Trade Liberalization and Firm Adjustment: Evidence from Pakistan*

Umer Sohail
University of Delaware

Zehra Farooq
Federal Board of Revenue, Pakistan

October 2026

Preliminary draft. Comments welcome.

Abstract

We study how firms adjust to preferential access to a large export market. Between November 2012 and January 2014, the European Union removed most of its remaining tariffs on Pakistani products in two steps—flood-relief preferences on a narrow set of products, followed by GSP+—without requiring tariff cuts in return. Using corporate tax records for 3,810 firms and variation across products in tariffs before the cuts, we find that each percentage point of tariff exposure raised firm export value by about 19 percent, mainly after the second, broader step, and Pakistan's exports shifted toward the EU. Export growth came with lower recorded production wage bills, while the evidence on capital is inconclusive. Export estimates are larger for more productive firms, and less productive firms became less likely to report positive sales or wages; among large firms, exporters expanded exports and cut production wage bills, while some non-exporters increased their recorded capital stock.

JEL Codes: D22, F12, F13, F14, O19, O24

Keywords: Trade preferences, tariff cuts, GSP+, non-reciprocal market access, heterogeneous firms, export entry, administrative tax data, Pakistan

*We thank Adrienne Lucas, Manawini Rao, Parag Mahajan, and Shafaat Yar Khan for helpful comments. This research uses administrative tax data provided by the Federal Board of Revenue (FBR), Pakistan. Farooq is affiliated with the FBR. The views expressed are the authors' and do not necessarily reflect those of the FBR. The authors are responsible for any errors. Contact: umersoha@udel.edu, zfarooq@tulane.edu.

1 Introduction

High-income countries routinely lower tariffs on imports from developing countries through trade preferences, such as the European Union's Generalised Scheme of Preferences (GSP) and the United States' African Growth and Opportunity Act (AGOA). These programs are non-reciprocal: the beneficiary gains access to a large market without lowering its own tariffs. Their promise extends beyond exports. By connecting domestic firms to foreign buyers, preferences may encourage firms to expand production, invest, and become more productive. Yet firms arrive at this opportunity with very different capabilities—some are highly productive and some are not, some already sell abroad and many do not—so the gains need not be shared evenly. Whether market access delivers on its development promise therefore depends on which firms respond and what changes inside them, and firm-level evidence on these questions is limited. The question is timely, as preference programs are being revised and renewed: the United States' GSP has lapsed since 2020, and a revised EU scheme takes effect in 2027.[1] In this paper, we use administrative tax records to trace how firms in a developing economy adjust when a large export market removes tariffs on their products without asking for tariff cuts in return.

We study how the EU removed most of its remaining tariffs on Pakistani products in two steps. Pakistan already received partial preferences under the EU's standard GSP. In the first step, the EU's Autonomous Trade Preferences (ATP), granted as relief after the 2010 floods, gave duty-free access from November 15, 2012, to 75 tariff lines: 49 without limit and 26 within tariff-rate quotas. In the second step, Pakistan's entry into the EU's GSP+ program on January 1, 2014, applied zero duties to about two-thirds of the EU's tariff lines and kept every line covered in the first step duty-free. Neither step required Pakistan to lower its own tariffs. Together, the two steps were a trade liberalization by the importing country alone: a foreign tariff cut like those studied by Lileeva and Trefler (2010) and Bustos (2011), but without a reciprocal cut at home. Because tariffs before the cuts differed widely across products, the two steps delivered very different tariff cuts to different firms: some producers saw EU tariffs of eight to nine percent removed, while producers of goods the EU already admitted duty-free received no tariff cut. We measure each firm's exposure as the average EU tariff in 2008–2012, before the first step, on the product that corresponds to its industry. In our tariff data, the tariff fell to about zero for 48 of the 52 products with a positive tariff before the cuts, so for most firms exposure equals the total cut; the

[1] The U.S. GSP program expired on December 31, 2020, and has not been renewed; AGOA lapsed in September 2025 and was renewed in February 2026 only through the end of 2026. The European Union adopted a revised GSP regulation in 2026 that applies from January 2027 (European Commission, 2026).

exceptions are two products whose tariffs were not cut and two that were cut only in part. Exposure ranges from essentially zero, for the 45 percent of firms whose products already entered the EU duty-free, to eight or nine percentage points for the most exposed products, and higher for a few; it averages 2.6 points. We compare firms with higher and lower exposure before and after the tariff cuts in event studies with firm and year fixed effects, estimated by Poisson pseudo-maximum likelihood for values (Santos Silva and Tenreyro, 2006) and by linear probability models for binary outcomes. We measure every change relative to fiscal year 2012 (FY2012, July 2011–June 2012), the last year before the first step; we show the years of the two steps, FY2013 and FY2014, separately; and we report effects averaged over FY2015–2019, the first five years after both steps. Our data are a balanced panel of 3,810 goods-producing firms, almost all in manufacturing, that filed corporate income tax returns with Pakistan's Federal Board of Revenue (FBR) in every fiscal year from 2008 to 2019; product-level EU tariffs from the World Integrated Trade Solution (WITS); and customs records of Pakistan's exports by product and destination from the Pakistan Bureau of Statistics (PBS). We link the tax records to tariffs through a crosswalk, built with the assistance of a large language model, Claude Opus 5.5, that assigns each industry class in the tax records to the product chapter in which EU tariffs are set.

Exports responded. In the customs data, Pakistan's exports to the EU rose by about 35 percent relative to its exports of the same products to other destinations, after similar trends before the cuts. Within the tax records, firms whose products faced higher EU tariffs before the cuts exported more afterward: each percentage point of exposure raised export value by about 19 percent. The response came mainly with the second step. In FY2013, after the first step, which covered only part of 11 products, exports had barely moved at the product level we measure; they rose from FY2014, when GSP+ took effect, and stayed higher. Firms that already exported before the cuts also exported more, with export value about 12 percent higher per point. Export growth came with lower recorded production wage bills, about 4 percent lower per point of exposure, while the evidence on the capital stock is inconclusive and the probability of reporting positive sales or wages shows no clear change on average. The export and wage-bill results remain statistically significant, at the 10 percent level or better, when we cluster standard errors by product; when we drop the products covered by the first step, so that the estimates come from the second step alone; and when we change the reference year.

These averages combine firms that responded differently. Among more productive firms, those with higher exposure exported about 26 percent more per point, became more likely to report positive sales or wages, and recorded lower production wage bills; their

capital stock may also have risen, but this increase is not robust. Among less productive firms, higher exposure brought no detectable export gain and a lower probability of reporting positive sales or wages. We compare separately estimated group coefficients and do not test their differences. Responses also differed with export experience. Among large firms, those in the top quartile of revenue before the cuts, firms that reported no exports in any year from FY2008 to FY2012 increased their recorded capital stock by about 6 percent per point of exposure and became more likely to report exports, whereas the capital stock of large firms that already exported showed no detectable change.

Beyond its policy relevance, our paper makes three contributions to the economics literature. First, we provide firm-level evidence on the effects of trade preferences. Studies of trade preferences find that they can raise exports, mostly using country- or product-level trade flows: Rose (2004) finds that GSP preferences are associated with substantially higher bilateral trade, and Frazer and Van Biesebroeck (2010) show that AGOA raised African exports to the United States. Closest to our setting, Cheong, Kwak, and Yuan (2017) study the first step, the ATP, and find that it raised Pakistan's exports of the waived goods to the EU within a few months, without significantly reducing competing countries' exports, and brought greater employment opportunities in the tariff-waived industries. We extend their work in two directions. We follow the full sequence of cuts, through GSP+ and five years beyond, and we observe outcomes inside firms—exports, production wage bills, capital, and whether a firm reports sales or wages—for exporters and non-exporters alike. Their employment findings and our payroll findings need not conflict: they measure labor market outcomes of workers in the tariff-waived industries around the time of the ATP, including workers outside the incorporated firms we observe, whereas we measure the recorded production wage bills of these firms, relative across exposure levels, over FY2015–2019.

Second, we contribute to the literature on heterogeneous firms and trade. Theory predicts that trade reallocates market share toward more productive firms and pushes the least productive toward exit (Melitz, 2003), and empirical work confirms this pattern after trade liberalizations (Pavcnik, 2002; Trefler, 2004; Topalova and Khandelwal, 2011). In that evidence, domestic firms face more import competition at home: on its own after Chile's unilateral tariff cuts, and together with better access to foreign markets under the Canada–United States Free Trade Agreement. The EU's two steps removed foreign tariffs with no cut in Pakistan's own tariffs, so they isolate the export-market channel. In this setting, we find patterns in line with that prediction: export estimates are larger for more productive firms, which also become more likely to report positive sales or wages, while less productive firms become less likely to do so. Because we compare separately estimated

coefficients rather than testing their difference, we treat this evidence as suggestive.

Third, we contribute to the literature on how export opportunities change what happens inside firms. Export opportunities can lead firms to upgrade quality (Verhoogen, 2008), induce lower-productivity plants to start exporting and invest in productivity (Lileeva and Trefler, 2010), prompt technology upgrading (Bustos, 2011), and raise quality and productivity through exporting itself (Atkin, Khandelwal, and Osman, 2017). In the closest firm-level studies, Lileeva and Trefler (2010) and Bustos (2011), foreign tariff cuts arrived together with cuts to the home country's own tariffs. Because entering export markets involves sunk costs, prior export experience shapes which firms can take advantage of new opportunities (Roberts and Tybout, 1997). We find that, with foreign market access alone, responses differ with export experience: among large firms, some that had not exported before the cuts increased their recorded capital stock and became more likely to report exports, while the capital stock of large firms that already exported did not change. This pattern is consistent with sunk entry costs, although we do not link the rise in capital to export entry within the same firms.

Overall, the EU's two-step tariff cut raised Pakistan's exports to the EU and changed how its firms operate. Firms with higher exposure exported more and recorded lower production wage bills. Export estimates are larger for more productive firms, and some large firms that had not exported increased their recorded capital stock and became more likely to report exports. These patterns suggest that preferences mainly benefit firms already positioned to use them.

2 Background: The EU's Two-Step Tariff Cut for Pakistan

Since 1971, the European Community, and later the European Union, has granted tariff preferences to developing countries under its Generalised Scheme of Preferences (GSP). During our sample period, the scheme had three tiers (European Union, 2012a): the standard GSP; GSP+, which removes the remaining tariffs for vulnerable developing countries that ratify and implement 27 international conventions; and Everything But Arms, which grants duty-free access to least-developed countries. None of the tiers requires beneficiaries to lower their own tariffs. Between November 2012 and January 2014, the EU removed most of its remaining tariffs on Pakistani products in two steps, described below. Throughout the paper, a *product* is a two-digit Harmonized System (HS) chapter, the level at which we measure exposure; the EU sets its tariffs on finer *tariff lines* within these chapters.

Before the cuts: the standard GSP. Before the first step, Pakistan exported to the EU under the standard GSP, which removes tariffs on some products and only reduces them on others; outside the lines cut in the first step, the standard GSP applied until the end of 2013. The cuts on many products were partial. On some products, for example, the standard GSP rate was 9.6 percent instead of the 12 percent most-favored-nation (MFN) rate, a reduction of one-fifth. Under the standard GSP, the EU removed tariffs on products it classified as non-sensitive and only reduced them on products it classified as sensitive; these classifications are set in EU regulations for all beneficiary countries (European Union, 2012a). Partial cuts therefore left tariffs that varied widely across products, set by EU rules rather than by conditions in Pakistan. These remaining tariffs are the ones the two steps removed, and they are the tariffs we use to measure exposure.

Step one, November 2012: the Autonomous Trade Preferences. After the 2010 floods, the EU offered Pakistan temporary trade relief. The Autonomous Trade Preferences (ATP) gave duty-free access to 75 tariff lines from November 15, 2012, to December 31, 2013: 49 without limit and 26 within tariff-rate quotas (European Union, 2012b; European Commission, 2015). The lines fall within 11 of the products we use to measure exposure. The first step was complete on the lines it covered but narrow: it cut tariffs on part of 11 products and left the rest of the EU's tariff schedule for Pakistan unchanged. Cheong, Kwak, and Yuan (2017) show that Pakistan's exports of the waived goods to the EU rose within a few months.

Step two, January 2014: GSP+. Pakistan qualified for GSP+ after ratifying and committing to implement the 27 conventions, which cover human rights, labor rights, environmental protection, and good governance. The European Parliament endorsed Pakistan's status on December 12, 2013, less than three weeks before GSP+ took effect on January 1, 2014. GSP+ applied zero duties to about two-thirds of the EU's tariff lines for Pakistan. These included every line covered in the first step, so those lines stayed duty-free when the ATP expired at the end of 2013. The status is conditional: the EU reviews beneficiaries' compliance every two years and can withdraw the preferences (European Union, 2012a). Like the first step, the second did not require Pakistan to lower its own tariffs.

The size of the tariff cut. In our tariff data, the two steps took the tariff to about zero for 48 of the 52 products with a tariff of at least 0.1 percentage point before the cuts, so for these products the tariff before the first step measures the total cut. Figure 1 plots, by calendar year, the average EU tariff on Pakistani products grouped by their tariff before

the cuts, together with the tariff lines cut in the first step. Products with the highest tariffs paid about 7 percent through 2013, and the second step brought them to roughly zero in 2014. Products with moderate tariffs paid about 1.3 percent and also fell to roughly zero, while about 45 percent of firms make products that entered the EU duty-free throughout. The lines cut in the first step fell in 2013 and reached zero in 2014. The exceptions are two products whose tariffs were not cut and two whose tariffs were cut only in part.

Timing. Our firm data are organized by Pakistan's fiscal year, which runs from July to June and is labeled by the year in which it ends; fiscal year 2012 (FY2012), for example, runs from July 2011 to June 2012. Figure 2 aligns the two steps with fiscal years. Our sample begins in FY2008, so FY2008–2011 provide four years before the cuts. FY2012, the last year before the first step, is our reference year; it ended five months before the first step and eighteen months before the European Parliament's vote on GSP+. FY2013 contains the first seven and a half months of the first step, and FY2014 combines its last six months with the first six months of the second step. We show both years but exclude them from the pre-trend tests and from the average effect. FY2015 through FY2019 follow both steps, and the sample ends in FY2019, before the COVID-19 pandemic. Tariffs are recorded by calendar year; our exposure measure averages 2008–2012, before the first step appears in the annual tariff data.

3 Empirical Strategy

The EU's two steps removed most of its remaining tariffs on Pakistani products between November 2012 and January 2014, but the total cut differed widely across products, from nothing for products the EU already admitted duty-free to eight or nine percentage points for the most exposed products. We exploit the cuts in two ways. At the country level, where customs data record export destinations, we compare Pakistan's exports of the same product to EU and non-EU destinations before and after the cuts. At the firm level, where tax records do not report destinations, we compare firms whose products faced higher and lower EU tariffs before the cuts.

3.1 Country-Level Design

We first test whether the tariff cuts moved Pakistan's exports toward the EU. We estimate

$$X_{dht} \;=\; \exp\Bigg(\sum_{\substack{k=2009 \\ k\neq 2012}}^{2019} \theta_k \,\mathrm{EU}_d \,\mathbf{1}[t=k] \;+\; \gamma_{dh} \;+\; \delta_{ht} \Bigg) \nu_{dht}, \tag{1}$$

where X_{dht} is the value of Pakistan's exports of product h to destination d in fiscal year $t = 2009, \ldots, 2019$, in constant FY2013 rupees, and EU_d indicates a fixed set of 28 EU member states. Destination-by-product fixed effects γ_{dh} absorb fixed differences in how much of each product Pakistan sells to each market, such as those due to distance, language, or long-standing buyer relationships. Product-by-year fixed effects δ_{ht} absorb any shock that affects a product's exports to all destinations in a given year, including supply shocks in Pakistan, such as floods or energy shortages, and changes in demand for the product common to all markets. Each θ_k therefore measures the change from FY2012 to year k, in log points, in Pakistan's exports of a product to the EU relative to its exports of the same product to other destinations. The identifying assumption is that, absent the EU's tariff cuts, Pakistan's exports of each product to EU and non-EU destinations would have grown at the same proportional rate; the coefficients for FY2009–2011 test an implication of this assumption, and we report a joint test that they are zero. We estimate equation (1) by Poisson pseudo-maximum likelihood (PPML), which keeps the many destination-product-year cells with zero exports, and cluster standard errors two ways, by destination and by product.

To summarize the effect in one number, we estimate

$$\begin{aligned} X_{dht} \;=\; \exp\Big(& \theta \,\mathrm{EU}_d \,\mathbf{1}[2015 \le t \le 2019] \;+\; \theta_{2013} \,\mathrm{EU}_d \,\mathbf{1}[t=2013] \\ & +\; \theta_{2014} \,\mathrm{EU}_d \,\mathbf{1}[t=2014] \;+\; \gamma_{dh} \;+\; \delta_{ht} \Big) \nu_{dht}, \end{aligned} \tag{2}$$

and report $100\,(e^{\theta}-1)$, the percentage change in exports to the EU relative to other destinations in FY2015–2019 compared with FY2009–2012.

3.2 Exposure to the Tariff Cut

Because the tax records do not report destinations, the firm-level design uses each firm's exposure to the tariff cut. Let $a_{\ell s}$ be the EU's effectively applied tariff on imports from Pakistan on six-digit HS tariff line ℓ in calendar year s, in percentage points. For each product h, an HS chapter, we take the simple average over the six-digit lines L_{hs} in h

reported in year s, and we average these annual values over the five calendar years before the first step:

$$\tau_h \;=\; \frac{1}{5}\sum_{s=2008}^{2012} \bar{a}_{hs}, \qquad \bar{a}_{hs} \;=\; \frac{1}{|L_{hs}|}\sum_{\ell \in L_{hs}} a_{\ell s}. \tag{3}$$

Each firm i is assigned the exposure of the product that corresponds to its industry, $\tau_{h(i)}$, as we describe in Section 4.3. Exposure is measured before the first step took effect in November 2012, so it is not affected by either step, and it is fixed within each firm. Together, the two steps removed the tariff entirely for 48 of the 52 products in the tariff data with a tariff of at least 0.1 percentage point before the cuts; for these products, τ_h equals the total tariff cut, whichever step delivered it. The exceptions are two products whose tariffs were not cut and two that were cut only in part (Section 2).

The variation in exposure comes from the EU's tariff schedule rather than from Pakistani firms' choices: the tariffs before the cuts are the EU's standard GSP rates, and the two steps removed them on dates set by the EU for all covered products (European Union, 2012b,a). Because both steps were one-way, exposure is not tied to any change in Pakistan's own tariffs, and because 45 percent of firms are assigned to products the EU already admitted essentially duty-free, the comparison includes a large group of firms whose EU tariffs did not change. This approach follows studies that measure firms' exposure to foreign tariff cuts by the tariffs their products faced before the cuts (Lileeva and Trefler, 2010; Bustos, 2011).

3.3 Firm-Level Event Study

In its simplest form, the design is a difference-in-differences that interacts exposure with an indicator for the years after the cuts. Our main specification replaces that indicator with one indicator for each year, so that we can trace the timing of the response and test for differences before the cuts:

$$Y_{it} \;=\; \exp\Bigg(\sum_{\substack{k=2008\\ k\neq 2012}}^{2019} \beta_k\, \tau_{h(i)}\, \mathbf{1}[t=k] \;+\; \alpha_i \;+\; \lambda_t\Bigg)\, \varepsilon_{it}, \qquad \mathbb{E}\big[\varepsilon_{it} \,\big|\, \tau_{h(i)}, \alpha_i, \lambda_t\big] = 1, \tag{4}$$

where Y_{it} is an outcome of firm i in fiscal year $t = 2008, \ldots, 2019$, α_i are firm fixed effects, and λ_t are year fixed effects.[2] The firm fixed effects absorb all time-invariant differences

[2]The estimating equation also includes firm age. Because age rises one-for-one with the fiscal year for 98.8 percent of firms, it is almost entirely absorbed by the firm and year fixed effects, and we omit it from the notation.

across firms, including their average scale, location, and product, and therefore also the level of exposure $\tau_{h(i)}$ itself, which is why exposure enters only through its interactions with year indicators. The year fixed effects absorb shocks common to all firms in a given year, such as economy-wide changes in tax administration and the average effect of energy shortages or exchange-rate movements. Each coefficient β_k is the difference, in log points, between the change in the expected outcome from FY2012 to year k of two firms whose exposure differs by one percentage point.

We estimate equation (4) by PPML for outcomes measured in values: exports, the production wage bill, and the capital stock. PPML keeps firm-years with zero values, which a logarithmic specification would discard, so the export estimates include firms that start or stop exporting. It is consistent whenever the conditional mean in equation (4) is correctly specified, whatever the form of heteroskedasticity, whereas a log-linear regression is not (Santos Silva and Tenreyro, 2006). Because the firm fixed effects absorb each firm's average, firms whose outcome is zero in every year carry no information; the export regressions therefore use the 1,790 firms that report positive exports in at least one year. For binary outcomes D_{it}—whether a firm exports and whether it is active—we estimate the linear probability model

$$D_{it} \;=\; \sum_{\substack{k=2008 \\ k\neq 2012}}^{2019} \beta_k \, \tau_{h(i)} \, \mathbf{1}[t=k] \;+\; \alpha_i \;+\; \lambda_t \;+\; u_{it}. \tag{5}$$

To summarize the effect of the two steps in one number, we average the coefficients over the first five years after both steps,

$$\bar{\beta} \;=\; \frac{1}{5} \sum_{k=2015}^{2019} \beta_k, \tag{6}$$

which we estimate, with its standard error, from the same regression. For outcomes estimated by PPML, we report $100\,(e^{\bar{\beta}}-1)$, the percentage change in the outcome per percentage point of exposure; for two firms whose exposure differs by Δ points, the implied difference is $100\,(e^{\Delta\bar{\beta}}-1)$ percent. For binary outcomes, we report $100\,\bar{\beta}$, the change in the probability, in percentage points, per percentage point of exposure. FY2013, the year of the first step, and FY2014, which contains the end of the first step and the start of the second, show how the response unfolded between the steps; we report their coefficients but exclude them from $\bar{\beta}$ and from the pre-trend test. Because FY2012 precedes both steps, $\bar{\beta}$ measures the combined effect of the two steps: for firms in products covered by the first

step it includes the effect of that earlier cut, and for all other firms it reflects the second step alone. Section 6 reports estimates that exclude the products covered by the first step.

Identification. The coefficients β_k are identified from how the gap between more- and less-exposed firms changes relative to FY2012. The identifying assumption is that, absent the EU's tariff cuts, the expected outcomes of firms at every level of exposure would have grown by the same proportion:

$$\mathbb{E}\big[Y_{it}(0) \,\big|\, \alpha_i, \tau_{h(i)}\big] \;=\; \exp(\alpha_i + \lambda_t), \tag{7}$$

where $Y_{it}(0)$ is the outcome of firm i in year t without the tariff cuts. For the binary outcomes, the analogue of equation (7) is additive: the probability would have changed by the same number of percentage points at every level of exposure. We also assume that firms did not adjust in anticipation before FY2013. Because exposure is continuous, reading β_k as the effect of one additional percentage point of tariff removed further requires that firms at different exposure levels would have responded alike to the same tariff cut (Callaway, Goodman-Bacon, and Sant'Anna, 2024). The coefficients β_{2008} through β_{2011} test an implication of the identifying assumption: if more-exposed firms had been on a different path before the cuts, they would differ from zero. For each outcome with variation before the cuts, we report a joint test that they are all zero.

Heterogeneity. To learn which firms drive the response, we estimate equation (4) separately for groups of firms g defined with data from before the cuts (Section 4.5),

$$Y_{it} \;=\; \exp\Big(\sum_{\substack{k=2008 \\ k\neq 2012}}^{2019} \beta_k^g \, \tau_{h(i)} \, \mathbf{1}[t=k] \;+\; \alpha_i \;+\; \lambda_t^g \Big) \, \varepsilon_{it}, \qquad i \in g, \tag{8}$$

so that each group has its own year effects and β_k^g compares more- and less-exposed firms within the same group. We first compare more and less productive firms, following the prediction that market access shifts activity toward more productive firms (Melitz, 2003). We then compare large firms that exported before the cuts with large firms that did not, following the prediction that sunk export-entry costs make firms with export experience better positioned to respond (Roberts and Tybout, 1997). Restricting this comparison to large firms narrows the size gap between the two groups, although large exporters remain larger and more exposed (Section 4.5); because each group is estimated separately with firm fixed effects, these level differences do not enter the comparison.

4 Data

We combine three administrative sources: the corporate income tax returns of Pakistani firms, the tariffs the EU applied to Pakistani products, and Pakistan's customs records of exports by product and destination. The tax returns describe each firm's industry, while tariffs are set on products, so linking the first two sources required a crosswalk from industry classes to product codes. Figure 3 summarizes how the sources fit together. This section describes each source, the crosswalk, and the samples we use.

4.1 Corporate Tax Records

Our firm data are the corporate income tax returns filed with Pakistan's Federal Board of Revenue (FBR) for fiscal years 2008–2019. The returns cover Pakistan's formal corporate sector. The returns report the firm's industry and the line items of its income statement and balance sheet. We use the records as provided in two FBR extracts, one covering fiscal years 2008–2013 and one covering 2014 onward, and we count a firm as filing in a year if its return reports any nonzero financial value. Over FY2008–2019, the records contain 57,397 such firms across all sectors and 327,605 firm-year observations.

The returns identify each firm's industry by its class in the International Standard Industrial Classification (ISIC), along with the corresponding division and section. We draw five outcomes from the returns. *Exports* are the value of the firm's export sales, in Pakistani rupees; the returns record no quantities or destinations. *Export participation* indicates whether the firm reports positive exports. The *production wage bill* is the salaries and wages the firm reports as a cost of production; it combines employment and pay, which the returns do not report separately. The *capital stock* is the book value of plant and machinery plus capital work in progress, which records machinery and plant being installed; from FY2014, the plant and machinery field also includes equipment and furniture. Finally, a firm is *active* in a year if it reports positive gross revenue, turnover, production salaries, or management salaries. We deflate all values to 2013 prices using the GDP deflator and winsorize the production wage bill and the capital stock at the 1st and 99th percentiles of all main-sample firm-years; we do not winsorize exports.

The export field requires one note. Through FY2013, the field is filled for almost all firms, and firms without exports report an explicit zero. Starting in FY2014, the revised return leaves the field blank for most firms without exports. In our main specification, we treat a blank field as missing rather than imposing a zero, so export value and export participation are undefined in those firm-years; the comparison by export experience instead counts a blank as no exports. Treating blanks as zeros leaves the export-value estimates

essentially unchanged (Section 6).

4.2 EU Tariffs

We obtain the tariffs the EU applied to imports from Pakistan from the World Integrated Trade Solution (WITS), which reports, for each six-digit HS line and year, the effectively applied tariff and the most-favored-nation rate. The data cover 4,226 six-digit lines over 2008–2021. We construct each product's exposure τ_h as in equation (3): the simple average of applied tariffs across six-digit lines within the chapter, averaged over 2008–2012. A product's exposure is defined only if the chapter has applied-tariff data in each of the five years; a reported zero tariff is treated as duty-free, and a product without complete data is treated as missing, not as zero.

4.3 Linking Firms to Tariffs

The matching problem. The tax records and the tariff data speak different languages. The tax records classify each firm by what kind of business it is—its ISIC industry class, such as "Preparation and spinning of textile fibres" or "Manufacture of plastics products." The EU sets tariffs on what is shipped—products defined by HS codes, such as chapter 52 (cotton) or chapter 39 (plastics). To give each firm a tariff, we needed to assign every industry class the product that best represents what Pakistani firms in that class sell. No ready-made table does this. Both classifications are nested: ISIC groups activities into sections, two-digit divisions, and four-digit classes, while the HS groups goods into two-digit chapters (for example, 52, cotton), four-digit headings (5205, cotton yarn), and six-digit subheadings, which countries extend to eight-digit national lines. Standard correspondences link each industry class to every product it could make anywhere; for spinning, these include silk, wool, and synthetic yarns as well as cotton yarn. Averaging tariffs over all of them would misstate the tariff that Pakistani firms faced. We therefore assign each class the one product that best represents what firms in that class sell in Pakistan.

What made it complex. The assignment had to resolve several difficulties at once. First, an industry class can point to different products depending on the country: in Pakistan, firms in "Preparation and spinning of textile fibres" mainly produce cotton yarn (HS 52) rather than other textile fibres, and weaving firms mainly produce cotton fabric. Second, catch-all classes such as "Other manufacturing n.e.c." and "Manufacture of other textiles n.e.c." are large but contain varied products. Third, some classes describe a process rather than a good—"Finishing of textiles," for example, must be assigned to the woven fabric

that finishing firms work on. Fourth, class names in administrative data are not always standardized; some appear abbreviated or misspelled. Finally, the 180 industry classes in the goods-producing sections of the tax records span 32 ISIC divisions, from agriculture and mining to manufacturing, so the assignment had to be made consistently across very different parts of the economy.

How we used AI. We used a large language model, Claude Opus 5.5 (Anthropic), to propose an assignment for each of the 180 classes and to apply the same criteria across all of them. The criteria follow from the difficulties above: assign the product that firms in the class mainly sell in Pakistan, not every product the class could make; for a class that describes a process, assign the good the process is applied to; read abbreviated or misspelled class names by their meaning; and, for a small class without a dominant product, assign a default chapter for its division. The authors are responsible for the final assignments.

The final crosswalk assigns each of the 180 classes one two-digit HS chapter and a confidence rating (high, medium, or low). Of the 180 assignments, 124 are rated high confidence, 17 medium, and 39 low. For 21 small classes without a dominant product, the crosswalk assigns a default chapter for the class's division; these classes account for about 1 percent of firm-year observations. To take one example end to end, a spinning mill is assigned chapter 52 (cotton), on which the EU's applied tariff averaged 5.0 percentage points in 2008–2012; that is the mill's exposure.

4.4 Customs Exports by Destination

For the country-level analysis, we use Pakistan's official export statistics, published by the Pakistan Bureau of Statistics (PBS) as tables of exports by commodity and country. Because these tables are released as documents rather than as a database, we extracted them programmatically from the published files into records of export value (in thousands of rupees) and quantity by eight-digit HS code, destination, and fiscal year. For FY2009–2019, the extraction yields 416,554 product-destination-year records covering 6,044 eight-digit codes. We standardize destination names, remove rows that report totals rather than destinations, fix the set of destinations using the years before the cuts, aggregate to destination-by-chapter-by-year cells, and record a zero for every destination-product pair with no exports in a given year. The resulting panel covers 234 destinations and 96 HS chapters. We deflate values to FY2013 rupees using the World Bank's consumer price index, averaged to fiscal years, and define the EU by its 28 member states as of 2014. About three-quarters of destination-chapter-year cells are zero, which is one reason we estimate by PPML.

4.5 Samples and Groups

Main sample. Our analysis universe consists of firms in the goods-producing sections of ISIC—manufacturing, mining and quarrying, and agriculture, forestry and fishing—whose assigned chapter has applied-tariff data in all five years before the cuts (including chapters with a zero tariff). This universe contains 9,559 firms over FY2008–2019. Within it, we keep firms that file in every year from FY2008 to FY2019, so that changes in outcomes reflect changes within the same firms rather than changes in which firms are observed. The resulting balanced panel contains 3,810 firms and 45,720 firm-year observations. Ninety-five percent of these firms are manufacturers (3,633); the remainder are in mining and quarrying (116) and agriculture (61). The firms belong to 134 industry classes and 54 HS chapters. Exposure averages 2.6 percentage points, with a standard deviation of 3.3 points; 45 percent of firms are assigned to products the EU already admitted essentially duty-free (exposure below 0.1 percentage point), and 36 of the 54 products had exposure of at least 0.1 point. Firms that exported in at least one year between FY2008 and FY2012 number 1,037; we refer to them as incumbent exporters.

Productivity groups. We measure each firm's productivity before the cuts as its labor productivity, the logarithm of value added per unit of production wage bill, adapting Lileeva and Trefler (2010) with the wage bill in place of employment, which the returns do not report. Value added is gross revenue minus domestic raw materials; imported materials are not recorded before FY2014. We winsorize the inputs at the 1st and 99th percentiles, average the measure over FY2008–2011 for firms with at least two years of positive value added and production wages, and rank the firms with a measure into quartiles pooled across industries. Less productive firms are those in the bottom quartile. More productive firms are those in the top quartile. Firms in the middle two quartiles belong to neither group.

Export experience. To narrow differences in size, we restrict the comparison by export experience to large firms, those in the top quartile of average gross revenue over FY2008–2012. Among them, large exporters (569 firms) reported positive exports in at least one year between FY2008 and FY2012, and large non-exporters (382 firms) reported zero exports in every one of those years; one large firm with blank export records before the cuts is excluded. For this comparison, we measure export participation by counting a blank export field as no exports, so that both groups are measured in the same way.

Summary statistics. Table 1 describes the firms before the cuts, overall and by export experience. The average firm had gross revenue of 1.2 billion rupees and exports of 0.18 billion rupees. More productive firms had higher revenue, exports, and capital stocks than less productive firms, and a slightly smaller production wage bill (0.030 versus 0.035 billion rupees). Even among large firms, the two export-experience groups differ: large exporters had about twice the revenue of large non-exporters (5.75 versus 3.00 billion rupees), higher production wage bills and capital stocks, were older (26.8 versus 22.1 years in FY2012), and faced higher exposure (3.2 versus 2.3 percentage points); each of these differences is statistically significant at the 5 percent level.

5 Results

We first show that the two-step tariff cut moved Pakistan's exports toward the EU. We then turn to firms: we estimate the average response of exposed firms and ask which firms drive it.

5.1 Exports Shifted toward the EU

Figure 4 plots the coefficients θ_k from equation (1). Each point compares Pakistan's exports of the same product in the same year to EU and non-EU destinations, relative to FY2012. Before the cuts, the coefficients are small and jointly insignificant ($p = 0.20$): exports to the two groups of destinations moved together. In FY2013, the year of the first step, exports to the EU had not yet moved relative to exports elsewhere (a difference of -1 percent). This does not contradict Cheong, Kwak, and Yuan (2017), who find a rapid rise in exports of the waived goods: our comparison is at the level of the HS chapter, where the 75 waived lines are averaged with the many lines in the same chapters that the first step did not cover. The gap opened in FY2014, when the second step began, at about 22 percent, and widened through FY2018 before leveling off. Estimating equation (2), Pakistan's exports to the EU in FY2015–2019 were about 35 percent higher, relative to exports of the same products to other destinations, than in FY2009–2012 (95 percent confidence interval: 13 to 62 percent).[3] Because the product-by-year fixed effects absorb shocks common to a product in all markets, this estimate measures how exports to the EU changed relative to exports of the same product elsewhere; it captures the combined effect of the two steps.

The raw data tell the same story. Between FY2012 and FY2019, Pakistan's exports to the EU rose by 50 percent in real terms, from 530 to 797 billion rupees, while its exports to other

[3]Starting the panel in FY2008 gives 33 percent, with a pre-trend test p-value of 0.05.

destinations fell by 14 percent, and the EU's share of Pakistan's exports rose from 23 to 34 percent (Appendix Figure A1). Because the comparison is relative, shocks to particular non-EU markets also move it, and several such shocks lowered non-EU exports over this period, concentrated in a few product flows to the United Arab Emirates and China and in trade with Afghanistan (Appendix Figure A2). Excluding those flows and all exports to Afghanistan, the EU-relative increase is 38 percent (95 percent confidence interval: 17 to 62 percent); excluding the United Arab Emirates, China, and Afghanistan entirely, it is 40 percent.

5.2 Average Effects on Firms

Figure 5 plots the event-study coefficients for firm exports. Before the cuts, more- and less-exposed firms' exports evolved similarly: the coefficients for FY2008–2011 are small and jointly insignificant ($p = 0.25$). In FY2013, after the first step, the coefficient is small and statistically insignificant (4.3 percent per point); the exports of more-exposed firms rise from FY2014, when the second step began, and remain higher. On average over FY2015–2019, export value rose by 19.2 percent more for each additional percentage point of exposure (95 percent confidence interval: 12.0 to 26.8 percent). For two firms whose exposure differs by one standard deviation (3.3 points), the implied difference in export growth is about 78 percent.

Firms that already exported before the cuts also sold more: restricted to the 1,037 firms that exported between FY2008 and FY2012, export value rose by 11.6 percent per point of exposure (Figure 6, left panel; 95 percent confidence interval: 4.7 to 19.1 percent). The probability that a firm exports rose by 1.6 percentage points per point of exposure, from a base of about 24 percent of firm-years with exports (Figure 6, right panel; 95 percent confidence interval: 0.9 to 2.3 percentage points). This estimate covers all firms, so it nets firms that started exporting against firms that stopped; it is also the least robust of our average effects (Section 6).

Export growth came with lower recorded production wage bills. Their production wage bills fell by 4.2 percent per point of exposure, beginning in FY2014, with the second step, and persisting through FY2019 (Figure 7, top panel; 95 percent confidence interval: -6.1 to -2.3 percent). Because the wage bill combines employment and pay, this decline reflects fewer production workers, lower production wages, or both. In contrast, the capital stock and the probability that a firm is active—reports sales or pays wages—in a given year show no clear change on average. Because every firm in the balanced panel files a return in every year, the activity measure captures whether a firm operates, not whether

it survives. The capital estimate is small, at 1.0 percent per point, and statistically insignificant (95 percent confidence interval: -0.4 to 2.5 percent); its coefficients before the cuts drift down (joint $p = 0.01$), a pattern that comes from the products covered by the first step (Section 6). The activity estimate is 0.2 percentage points (95 percent confidence interval: -0.1 to 0.6). Measured labor productivity—value added per unit of production wage bill—also does not change on average, as value added fell about in proportion to the wage bill (Appendix Figure A3).

On average, then, more-exposed firms exported more and recorded lower production wage bills; the evidence on their capital stock is inconclusive, and the probability that they report positive sales or wages shows no clear change. These averages, however, combine firms that may have responded very differently. We next ask which firms drove them.

5.3 Heterogeneity by Productivity

We estimate equation (8) separately for the more and less productive firms defined in Section 4.5. We compare separately estimated coefficients and do not report formal tests of the differences between groups.

Export estimates are larger for more productive firms: among them, those with higher exposure increased their export value by 26.2 percent per point of exposure (Figure 8, panel (a); standard error 7.0). Among less productive firms, the estimate is 3.0 percent and imprecise (95 percent confidence interval: -14 to 24 percent); only 236 of these firms export in any year. Export participation rose in both groups, by 1.2 and 1.8 percentage points per point of exposure.

Exposure was also associated with whether firms were active—reported positive sales or wages—in opposite directions in the two groups. More productive firms with higher exposure became more likely to be active, by 0.5 percentage points per point of exposure, while less productive firms with higher exposure became less likely to be active—more likely to report neither sales nor wages in a year—by 0.8 percentage points (Figure 8, panel (b)). Across a one-standard-deviation difference in exposure, these estimates imply a 1.7 percentage-point higher probability of being active for more productive firms and a 2.6 percentage-point lower probability for less productive firms.

Among more productive firms, recorded inputs also changed. Their production wage bills fell by 4.9 percent per point of exposure, and their capital stock rose by 2.0 percent per point ($p = 0.07$; Figure 8, panel (c)). We treat the capital increase as suggestive: it is 1.6 percent ($p = 0.16$) when capital is measured by plant and machinery alone. Among less productive firms, neither estimate is statistically significant, although the wage-bill esti-

mate (-1.7 percent) is too imprecise to rule out a decline as large as that of more productive firms. Lower wage bills alongside a possible rise in capital suggest input adjustment, but we do not directly observe firms substituting capital for labor. Taken together, these patterns are in line with the reallocation toward more productive firms that Melitz (2003) predicts, here with no change in Pakistan's own tariffs. Because we compare separately estimated coefficients without testing their differences, and because each estimate compares more- and less-exposed firms within a group, we treat this evidence as suggestive; we do not observe activity moving between firms directly.

5.4 Heterogeneity by Export Experience

Firms that already export have paid the sunk costs of entering foreign markets and can scale up quickly, while firms that do not export must pay them first (Roberts and Tybout, 1997). To narrow differences in size, we estimate equation (8) for large exporters and large non-exporters, both drawn from the top quartile of firms by revenue before the cuts; large non-exporters reported no exports in any year from FY2008 to FY2012.

Some large firms that had not exported before the cuts increased their recorded capital stock. Among large non-exporters, those with higher exposure raised their recorded capital stock by 5.7 percent per point of exposure, an increase that is significant from FY2016 and reaches about 8 percent by FY2018 (Figure 9, panel (a); standard error 1.5). Among large exporters, the capital stock did not change (-0.6 percent). The result does not depend on including capital work in progress: measured by plant and machinery alone, the capital stock of large non-exporters rose by 6.3 percent per point. It remains significant when standard errors are clustered by product ($p = 0.001$; Section 6).

Large non-exporters also became more likely to report exports. Counting a blank export field as no exports, their probability of exporting rose by 2.5 percentage points per point of exposure, beginning in FY2014 (Figure 9, panel (b)). Because these firms did not export in any year before the cuts, their probability before the cuts is zero by construction. For large exporters, which were already exporting, the probability rose by only 1.2 percentage points; for them, the measure mostly captures continuing to export. Large exporters instead sold more abroad: their export value rose by 12.4 percent per point of exposure, and their production wage bills fell by 5.5 percent, while the production wage bills of large non-exporters did not change (Appendix Figures A4 and A5).

These results are consistent with sunk entry costs: some firms without export experience increased their recorded capital stock and became more likely to report exports, while firms already exporting expanded their sales abroad with no change in their capital

stock. They do not establish that firms invested in order to begin exporting. We observe book-value capital stocks rather than investment, and we do not link the firms that raised their capital stock to those that began to export. Firms' productivity and export experience before the cuts are associated with both whether and how they respond to market access.

6 Robustness

We test the average effects against three alternative specifications and several further checks. The export and production wage bill results hold throughout: exports rise and wage bills fall when we cluster standard errors by product, use only the second step by dropping products covered by the first, or change the reference year, although the wage-bill decline halves and is significant only at the 10 percent level without the products covered by the first step. Export participation is less robust: it loses statistical significance with product-level inference and without the products covered by the first step. The capital stock shows no robust change for the sample as a whole.

Inference with product-level exposure. Exposure varies only across products, so firms that make the same product share their treatment and may share shocks. Clustering standard errors by HS chapter instead of by firm leaves the estimates unchanged by construction and widens the confidence intervals: export value and the production wage bill remain significant at the 1 percent level, while export participation is no longer significant ($p = 0.16$). Among the group results, the export value and production wage bill of more productive firms and of large exporters, the activity responses of both productivity groups, and the capital stock of large non-exporters remain significant at the 5 percent level with product-clustered standard errors.

The second step alone. The first step cut tariffs on part of 11 products more than a year before the second. Our reference year precedes both steps, so the main estimates combine them. To isolate the second step, we drop the 1,047 firms in chapters with any tariff line covered by the first step; the remaining firms saw their tariffs cut only in January 2014. Export value then rises by 17.9 percent per point of exposure, close to the main estimate. In this smaller sample the pre-trend test rejects ($p = 0.03$), but the coefficients before the cuts are small, about -3 percent in FY2010–2011, next to the rise after the cuts (Appendix Figure A6). Export participation halves, to 0.8 percentage points, and is no longer significant. The production wage bill declines by 1.9 percent ($p = 0.08$), about half the main estimate, so much of the wage-bill response comes from the chapters covered by the first

step. The capital stock estimate rises to 1.9 percent ($p = 0.02$) with a pre-trend p-value of 0.81, so the pre-trend failure of the main capital estimate comes from the products covered by the first step.

Reference year. Every estimate is measured relative to a single year, FY2012, so an unusual base year would shift all later coefficients. Using FY2013 as the reference year instead shifts the levels, because FY2013 was partly affected by the first step, but not the conclusions: export value rises by 14.2 percent and the production wage bill falls by 5.1 percent per point of exposure (both $p < 0.001$), and the capital stock and activity estimates remain small and insignificant.

Measurement. The tax return changed in FY2014, after which most firms without exports leave the export field blank. Treating these blanks as zeros rather than as missing yields an export effect of 19.7 percent per point of exposure, and 12.0 percent for incumbent exporters, close to the main estimates of 19.2 and 11.6 percent. When we measure the capital stock as plant and machinery alone, without capital work in progress, the capital stock of large non-exporters rises by 6.3 percent per point of exposure, against 5.7 percent in the main specification, while the increase for more productive firms falls to 1.6 percent and is not significant ($p = 0.16$).

7 Conclusion

One-way trade preferences are among the main tools high-income countries use to support development through trade, and they are being rewritten: a revised EU scheme takes effect in 2027, while the United States' GSP has lapsed since 2020. Their value depends not only on whether they raise exports but on which firms respond and how. The EU's two-step tariff cut for Pakistan offers a sharp test. Between November 2012 and January 2014, first through flood-relief preferences on a narrow set of products and then through GSP+, a large export market removed most of its remaining tariffs, by amounts that differed sharply across products, without any cut in Pakistan's own tariffs.

We find that market access raised exports and changed how firms operate. Pakistan's exports to the EU rose by about 35 percent relative to its exports of the same products elsewhere, and each percentage point of tariff exposure raised firms' export value by about 19 percent, while their recorded production wage bills were about 4 percent lower; the evidence on capital is inconclusive. The response came mainly with the second, broader step and grew in the years that followed. Export estimates are larger for more productive

firms, which also became more likely to report positive sales or wages, while less productive firms became less likely to do so—a pattern in line with the reallocation that theory predicts, here arising from a foreign market opening alone, although we do not test the difference between groups. Some large firms that had not exported before the cuts increased their recorded capital stock and became more likely to report exports, consistent with the sunk costs of entering foreign markets, although we do not link the two changes within firms. The results suggest that preferences reward firms already positioned to use them; less productive firms may need complementary support, such as access to finance or links to foreign buyers, to share in the gains.

References

Atkin, David, Amit K. Khandelwal, and Adam Osman. 2017. "Exporting and Firm Performance: Evidence from a Randomized Experiment." *Quarterly Journal of Economics* 132 (2): 551–615.

Bustos, Paula. 2011. "Trade Liberalization, Exports, and Technology Upgrading: Evidence on the Impact of MERCOSUR on Argentinian Firms." *American Economic Review* 101 (1): 304–340.

Callaway, Brantly, Andrew Goodman-Bacon, and Pedro H. C. Sant'Anna. 2024. "Difference-in-Differences with a Continuous Treatment." NBER Working Paper 32117.

Cheong, Juyoung, Do Won Kwak, and Haishan Yuan. 2017. "Trade to Aid: EU's Temporary Tariff Waivers for Flood-Hit Pakistan." *Journal of Development Economics* 125: 70–88.

European Commission. 2015. "Report from the Commission to the European Parliament and the Council on the Operation and Effect of Regulation (EU) No 1029/2012 Introducing Emergency Autonomous Trade Preferences for Pakistan." COM(2015) 591 final, Brussels, November 30.

European Commission. 2026. "Questions and Answers on the New EU Generalised Scheme of Preferences." Directorate-General for Trade. https://policy.trade.ec.europa.eu/development-and-sustainability/generalised-scheme-preferences/questions-answers-new-eu-generalised-scheme-preferences_en.

European Union. 2012a. "Regulation (EU) No 978/2012 of the European Parliament and of the Council of 25 October 2012 Applying a Scheme of Generalised Tariff Preferences." *Official Journal of the European Union* L 303.

European Union. 2012b. "Regulation (EU) No 1029/2012 of the European Parliament and of the Council of 25 October 2012 Introducing Emergency Autonomous Trade Preferences for Pakistan." *Official Journal of the European Union* L 316.

Frazer, Garth, and Johannes Van Biesebroeck. 2010. "Trade Growth under the African Growth and Opportunity Act." *Review of Economics and Statistics* 92 (1): 128–144.

Lileeva, Alla, and Daniel Trefler. 2010. "Improved Access to Foreign Markets Raises Plant-Level Productivity…for Some Plants." *Quarterly Journal of Economics* 125 (3): 1051–1099.

Melitz, Marc J. 2003. "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity." *Econometrica* 71 (6): 1695–1725.

Pavcnik, Nina. 2002. "Trade Liberalization, Exit, and Productivity Improvements: Evidence from Chilean Plants." *Review of Economic Studies* 69 (1): 245–276.

Roberts, Mark J., and James R. Tybout. 1997. "The Decision to Export in Colombia: An Empirical Model of Entry with Sunk Costs." *American Economic Review* 87 (4): 545–564.

Rose, Andrew K. 2004. "Do We Really Know That the WTO Increases Trade?" *American Economic Review* 94 (1): 98–114.

Santos Silva, J. M. C., and Silvana Tenreyro. 2006. "The Log of Gravity." *Review of Economics and Statistics* 88 (4): 641–658.

Topalova, Petia, and Amit Khandelwal. 2011. "Trade Liberalization and Firm Productivity: The Case of India." *Review of Economics and Statistics* 93 (3): 995–1009.

Trefler, Daniel. 2004. "The Long and Short of the Canada–U.S. Free Trade Agreement." *American Economic Review* 94 (4): 870–895.

Verhoogen, Eric A. 2008. "Trade, Quality Upgrading, and Wage Inequality in the Mexican Manufacturing Sector." *Quarterly Journal of Economics* 123 (2): 489–530.

Figures and Tables

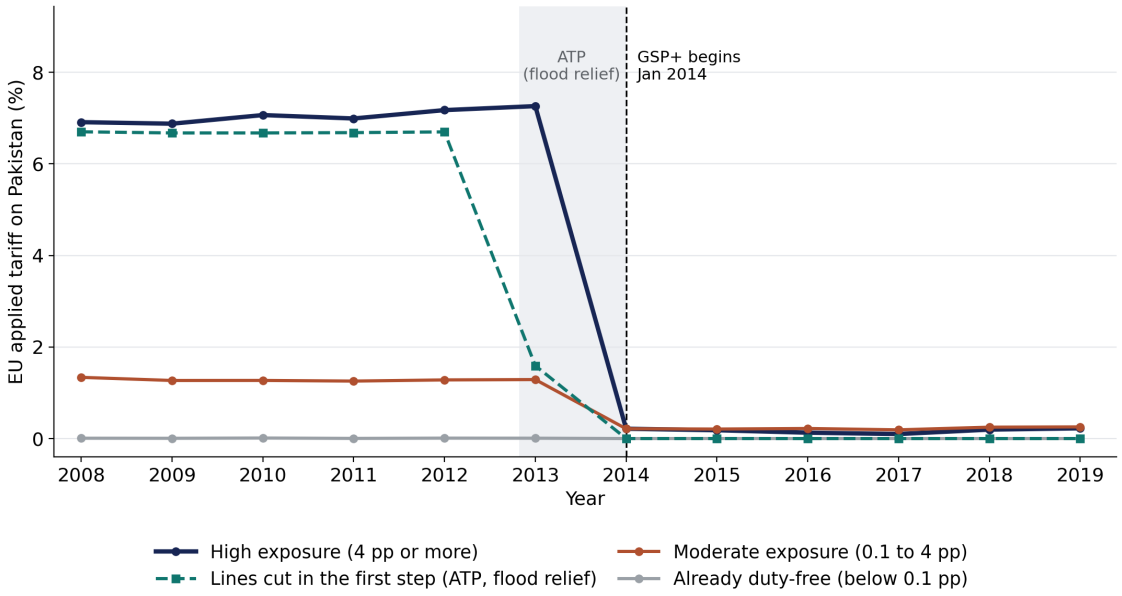


Figure 1: EU Tariffs on Pakistani Products, by Exposure to the Tariff Cuts

Notes: EU effectively applied tariffs on imports from Pakistan, by calendar year: simple average across six-digit HS lines within each HS chapter, then across chapters in each group. Groups are defined by the chapter's average applied tariff over 2008–2012: high ($\geq$ 4 percentage points), moderate (0.1–4), and already duty-free ($<$ 0.1). The dashed line shows the six-digit tariff lines cut in the first step (the flood-relief ATP), whose tariff fell between 2012 and 2013. Source: WITS.

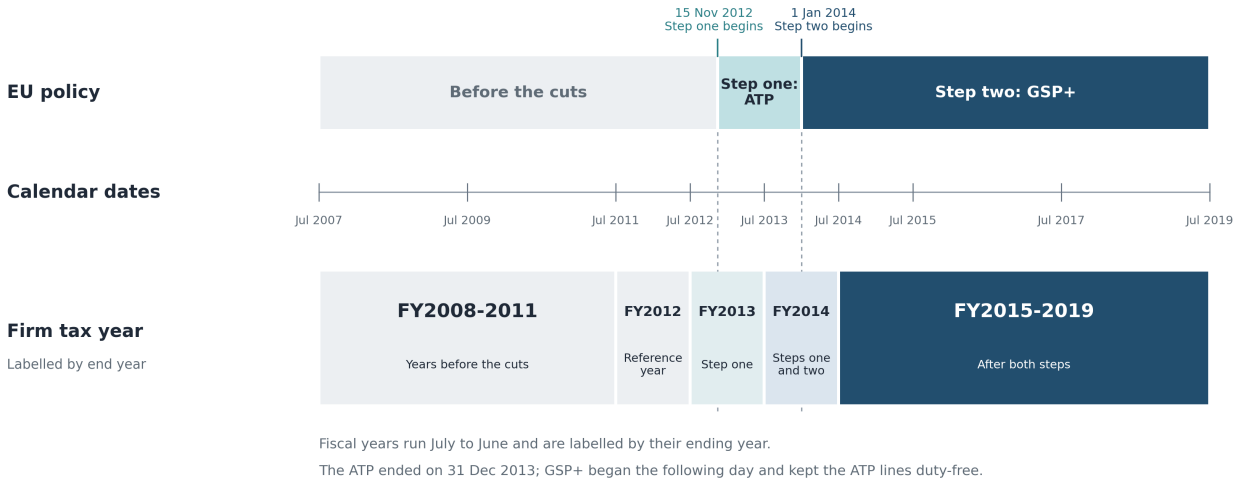


Figure 2: The Two Steps of the EU's Tariff Cut and Pakistan's Fiscal Years

Notes: The top row shows the two steps in calendar time: step one, the flood-relief Autonomous Trade Preferences (ATP), from November 15, 2012, and step two, GSP+, from January 1, 2014, which kept the lines cut in step one duty-free after the ATP expired on December 31, 2013. The bottom row shows Pakistan's fiscal years, which run from July to June and are labeled by their ending year (FY2012 = July 2011–June 2012). FY2012 is the reference year; FY2013 and FY2014 contain the two steps; FY2015–2019 follow both steps.

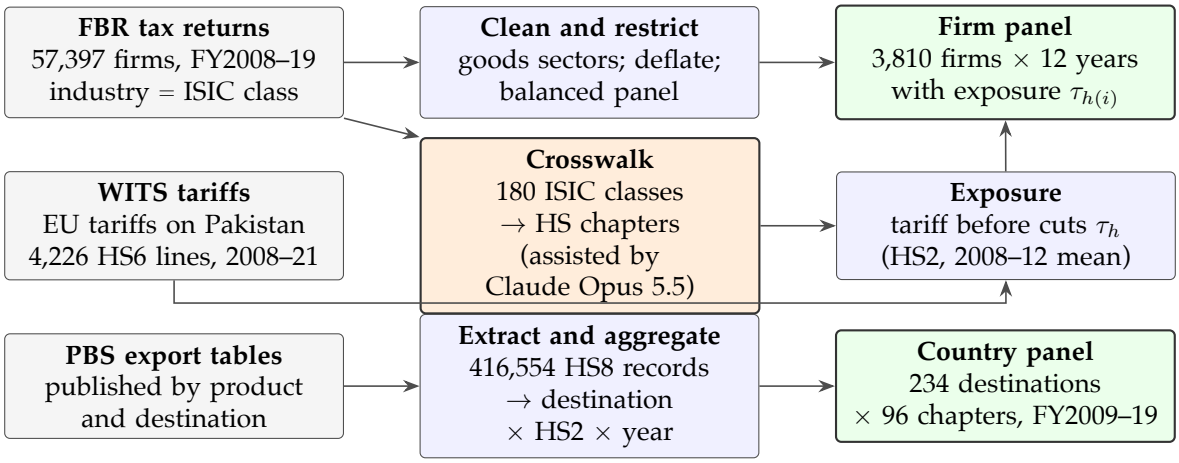


Figure 3: How the Data Sources Fit Together

Notes: The tax returns record each firm's industry class; tariffs are set on HS products. The crosswalk assigns each class the HS chapter that best represents its main product, which links each firm to the EU tariff on that chapter before the cuts. The customs export tables, which report destinations but cannot be linked to firms, form a separate country-level panel. Counts refer to the years used in the analysis.

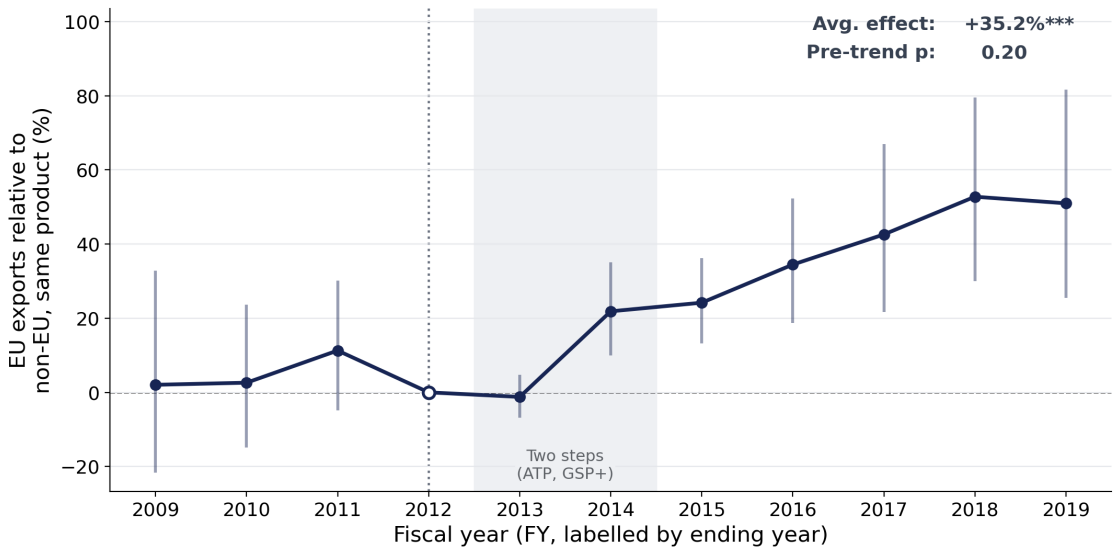


Figure 4: Pakistan's Exports to EU versus Non-EU Destinations

Notes: Coefficients θ_k from equation (1), expressed as percentage differences, $100(e^{\theta_k} - 1)$, with 95 percent confidence intervals. Each coefficient compares exports of the same HS chapter in the same fiscal year to EU and non-EU destinations, relative to FY2012. PPML with destination-by-chapter and chapter-by-year fixed effects; standard errors clustered by destination and by chapter. The shaded area marks FY2013–2014, the years of the two steps. Pooled estimate from equation (2), FY2015–2019 relative to FY2009–2012: 35 percent (95 percent confidence interval: 13 to 62 percent); pre-trend test, FY2009–2011: $p = 0.20$. Source: PBS.

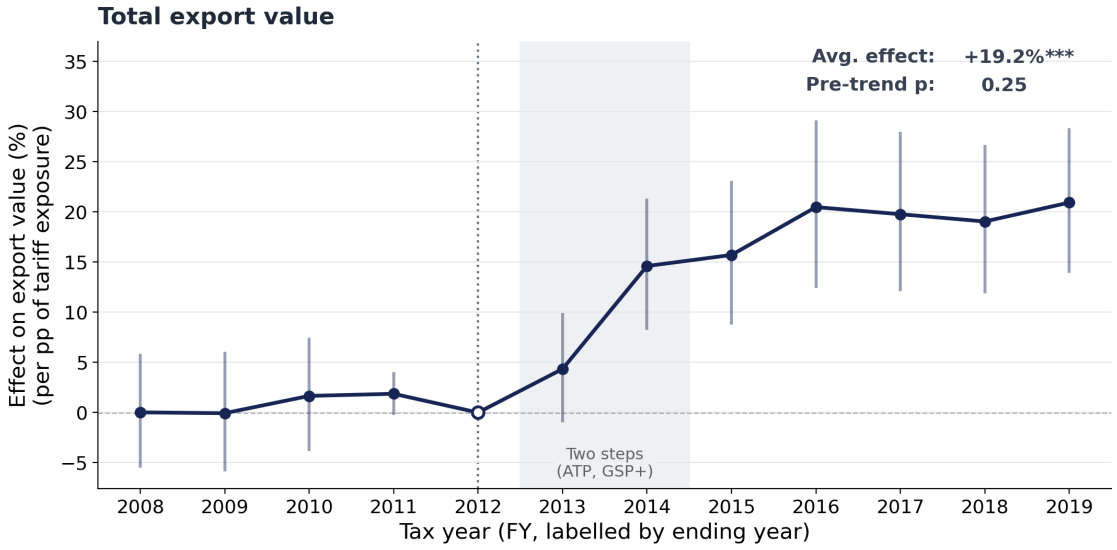


Figure 5: Firm Exports

Notes: Coefficients β_k from equation (4) for firm export value, expressed as the percentage change per percentage point of exposure, $100(e^{\beta_k} - 1)$, with 95 percent confidence intervals. PPML with firm and year fixed effects; standard errors clustered by firm. Reference year FY2012; the shaded area marks FY2013–2014, the years of the two steps. The box reports the FY2015–2019 average effect and the p-value of a joint test that the FY2008–2011 coefficients are zero.

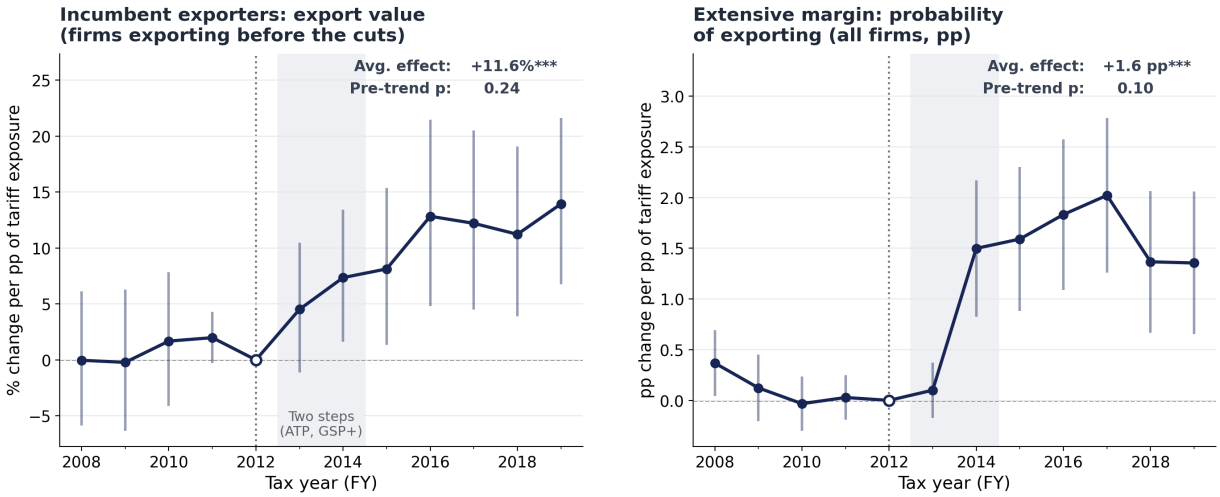


Figure 6: Exports of Incumbent Exporters and Export Participation

Notes: Left: export value of the 1,037 firms that exported in at least one year in FY2008–2012 (PPML, percentage change per percentage point of exposure). Right: probability that a firm reports positive exports, estimated on all 3,810 firms (equation (5), percentage points per percentage point of exposure); a blank export field, common after FY2013, is treated as missing. Otherwise as in Figure 5.

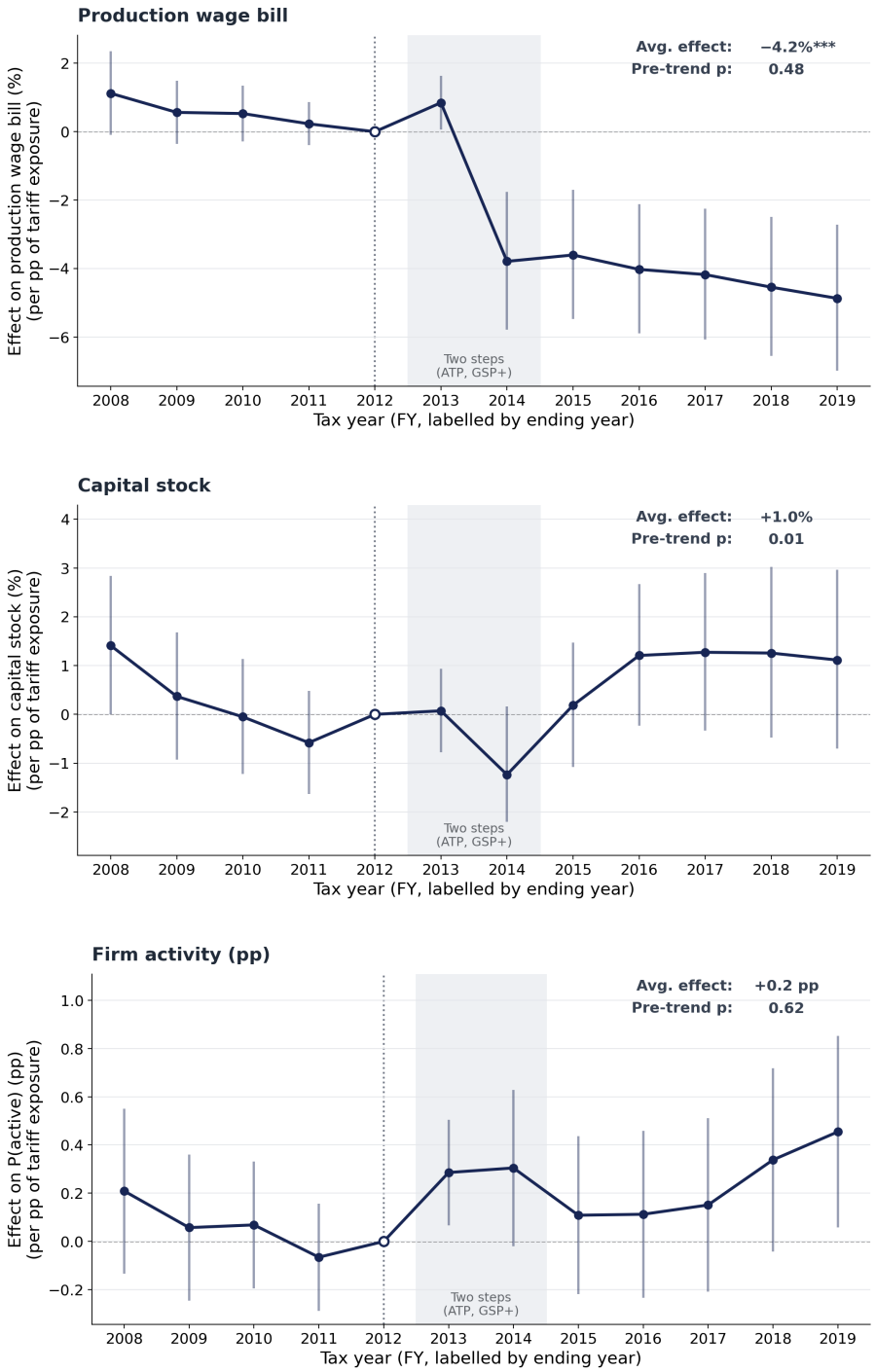
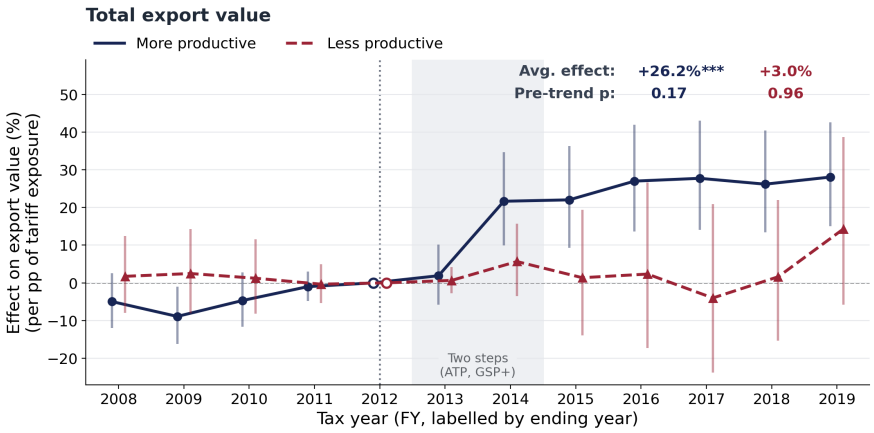


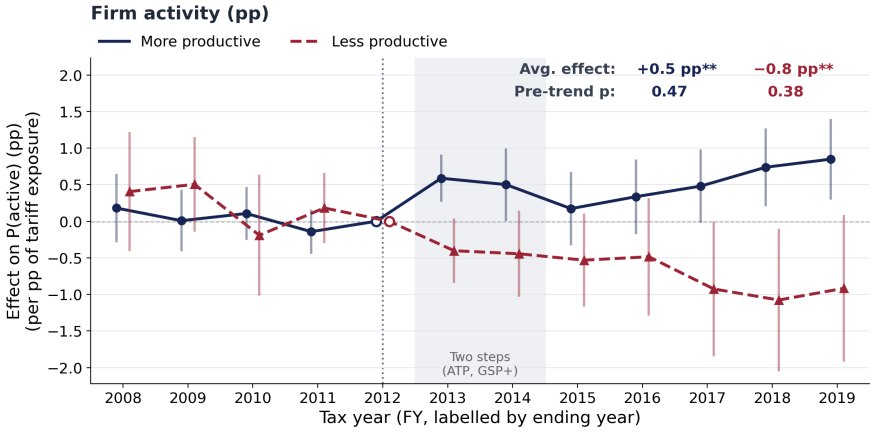
Figure 7: Production Wage Bill, Capital Stock, and Firm Activity

Notes: Top: production wage bill. Middle: capital stock (plant and machinery plus capital work in progress, book value). Bottom: probability that the firm is active, that is, reports positive gross revenue, turnover, production salaries, or management salaries (equation (5), percentage points). Otherwise as in Figure 5.

(a) Exports



(b) Firm activity



(c) Production wage bill and capital stock

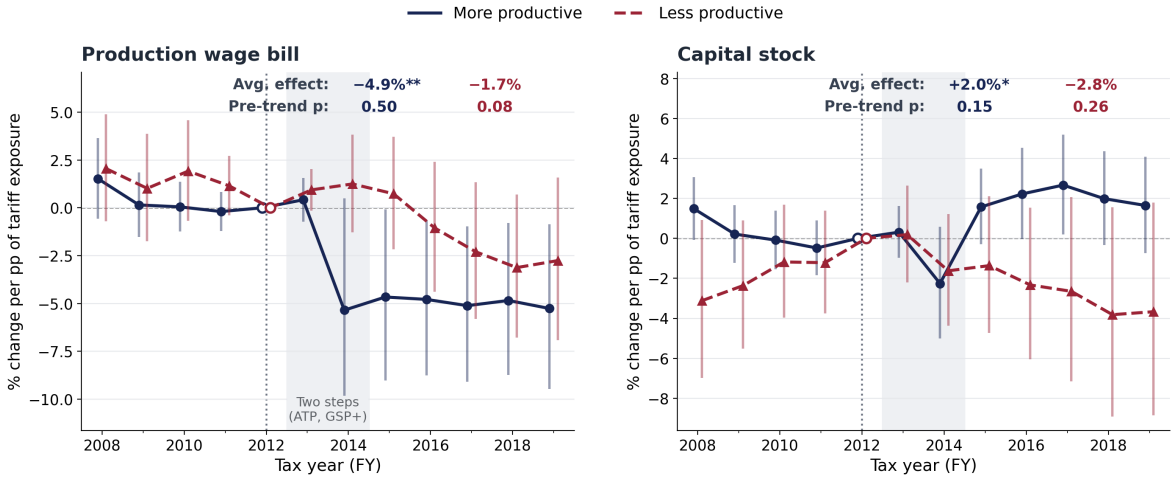
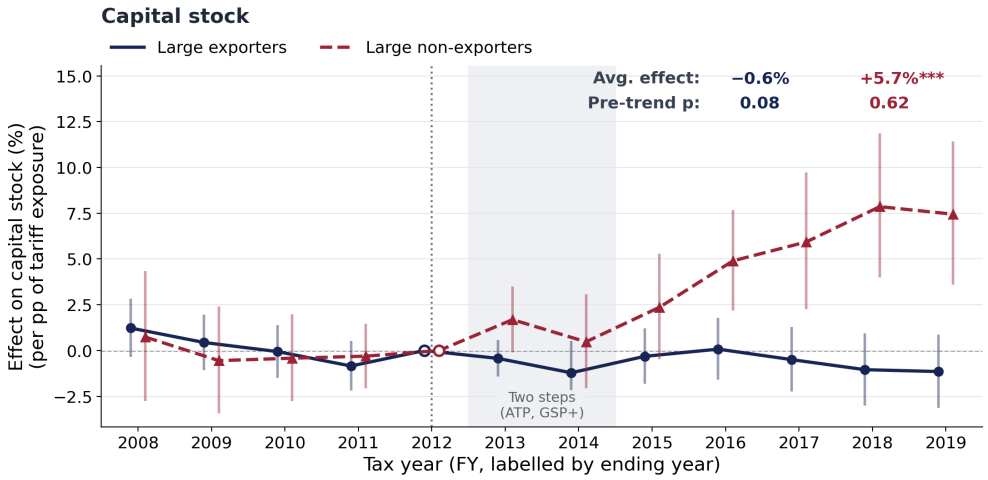


Figure 8: Responses by Productivity before the Cuts

Notes: Equation (8) (linear probability analogue for activity), estimated for each group. More productive (navy) and less productive (maroon) firms, as defined in Section 4.5. Otherwise as in Figure 5.

(a) Capital stock



(b) Probability of exporting

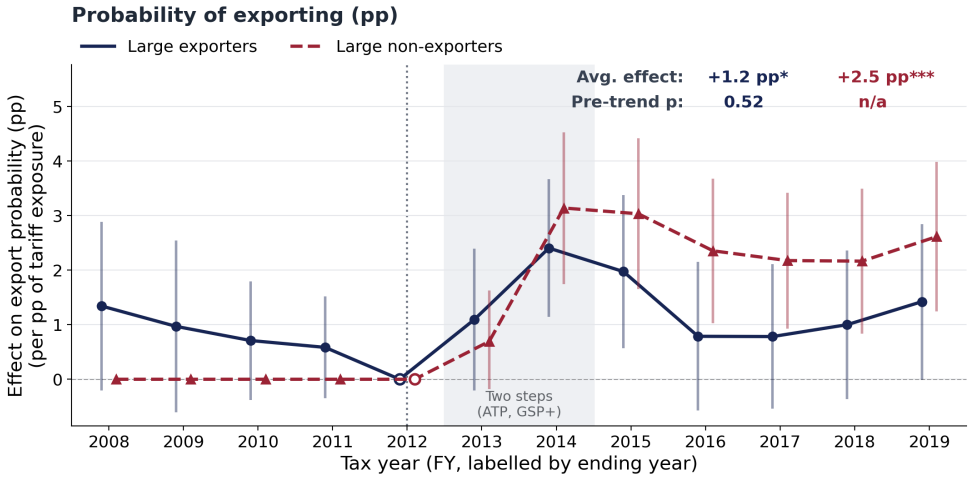


Figure 9: Responses by Export Experience before the Cuts, Large Firms

Notes: Equation (8) (linear probability analogue in panel (b)), estimated for large exporters (navy) and large non-exporters (maroon), among firms in the top quartile of gross revenue before the cuts. In panel (b), a blank export field counts as no exports for both groups; large non-exporters report no exports in FY2008–2012 by construction, so their coefficients before the cuts are zero and no pre-trend test applies. Otherwise as in Figure 5.

Table 1: Firm Characteristics before the Cuts

	All firms	Large firms	
		Exporters	Non-exporters
	(1)	(2)	(3)
Gross revenue (bn PKR)	1.22	5.75	3.00
Exports (bn PKR)	0.18	1.20	0.00
Production wage bill (bn PKR)	0.040	0.179	0.099
Capital stock (bn PKR)	0.33	1.34	0.82
Firms	3,810	569	382

Notes: Means of firm-level averages over FY2008–2012, in 2013 prices. Capital stock is plant and machinery plus capital work in progress. Large firms are in the top quartile of average gross revenue over FY2008–2012; exporters reported positive exports in at least one of those years.

A Appendix

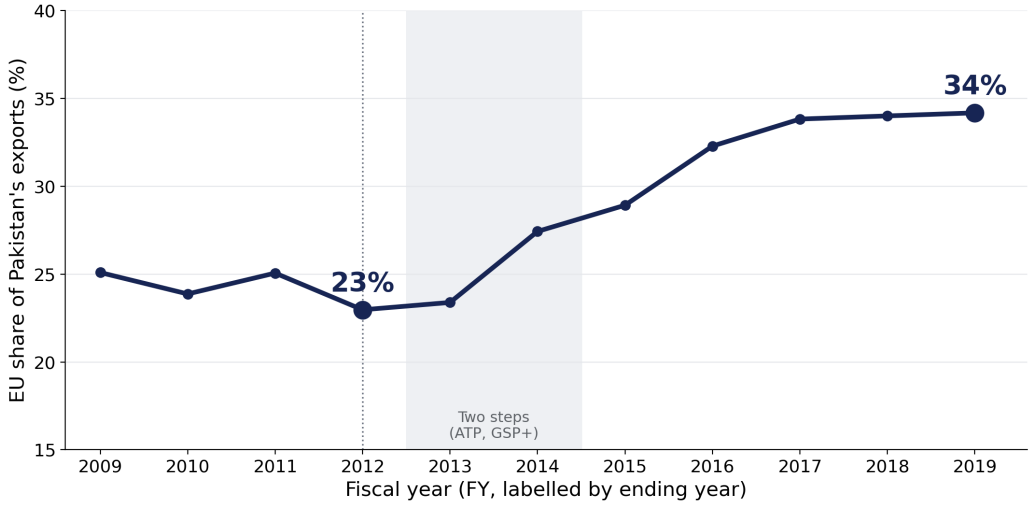


Figure A1: EU Share of Pakistan's Exports

Notes: Exports to the 28 EU member states as a share of Pakistan's total exports, by fiscal year (23 percent in FY2012, 34 percent in FY2019). Source: PBS.

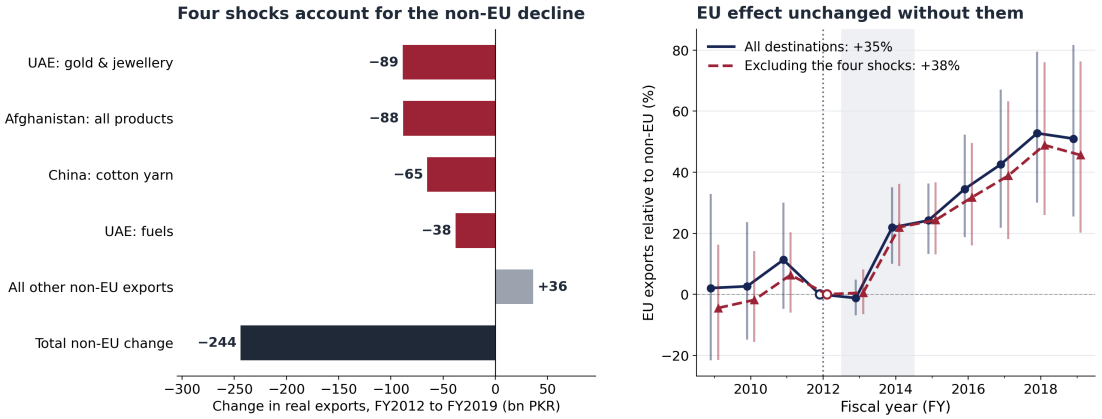


Figure A2: Sources of the Decline in Pakistan's Non-EU Exports

Notes: Change in real exports to non-EU destinations between FY2012 and FY2019. Non-EU exports fell by 244 billion rupees; a few product flows to the United Arab Emirates and China, together with exports to Afghanistan, account for more than the entire decline, while all other flows together rose by 36 billion rupees. Source: PBS.

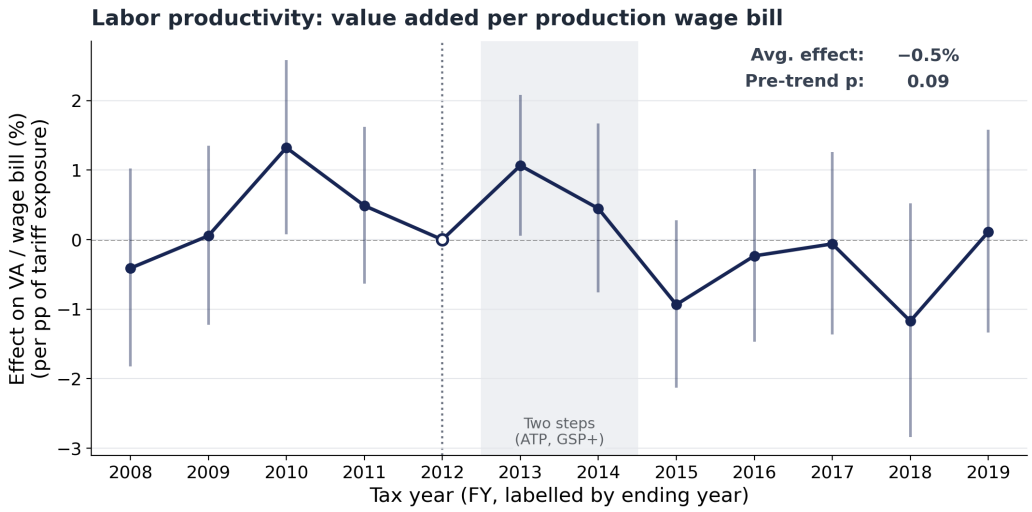


Figure A3: Labor Productivity

Notes: Event-study coefficients for the logarithm of value added per unit of production wage bill (OLS with firm and year fixed effects; standard errors clustered by firm). Value added is gross revenue minus domestic raw materials. FY2015–2019 average: -0.005 log points per percentage point of exposure (95 percent confidence interval: -0.016 to 0.007); pre-trend $p = 0.09$. Otherwise as in Figure 5.

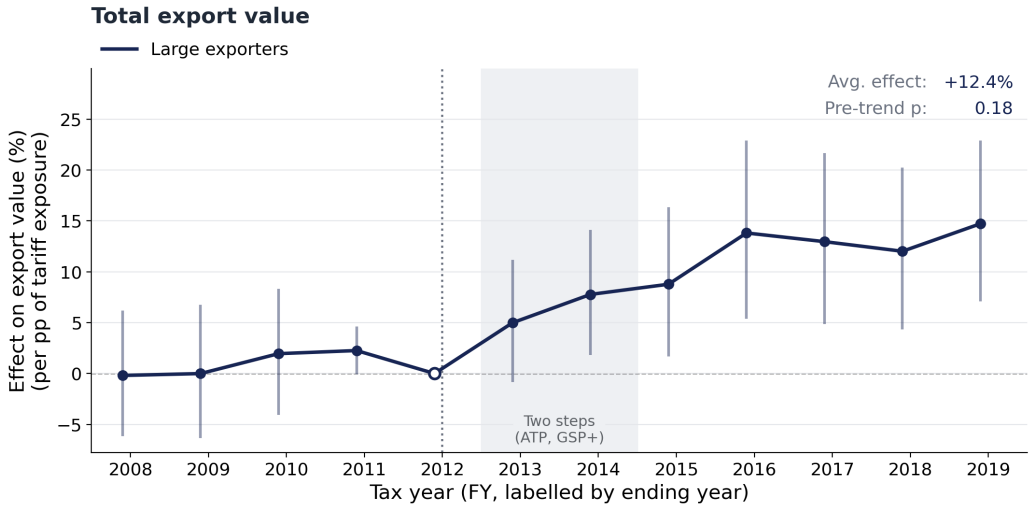


Figure A4: Export Value of Large Exporters

Notes: Equation (8) for the export value of large exporters (PPML). Large non-exporters had no exports before the cuts, so their export value has no base before the cuts. Otherwise as in Figure 5.

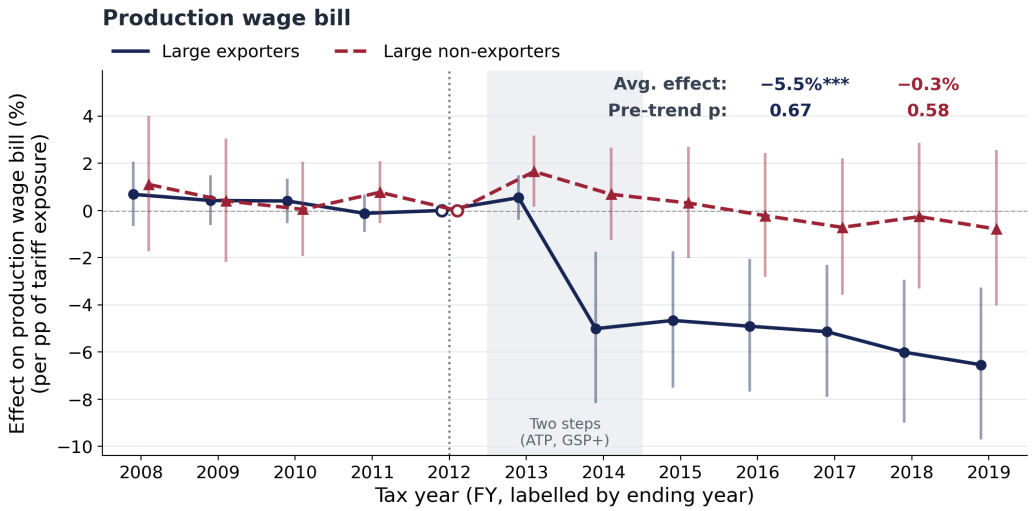


Figure A5: Production Wage Bill by Export Experience, Large Firms

Notes: Equation (8) for the production wage bill, estimated for large exporters and large non-exporters (PPML). Otherwise as in Figure 5.

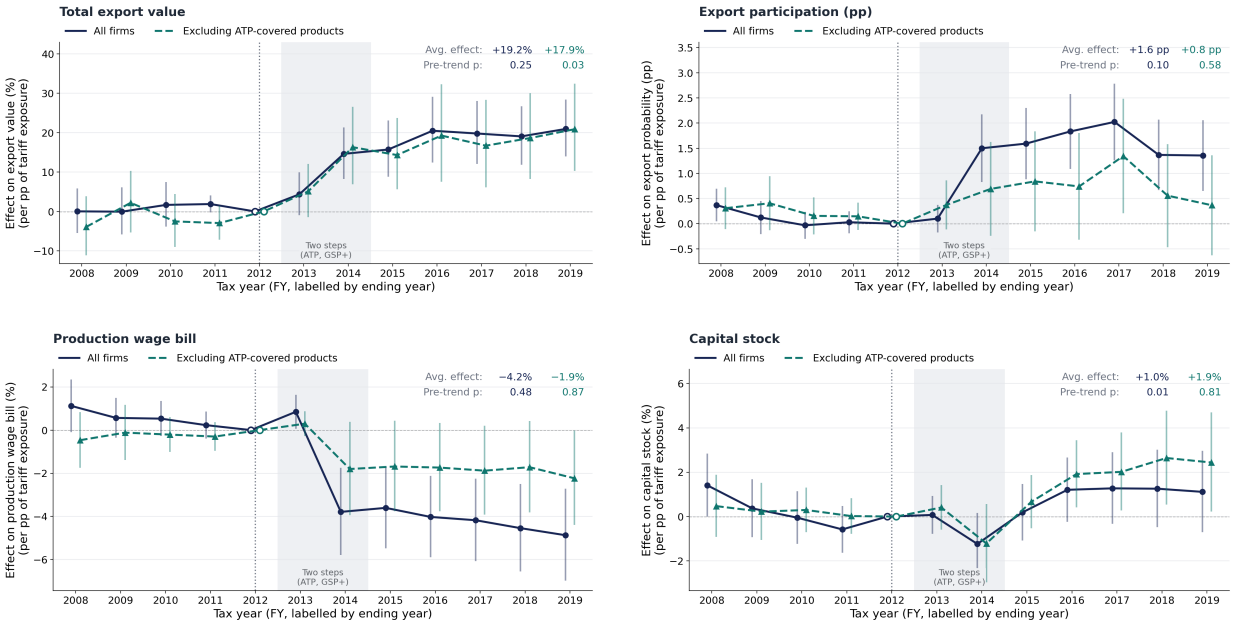


Figure A6: Robustness: The Second Step Alone

Notes: Event-study coefficients for all firms and for the 2,763 firms outside the HS chapters with any tariff line cut in the first step (the flood-relief ATP), whose tariffs were cut only in January 2014: exports, export participation, production wage bill, and capital stock. Otherwise as in Figure 5.