakistan within the Pak-China FTA were more substantial in low-value-added, intermediate input sectors like spinning and less generous in higher-value-added clothing and garments. As an example, figure 4 shows China's import of cotton from Pakistan during the period of 2000-2011. Cotton, in particular, is a critical raw material for China's textile sector with Pakistan contributing significantly as a regional producer and exporter (Karim, 2023).

Figure 4: China's import of Cotton from Pakistan (US $ Billions)

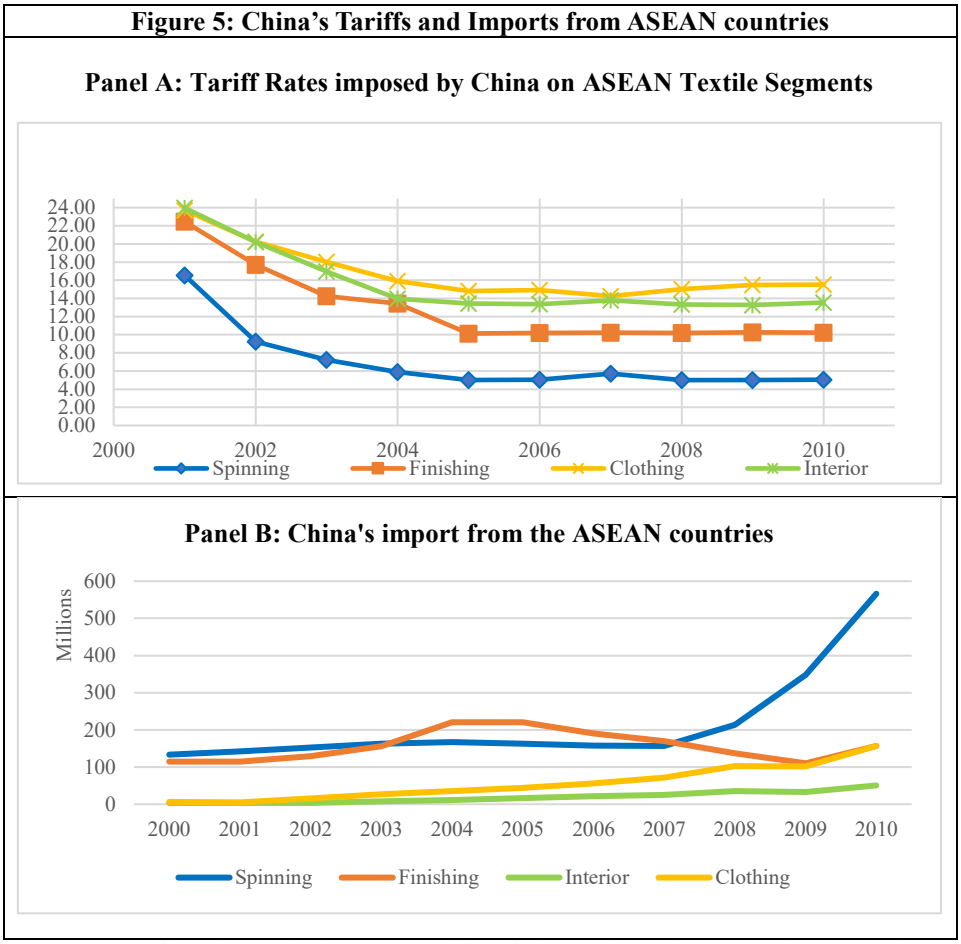


Source: UN Comtrade Data

China's FTA with Pakistan was not unique. In fact, China adopted a similar strategy throughout the region, entering into Free Trade Agreements with several ASEAN countries following the same pattern for the textile sector: low tariff rates and high imports of intermediate inputs (spinning and finishing) needed to produce high value-added outputs (interior and clothing) within the textile industry (Figure 5).

Liu and Qiu (2016) indicate that between 2000 and 2006 alone, China's imports of intermediate inputs surged 256%. This significant rise reflects China's rapidly growing role in global supply networks. As Kastner (2022) notes, China's significant domestic raw material production is complemented by strategic input imports- high-quality cotton, specialized fibers, and production equipment—to maintain its broad textile product portfolio and stabilize costs. The imports of intermediate inputs were directly tied to export demand, illustrating China's integration into global and regional manufacturing networks (Godbout & Langcake, 2013).

Figure 5: China's Tariffs and Imports from ASEAN countries



Data Source: World Trade Organization (WTO) Tariff Analysis (Panel A) and UN Comtrade Data (Panel B)

IV. Data

The data sources used in this analysis include the Census of Manufacturing Industries (CMI) for Punjab, Pakistan, the Textile Export Customs Transactions Database, World Trade Organization (WTO) Tariff Data, US Commerce Department's Office of Textile and Apparel (OTEXA), and the United Nations Comtrade Trade Data.

The Punjab Bureau of Statistics in Pakistan conducts the firm-level *Census of Manufacturing Industries* (CMI) approximately every five years. This comprehensive survey provides data on the firm's income and input usage, including materials and labor costs and various capital stock measures. We create an unbalanced panel data set for textile firms in Punjab, Pakistan, using the waves conducted in 2000, 2005, and 2010. The primary feature of our data set is that, unlike most microdata sets, it includes disaggregated pricing and quantity details for each firm f at the product level j for the period t.[8] Therefore, our data set has three dimensions of variation: time, firm, and product level. By utilizing the firm's actual physical output

[8] The products in the CMI data were coded using Pakistan Standard Industrial Classification (PSIC) codes based on International Standard Industrial Classification (ISIC) codes. We first convert these PSIC codes into relatable ISIC codes. Then we link them into convertible Harmonized System (HS) codes using the conversion codes made available by the United Nations International Trade Statistics to make them compatible with the international databases primarily relying on HS product coding. We have to link these products with their respectable tariff rates which are available by the World Trade Organization (WTO) and quota/fill rates made available by US Commerce Department's Office of Textile and Apparel (OTEXA), both classified in accordance with the HS code.

instead of depending on sectoral deflators, we can reduce the impact of the omitted output price bias in our estimation.

Table 1 shows us the size of the firms (as measured by their inputs) for exporters and non-exporters. Furthermore, the CMI provides detailed energy usage data, enabling us to calculate CO2 intensities at the firm level. In the CMI, firms report their annual energy use in value and physical quantity (kilowatts of electricity)[9]. We convert energy usage into CO2 output intensity using the International Energy Agency (IEA)[10] emission factors.

Table 1: Firm level summary statistics for Textile Manufacturers according to the CMI

CMI Year	*2000*	*2005*	*2010*
Number of firms	433	366	378
Multi-Segment firms	1.7%	5.70%	17.80%
Multi-Product firms	3%	22%	17%
Exporters	90	108	147
Capital (PKR[11])	362,839.7	506,279.1	654,147.8
Labor	445	456	475
Materials (PKR)	364,714	413,322.5	1,410,323
Energy (PKR)	62,535	78,598	132,348
% of exporters selling to China	26%	21%	14%
% of exporters selling to USA	32%	27%	26%
Non-Exporters	343	258	231
Capital (PKR)	217,970.6	276,705.1	325,221.8
Labor	161	252	266
Materials (PKR)	155,007.7	180,341.3	193,269.3
Energy (PKR)	48,727	55,582	69,384

Source: Authors' calculations

We use the *Textile Export Customs Transaction Data* set to identify firms that export specifically to China and the United States. With detailed information on each textile firm's export shipments from Pakistan to the world from 2000 to 2011, we match this data set to the firms in the CMI to determine each firm's export status and destination. We use the *World Trade Organization (WTO) Tariff Analysis Online Database*[12] to get the Chinese tariff rates imposed on Pakistani textile products. The database contains information on annual country and product-specific tariff rates[13]. We use the *United Nations (UN) Comtrade database*, containing extensive trade statistics, including trade volumes categorized by product type and

[9] Firms also use other forms of energy, including gas and diesel, but electricity remains the major source of energy used in production. Imran, et al., (2023) examine various sources of carbon emissions in the textile industry of Pakistan including electricity, water, gas, heavy fuel oil, diesel, coal, furnace oil, wood and biomass. They conclude that electricity consumption is the main contributor of carbon footprints in the textile industry of Pakistan. Moreover, even natural gas, diesel, and coal used in the textile firms in Pakistan is mainly to fuel generators, ultimately to produce electricity for textile mills especially for large and medium units (Naqvi, Sayed, & Dar, 2014).

[10] The IEA has the most reliable available factors for converting electricity into CO_2 emissions (kg CO_2 per kWh) for most countries, which also serve as the foundation for most of the grid electricity factors in the World Resources Institute (WRI) tool for emissions from purchased electricity (WRI, 2024), as well as UK Department for Environment, Food and Rural Affairs (DEFRA) factors for UK and non-UK countries (DEFRA, 2024). The IEA composite electricity factor (kgCO2/kWh) for Pakistan is 0.4511194. Detailed list for conversion factories for other countries can be found at https://www.iea.org/data-and-statistics/data-product/emissions-factors-2 and in Table 1 by Brander et al., (2011).

[11] 1 PKR equals to approximately $0.006. The values reported in the table are at the current PKR value.

[12] Retrieved from the link: http://tariffanalysis.wto.org

[13] This database contains general information about applicable tariffs and imports, as well as the Consolidated Tariff Schedules (CTS), which include members' binding commitments to maximum tariffs. For each product, it reports the tariff line duties, average tariffs, principal suppliers, duty comparison, tariff concessions, and quotas. The WTO tariff data uses Harmonized System (HS) codes to identify products. These tariff rates are available at the product level, which we then aggregate to the firm level using revenue shares as weights.

trading partner, to estimate product quality based on the methodology developed by Khandelwal (2010).[14]

The Commerce Department's Office of Textiles and Apparel (OTEXA) managed the product-country-year specific quotas for imports into the US under MFA. OTEXA maintained annual "progress reports" on each quota since 1984, including the exporting country, year, quota limit, and fill rate (how much of the quota was used). Using HS code mapping available on the OTEXA website, we link the OTEXA data to the CMI firm-level data.

OTEXA reports "base" and "adjusted base" quotas and total exports for each country and year. The base quota is the level agreed upon at the commencement of a term agreement. Adjusted base quotas use "flexibilities," allowing countries to borrow unused base quotas up to a certain percentage of the receiving category within a year or across years within a category. The restrictiveness of quotas under the MFA is commonly determined by analyzing "fill rates," which represent the proportion of exports relative to the adjusted base quota.[15] A higher fill rate indicates a higher utilization of the quota and that the quota is restrictive and binding.[16]

V. Preliminary Correlations

The primary environmental outcomes we are considering are emissions and the intensity of emissions[17] from firms resulting from higher exports. If export volumes are significantly associated with emissions and/or their intensity, trade's further relationship with output, capital, and core production will help understand the source of the change. For example, the scale effect is operational if emissions and output simultaneously rise with trade. Since new equipment tends to be more energy efficient, an increase in capital resulting from higher exports would point toward the technology or technique effect. Finally, since firms are usually more efficient at producing core products, a higher share of core product manufacturing (and a smaller number of different products) due to more trade would indicate the composition effect.

We start by regressing firm-level outcomes, including emissions and emissions intensity, on firm export value using equation (1):

$$Y_{it} = \beta_0 + \beta_1 LogExportValue_{it} + \beta_2 X_{it} + \alpha_j + \alpha_t + \alpha_s + \alpha_{st} + \varepsilon_{it} \quad (1)$$

where Y_{it} is emissions, emissions per unit, firm output, product quality, the quantity of its core product, number of products, and capital usage for firm *i* at time *t*. $LogExportValue_{it}$ is the log of export value for firm *i* at time *t*. X_{it} consists of firm-level controls, including firm-level total factor productivity (TFPQ) and firm inputs. α_j are the product-fixed effects and α_t are the time-fixed effects. Based on De Loecker (2011), we divide the textile sector into four segments, *s,* which include spinning, clothing, interior, and finishing. We control for the segment fixed effects and segment-time effects as represented by α_s and α_{st} respectively. We estimate firm-level total factor productivity (TFPQ) based on De Loecker et al. (2016) and

[14] Refer to Appendix B for a detailed discussion of the estimation of product quality based on Khandelwal (2010).

[15] For instance, if a country has an adjustable quota to export 100,000 units of a certain textile product and it exports 90,000 units, the fill rate would be: $(\frac{90,000}{100,000}) * 100 = 90\%$. This means that 90% of the quota was utilized, indicating a high fill rate and suggesting that the quota was nearly fully used.

[16] Adjusted base quotas can exceed base quotas, but fill rates cannot exceed 100.

[17] Emissions intensity is measured as the emissions per unit of output.

product quality based on Khandelwal (2010). Appendix A and B describe these methodologies in detail.

Table 2 presents the results of the preliminary specification from equation (1). As the value of Pakistan's textile exports increased, the total emissions also increased, since higher exports translate into higher output, i.e., the scale effect. At the same time, as exports increased, firms increased the output of their core products. (A positive side effect was that the quality of these products also increased.) Overall, the emissions per unit of output decreased, i.e., we find evidence of a composition effect with firms moving towards their core products rather than a technological effect (insignificant result in column 6).

Table 2: Log Firm Level Outcomes

	Emissions	Emissions Per Unit	Log Output	Log Core Product Quantity	Log Quality	Log Capital	Log number of products
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log Export Value	0.038**	-0.046***	0.084***	0.037**	0.004***	0.019	0.004
	(0.018)	(0.007)	(0.018)	(0.016)	(0.001)	(0.026)	(0.005)

Controls include firm average productivity, quality (excluded in column 5), number of products produced (excluded in column 7), firm inputs (capital excluded in column 6), product, segment, time and segment-time fixed effects.
N=1177, *p<0.10, ** p<0.05, *** p<0.01, Robust Standard Errors in parentheses.

The primary concern regarding endogeneity in equation (1) is the potential impact of time-varying omitted variables that can influence both the firm-level outcomes and the export value of the firm. A second issue arises when the export value is zero. Since exports cannot take negative values, the distribution is left-censored. To solve these issues, many studies use exogenous determinants of exports, such as foreign demand shocks or changes in trade policy (Barrows & Ollivier, 2018b; Bernard et al., 2014; Chen et al., 202; El-Sahli et al., 2023). Therefore, we estimate firm level demand shocks based on Forlani et al., (2023), and use those to decompose the impact of the FTA and the end of the MFA, rather than using export value as our main variable of interest in equation (1).

VI. Estimating Firm Level Demand Shocks

We estimate firm level demand shocks based on the methodology developed by Forlani et al., (2023). Their methodology is based on estimating a model capturing three dimensions of firm heterogeneity simultaneously: quantity total factor productivity (TFPQ), markups, and demand. While previous literature has established methods to measure heterogeneity in TFPQ and markups (De Loecker et al., 2016), this methodology explicitly introduces demand heterogeneity within a unified framework, quantifying demand variation across firms without depending on complex demand system models or adopting the restrictive assumptions found in Foster et al.'s (2008) methodology. Therefore, using production data, one can identify firm level demand shocks.

- *Production Technology*

The production function follows a Cobb- Douglas production technology based on capital (K), labor (L) and materials (M) hired by firm *i* at time *t* respectively. Q_{it} is the output produced by firm *i* at time *t.* Capital is assumed to be a dynamic input (pre-determined in the short run) and therefore, cannot be adjusted immediately to adjust the current period need.

Materials are the variable input which are free of adjustment cost. Labor is assumed to be a semi-flexible input as in Ackerberg et al. (2015) where labour doesn't adjust to shocks as fully as materials do, but they adjust faster as compared to capital.

Firms minimize their cost with the price of materials as given (W_{Mit}). Therefore, the short run cost minimization problem of a firm is given as:

$$min_{M_{it}}\{M_{it}W_{Mit}\}\ s.t.\ Q_{it} = A_{it}L_{it}^{\alpha_L}M_{it}^{\alpha_M}K_{it}^{\gamma-\alpha_L-\alpha_M} \quad (2)$$

where α are the input shares and γ represents the returns to scale. A_{it} is the TFP of firm i at time t which is observable to the firm but unobservable to the econometrician. Taking logs of equation (2), we get equation (3), where lower case letters depict the log values:

$$q_{it} = \alpha_L l_{it} + \alpha_M m_{it} + (\gamma - \alpha_L - \alpha_M)k_{it} + a_{it} \quad (3)$$

Taking the first order conditions of the cost function gives:

$$W_{Mit} = \chi_{it}\frac{Q_{it}}{M_{it}}\alpha_M \quad (4)$$

where χ_{it} is the Lagrange multiplier, where $\chi_{it} = \frac{W_{Mit}}{\alpha_M}Q_{it}^{\frac{1}{\alpha_M}-1}A_{it}^{-\frac{1}{\alpha_M}}L_{it}^{-\frac{\alpha_L}{\alpha_M}}K_{it}^{-\frac{\gamma-\alpha_L-\alpha_M}{\alpha_M}}$

Therefore, the short run cost function of firm i at time t can be written as:

$$C_{it} \equiv M_{it}W_{mit} = \chi_{it}Q_{it}\alpha_M = W_{mit}\left(\frac{Q_{it}}{A_{it}}\right)^{\frac{1}{\alpha_M}}L_{it}^{-\frac{\alpha_L}{\alpha_M}}K_{it}^{-\frac{\gamma-\alpha_L-\alpha_M}{\alpha_M}} \quad (5)$$

Marginal cost is given by:

$$MC_{it} \equiv \frac{\partial C_{it}}{\partial Q_{it}} = \frac{1}{\alpha_M}\frac{C_{it}}{Q_{it}} \quad (6)$$

Combining equation (4), (5) and (6) gives the markup ($\mu_{it} \equiv \frac{P_{it}}{MC_{it}}$) which is in line with De Loecker et al., (2016) where markups are computed as a ratio of the output elasticity of materials to the share of materials expenditure in revenue (see appendix A):

$$\mu_{it} = \frac{\alpha_M}{s_{Mit}} \quad (7)$$

- *Demand Heterogeneity*

The model considers a framework where a representative consumer selects from a continuum of differentiated varieties. In each time period t, the consumer seeks to maximize a differentiable utility function $U(.)$ while operating within the constraints of budget B_t:

$$\underset{Q}{Max}\{U(\tilde{Q})\}\ subject\ to\ \int_i P_{it}Q_{it}d_i - B_t = 0 \quad (8)$$

Where Q_{it} is the output produced and P_{it} is the price set by firm *i* at time *t.* The representative consumer selects quantities Q while paying prices P, but these quantities enter the utility function modified as $\tilde{Q}$ with a vector element $\Lambda_{it}Q_{it}$. The vector Λ (containing elements Λ_{it}) is predetermined from the consumer's perspective. The parameter Λ_{it} functions as a measure of perceived quality or appeal for variety *i*, representing firm-specific demand shock.

When maximizing profits, firms choose quantities while taking Λ_{it} and market aggregates as given, leading to the fundamental relationship between markups and the elasticity of demand ($\eta_{it}=-\frac{\partial q_{it}}{\partial p_{it}}$):

$$\mu_{it} = \frac{\eta_{it}}{\eta_{it}-1} \quad (9)$$

Here the demand elasticity, the price and markups are a function of the quantity chosen by firm *i* i.e., Q_{it} and perceived quality and appeal of variety *i* i.e., $\Lambda_{it.}$ Although Q_{it} is directly observable in our dataset, the demand parameter Λ_{it} is not. Nevertheless, Λ_{it} can be derived from the data using a linear approximation. As shown in Forlani et al. (2023), the conditions for utility maximization imply:

$$\frac{\partial p_{it}}{\partial q_{it}} = -\frac{1}{\eta_{it}} = \frac{\partial p_{it}}{\partial \lambda_{it}} - 1 \quad (10)$$

The elasticity of price with respect to quantity differs from the elasticity of price with respect to product appeal by precisely one, where λ_{it} represents the logarithm of Λit. Equation (10) has a straightforward interpretation: firms sell quality-adjusted quantities $\tilde{Q}_{it}$ and charge quality-adjusted prices $\tilde{P}_{it} = P_{it}/\lambda_{it}$, generating revenue $R_{it} = \tilde{P}_{it}\,\tilde{Q}_{it} = P_{it}Q_{it}$. Consequently, changes in either Λ_{it} or Q_{it} should equally affect the quality-adjusted price $\tilde{P}_{it}$, meaning that $\frac{\partial \tilde{p}_{it}}{\partial q_{it}} = \frac{\partial \tilde{p}_{it}}{\partial \lambda_{it}}$.

By combining equation (10) with the standard relationship between revenue, price, and quantity ($r_{it} = p_{it} + q_{it}$) along with the profit maximization solution for firm *i* operating within a Cobb Douglas production framework, firm-level revenue (r_{it}) can be expressed as:

$$r_{it}(q_{it},\lambda_{it}) \backsimeq \frac{\partial r_{it}}{\partial q_{it}} q_{it} + \frac{\partial r_{it}}{\partial \lambda_{it}} \lambda_{it} = \left(\underbrace{\frac{\partial p_{it}}{\partial q_{it}}}_{-\frac{1}{\eta_{it}}} + \underbrace{\frac{\partial q_{it}}{\partial q_{it}}}_{+1} \right) q_{it} + \left(\underbrace{\frac{\partial p_{it}}{\partial \lambda_{it}}}_{-\frac{1}{\eta_{it}}+1} + \underbrace{\frac{\partial q_{it}}{\partial \lambda_{it}}}_{0} \right) \lambda_{it}$$

$$= \left(\underbrace{1 - \frac{1}{\eta_{it}}}_{\frac{\eta_{it}-1}{\eta_{it}} = \frac{1}{\mu_{it}}} \right) (q_{it} + \lambda_{it})$$

Thus, $$r_{it} \backsimeq \frac{1}{\mu_{it}} (q_{it} + \lambda_{it}) \quad (11)$$

Firm output q_{it} and revenue r_{it} are directly observed in our data, while profit maximizing markup μ_{it} is estimated with production data as in equation (7). Given this, one can recover firm specific demand shock as:

$$\lambda_{it} \backsimeq \mu_{it} r_{it} - q_{it} \quad (12)$$

In contrast to Barrows & Ollivier (2018b), we cannot directly observe firm-level *foreign* demand shocks. Our equation (12) incorporates *total* demand shocks at the firm level. To extract the foreign demand elements from these aggregate shocks, we instrument with trade policy variables—tariffs for the Pak-China FTA and quota reductions after the MFA ended—as explained in the next section.

VII. A Deeper Dig into the Pak-China FTA and the End of the MFA

To measure the impact of the Pak-China FTA, we use the $Tariff_{it}$ imposed by China on Pakistani firm *i* at time *t.* As mentioned in the data section, the tariff rates provided by the World Trade Organization (WTO) are at the product level. We use firms' product revenue shares as weights to aggregate these tariff rates to the firm level for firm *i* at time *t.*

To estimate the impact of the end of the MFA, we use two measures: one for the opportunities afforded to Pakistan due to phased-out quotas and the other for the effect of competition from third parties. These are Pakistan's quantity restrictions or constraints (QR_Pak_{it}) for exporting to the USA and the quantity restrictions or constraints for the rest of the world (ROW_{it}) on exporting to the USA (other than Pakistan). Unlike the Pak-China FTA, which was specific to Pakistan and China, the end of the MFA not only abolished the quotas for Pakistani exporters but simultaneously for exporters from the rest of the world. Including the impact of ROW_{it} is essential to fully capture the effects of the MFA termination.

The US Commerce Department's Office of Textile and Apparel (OTEXA) reported the fill rates for each product *i* at time *t* faced by Pakistan. Using product revenue shares as weights, we aggregate these to the firm level to get the effective firm-level quantitative restrictions QR_Pak_{it} for firm *i* at time *t*.

We estimate the constraints on the rest of the world ROW_{it} using Barrows and Ollivier (2014b). To calculate Pakistani competitor constraints by product category under the MFA, we consider a weighted average of imports into the US under quotas from countries other than Pakistan each year. Let *j* represent a quota-group product category, *t* the year, and *k* the exporting country to the US. We create a competitive constraints index for the rest of the world (ROW), which includes countries other than Pakistan as:

$$ROW_{jt} = \frac{\sum_{i \in \cap} V_{jk0} * R_{jkt}}{\sum_{i \in \cap} V_{jk0}} \qquad (13)$$

V_{jk0} is the value of exports of product *j* from country *k* to the USA in a pre-liberalization base period 0. R_{jkt} is the quota indicator fill rate for product *j* from country *k* in year *t*, and $\cap$ is the set of all countries other than Pakistan that export to the USA. The import shares V_{jk0} must be calculated using data before the end of the MFA since the value of exports may change year to year due to the liberalization and, therefore, may respond endogenously. Following

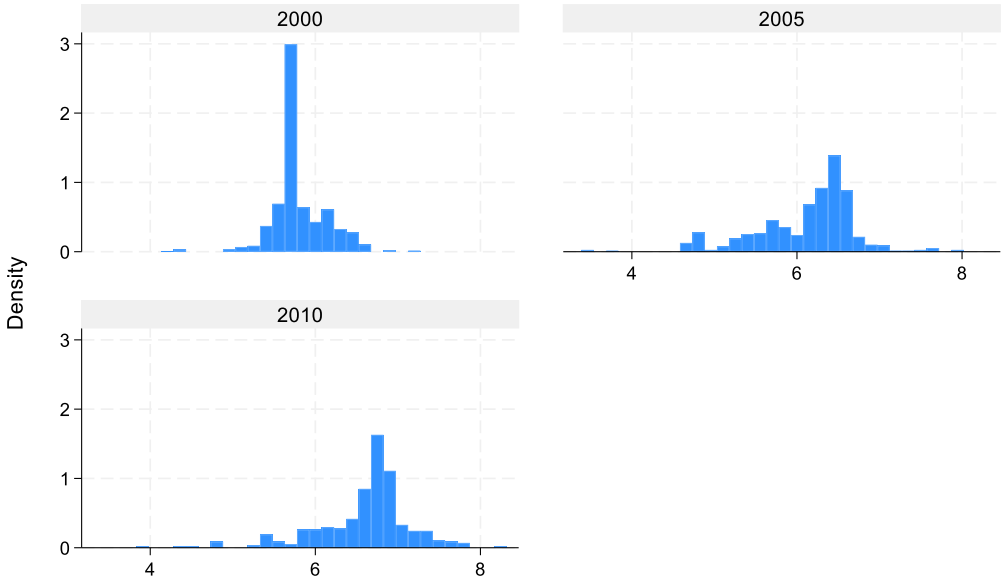
Barrows and Ollivier (2014b) we take 1994 (the final year before the first phase out of the MFA) as the base year.

The ROW_{jt} index ranges from 0 to 1, where ROW_{jt}= 0 indicates that no exports from Pakistan's competitors to the US were subject to a quota in year *t* (based on pre-period weights), and ROW_{jt}=1 indicates that all exports to the USA (excluding Pakistan) for product category *j* were subject to a quota in year *t*. As ROW_{jt} increases, the rest of the world is more constrained, which means Pakistan has less competition in (better access to) the US market. Finally, the ROW_{jt} indicator at the product level is then aggregated at the firm level using firms' product revenue shares as weights to get a firm-level measure of ROW_{it}, i.e., the competition faced by firm *i* at time *t* from the rest of the world. This measures the "third-party" effects of the presence of other countries (excluding Pakistan) in the US market.

VIII. Results and Discussion

To estimate the impact of the Pak-China FTA and MFA conclusion, we revise equation (1) by focusing on demand shocks (λ_{it}) rather than export value, due the concerns mentioned earlier. Figure 6 shows the year wise distribution of the demand shocks based on Forlani et al., (2023). As equation (12) captures total firm-level demand shocks, we use instruments to specifically identify the foreign demand components within these aggregates. We use tariff rates ($Tariff_{it}$) and quantity restrictions (QR_Pak_{it} and ROW_{it}) to measure the impacts of the Pak-China FTA and the end of the MFA, respectively.

Figure 6: Demand Shocks Distribution: Year Wise



Pak-China FTA

For the Pak-China FTA, we use the firm-specific tariffs applied by China as instruments for the demand shocks (λ_{it}) as shown in equation (14). We use tariff rates as an instrument for demand shocks, the main exogeneity argument being that tariffs can impact a firm's demand mainly due to global competition and price effect but a single firm on its own cannot influence the tariff rates. We then estimate the second stage as shown in equation (15).

$$Demand\ Shock_{it} = \delta_0 + \delta_1 Tariff_{it} + \delta_2 X_{it} + \alpha_j + \alpha_t + \alpha_s + \alpha_{st} + \varepsilon_{it} \quad (14)$$

$$Y_{it} = \beta_0 + \beta_1 \widehat{Demand\ Shock}_{it} + \beta_2 X_{it} + \alpha_j + \alpha_t + \alpha_s + \alpha_{st} + \varepsilon_{it} \quad (15)$$

Table 3: Panel A: Second Stage Results: Firm Level Outcomes

	Log Exports	Emissions	Emissions Per Unit	Log Output	Log Core Product Quantity	Log Quality	Log Capital	Log number of products
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Demand\ Shock_{it}$ (λ_{it})	0.663***	0.495**	-0.190	0.685***	0.356**	0.031**	-0.097	-0.272
	(0.090)	(0.201)	(0.175)	(0.078)	(0.167)	(0.015)	(0.106)	(0.174)
Panel B: First Stage								
	Demand Shock (λ_{it})							
$Tariff_{it}$	-0.102**							
	(0.045)							

Controls include firm average productivity, quality (excluded in column 6), number of products produced (excluded in column 8), firm inputs (capital excluded in column 7), export status, product, segment, time and segment-time fixed effects.
N=1177, *p<0.10, ** p<0.05, *** p<0.01, Robust Standard Errors in parentheses.

Table 3 shows the results for the IV estimation of the impact of demand shocks on firm outcomes using the Pak-China FTA. The first stage shows that a reduction in tariff leads to positive demand shocks. In the second stage, we see that the rise in demand led to higher exports, emissions and output, a greater concentration on core products, and higher product quality. In contrast, the emissions intensity did not change significantly. Therefore, for firms exporting to China, we find evidence of the scale effect i.e., more output production increases emissions. We also find evidence of the composition effect with firms focusing more on their core products, with the side effect of increasing the overall product quality. We do not find any evidence of firms investing more in capital as shown in column (7) i.e., no evidence of technological or technique effect. Therefore, changes in product mix and shift towards core products is not enough for firms exporting to China to significantly reduce emissions per unit.

End of the MFA

To estimate the impact of the end of the MFA on firm-level outcomes Y_{it}, we use the quota restrictions imposed on Pakistani firms as measured through QR_Pak_{it} and the quota restrictions imposed on the rest of the world as measured through ROW_{it} as instruments as shown in equation (16). The argument for the exogeneity of the instrument is similar to the specifications for Pak-China FTA above. While restrictions on Pakistan and competition in the US market can impact firm-level exports, the impact cannot be vice versa i.e., firm-level demand cannot impact quantity restrictions imposed by the USA on Pakistan or the rest of the

world. We then estimate the second stage, as shown in (17), to estimate the impact of the end of the MFA.

$$Demand\ Shocks_{it} = \delta_0 + \delta_1 QR_Pak_{it} + \delta_2 ROW_{it} + \delta_3 X_{it} + \alpha_j + \alpha_t + \alpha_s + \alpha_{st} + \varepsilon_{it} \quad (16)$$

$$Y_{it} = \beta_0 + \beta_1 \widehat{Demand\ Shocks}_{it} + \beta_2 X_{it} + \alpha_j + \alpha_t + \alpha_s + \alpha_{st} + \varepsilon_{it} \quad (17)$$

Table 4: Panel A Second Stage Results: Firm Level Outcomes

	Log Exports	Emissions	Emissions Per Unit	Log Output	Log Core Product Quantity	Log Quality	Log Capital	Log number of products
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Demand\ Shock_{it}$ (λ_{it})	0.576***	0.567**	-0.376**	0.942**	0.780**	0.085**	-0.687	-0.165
	(0.091)	(0.275)	(0.177)	(0.335)	(0.258)	(0.040)	(2.595)	(0.179)
Panel B: First Stage								
	Demand Shock (λ_{it})							
QR_Pak_{it}	-0.006							
	(0.566)							
ROW_{it}	0.535**							
	(0.180)							

Controls include firm average productivity, quality (excluded in column 6), number of products produced (excluded in column 8), firm inputs (capital excluded in column 7), export status, product, segment, time and segment-time fixed effects.
N=1177, *p<0.10, ** p<0.05, *** p<0.01, Robust Standard Errors in parentheses.

Table 4 shows the impact of the end of the MFA on firm-level outcomes when one uses increased access to the US market for Pakistani firms and increased access to the US market for other country firms, "third party" effects, as instruments for demand shocks. Here, the first-stage results reinforce the idea that the impact of increased access for Pakistani firms was far less important than the impact of increased competition from other firms as they also gained greater access to the US markets. Eliminating quotas on Pakistan (QR_Pak_{it} falling) had no statistically significant impact on the demand shocks faced by the firms. However, the "third party" effects via the indirect channel had far-reaching effects: increased access to the US market by third parties (lower values of ROW_{it}, the quotas on the rest of the world), indicating an increase in competition facing Pakistani firms in the US market, greatly reduced the demand of Pakistani textile manufacturers.

The export, output, focus on core products, and product quality all decrease as Pakistani firms compete with other countries in the US market since this lower value of ROW_{it} translates into a fall in demand shocks, while overall emissions decrease and emissions per unit increase. Therefore, for firms exporting to the US, the "third-party" effects dominate, where firms lose out on their demand share. The scale effect (more output, more emissions) worked here toward both less output and lower emissions. In this context, the composition effect led firms to move away from their core products. We do not find any changes in capital investment (technological effect) for firms overall.

Therefore, like in the case of firms exporting to China, the scale and composition effects also seem to predominate for firms exporting to the US. Unlike in the case of firms exporting to China, for firms exporting to the US, the changes in the firm's product mix are substantial enough to significantly impact the emissions per unit. In this case, as firms lose out on their market share and move away from their core products, emissions per unit increase (as the end of the MFA resulted in a negative demand shock).

Reduced Form Effects of the Pak-China FTA and End of the MFA

Table 5 presents the results in the reduced form in which the effect of the Pakistan-China FTA (represented by changes in tariffs $Tariff_{it}$) and the effect of the MFA (direct impact represented by the restrictions on Pakistan exports $QR_{Pak_{it}}$ and indirect impact represented by the "third-party" restrictions ROW_{it}) is directly regressed on firm-level outcomes. Panel A shows the results for the exporters only, while Panel B focuses on the non-exporters only to see if there were any spillovers to domestic producers.

Table 5: Reduced Form Effects of the FTA and the end of the MFA

Panel A: Exporters Only

	Log Export Value	Emissions	Emissions Per Unit	Log Output	Log Core Product Quantity	Log Quality	Log Capital	Log number of products
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Tariff_{it}$	-0.955***	-0.950***	0.079	-1.029***	-0.496***	-0.038***	-0.005	0.055
	(0.178)	(0.178)	(0.072)	(0.195)	(0.128)	(0.008)	(0.140)	(0.033)
QR_Pak_{it}	-1.560*	0.537	0.330	0.207	0.416	0.063	0.182	0.550
	(0.915)	(1.164)	(0.527)	(1.033)	(0.999)	(0.046)	(1.224)	(0.389)
ROW_{it}	4.090***	2.787***	-0.410**	3.196***	2.292***	0.114***	-1.974***	-0.336*
	(0.722)	(0.667)	(0.183)	(0.739)	(0.542)	(0.033)	(0.459)	(0.191)

Panel B: Non-Exporters Only

	Log Export Value	Emissions	Emissions Per Unit	Log Output	Log Core Product Quantity	Log Quality	Log Capital	Log number of products
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Tariff_{it}$		0.039	0.008	0.032	-0.037	-0.004**	0.400	-0.037
		(0.043)	(0.012)	(0.041)	(0.203)	(0.002)	(0.258)	(0.203)
QR_Pak_{it}		-0.725	-0.004	-0.721	-1.112	-0.004	-0.646	-1.112
		(0.741)	(0.080)	(0.695)	(0.878)	(0.034)	(0.846)	(0.878)
ROW_{it}		-1.198	0.168	-1.366	-0.089	0.027**	0.633	-0.089
		(0.775)	(0.302)	(0.750)	(0.413)	(0.010)	(0.993)	(0.413)

Controls include firm average productivity, quality (excluded in column 6), number of products produced (excluded in column 8), firm inputs (capital excluded in column 7), product, segment, time and segment-time fixed effects.
N=345 (Panel A); 832 (Panel B), *p<0.10, ** p<0.05, *** p<0.01, Robust Standard Errors in parentheses.
It is not possible to estimate column (1) for non-exporters as all of them have an export value of 0.

The reduction in tariffs resulting from the Pak-China FTA led to an increase in output, and a rise in exports among textile manufacturers. This was accompanied by improved product quality and an increase in overall emissions (scale effect). However, this growth was not matched by a reduction in emissions per unit. Consequently, changes in product mix (composition effect) are insufficient to lower emissions per unit. Additionally, there is no evidence of firms investing in capital (technological effect). Jamil et al. (2022) report similar findings for textile firms in Pakistan, indicating that the FTA boosts firm productivity, but not

to the extent reported for other countries. They also demonstrate that firms exporting to China do not increase their capital investments as a result of the FTA.

Simultaneously, the direct effect of greater access for Pakistani textile exporters to the U.S. market $QR_{Pak_{it}}$—compared to the indirect effect under which other countries obtained access ROW_{it} — had a less significant impact. We see that in most of the columns in Table 5, when we control for both $QR_{Pak_{it}}$ and ROW_{it} together, ROW_{it} has a higher significance. Therefore, the end of the MFA, particularly through the "third-party" effect, had a significantly negative impact on the demand for Pakistani goods (with lower value of ROW_{it} indicating more competition for Pakistani firms). This led to a decrease in output and export value, reduced focus on the core products produced by firms, a decline in the quality of their output, and a decrease in emissions. Conversely, emissions per unit of output increased.

Our findings align with those of Barrows and Ollivier (2014b), who illustrated that in India, following the end of the MFA, the impacts were primarily due to "third-party" effects. While access to export markets may motivate firms to reduce emission intensity, those firms displaced by foreign market competition might increase their emissions indirectly. Interestingly, we only have weak evidence (10% significance level for the influence of QR_Pak_{it}) that US-Pakistan quotas restricted Pakistani exports. The reduction in quota restrictions imposed on Pakistan QR_Pak_{it} (direct effect) did not impact firm-level outcomes as much as the effect of greater competition from the rest of the world ROW_{it} (indirect effect) in both magnitude and statistical significance.

When competitors still faced restrictions on exporting to the US prior to the end of the MFA (higher values of ROW_{it}), Pakistani firms had higher exports and output. After the MFA ended, Pakistani firms formerly restricted by third-party quotas lost their advantage in accessing the US market (negative scale effect). This is consistent with the assumption that "multilateral resistance" affects exports. The concept of multilateral resistance suggests that trade flow between two countries is affected not only by direct channels like trade barriers or trade agreements but also by their interactions with the rest of the world. Anderson and van Wincoop (2003) introduced this idea when discussing the gravity model of trade, which incorporates terms for multilateral resistance to recognize that a country's trade patterns are shaped by trade barriers and its connections to all other countries, not solely with its trading partner. Overall, the estimates suggest that Pakistani firms experienced a competitive shock as a result of the MFA's termination.

The positive aspect of this increased competition from other countries in the US market faced by Pakistani exporters was an increase in capital stock as firms tried to regain their competitiveness, i.e., lower values of ROW_{it} led to capital accumulation. This result supports the literature that firms increase capital in response to competition and productivity improvements rather than demand shocks. Therefore, as Pakistani firms face more competition in the US market, they invest more in capital. Kang (2022) suggests that export competition increases innovation among high-productivity firms. For example, South Korean firms facing competition from Chinese exports have increased their innovation efforts, particularly high-productivity firms. This suggests that export competition can drive firms to invest more in R&D to maintain their competitive edge. Similarly, Goodwin & Pierola (2015) suggest that firms become more productive from exporting to other markets due to knowledge spillovers and exposure to foreign competition. This increased productivity can lead to more capital being allocated towards enhancing export capabilities.

The potential reason for the increase in emission intensity is that as firms face more competition in the US market, output quality falls (column 6) as firms move towards the production of low-quality products (away from their core products). While high-quality products generate low emissions, low-quality products are emissions-intensive. Therefore, our results suggest that emissions intensity is decreasing in quality.

As for the spillover effects on non-exporters, our results suggest that there exist quality spillovers. Lower tariffs under the Pak-China FTA result in improved quality for non-exporters. Jamil et al. (2022) show that Pak-China FTA lead to an increase in quality spillovers from exporters to non-exporters, particularly if the exporters were upstream firms in the supply chain for non-exporters. The impact was reduced as the physical distance between the exporting and the non-exporting firm increased. Finally, the termination of the MFA led to a negative quality spillover even for the non-exporters.

Exporters Only Subsample

In this subsection, we restrict our sample to the exporting firms only. We directly instrument the export value with the $Tariff_{it}$ instrument for the Pak-China FTA and the QR_Pak_{it} and ROW_{it} instrument for the end of the MFA. Since we restrict our sample to exporters only, there are no zero values for exports, thus, we estimate equations (18)-(21) without relying on demand shocks.

Pak-China FTA

$$LogExportValue_{it} = \delta_0 + \delta_1 Tariff_{it} + \delta_2 X_{it} + \alpha_j + \alpha_t + \alpha_s + \alpha_{st} + \varepsilon_{it} \quad (18)$$

$$Y_{it} = \beta_0 + \beta_1 \widehat{LogExportValue}_{it} + \beta_2 X_{it} + \alpha_j + \alpha_t + \alpha_s + \alpha_{st} + \varepsilon_{it} \quad (19)$$

Table 6: Panel A: Second Stage Results: Firm Level Outcomes

	Emissions	Emissions Per Unit	Log Output	Log Core Product Quantity	Log Quality	Log Capital	Log number of products
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log Export Value	0.756**	-0.118	0.874**	0.661**	0.021**	0.183	-0.517
	(0.390)	(0.318)	(0.394)	(0.219)	(0.007)	(0.382)	(2.451)
Panel B: First Stage:							
	Log Export Value						
$Tariff_{it}$	-0.733***						
	(0.206)						

Controls include firm average productivity, quality (excluded in column 5), number of products produced (excluded in column 7), firm inputs (capital excluded in column 6), product, segment, time and segment-time fixed effects.
N=345 (exporters only), *p<0.10, ** p<0.05, *** p<0.01, Robust Standard Errors in parentheses.

Table 6 shows the impact of the Pak-China tariff. Results show that a reduction in tariffs increases exports. These exports lead to more output and emissions (scale effect) with more concentration on core products, improving output quality (composition effect). We don't find any evidence of capital investment (technique effect). Our results in table 6 reconfirm the prior results that the composition effect is not enough to reduce the emission intensity of the firms

End of the MFA

$$LogExportValue_{it} = \delta_0 + \delta_1 QR_Pak_{it} + \delta_2 ROW_{it} + \delta_3 X_{it} + \alpha_j + \alpha_t + \alpha_s + \alpha_{st} + \varepsilon_{it} \quad (20)$$

$$Y_{it} = \beta_0 + \beta_1 \widehat{LogExportValue}_{it} + \beta_2 X_{it} + \alpha_j + \alpha_t + \alpha_s + \alpha_{st} + \varepsilon_{it} \quad (21)$$

Table 7: Panel A Second Stage Results: Firm Level Outcomes

	Emissions	Emissions Per Unit	Log Output	Log Core Product Quantity	Log Quality	Log Capital	Log number of products
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log Export Value	0.588***	-0.164**	0.752***	0.681***	0.029**	-0.857	-0.112
	(0.139)	(0.079)	(0.162)	(0.188)	(0.010)	(0.506)	(0.147)
Panel B: First Stage							
	Log Export Value						
QR_Pak_{it}	-1.909						
	(1.583)						
ROW_{it}	3.111***						
	(0.688)						

Controls include firm average productivity, quality (excluded in column 5), number of products produced (excluded in column 7), firm inputs (capital excluded in column 6), product, segment, time and segment-time fixed effects
N=345 (exporters only), *p<0.10, ** p<0.05, *** p<0.01, Robust Standard Errors in parentheses.

Table 7 shows the impact of the end of the MFA. Results indicate that market access to the US is driven by the competitive effects (third party effects) rather than Pakistan's own restrictions. As commotion increases (lower values of ROW_{it}), Pakistani firms export less which in turn leads to lower output production and emissions (scale effect). As a result, firms move away from their core product towards the manufacturing of low-quality products (composition effect). These low-quality products are more polluting, increasing firms' emission intensity. We don't find evidence of technique effect.

IX. Conclusion

Trade is a crucial driver of economic growth in both developing and developed countries; however, trade-related emissions present a global concern. The relationship between trade and emissions is complex; some firms may compromise quality as they increase exports, resulting in higher emissions per unit of output, while others may improve quality and lower emissions per unit. Therefore, understanding how different types of trade-related demand shocks impact emissions is essential, as firms will respond to these shocks by adjusting their output (scale effect), product mix (composition effect), and capital investment (technology effect), which can increase or decrease emissions and their intensity.

We examined the impact of two exogenous demand shocks on Pakistan's textile exports: the signing of the Pakistan-China Free Trade Agreement (FTA), which reduced tariffs on Pakistani exports to China, and the end of the Multifibre Agreement (MFA), which increased market access for Pakistani textile manufacturers to the United States. The key difference between these two shocks is that the first affected only Pakistan, whereas the second increased access for Pakistani firms to the US while also heightening competition in this

market, as other countries gained access simultaneously. Therefore, it is critical from a policymaking standpoint to examine how these demand shocks, with varying degrees of foreign market competition or “third-party” effects, influenced Pakistan's textile exports, overall firm-level emissions, and emissions per unit.

We find that the Pakistan-China FTA resulted in increased exports (of low value-added segments), a focus on core products, and improved quality of the goods exported to China. This was accompanied by a rise in overall emissions but no significant increase in emissions per unit of output. However, the end of the MFA led to a decline in Pakistan's exports, firms moving away from their core products, and decreased emissions due to heightened competition from other countries. This competition had a much greater impact than gaining access to the US market. Additionally, it resulted in a significant rise in emissions per unit of output, with Pakistani firms producing lower-quality, polluting products and losing market share in high-value-added goods. Thus, our results indicate that different types of demand shocks have varying impacts on emissions, and any analysis of the impacts of increased market access must also consider the effects of intensified competition.

Overall, regarding emission intensity, the Pak-China FTA (which caused a positive demand shock) increased emissions but did not raise emissions intensity compared to the negative shock from the end of the MFA, which led to the production of low-quality, high-emission-intensity products. Pakistan’s gain from its FTA with China was associated with growth in low-value-added exports, while its loss at the end of the MFA involved more than just an increase in emission intensity and a decline in product quality; it also included losses in high-value-added segments.

These findings are important for developing countries where economic growth relies on export sectors. The study reveals that trade agreements like the Pak-China FTA can boost exports and quality but increase emissions, while increased competition from events like the end of the MFA can push firms toward lower-quality, higher-emission products. This underscores the need for policies that balance trade growth with environmental sustainability, especially in developing countries where the structure of exports is highly susceptible to foreign demand shocks.

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Appendix A

Firm Level Productivity based on De Loecker et al. (2016)

We begin by estimating firm-level productivity based on the methodology developed by De Loecker et al. (2016). This methodology works well when price and physical quantity information is available at the product level for multi-product firms, as it is with our data. One of the major contributions of this methodology is that, unlike traditional production function estimation approaches, it estimates the production function at the product level rather than the firm level. Additionally, this methodology has the advantage of estimating productivity without considering any parametric assumptions about consumer demand, market structure, or the nature of competition. As a result, this methodology enables the analysis to be conducted using product-level data without explicitly assuming a market demand function to aggregate output and prices at the firm level.

Using disaggregated price and physical output data at the product level, the estimation of the quantity-based production function helps control for any omitted output price bias that typically arises when the analysis relies on sectoral deflators. In this methodology, since disaggregated price and physical output data is used (as is available in our data set), there is no need for sectoral deflators. Additionally, this methodology addresses a number of other biases, typically ignored in literature. These biases include the omitted input price bias (mainly arising due to different variety/quality of inputs used by firms) and the unobserved allocation of inputs across multi-product firms (mainly arising due to data limitations where typically input expenditures are available at firm level rather than at the product level). Based on De Loecker et al. (2016), we start by writing the production function for firm *f* producing product *j* at time t as:

$$Q_{fjt} = F_{jt}\left(V_{fjt}, K_{fjt}\right)\Omega_{ft} \qquad \text{(A.1)}$$

where Q is the physical output, V is a vector of variables inputs which adjust freely and K is a vector of fixed inputs facing some adjustment cost. Ω_{ft} is the firm specific productivity. Taking logs of the production function as in equation (A.1) gives:

$$q_{fjt} = f_j\left(\chi_{fjt};\, \beta\right) + \omega_{ft} + \varepsilon_{fjt} \qquad \text{(A.2)}$$

where $q_{fjt}$is the log of output which is a function of the vector χ_{fjt} which includes the log of physical inputs $\{V_{fjt}, K_{fjt}\}$. β represents the respective coefficients while ω_{ft} is the log of productivity. ε_{fjt} is the with idiosyncratic error. Denoting $\widetilde{\chi_{ft}}$ as the observed vector of price index-deflated input expenditures, the product-level input quantities $\chi_{fjt}$for each input are then given as:

$$\chi_{fjt} = \rho_{fjt} + \widetilde{\chi_{ft}} - w^{x}_{fjt} \qquad \text{(A.3)}$$

where ρ_{fjt} is the share of firm input expenditures (in logs) allocated to product j at time t. w^{x}_{fjt} is the deviation of the unobserved firm-specific input prices from the industry-wide input price index (in logs). Substituting this expression of physical inputs (A.3) into equation (A.2) and denoting w_{fjt} as a vector of log firm product specific input price gives:

$$q_{fjt} = f_j(\widetilde{\chi_{ft}};\ \beta) + A(\rho_{fjt}, \widetilde{\chi_{ft}}, \beta) + B\left(w_{fjt}, \rho_{fjt}, \widetilde{\chi_{ft}}, \beta\right) + \omega_{ft} + \varepsilon_{fjt} \quad (A.4)$$

Comparing equation (2) to equation (4), there are now two additional unobserved terms: A(.) represents the input allocation bias which is due to the presence of the unobserved product-level input allocation ρ_{fjt}, while B(.) represents the input price bias which arises from unobserved firm-specific input prices w_{fjt} .

De Loecker et al. (2016) relies on the data from the single product firms to estimate the product-level production function. Using single product firms means that the term A(.)= 0 as ρ_{fjt}=1 by definition. The model by De Loecker et al. (2016) assumes that if the physical relation between input-output is the same for both the single and multi-product firms which produce the same product, and that the technology used in the manufacturing of product j is independent of other products produced by the firm, in that case the input-output relationship from single-product firms can help in approximating the input allocations for multi-product firms.[18] Using single-product firms only (with A(.)=0), equation (A.4) then can be re-written as:

$$q_{fjt} = f_j(\widetilde{\chi_{ft}};\ \beta) + B\left(w_{fjt}, \rho_{fjt}, \widetilde{\chi_{ft}}, \beta\right) + \omega_{ft} + \varepsilon_{fjt} \quad (A.5)$$

In order to solve the problem from the omitted input price bias in B(.) as in equation (A.5), this methodology uses information from the product level output data as proxy for input prices. The main idea is that high quality inputs are needed to manufacture high quality output. Therefore, output prices reflect the quality of inputs and thus, contain information regarding input prices. Assuming that input prices increasing monotonically in input quality, this methodology uses output prices, market share and product dummies to proxy for input prices. Therefore, input prices w^x_{fjt} are written as a function of output quality v_{ft} and firm location G_f as:

$$w^x_{fjt} = w_t(v_{ft}, G_f) \quad (A.6)$$

where output quality v_{ft} is estimated based on output price of the firm p_{ft}, vector of market share ms_{ft}, vector of product dummies $D_{f,}$ and export status of the firm EXP_{ft}. Hence equation (A.6) can be written as:

$$w^x_{fjt} = w_t(p_{ft}, ms_{ft}, D_{f,} EXP_{ft}, G_f) \quad (A.7)$$

As a next step, the GMM estimation procedure is applied to solve for the production function estimates. Once these estimates are obtained, they are used to solve for the input allocation across multi-product firms by simultaneously solving a system of $J_{ft} + 1$ equations for each multi-product firm (where J_{ft} is the number of products produced by firm f in time t). This then helps to back out firm level productivity.

Additionally, this methodology also applies a selection-correction procedure, since firms self-select into being a multi-product firms based on their productivity and input set. This introduces a self-selection bias in the sample, which is corrected by a correction procedure. The correction procedure is based on a probability estimation of the firm being a multi-product firm, based its own productivity threshold and information set.

[18] To illustrate this with an example, this methodology assumes that a firm which only produces motorcycles will use the same technology as a firm which produces both motorcycles and cars.

Appendix B

Output Quality based on Khandelwal (2010)

We use the methodology by Khandelwal (2010) to estimate output quality. This methodology is based on nested logit demand system which allows for both preferences of both horizontal and vertical attributes. The methodology assumes that the quality is a vertical component of the model which represent the mean value a typical consumer attaches to the product. Therefore, it is essential to incorporate product differences at the horizontal level, as expensive imported products may co-exist in the market at the same time with cheap rivals, where price might not be an appropriate proxy for quality.

In the model, a typical consumer n's preferences are based on assuming that she purchases that variety of the product ci within product i at time t to maximize her utility. Therefore, the demand curve of a typical consumer can be represented as:

$$ln\ (s_{cit}) - ln\ (s_{ot}) = \lambda_{1,ci} + \lambda_{2,t} + \alpha p_{cit} + \sigma ln\ (ns_{cit}) + \lambda_{3,cit} \qquad (B.1)$$

where ln (s_{cit}) is the log of variety ci's overall market share and $ns_{cit}$is its market share within product i (nest share). ln (s_{ot}) is the log of the outside option's market share. p_{cit} is the price of the variety *ci* at time *t*.

Quality is defined as $\lambda_{1,ci} + \lambda_{2,t} + \lambda_{3,cit}$ which reflects a valuation of variety ci common across all consumers[19]. Thus, the quality term is decomposed into three main elements: $\lambda_{1,ci}$ the time invariant valuations that the consumer attaches to variety ci reflecting variety fixed-effects; $\lambda_{2,t}$ captures time trends across all varieties represented by the time fixed-effects; and $\lambda_{3,cit}$ a variety-time deviation observed by the consumer (and not by the econometrician) that plays the role of the estimation error. The quality of variety ci is then computed as[20]:

$$\lambda_{cit} = \hat{\lambda}_{1,ci} + \hat{\lambda}_{2,t} + \hat{\lambda}_{3,cit} \qquad (B.2)$$

[19] There is no subscript *n* in these terms since it represents common valuation across all consumers.
[20] For our study, we aggregate the quality at the firm level by using product revenue shares as weights.

Appendix C

Percentage change in Pakistan's Export Value to the US (US $)				
Product Code	**Product Description**	**% Change between the years 2000-2005**	**%Change between the years 2005-2010**	**% Change between the years 2000-2010**
6101302020	BOYS' OVERCOATS ETC	46.71	-58.46	-39.05
6103431520	MEN'S TROUSERS & BREECHES	-64.25	-79.30	-92.60
6103431540	BOYS' TROUSERS & BREECHES	-46.33	-90.19	-94.73
6103431570	BOY'S SHORTS KNITTED OR CROCHETED	19.34	-66.28	-59.76
6104332000	W/G SUIT-TYPE JACKET	669.27	-88.61	-12.39
6104420010	WOMEN'S DRESSES OF COTTON	6.44	-80.16	-78.88
6104432020	GIRLS' DRESSES KNITTED OR CROCHETED	66.46	-72.10	-53.55
6104520010	WOMEN'S SKIRTS AND DIVIDED SKIRTS	-62.59	-96.77	-98.79
6104621020	WOMEN'S OVERALLS OF BIB AND BRACE	86.66	-87.13	-75.97
6104622050	GIRLS' SHORTS COTTON	-44.29	-83.42	-90.76
6104632028	KNITTED GIRLS' SYNTHETIC TROUSERS	-58.36	-99.08	-99.62
6104632030	WOMEN'S SHIRTS OF SYNTHETIC FIBERS	-55.87	-77.55	-90.09
6105202030	BOYS' SHIRTS OF MANMADE FIBERS	23.53	-94.29	-92.94
6106100010	WOMEN'S BLOUSES AND SKIRTS	8.52	-23.92	-17.44
6108320010	WOMEN'S NIGHTDRESSES	649.57	-96.18	-71.33
6108910015	WOMEN'S UNDERWEAR	-63.86	-87.64	-95.53
6109901013	MEN'S TANK TOPS & SINGLETS	-48.77	-93.07	-96.45
6109901025	BOYS' TANK TOPS & SINGLETS	232.24	-96.74	-89.17
6109901049	MEN'S/BOY'S ARTICLES OF MMF	127.25	-70.73	-33.48
6109901065	WOMEN'S TANK TOPS & SINGLETS	-5.07	-62.06	-63.99
6110202020	WOMEN'S SWEATERS OF COTTON	21.60	-20.25	-3.02
6110303035	W/G VESTS	159.57	-85.51	-62.39
6111305030	BABIES' GRMNT & CLTH	-70.11	-90.62	-97.20
6112120010	MEN'S/BOY'S JACKETS FOR TRACK SUITS	1114.74	-95.00	-39.24
6112120050	MEN'S/BOY'S TROUSERS FOR TRACK SUITS	60.71	-91.77	-86.77
6112120060	WOMEN'S/GIRL'S TROUSERS FOR TRACK SUITS	60.30	-77.44	-63.84
6114200005	MEN'S OR BOYS' TOPS	560.79	-91.07	-40.99
6114200015	JUMPERS OF COTTON	-59.50	-92.56	-96.99
6201110010	MEN'S OVERCOATS CARCOATS	-44.40	-79.06	-88.36
6201122060	BOYS' OVERCOAT	203.45	-98.14	-94.34
6201134030	MEN'S OVERCOAT	-43.04	-84.88	-91.39
6202134020	WOMEN'S OVERCOATS & CARCOATS	-90.74	-91.44	-99.21
6203332010	MEN'S SUIT JACKET/BLAZER	101.53	-70.09	-39.72
6203411810	MN TRSRS/BRCHS OF WL	479.07	-84.25	-8.80
6203422010	MEN'S BIB AND BRACE	-78.25	-84.89	-96.71
6203434010	MEN'S TROUSERS	-68.27	-74.12	-91.79
6203492045	MEN'S SHORTS OF ARTI	189.49	-75.15	-28.07

6204194000	WOMEN’S/GIRL’S SUITS OF SILK COTTON	53.56	-38.75	-5.94
6204335010	WOMEN’S SUIT TYPE JACKET SYNTHETIC FIBERS	122.88	-96.64	-92.51
6204423050	WOMEN’S DRESS OF COT CON	-53.34	-71.03	-86.48
6204423060	GIRL’S DRESS OF COTTON	-49.94	-77.16	-88.57
6204444010	WOMEN’S DRESSES OF ARTIFICAL FIBERS	-78.33	-98.56	-99.69
6204522030	WOMEN'S SKIRT & DIVIDED SKIRTS OF COTTON	31.41	-41.84	-23.58
6204522040	GIRLS' SKIRT & DIVIDIDED SKITRS OF COTTON	56.18	-56.89	-32.67
6204533010	WOMEN’S SKIRTS OF SYNTHETIC FIBERS	-9.98	-73.10	-75.78
6204533020	GIRL’S SKIRT OF SYNTHETIC FIBERS	-76.91	-93.61	-98.53
6204593010	WOMEN’S SKIRTS ARTIFICAL FIBERS	-71.08	-86.76	-96.17
6204633530	GIRL’S TROUSERS SYNTHETIC FIBERS	-57.42	-69.44	-86.99
6204692510	WOMEN'S TROUSERS ARTIFICAL FIBERS	-61.58	-99.06	-99.64
6205302050	MEN'S SHIRT OF MAN MADE FIBERS	-6.23	-6.54	-12.36
6205302070	MEN SHIRTS MAN MADE FIBERS	-21.60	-67.06	-74.18
6205302080	BOYS' SHIRT MAN MADE FIBERS	112.51	-96.85	-93.31
6206302000	WOMEN’S/GIRL’S BLOUSES COTTON	238.37	-98.67	-95.50
6206403010	WOMEN’S BLOUSES, SKIRTS AND SKIRT BLOUSES	-30.77	-63.98	-75.06
6206403040	GIRL’S BLOUSES, SKIRTS AND SKIRT BLOUSES	125.47	-87.33	-71.43
6207110000	MEN’S/BOY’S UNDERPANTS	124.53	-59.59	-9.27
6207210010	MEN'S NIGHTSHIRTS	186.48	-85.50	-58.47
6207210040	BOYS' NIGHTSHIRTS	-90.04	-94.53	-99.46
6207220000	MEN’S/BOY’S NIGHTSHIRTS & PAJAMA	-41.67	-96.92	-98.20
6207911000	MEN’S/BOY’S BATHROBES, DRESS	48.61	-93.84	-90.84
6207913020	MEN’S/BOY’S SINGLETS, OTHER	-5.08	-42.50	-45.41
6208110000	WOMEN’S/GIRL’S SLIPS AND PETTIC	-15.54	-24.62	-36.33
6208210020	WOMEN'S NIGHTDRESS	50.84	-59.72	-39.25
6208220000	WOMEN’S/GIRL’S NIGHTDRESSES & PAJAMAS	-32.50	-86.58	-90.94
6208913020	GIRLS' BRIEFS AND SINGLETS	-62.35	-97.97	-99.23
6208920010	WOMEN'S NEGLIGEE	-68.75	-69.54	-90.48
6208920030	WOMEN'S BRIEFS AND SINGLETS	434.90	-95.83	-77.67
6209205050	BABIES' OT GARMENTS	11.18	-41.25	-34.69
6211111010	MEN'S SWIMWEAR	-11.79	-95.59	-96.11
6211320015	B CVRALS & SIM APPRL	-74.68	-84.87	-96.17
6211430050	WOMEN’S/GIRL’S TRACK SUITS	-76.45	-90.71	-97.81
6211430076	WOMEN’S/GIRL’S MMF VESTS N KT C	-49.98	-78.93	-89.46
6214101000	SHAWLS SCARVES, MUFFLERS SILK	-12.06	-78.40	-81.01
6214900090	SHAWLS SCARVES, MUFFLERS OTHER MATERIALS	24.16	-65.25	-56.86
6216000800	SKI/SNOWMOBILE GLOVE	15.39	-33.77	-23.58
6216004100	GLOVES EX SKI COTTON	16.07	-89.26	-87.53
6217101090	CLOTHING ACCESSORIES	494.18	-83.53	-2.12
6301300020	BLANKET N/ELEC & TRA	115.10	-64.80	-24.27
6302100015	BED LINEN, KNITTED O	-27.99	-64.45	-74.40
6302215020	SHEETS OF PRINTED COTTON	257.89	-87.55	-55.45

6302217040	PILLOWCOVERS OF PRINTED COTTON	1290.76	-96.91	-57.08
6302222010	PILLOWCASES OF PRINTTED	24.61	-66.32	-58.03
6302222020	SHEETS OF PRINT MANM	-7.59	-86.57	-87.59
6302321040	SHEETS OF MANMADE FIBER	467.22	-98.95	-94.05
6302321060	BED LINEN: OTHER THAN PRINTED	-9.38	-93.38	-94.00
6302322010	PILLOWCASES OF MANMA	544.38	-99.86	-99.09
6302390010	BED LINEN OF WOOL	204.14	-94.81	-84.22
6302512000	TABLECLOTHS AND NAPK	42.84	-43.57	-19.39
6302530030	TABLE LINEN EX TABLE	1445.44	-94.44	-14.12
6302910005	COTTON DISH TOWELS	-12.56	-69.09	-72.97
6302910035	COTTON TOWELS JACQUA	183.94	-72.10	-20.78
6302932000	BED, TABLE, TOILET,	1.66	-50.51	-49.69
6303921000	CURT & INTER BLINDS/	711.60	-99.50	-95.93
6304192000	OTHER FURNISH ART NT	-54.41	-72.76	-87.58
6304930000	FURNISHISHING ARTICLES	33.32	-93.92	-91.89
6304996030	OTHER FURNISHISHING ARTICLES	447.54	-90.44	-47.67
6307908945	PILLOW SHELLS, OF COTTON	-1.94	-26.03	-27.47
6307908985	SHELLS FOR QUILTS, EIDERDOWNS	-15.95	-68.04	-73.14
6310102030	USED/NEW RAGS, SCRAP TWINE	623.81	-96.84	-77.11

Source: International Trade Administration, The Office of Textiles and Apparel (OTEXA)