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Abstract

This paper studies the effects of an important shock on the reputation of textile importers from Bangladesh. The collapse of the Rana Plaza building in April 2003 generated a surge in activism targeting specifically the firms that were sourcing from the factories affected by the disaster. Using monthly firm-level import data from French customs, we investigate whether there is any disruption in the sourcing from Bangladesh of the companies reported, compared to other companies and other sourcing origins. We use a triple difference approach and control for common demand and supply determinants. Our results show that retailers directly targeted for their responsibility experienced a decrease of imported volumes from Bangladesh consecutive to the shock. This relative trade loss occurs within a context of a continuous increase in French textile imports from Bangladesh. The effect on imports is extremely focused: we identify a relative decline in imports exclusively on retailers connected to the Rana Plaza factories and only for their imports from Bangladesh. Finally, the effect is paralleled by a relative increase in the criticized firms' imports from three specific origin countries, which are all non-Asian and located close to the Mediterranean area.

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1 Introduction

An important challenge raised by the emergence of global value chains across countries, is to ensure that the international division of production does not develop at the expense of information regarding the origin and composition of products. From consumers' perspective, this raises the risk that multinational companies may neglect labor and human rights, child welfare or environmental care when outsourcing abroad. Since supplier countries often lack a strong regulatory framework on these issues, unethical behaviors by foreign companies can be feared when one has very little information on the composition of goods and of production processes. From the point of view of multinational firms, taking part in global value chains sets up the risk of being associated by the media and pressure groups, to accidents or environmental and industrial scandals.

Answers to the opacity of global value chains have emerged at different levels.[1] Multinational firms themselves often get involved in self-regulation (Amengual and Distelhorst 2019, Boudreau 2019). In parallel, another form of private regulation involve non-governmental organizations (NGOs), whose requests directly confront companies (Baron 2001, Feddersen and Gilligan 2001). Acting as watchdogs of globalization, advocacy NGOs publicly denounce firms for observed unethical behaviors. Their campaigns convey information to consumers about hidden and undesirable characteristics of production processes of goods or inputs, and harmful effects of final products.[2] These campaigns also aim to put pressure on companies by threatening their reputation.

In this paper we investigate how revealing information about companies' misbehavior affects their imports of consumer goods sourced abroad. We focus on an event which has generated a very important amount of criticism towards multinational firms, namely the collapse of the Rana Plaza building near Dhaka, in Bangladesh, on April 24, 2013. The building contained factories manufacturing apparel for world-known brands, however its structure was not suitable for heavy machinery. Activists, followed by the media, immediately denounced the companies which had been sourcing from clothing factories located in the building. The news echoed in many developed countries' media, denouncing the indifference of those firms for labor rights and making consumers aware of the harmful consequences of globalization. We consider the disclosure of information about accountable firms as affecting the quality of their products as perceived by consumers. Within the universe of French textile importers from Bangladesh, we thus assume that firms which have been cited as having subcontracted in the Rana Plaza were confronted to a negative shock on their

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[1]Next to private regulation, the public regulation of the consequences of offshoring on human and environmental resources has emerged at different levels: international initiatives managed by the United Nations, aimed at making multinationals aware of their responsibilities: The United Nations Human Rights Office established the Working Group on Business and Human Rights in 2011, renewed since then: https://www.ohchr.org/en/issues/business/pages/wghrandtransnationalcorporationsandotherbusiness.aspx. At the national level, a small number of countries passed legislation aimed at having multinational firms internalize the side-effects of production processes abroad. France is among the first countries to enact a Duty of Vigilance law in 2017 and Switzerland has launched the first steps towards such a legislation.

[2]Goods' attributes have been categorized by Darby and Karni (1973) and Nelson (1970) as being of three types: search, experience and credence attributes. Globalization and the emergence of global value chains have increased the set of commodities' credence attributes. Those are characteristics which the consumer is not aware of neither before nor after the purchase. See also Auriol and Schilizzi (2015) for an instructive overview.

reputation. Using firm-level French Customs import data in the clothing industry, we investigate how firms' import flows of final garment products have changed after the shock, according to whether the name of the firm has been associated to the collapse or not.

While NGOs' behavior has attracted academic interest (Aldashev and Verdier 2009; Aldashev et al. 2015; Krautheim and Verdier 2016; Couttenier and Hatte 2016; Daubanes and Rochet 2017), the consequences of NGOs' advocacy against multinationals have been very little studied, empirically and on a large scale, probably due to difficult comparability of requests by activists.[3] Activism can impact firms through three main channels. First, campaigns may mobilize consumers against buying the firm's product, which may induce a drop in demand. Second, NGOs' pressure may decide the firm to correct its ethical misconduct abroad. Third, the firm may engage in more intense socially and environmentally responsible actions, aimed at compensating activists' criticism. Analyses that differentiate between the different channels and focus on the demand channel are very rare. They mainly study the indirect consequences of consumer boycotts in terms of sales, through the evolution of the company's stock prices.[4] Regarding the latter two channels, NGOs act by signalling the quality attributes of goods manufactured abroad, such as ethical characteristics of products and well-monitored supply chains (Auriol and Schilizzi, 2015). In well-known examples, activists challenge firms to modify specific components or side-effects of the production process, such as deforestation (targeting Staples, 2001), work conditions (against Nike, 1997), and drug prices (against Novartis in the late 1990s). Few papers investigate their effects, due to the difficulty in accessing data on these outcomes. Very instructive case studies (O'Rourke, 2005; Spar and La Mure, 2003) discuss the evidence regarding companies' reactions to these campaigns, highlighting in many cases a willingness of firms to comply with NGOs' requests. One paper estimates the effect of activism against Nike and Reebok on wages paid to their subcontractors (Harrison and Scorse, 2010), by focusing on differences in the evolution of wages in the textile industry compared to other sectors in Indonesia.

To the best of our knowledge, our paper is the first to analyze the firm-level trade effects of an ethical scandal denounced by activists. We believe that revealing details about the unethical production process may alter firms' reputation. The estimated effects on imports may capture both the reaction of individuals who withhold their purchases of incriminated firms and products and the decision of companies to keep future production far from criticized locations. Our analysis thus contributes to the analysis of both the demand effect of activists' targeting and the effect on firms' production strategies.

We adopt a triple difference analysis in our main specification. We compare (1) the imports of

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[3]By comparison, the effect of multinationals self-regulation through private enforcement of labor or environmental regulations has been largely addressed, with a wide array of estimation methods (Amengual and Distelhorst, 2019; Tanaka, 2019; Boudreau, 2019).

[4]Results document losses in market price valuation resulting from NGOs' allegations about the unethical behavior of firms (Flammer, 2013; King and Soule, 2007). Hendel et al. (2017) do quantify the impact of consumer activism on demand, by estimating how the boycott of the cottage cheese industry in Israel in 2001 affected local daily stores' sales. This boycott is however different as it did not originate in a company's misdeed with damages on workers or on the environment. Interpreting the boycott as a tarnish of firms' reputation, the authors show a 30% decline in demand, relative to its predicted level had the boycott not occurred.

French firms linked to production inside the Rana plaza to those of other importers not involved in the scandal, (2) before and after the collapse, (3) from Bangladesh and from other origins. We find a decrease in the imports from Bangladesh of firms accused of subcontracting in the building, compared to the imports of others in the months following the disaster. Bangladesh is the sole origin country from which those companies' trade flows deteriorate. Their imports are affected negatively, exclusively on quantities, with no repercussion observed on prices. We show that the drop in imports concentrates on the intensive margin, since there is no marked change in the exit rate of importers from Bangladesh.

We investigate whether the decrease affects the trade flows of companies that did not source from the Rana Plaza factories but whose name was associated with the scandal through the subsequent implementation of enhanced security measures.[5] No such outcome occurs, suggesting that there is no contamination effect, such as for example collective aspects of reputation effects (Bai et al. 2019). We show that the relative trade loss experienced by the firms linked to the Rana Plaza occurs within a context of a continuous increase in French imports from Bangladesh. Finally, the effect is paralleled by a relative increase in these firms' imports from three specific origin countries, which are all non-Asian and located around the Mediterranean area (Portugal, Morocco and Turkey). Our results are robust to a variety of checks, including sample checks, and a number of placebo tests with the random assignment of importers to the "treated" Rana category. We abstract from any demand or supply shock common to all importers, and we set aside issues linked to seasonality, by using appropriate fixed effects.

This paper contributes to different strands of the literature. First, it provides new evidence in the literature analyzing the causal effects of campaigns on corporate behavior. While private regulation has gained importance both in the public debate and in the academic literature, very few papers are able to link changes in companies' practices to companies' shaming by NGOs. Harrison and Scorse (2010) is the central reference on the issue: They analyze the garment and textile industry in Indonesia and use differences in the evolution of wages compared to other sectors and regions to identify the effect of campaigns targeting subcontractors of Nike, Reebok, and Adidas on local wages. Our paper similarly studies, building on relative differences, a shock of campaigns targeting multinational firms in the garment industry. Our dependent variable is retailers' imports from their suppliers, which capture both demand effects and reallocation effects. Also, we observe which retailer importing from Bangladesh should be impacted by the possible reputation shock.

Second, our paper contributes to understanding the multidimensional consequences of the scandal that followed from the Rana Plaza collapse, namely whether the shock created awareness among consumers towards more responsible consumption, and whether retailers modified their management of suppliers after the shock, globally and specifically for Bangladesh. While a number of studies estimate consumers' preferences for ethical goods in contexts disconnected from Bangladesh (Arnot et al., 2006; Dragusanu et al., 2014; Hainmueller et al., 2015), the academic literature did not assess whether individuals' social and ethical motivations intensified specifically after the dis-

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[5]As will be detailed later, some firms signed the "Accord on Fire and Building safety", which is a legally-binding text, and others signed a non-binding document called the Alliance.

aster. Following the Rana Plaza collapse, Jacobs and Singhal (2017) document firms' stock price reaction to the shock and report a significant, negative, however very short-lived effect of the Rana Plaza disaster on firms' valuation.[6] A thorough and detailed description of contracting with domestic factories for the fast-fashion industry features in Cajal Grossi et al. (2019) and Cajal Grossi (2016), which analyze buyers-sellers relationship using data on contracts in Bangladesh. Whether the scandal raised awareness among western fashion companies, and whether firm's self-regulation is efficient, is analyzed in the following papers. Ahlquist and Mosley (2018) provide evidence on the characteristics of firms which signed either the Accord or the Alliance document. They report that firms with more public exposure (larger sales, multinational structure) were more likely to commit to future safety inspections than others. Bossavie et al. (2019) use six waves of Bangladesh' labor force survey before and after the Rana Plaza disaster, to analyze the effects of the shock on wages and working conditions. Their results emphasize that although formal reforms were implemented, and informal labor management was conducted by retailers, the net effects on the labor market for garment workers are mixed. Employees benefit from better sick leave and some workplace safety measures, but their job security and hourly wages are simultaneously reduced. Finally, Boudreau (2019) implements a randomized controlled trial during 2017-2018 in post-Rana Plaza Bangladesh, within 84 suppliers of multinational retail firms. The treatment targets half of the supplier factories by enforcing the law requiring worker-managed safety committees. She finds that the privately-led intervention bringing suppliers' practices in line with higher social standards, succeeded in increasing the compliance of factories to the law, and increased committees' effectiveness at improving safety. By working with detailed monthly data on imports at the firm-product-level, before and after the Rana Plaza collapse, our paper complements this strand of results. We show that while the firms directly involved in the scandal did experience a relative downturn in their imports of garment, the overall upward trend in French sourcing apparel from Bangladesh was not reversed by the event.

Last, our paper also contributes to the literature assessing the impact of boycotts (Heilmann, 2016; Michaels and Zhi, 2010; Fuchs and Klann, 2013; Crozet and Hinz, 2016). One difference is that these studies correspond to situations in which products from specific countries, and not firms, are the main targets of activism. Eventual drops in demand are in such cases caused by consumers' mobilization driven by political motives, and not by a belief on an inferior product or firm quality. Our paper complements this literature without, however, studying the effects of an official boycott: as is often the case when suppliers in developing countries are involved, activists' and media critics focus on targeted demands related to the production process, carefully avoiding requesting a boycott in order not to harm local productions.

The paper is structured as follows. Section 2 presents the Bangladeshi clothing industry from the perspective of clothing retailers, increasingly sourcing from the country to supply the French market. We document the context of the accident and the focus of activists on fashion retailers. Section 3 introduces the data, presents the set of firms that were directly associated to the disaster,

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[6] Boudreau et al. (2015) also find a negative stock price effect for the subset of firms which signed the Bangladesh Accord on Fire and Building safety after the accident.

and provides descriptive statistics. Section 4 details how we expect reputation to affect firm-level import flows and presents the estimation method. Section 5 displays the empirical results and the final Section 6 proposes suggestive evidence to disentangle the consumption-driven and firm-driven aspects of the effect.

2   French clothing imports exposed to the Rana Plaza accident

Throughout the paper we define the garment industry as activities corresponding to the 2-digit Harmonized System (HS) codes 61 (Apparel and clothing accessories knitted or crocheted), 62 (Apparel and clothing accessories not knitted or crocheted) and 63 (Textiles and made up articles). In the following we equivalently use the words *garment*, *textile*, *apparel*, *clothing* to refer to the products within HS codes 61 to 63. We begin by illustrating the globalization of production in the French clothing industry and the role of Bangladesh as a supplier country. Then we provide details about the collapse of the Rana Plaza building where clothing was produced for international use and the subsequent blame of multinational companies.

2.1   Outsourcing in Bangladesh

The French textile clothing sector has suffered from international competition. The trade balance in textiles and clothing is the second largest deficit excluding energy after the IT deficit. In twenty years, it has lost two thirds of its workforce and more than half of its production. Imports of clothing products are estimated at three times more than production in France (15 compared to around 5 billion euros in 2014 according to the national statistics bureau of France (INSEE)). Imports are dominated by Asia (60%), a fifth of supplies are intra-EU. While China is undoubtedly the main source of imported clothing, in 2013 Bangladesh is the third largest supplier to France after China (32.6%) and Italy (8.4%), overtaking Turkey (6.8%). In 2013 Bangladesh represents 8.1% of French imports of apparel, a proportion which should be put into perspective with the country's share of world population (2.2%) and of world GDP (0.2%), to show the leading role of Bangladesh's industry in the global apparel value chain.

Bangladesh's export specialisation in the ready-to-wear sector is considerable[7] and is not specific to the French market: in 2013, world exports from Bangladesh of products from sectors 61 to 63 represent close to 90% of the country's total exports.[8] Bangladesh's exports to France are dominated by two products: T-shirts and Jerseys. Each of these two products accounts for roughly 20% of Bangladesh's total exports to France (of which 94% are in products from sectors 61 to 63). And close to a fifth of the T-shirts and men's shirts that France imported in 2013 originate from Bangladesh (Table A-1). These figures highlight Bangladesh's dependence on apparel, but also the high penetration of Bangladeshi products in Western economies such as France. Table 1 lists origin countries for apparel imports into France in 2013. While the above cited average share of 8.1%

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[7]See Gereffi (1999) for a description of the rise of global value chains involving the apparel sector in Asia.
[8]Between 2010 and 2016, the export share of products of HS2 61, 62 and 63 in the country's total exports are respectively 44, 41 and 3.3%.

Table 1: Top 25 origin countries of French apparel imports in 2013

Firms	All importers		Importers from BGD in 2013		Rana firms	
Country name	Import value (million euros)	Share in total French Apparel imports (in %)	Import value (million euros)	Share in total French Apparel imports (in %)	Import value (million euros)	Share in their Apparel imports (in %)
China	5 972	32.6	4 120	36.7	344	25.4
Italy	1 548	8.4	234	2.1	32	2.3
Bangladesh	1 481	8.1	1 480	13.2	207	15.3
Turkey	1 245	6.8	904	8.1	173	12.7
India	919	5.0	693	6.2	69	5.1
Tunisia	910	5.0	385	3.4	11	0.8
Morocco	821	4.5	575	5.1	137	10.1
Germany	503	2.7	135	1.2	10	0.8
Portugal	500	2.7	203	1.8	58	4.3
Romania	396	2.2	241	2.1	14	1.1
Pakistan	395	2.2	269	2.4	50	3.7
Belgium	335	1.8	150	1.3	13	1.0
Vietnam	329	1.8	270	2.4	49	3.6
Great Britain	229	1.2	48	0.4	5	0.4
Spain	217	1.2	85	0.8	25	1.8
France	212	1.2	85	0.8	31	2.3
Bulgaria	204	1.1	122	1.1	8	0.6
Netherlands	203	1.1	83	0.7	17	1.3
Cambodia	202	1.1	186	1.7	30	2.2
Indonesia	161	0.9	138	1.2	21	1.6
Thailand	148	0.8	90	0.8	1	0.0
Madagascar	142	0.8	61	0.5	6	0.5
Poland	120	0.7	43	0.4	6	0.5
Sri Lanka	119	0.6	109	1.0	6	0.4
Mauritius	98	0.5	75	0.7	6	0.4
Egypt	81	0.4	69	0.6	10	0.7

Source: French Customs, 2013. Non-OECD countries are marked in bold. Apparel is defined as HS4 products in HS2 categories 61, 62 and 63.

applies to all French importers, for those importing from Bangladesh it equals 13.2% (see middle column of Table 1). For many companies, Bangladesh's share in their clothing imports exceeds 30%.

The rise of Bangladesh as a major source of supply for clothing brands and the country's hyper-specialization in textile products explain the extent of the international community's reactions to the Rana Plaza disaster. The event, which became a symbol of the excesses of multinational production and outsourcing, deeply shocked public opinion. Its impact on supplies, however, remains an open question.

2.2 The Rana Plaza collapse

On April 24 2013, the heaviest industrial accident in the history of the textile industry took place in the suburbs of Bangladesh's capital city, Dhaka. The building which collapsed, called the Rana Plaza, hosted five garment factories, several stores and a bank, distributed on eight floors.

The origin of the accident was unambiguous: safety measures were not sufficiently enforced and adapted to the activity taking place in the building. According to the architects interviewed at the time of the disaster,[9] the Rana Plaza was originally planned for shops and offices and was not

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[9]https://www.telegraph.co.uk/news/worldnews/asia/bangladesh/10036546/Bangladesh-Rana-Plaza-architect-

prepared for accepting the weight and vibrations of heavy machinery associated to the factories. More, three unauthorized levels were added by the owners to the three floors originally approved by the local municipality. Signs of an imminent collapse appeared the day before the collapse, as important cracks were found on the walls of the structure. While an evacuation of over 3,000 garment workers had been ordered by the city officials, they were asked by the owners of the factories to return to work in the building shortly afterwards. The structure fell down the next morning, killing 1,134 people and injuring more than 2,500 others.

2.3 Naming the multinational firms involved in the accident

The owner of the Rana Plaza, named Sohel Rana, who had built the structure in 2006, was arrested four days after the event. A group of people including him is facing two main charges related to the collapse: murder and violation of the building code. These trials however still have not taken place as they are delayed by legal obstacles.

What could have been an accident became a scandal: Trade unions and NGOs immediately pointed to the shared responsibility of companies which contracted with factories inside the Rana Plaza building: the five plants manufactured shirts, trousers and leggings for major retail companies in Europe and North America. Pressure to complete orders on time, in a context of quickly changing designs, could have been responsible for the decision of factory owners to pursue work even though safety was not guaranteed. Also, NGOs and trade unions criticized the lack of responsibility of foreign buyers which contracted with these Bangladeshi factories without making sure that they complied with current safety measures.

Immediate initiatives took care of organizing compensation for victims and preventing future incidents. Compensating the victims was made through the signature of the Rana Plaza Arrangement in November 2013. The meetings that led to this document were chaired by the International Labor Organization (ILO) and were attended by the government, by representatives of the garment manufacturers and exporters association, by trade unions, NGOs, and by brands sourcing from the Rana Plaza. The Arrangement document officially created the Rana Plaza Donors Trust Fund, to collect donations primarily from brands and retailers that had been buying from a Rana Plaza factory at the time, or in the period prior to the collapse.[10] The Fund was a voluntary initiative, intended to receive donations from firms contracting with Rana Plaza factories, but it was not restricted to them. The process leading to collecting funds is considered as a ground-breaking initiative by NGOs, because it gathered the entire supply chain to ensure that workers affected by the industrial disaster were compensated.

The indirect effect of this supply chain-funded system is that it publicly established a list of companies, all of which headquartered in developed countries, which were immediately associated to the responsibility of the disaster. The NGO Clean Clothes Campaign, an alliance of labour unions and non-governmental organizations in the garment industry, participated in the gathering of these

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says-building-was-never-meant-for-factories.html

[10]https://ranaplaza-arrangement.org/

29 names[11], shown in Table 2. Of interest for our investigation, is the fact that these companies' names were soon after mentioned by the media in countries importing apparel from Bangladesh. Let us illustrate this phenomenon for France, whose imports are the object of our investigation. The naming of companies linked to the disaster took place in various newspapers. The media questioned whether retailers cited by labour unions and NGOs admitted having contracted with factories inside the building: French journal *Le Figaro* reports, on April 28, 2013, "The remains of clothes found in the rubble of the Rana Plaza building that collapsed on Wednesday in Bangladesh will soon reveal which multinational clothing companies were supplying the destroyed garment factories."[12] On April 30, 2013, *L'Humanité* writes "In addition to Primark and Mango, other Western brands are believed to have placed an order with the textile workshops located in the Rana Plaza."[13]

Our empirical analysis builds on the naming of those 29 retailers. In particular, we question whether the large amount of criticism against those retailers linked to the Rana Plaza may have acted as a negative reputation shock, affecting their imports of clothing products outsourced in Bangladesh. We build on the heterogeneity among importers of clothing from Bangladesh into the French market: some were negatively cited for their production in the collapsed building, others not. Working on firm-level import flows from all origin countries to France, we investigate whether these specific firms exhibit different trends in their imports from Bangladesh after the shock, compared to other garment importers. We now introduce the data and the way we proceed to categorize the importing firms.

3   The data

This section explains how we link the multinationals reported for their supply in the Rana Plaza to the French Customs data. Then, we describe the evolution of France's imports from Bangladesh at the time of the event and study possible differences according to whether companies are identified as sourcing from the collapsed building.

3.1   Importers associated to the disaster

Our empirical approach focuses on the international supplies to France of companies identified as sourcing from the Rana Plaza. The starting point is the list established by Clean Clothes Campaign, naming the 29 firms subcontracting with factories located in the Rana Plaza in 2013. It is reported in Table 2. We first want to establish whether the named multinational firms were present in France in April 2013, the date of the collapse of the Rana Plaza. By presence, we mean whether the firms had points of sale or stores where their products were available to final consumers and whether they had an official registration in France. For this we use information from their respective corporate websites, together with other media sources. For those firms selling their products in

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[11]https://cleanclothes.org/campaigns/past/rana-plaza.
[12]http://www.lefigaro.fr/societes/2013/04/28/20005-20130428ARTFIG00110-l-industrie-du-textile-embarrassee-par-le-drame-au-bangladesh.php
[13]https://www.humanite.fr/bangladesh-la-griffe-des-marques-sur-les-usines-de-la-mort

France, we used the official website (https://www.sirene.fr) to determine whether they had a legal entity registered in the French company register (INSEE's SIRENE database).

In the end, we identify 10 out of the 29 named firms as present in France at the time of the shock. Some are among the largest clothing distributors in France, selling several million euros worth of clothing in their stores under their brand name. Alternatively, most of the own-brand store operators listed at the bottom of the Table 2 (from JoeFresh to LPP) have activities exclusively in their country of origin and were not present in France in 2013. Primark is a special case since it opened its first store in France in December 2013 and therefore can not be used to make a before-after comparison of its imports from Bangladesh. The following three firms, Manifattura Corona, Essenza and Kids Fashion Group are wholesalers that sell their products through independent stores. We have not identified these companies in the French company register but we cannot totally exclude that some independent stores in France sell their clothes by importing them directly or via wholesalers. Thus, the import flows of these brands, if they exist, are not considered as "treated" as they should be, but are wrongly included in the control group. If these flows are ever negatively affected, as will be found in our results for other Rana firms, this is likely to contribute to an underestimation of the true negative impact measured in our baseline estimates.

Our second task is to match the firms connected with the Rana Plaza and selling in France at the time of the disaster, with the French Customs data. We used the same official website mentioned above, to retrieve the identification code of the legal entities corresponding to the firms connected with the Rana Plaza. In France, when a company is created and registered it is granted a unique 9-digit number called SIREN. The various establishments of this company (i.e. the geographically-distinct units where all or part of the economic activity of the SIREN is carried out) are identified by a longer code (SIRET, with 14 digits) whose first 9 digits are those of the SIREN. By way of illustration, the SIRET codes of all Zara stores begin with "348 991 555", the SIREN code of the legal entity *ZARA France*. The search for companies sought to be exhaustive and was not limited to entities registered under the activity code (APE code in the French system) "Retail sale of clothing in specialised stores" (4771Z]) or Hypermarkets (47.11F) but also covered those in "Activities of head offices (7010Z)", "Wholesale trade (inter-company trade) (4649Z)", and "Wholesale trade (business-to-business) in clothing and footwear (4642Z)" to ensure that all vehicles used by the company when sourcing from abroad would be covered.

Table 2: List of companies linked to Rana Plaza in 2013

	Names	Country of origin	Presence in France[a] in April 2013	Distribution mode	Apparel sales in France 2013 (million euros)[a]
1	Zara	Spain	Yes	Own-brand retail stores	726
2	Camaïeu	France	Yes	Own-brand retail stores	704
3	Carrefour	France	Yes	Own-brand Hypermarkets	640[c]
4	Auchan	France	Yes	Own-brand Hypermarkets	523[c]
5	C&A	Belgium/Germany	Yes	Own-brand retail stores	498
6	Mango	Spain	Yes	Own-brand retail stores	120
7	Benetton	Italy	Yes	Own-brand retail stores	25 (2018)
8	Lee Cooper	UK/US	Yes	Few Lee stores, mostly independent retailers & point of sales	12 (2015)
9	Güldenpfennig	Germany	Yes	Wholesale to independent retailers	12 (in 2017)
10	Mascot	Denmark	Yes	Distributors and independent retailers	1.9 (in 2017)
11	Primark	Ireland	No[b]	Own-brand retail stores	-
12	Manifattura Corona	Italy	No	Wholesale to independent retailers	
13	Essenza	Italy	No	Wholesale to independent retailers	
14	Kids Fashion Group	Germany	No	Distributors and independent retailers	
15	JoeFresh	Canada	No	Own-brand retail stores & in Loblaw supermarkets / J.C Penney	
16	J.C Penney	US	No	Own-brand department stores	
17	The Children's Place	US	No	Own-brand retail stores	
18	Cato Fashions	US	No	Own-brand retail stores	
19	Walmart	US	No	Own-brand Hypermarkets	
20	Ascena	US	No	Own-brand retail stores	
21	Bonmarché	UK	No	Own-brand retail stores	
22	Matalan	UK	No	Own-brand retail stores	
23	Store Twenty One	UK	No	Own-brand retail stores	
24	NKD	Germany	No	Own-brand retail stores	
25	KiK	Germany	No	Own-brand retail stores	
26	Adler Modemarkte	Germany	No	Own-brand retail stores	
27	PWT	Denmark	No	Distributors and independent retailers	
28	El Corte Ingles	Spain	No	Own-brand department stores	
29	LPP	Poland	No	Own-brand retail stores	

Source: The list of the 29 firms comes from Clean Clothes Campaign: https://cleanclothes.org/safety/ranaplaza/who-needs-to-pay-up and https://cleanclothes.org/safety/ranaplaza/rana-plaza-actual-and-potential-donors-listed-by-g7-country/view. The link of two additional firms (Kappa and LC Waikiki) with the Rana Plaza was established only in 2015. [a] The information on the presence of the firms in France and on their sales (in 2013 or closest year we could find) are taken from various sources including Euromonitor, Statista, https://www.societe.com and corporate websites. [b] Primark opened its first shop in France in December 2013. [c] The values for Auchan and Carrefour correspond to sales of textile under the private labels of the retailers.

For the 10 firms with sales in France in 2013, the SIREN codes lead us to 9 distinct importers which declare positive imports from Bangladesh in 2013. The fact that almost all companies are included in customs data is reassuring that they import in their own name and not through an intermediary. We are therefore able to apprehend the dynamics of their supplies. To make sure we match most of their imports, we compare their total imports (all origins) to their estimated apparel sales in France for 2013 (Table 2). The ratio averages 60%, with some variation between firms, still allowing to follow a substantial proportion of their imports (the lowest share is 38%). The lower values seem to reflect the fact that some firms do not have their own stores and therefore that their products may be partly imported by wholesalers or final sellers. In this case, these flows will be in the control group. If they are ever impacted similarly to those that we can observe in the customs data, this is likely working against us finding a significant effect.

In the empirical analysis, we investigate whether the firms pinned for their involvement in the collapsed building by activists and the media, exhibit different trends in their imports from Bangladesh after the shock, compared to other garment importers. Our approach is based on a difference in difference analysis which contrasts the imports of these 9 companies with those of other importers sourcing from Bangladesh in 2013. Since the entities associated to the disaster correspond to the observation level in the Customs data, in the following we equivalently use the words *importer*, *firm*, *company*, *retailer*, and *brand*.

3.2 Comparison with the rest of French importers

An obvious question when pointing to these firms, is whether the companies related to the scandal are different from the rest of importing retailers. In particular, one would want to avoid an omitted variable bias due to firm characteristics correlated with the presence of these firms in the Rana Plaza at the time of the disaster. The following paragraphs and Table A-2 provide some aggregate statistics to gauge the particular profile of the 9 importers that we will now call the Rana firms.

While it is impossible to provide information that may violate the confidentiality rule in the use of customs data, we can say that six of the firms coded as Rana firms in our empirical approach are among the top 25 importers of clothing in France in 2013. From Table A-2, the average value of each Rana firm's textile imports (104 million Euros) is comparable to that of other importers in the top 100 (96.5 million Euros). This is also what suggest the sales data in France, reported in Table 2: the "treated" Rana importers are rather important players on the clothing market in France. Coming back to Table A-2, Rana firms' average value of imports from Bangladesh is slightly higher than that of other importers in the top 100: 15.9 million Euros against 11.8 million Euros. The share of Rana firms' imports coming from Bangladesh is thus slightly higher than what Bangladesh represents in the imports of the 100 largest French importers of apparel (15.3%, against 12.3%). Table 1 puts these shares in perspective by showing the share of Bangladesh in all French apparel imports, which is 8.1%. As shown in the last column of Table 1, the volume imported from different sourcing countries for apparel products is less concentrated for Rana firms compared to all French imports: our 9 companies rank Bangladesh second, followed by Turkey, with Morocco

and Portugal entering the top-6 of sourcing countries. Finally, the Rana firms account for close to 7% of total French apparel imports and 14% of imports originating from Bangladesh in 2013.

In our estimates, we seek to take into account these differences between firms and compare the evolution of imports of firms involved in the Rana Plaza to the evolution of imports of firms of similar import structure and size. Our control group only includes firms that source from Bangladesh. Our baseline sample contains the 1,095 firms that import textile into France from Bangladesh in 2013. To further check that the results do not reflect the larger size of Rana firms, we restrict the list of firms in the control group to firms of similar total import value. The stylized facts presented in Table A-2 motivate the placebo test in which a number of firms corresponding to the number of Rana firms is randomly drawn from the largest (Top 1000 or Top 100) importers of apparel and assigned to the "treated Rana" category. We also ensure that the results hold when restricting the sample of origin countries to textile producers similar to Bangladesh (in terms of market share and income level), to ensure greater comparability of outsourcing reasons. Overall our results suggest that the relative decline of Rana firms' imports after the collapse of the building, does not relate to some unobserved firm characteristics specific to the Rana firms.

3.3 A glance at French apparel imports

The French customs provide monthly import data at the firm level for the period 2010-2015. Every year during this period, around 25,000 firms import apparel into France. We focus on 4-digit level products in HS codes 61, 62 and 63, which correspond to the garment industry. This covers a total of 44 clothing products for men, women and children. Using French Customs data, Figure 1 displays the share of aggregate monthly imports of garment into France from Bangladesh, between 2010 and the end of 2015. The vertical line displays the month of April 2013 in which the accident occurred, to help determine a potential disruption in French supplies of clothing from Bangladesh at the time of the event, potentially highlighting a global effect on French imports.

Figure 1: Evolution of Bangladesh's share in French apparel imports
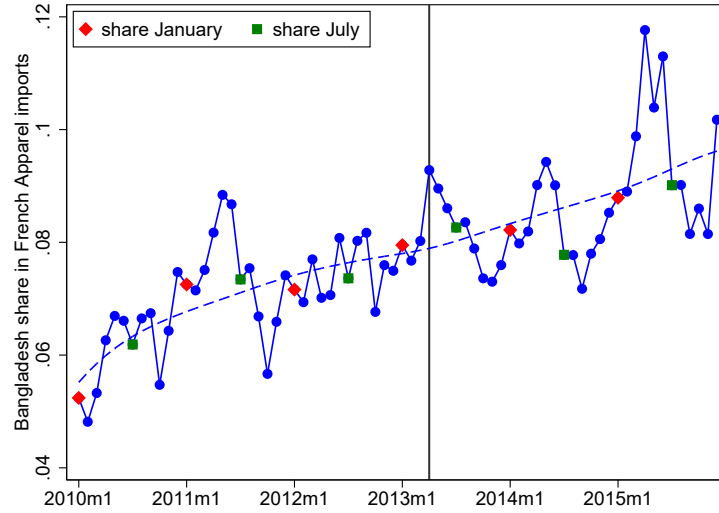
Note: The dots indicate the share of Bangladesh in French clothing imports in a given month. The values for January and July have been highlighted by diamonds and squares. The dashed line corresponds to the Lowess smoothing. Source: French customs data.

In the appendix we include the graphs showing French imports in value (Figure A-1), as well as world imports out of Bangladesh, as elements of comparison (Figure A-2 in level and Figure A-3 in share). French textile trade flows out of Bangladesh show no apparent change of trend. Clothing imports originating from Bangladesh do not exhibit any inflection visible to the naked eye in the months following the collapse of the building. On the contrary, the French market's supplies of clothing from Bangladesh follow an upward trend in value and share.[14] This upward trend is also visible for the world in Figures A-2 and A-3: World imports from Bangladesh, in value and share, exhibit a continuous progression over the period.[15] The seasonality of the data for world imports seems to reflect a double summer-winter cycle where import peaks are reached in March (shown with diamonds) and August (shown with squares). The seasonality of French imports from Bangladesh seems slightly out of step with that observed at world level. It also corresponds to a fashion with two seasons per year but the peaks of imports are reached in January and June-July.

Figure 2 investigates whether firms linked to the Rana Plaza exhibit different trends. Aggregated monthly imports of garment into France, from Bangladesh, between 2010 and the end of 2015 are reported separately for the two types of firms: the 9 importers that were accused of being linked to the Rana Plaza (shown with dots) and those without any relation to it (represented by the squares). Is it possible to observe any diverging pattern to the naked eye?

The first impression from Figure 2 is a continuous rise in both groups' imports from Bangladesh over the period 2010-2015. Nevertheless, particularly compared to the trajectory of imports by remaining firms (not linked directly to the Rana Plaza), it seems that the trend for involved

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[14]While Bangladesh rises as a sourcing country for French imports, relative to other origins, it does not increase as much as for other OECD importing countries: see Koenig and Poncet (2019).

[15]We use monthly world trade data from the UN Comtrade database (https://comtrade.un.org/).

firms slows down from 2014 onwards. Since it takes at least one quarter[16] for a product exported by Bangladesh to clear French customs, this decline could be consistent with import-reducing repercussions related to the Rana incident.
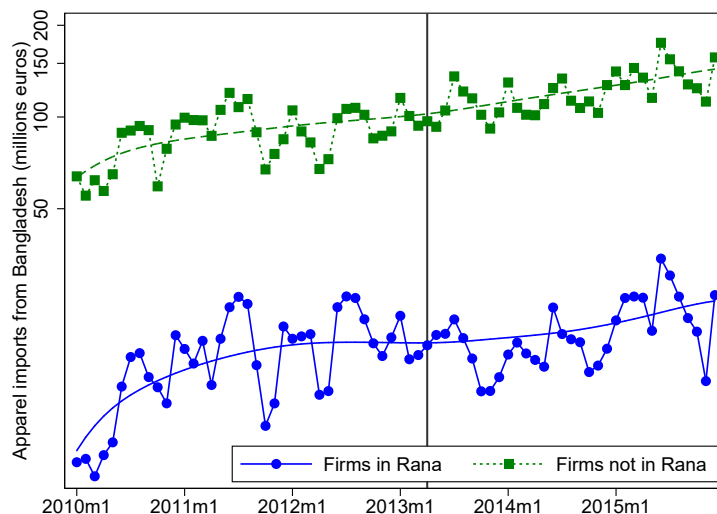

Figure 2: Evolution of apparel and clothing imports (in logs) from Bangladesh : importers in or out of Rana Plaza (Source: French customs data using firms importing from Bangladesh in 2013.)

Figure A-4 in the Appendix highlights the evolution of the share of imports coming from Bangladesh, for the two groups of firms (only firms that import from Bangladesh in 2013 are included). As already reported in Table 1, the firms linked to the Rana Plaza indeed exhibit a higher propensity to source clothing from Bangladesh than the rest of the industry. But what is interesting for our analysis is that their import trend seems to differ from that of others, as the stronger increase in 2010-12 before the disaster, was followed by a sharper relative decline in mid-2013.

Summarizing, we now know that aggregate French imports of clothing from Bangladesh rise steadily, including after the shock. We guess that there might be some differences across French importers around the time where the accident took place. While the clothing import activities from Bangladesh do not seem to have suffered any global repercussions following the collapse of the Rana Plaza, there seems to be a relative drop in the case of the firms specifically associated with the malpractices revealed by the incident. At this point it is useful to clarify what we mean by the effect of activism on trade: the next section details the theoretical predictions regarding perceived quality and demand, and details our specification.

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[16]Outsourcing garments to Bangladesh by retailers is the object of well-documented deadlines: it takes about 60 days between the order being sent to a factory in Bangladesh and the production being finalised. This period corresponds to the order of raw materials and to the production itself. It takes on average 30 additional days to transport the items from Bangladesh to Western port cities. The final products thus arrive three months after the initial order is placed. Also, orders are not placed with more than the required advance related to production and transport, due among others to storage costs and seasonality of collections.

4 Estimation approach

Our estimation approach is based on a gravity equation which describes bilateral imports at the firm-level. We consider that the Rana Plaza collapse amounts to a reputation shock which affects negatively the perceived quality of products sold by the "guilty" firms.

4.1 The effects of being associated to the scandal

We describe the structure of global value chains in the French textile industry by referring to a multinational production framework. Antras et al. (2017) develop such a model and describe a firm's import decisions about her inputs outsourced abroad. Head and Mayer (2019) focus on brands selling a portfolio of models in the car industry and generalize the multinational production model to include, among others, several consumption countries. Here, we consider a situation where a firm in the clothing industry sells her products domestically. She outsources each of them from one of many potential suppliers abroad. Firms choose the sourcing location of each variety according to cost considerations. Consumers in the home country decide about the value purchased from a given firm. Their decision to buy one clothing item from a particular firm is made by considering not only the price of the item but also the quality attributes of the firm. Activism acts by affecting the quality parameter in the consumer's demand equation. We now detail these different decisions.

Let us assume, as in Antras et al. (2017), that the firm sources each of her products from one of many potential suppliers. Choosing the best supplier for her products in an Eaton-Kortum way, a firm f has the following micro-founded gravity equation for imports, describing the share of goods sourced from country j:

$$\text{imports}_{fj} = \frac{c_j^{-\theta}}{\sum_{h \in H_f} c_h^{-\theta}} v_f \tag{1}$$

where c_j is the production cost in j and v_f is total imports of firm f. c_h is the production cost in each country pertaining to the set of H_f countries in which firm f could have source the product.

Consumers purchase value v_f from firm f, through a standard CES demand function for clothing products. We assume that this demand function incorporates a parameter measuring the quality of the firm's products: it evaluates for example the design of clothes but it is also receptive to the reputation of the firm. This is the element that is of interest for us: whenever the consumer reads or hears a new information about the firm, this updates his perceived quality parameter for the firm's products.

Criticism against a company, such as the accusation of misbehavior in a foreign country, for instance, may affect how much the firm sells, through a reputation effect: it acts as a negative shifter on the perceived quality of products sold by the firms that were criticized. Reacting to the negative news, consumers refrain from purchasing additional items from that firm.

Note that we can be more precise about the goods avoided by consumers in the period following the scandal. Whether consumers put more weight on firm responsibility, or on origin attributes (such as the fact that it happened in Bangladesh), the drop in demand will affect either only

the incriminated firms, or more firms than the ones originally targeted by the activists. In the case consumers evaluate independently a shirt outsourced by a given firm in Bangladesh and a shirt outsourced by that same firm in India, the revelations linked to the Rana Plaza decrease the perceived quality of that firm's products sourced in Bangladesh only. The drop in demand should then be specific to the targeted firms' imports from Bangladesh. On the contrary, the negative news related to a firm's behavior in Bangladesh might change consumers' preferences for all goods outsourced in Bangladesh, and not only those criticized by the press. This assimilates to a spillover effect on all items sourced in the country mentioned in the negative news. Bai et al. (2019) highlights such a collective reputation effect when analyzing the exports of Chinese firms following a scandal in the dairy industry. Finally, we could imagine a spillover effect on all products sold by the same retailer, whatever the origin.

Aggregating both steps of the supply chain for clothing, a firm's import flows from a given country are a function of the share of clothes outsourced in each location and of the consumer's choice of the amount of expenses on the company's products. In this context, our objective is to identify the effect of the reputation shock caused by the collapse of the Rana Plaza on a firm's imports. We expect the event to decrease the imports of firms linked to the scandal, in the case consumers cease buying products manufactured unethically. Note however that observing a drop in firm-level imports cannot exclusively be interpreted by the demand channel: it could also reflect the firm's reaction to counter the decrease in demand: retailers may decide to abandon providers in Bangladesh and relocate part of their production in alternative sourcing countries, whose image is associated to a safer production environment. Our analysis investigates the global effect and proposes ways to disentangle the demand and supply channels.

4.2 Estimation approach

We now detail our empirical specification. We rely on a difference-in-difference approach to examine the impact of the negative reputation shock of being linked to the Rana Plaza collapse. Post-disaster activism, followed by the media, having named the firms specifically linked to the building, we should expect that the perceived quality of those firms decreased with respect to other importers from Bangladesh. Lower perceived quality may have led to a drop in the import flows of the firms linked to the scandal. The following equation illustrates the expected effect of a negative reputation shock on the imports of firms. Equation 2 is a bilateral firm-product-level gravity equation, between the importing firm f and the country j where the garment product p is sourced:

$$\ln \text{Imports}_{jpym}^{f} = \beta \ \text{Rana firm}^{f} \times \text{Post}_{ym} \times \text{Bangladesh}_{j} \qquad (2)$$
$$+ \ \lambda_{pym}^{f} + \mu_{jpym} + \nu_{jpm}^{f} + \epsilon_{jpym}^{f}$$

where $\text{Imports}_{jpym}^{f}$ denotes quantities imported by firm f of product p from country j in month m of year y. We estimate Equation 2 on the panel of French firm-level monthly bilateral import data, from 2010 to 2015. Among the 25,000 firms in France which import textile on average, each year, around 1,000 import from Bangladesh. We focus our attention on the 1,095 firms that import

from Bangladesh in 2013, the year of the Rana Plaza disaster, since they alone will be used to identify the triple difference term. Our final sample is based on those 1,095 firms importing from 177 countries for which we measure macroeconomic conditions.

Our explanatory variable of interest is Rana^f, which is a dummy denoting that products of firm f were manufactured in the Rana Plaza when it collapsed. We focus on the triple interaction between the Rana^f dummy, Post_{ym}, which is a dummy which takes the value of 1 from May 2013 onwards, and a dummy for imports originating from Bangladesh. If the naming of the companies impacted their trade flows, we should find a significant coefficient on this interaction.

Following standard gravity estimation procedures (Head and Mayer, 2014), we use appropriate fixed effects to control for supplier and demand terms through time, and for factors varying bilaterally. Time-varying fixed effects by origin country and product, μ_{jpym}, account for all factors that affect the export potential of the origin country for a particular good in a way that is common to all importing firms. This includes among others the costs of producing and transporting goods. These fixed effects account for the possible impact that the Rana Plaza collapse had on the consumer beliefs on the quality of textile products made in Bangladesh in general (whatever the brand under which they are sold). It is also possible that the disaster induced consumers to reconsider their assessments about everything that is imported from abroad by clothing retailers. We do not make explicit assumptions about the magnitude of these effects that would be reflected in the coefficients on Post and the interaction $\text{Post}_{ym} \times \text{Bangladesh}_j$ and simply absorb them into fixed effects that vary over time by country. Unilateral firm time-varying fixed-effects, λ^f_{pym}, capture the firm import capacity for each apparel product, each month, from all destinations.

If the Rana Plaza event affected the reputation and purchases of the named firms for their relation with the collapsed factories, we should observe a significant post-Rana bilateral effect specific to "Rana firms" importing from Bangladesh. We should nevertheless control for structural bilateral explanations for trade flows between a firm f and Bangladesh: this is done by the bilateral fixed-effects at the firm-origin-product level, ν^f_{jp} that are allowed to vary by month: we interact the firm-origin-product fixed effects ν^f_{jp} with 12 dummies (one for each of the 12 months of the year from January to December). These fixed-effects account for the factors that explain why a firm may have a tendency to source a specific product from a specific origin. Explanations could be some features of the firm organisation (ties to the production country) or historical events in the sourcing strategy of the firm giving precedence to a given origin country. Bilateral time-varying factors are also a key concern, since we want to control for omitted variables. Seasonality for instance is a very prevalent question when analyzing textile trade flows, as the production and consumption patterns of clothing items are subject to recurrent deadlines every year. The firm-country-product-month fixed effects precisely account for seasonality and also help distinguish the impact of the April 2013 shock from other monthly shocks affecting French bilateral imports from Bangladesh. Finally, we cluster regression standard errors two ways, at the firm level and the origin country level, to account for the correlation between transactions within importer firms and origin countries.

Our results are presented in Sections 5 and 6. Section 5 starts by investigating whether there is a drop in imports from Bangladesh that coincides with the date of the Rana Plaza, adopting a

double-difference approach. The main results in triple difference are then displayed, followed by robustness checks on the existence of pre-trends and on the identity of named companies. Section 6 proposes further evidence to characterize the effect: we decompose the triple interaction term in various subperiods, graph the estimated coefficients, we also investigate the effect on the extensive margin and discuss a possible reallocation of production to alternative production countries.

5 Did the scandal impact retailers' imports?

The first subsection echoes the questions raised by Figures 1 and 2: did apparel imports from Bangladesh evolve differently from those of other origins, after the scandal? Do the results differ depending on whether or not the importer had clothing manufactured in the Rana Plaza? The remaining of the section gathers the two questions within one estimation by providing triple difference estimates.

5.1 Difference in difference estimates on French firm-level imports

Table 3 focuses on the gap between the evolution of firm-level imports from Bangladesh and from other countries. It looks at whether there is a change in the dynamics of imports from Bangladesh before and after the collapse of the Rana Plaza, depending on being directly linked to the factories or not. The key parameter of interest is the interaction between the dummy equal to one for imports from Bangladesh and the Post_{ym} dummy. Hence our double difference term measures, for firms importing a given product from both Bangladesh and other countries, the difference before/after the event in the import intensity from Bangladesh compared to the difference before/after for the other origins. The specification contains firm-product-year-month fixed effects as well as firm-origin country-product-month fixed effects to account for shocks affecting the importer specific demand and the seasonality in the sourcing patterns of products. We can however not include a time-varying fixed effect by origin country as it would absorb our key interaction variable. In order to control for country heterogeneity we follow the literature estimating gravity equations and add the origin country GDP, population size and bilateral exchange rate to our specification (Head and Mayer, 2014; Fuchs and Klann, 2013). Column 1 incorporates all firms while the following columns look into the heterogeneity between importers and contrast the exposed and non-exposed firms. Columns 2 to 4 zoom on the import pattern of the firms linked to the Rana plaza and columns 5 to 8 relate to the other French importers.

Results in column 1 reveal a rise in the imports of apparel sourced from Bangladesh into France over the period. The coefficient on the interaction Bangladesh$^f \times \text{Post}_{ym}$ suggests that imported volume from Bangladesh (relative to the other origins) is 23 percent higher after the Rana Plaza collapse compared to before.[17] The results in column 2 looking at the specific evolution for the firms linked to the Rana Plaza are very different. The coefficient on the double interaction capturing the change in imports from Bangladesh relative to other countries of origin after the shock, is negative

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[17]This is calculated as $100 \times [\exp(0.208)\text{-}1]$.

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Table 3: Double difference on Bangladesh: Heterogeneity among importers

Explained variable	Ln import quantity of apparel product p by firm f from country j in month m of year y (2010-2015)						
Firms	All	Firms linked to Rana Plaza			All other firms sourcing from Bangladesh		
	1	2	3	4	5	6	7
Bangladesh × Post	0.208^a	-0.162			0.234^a		
	(0.038)	(0.169)			(0.038)		
Bangladesh × 2010				-0.388^b			-0.229^a
				(0.127)			(0.038)
Bangladesh × 2011				-0.219			-0.164^a
				(0.180)			(0.030)
Bangladesh × Jan.-Apr. 2013				0.093			0.221^a
				(0.160)			(0.036)
Bangladesh × May-Dec. 2013			-0.143	-0.281^a		0.229^a	0.170^a
			(0.146)	(0.061)		(0.029)	(0.032)
Bangladesh × 2014			-0.233	-0.353^c		0.207^a	0.172^a
			(0.288)	(0.175)		(0.043)	(0.048)
Bangladesh × 2015			-0.091	-0.210		0.273^a	0.238^a
			(0.210)	(0.140)		(0.054)	(0.055)
Ln country GDP$_{jy}$	0.593^a	0.531	0.496	0.456	0.593^a	0.577^a	0.575^a
	(0.137)	(0.398)	(0.397)	(0.425)	(0.143)	(0.148)	(0.143)
Ln country population$_{jy}$	1.564	1.770	1.776	1.910	1.578	1.574	1.485
	(0.994)	(2.863)	(2.860)	(2.895)	(1.017)	(1.016)	(1.016)
Ln exchange rate$_{jy}$	0.008	-0.164	-0.162	-0.232	0.010	0.009	0.007
	(0.065)	(0.536)	(0.535)	(0.536)	(0.065)	(0.065)	(0.064)
Observation	1,582,158	51,269	51,269	51,269	1,530,889	1,530,889	1,530,889
Adjusted R-squared	0.790	0.705	0.705	0.705	0.786	0.786	0.786
Fixed effect by							
Firm-product-year-month	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-country-product-month	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Heteroskedasticity-robust standard errors two-way clustered at the firm level and at the country level appear in parentheses.. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% confidence levels. Firm-country-product-month fixed effects are firm-product-country fixed effects interacted with 12 dummies (one for each of the 12 months of the year from January to December). Apparel is defined as HS4 products in HS2 categories 61, 62 and 63. Our sample includes 1,095 firms that import from Bangladesh in 2013.

but insignificant. Column 5 looks at the rest of the firms and reports a coefficient equal to 0.234, very close to that of 0.208 for the total sample. This confirms that the firms linked to the Rana Plaza have a distinct supply trajectory for Bangladesh.

Column 3 (for Rana firms) and column 6 (for non-Rana firms) split the Post dummy in the interaction Bangladesh^f×Post$_{ym}$ into yearly subcomponents. Columns 4 and 7 add an investigation for possible pre-trends in the difference between the two groups of firms: we decompose Post into various year dummies before and after the Rana Plaza collapse, keeping 2012, the year before the incident, as the benchmark. The coefficients relative to pre- or post-2012 periods thus inform about the relative level of imports with respect to the benchmark.

The results confirm that the evolution of imports from Bangladesh for companies linked to Rana Plaza is very different. Coefficients in columns 6 and 7, for the firms not linked to the Rana, indicate

that the relative rise identified in column 5 built up over time, with no major break around the time of the Rana Plaza event. This suggests that the incident did not have an overall impact on textile supply in Bangladesh and that the disclosure of information about the bad practices in garment production in Bangladesh has not led to a massive diversion of supplies from this source. These findings are consistent with the continued increase in imports from Bangladesh for the world and for France, whether expressed in value or share, as displayed by the figures discussed in Section 3.3. By contrast, coefficients in columns 3 and 4 for Rana firms suggest that a negative and significant relative change in import volumes from Bangladesh relative to other countries of origin after the shock. Results in column 4 indicate an inverted V pattern whereby the firms' import intensity from Bangladesh (relative to other sourcing countries) switches from a rising trend up to early 2013 to a declining trend afterwards. The inversion results in the lack of significance of the interaction of Bangladesh×Post. This trend contrasts sharply with that of other companies, for which imports from Bangladesh (relative to imports from other countries) increase steadily over time, with no change in pace at the time of the Rana Plaza incident.

The coefficients obtained in columns 4 and 7 of Table 3 are displayed in Figure 3. It depicts a situation in which, in a context of general relative growth in clothing supplies from Bangladesh, the firms most affected in terms of reputation by the Rana incident saw their imports from Bangladesh grow less rapidly than those from other countries. This relative decline contrasts with Bangladesh's continued rise as a source of clothing for firms not directly associated with the scandal.
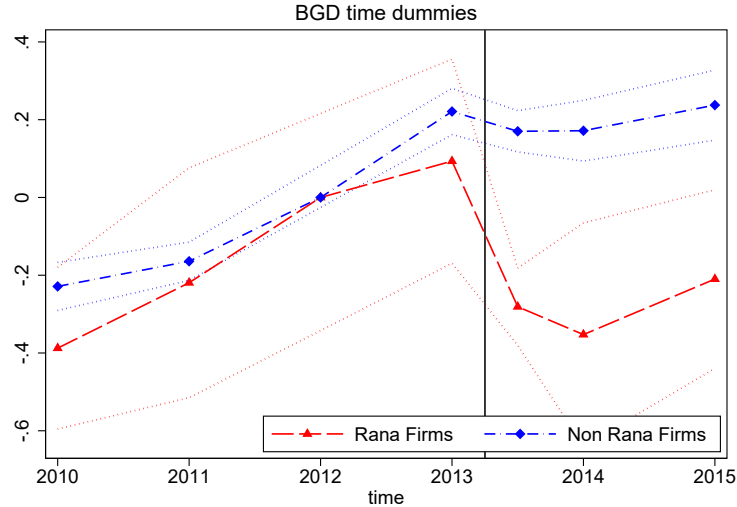
Figure 3: Bangladesh double difference quantity estimates: Heterogeneity among importers

The estimates presented in Table 3 apply only to non-zero flows. Logarithmic transformation leads to leaving aside a significant number of observations corresponding to zero imports for a given period (year-month) for a firm-product-origin triad. A standard approach to incorporate the zero trade flows is the Poisson pseudo-maximum likelihood estimator (Silva and Tenreyro, 2006). Silva and Tenreyro (2011) show that it is generally well behaved, even when the proportion of zeros in the

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Table 4: Double difference on Bangladesh: Poisson (accounting for zeros)

Explained variable	Import quantity of apparel product p by firm f from country j in month m of year y (2010-2015)						
Estimator	Poisson pseudo-maximum likelihood estimator						
Firms	All	Firms linked to Rana Plaza			All other firms sourcing from Bangladesh		
	1	2	3	4	5	6	7
Bangladesh × Post	0.206^a	0.019			0.247^a		
	(0.075)	(0.255)			(0.056)		
Bangladesh × 2010				-0.494^b			-0.170^a
				(0.199)			(0.044)
Bangladesh × 2011				-0.294^a			-0.082^c
				(0.062)			(0.043)
Bangladesh × Jan.-May 2013				0.058			0.190^a
				(0.241)			(0.059)
Bangladesh × May-Dec. 2013			-0.086	-0.303		0.231^a	0.164^a
			(0.176)	(0.200)		(0.042)	(0.047)
Bangladesh × 2014			-0.063	-0.268		0.162^a	0.108
			(0.274)	(0.299)		(0.054)	(0.067)
Bangladesh × 2015			0.227	0.017		0.367^a	0.311^a
			(0.321)	(0.351)		(0.092)	(0.104)
Ln country GDP$_{jy}$	-0.05	-0.011	-0.203	-0.182	-0.048	-0.127	-0.115
	(0.435)	(0.544)	(0.583)	(0.610)	(0.221)	(0.242)	(0.237)
Ln country population$_{jy}$	6.893	5.008	4.878	4.804	3.461	3.299	3.241
	(4.299)	(4.196)	(4.157)	(4.202)	(3.037)	(3.029)	(3.018)
Ln exchange rate$_{jy}$	-0.822	0.022	0.000	-0.084	-0.019	-0.025	-0.047
	(0.648)	(0.357)	(0.352)	(0.324)	(0.227)	(0.228)	(0.234)
Observations	8,943,684	192,600	192,600	192,600	8,751,084	8,751,084	8,751,084
Fixed effect by							
Firm-product-year-month	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-country-product-month	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Heteroskedasticity-robust standard errors two-way clustered at the firm level and at the country level appear in parentheses.. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% confidence levels. Firm-country-product-month fixed effects are firm-product-country fixed effects interacted with 12 dummies (one for each of the 12 months of the year from January to December). Apparel is defined as HS4 products in HS2 categories 61, 62 and 63. Our sample includes 1,095 firms that import from Bangladesh in 2013.

sample is very large, as in our case. The sample including all monthly flows, whether null or not, for all the firm-product-country triads which report a least one positive imports over the sample period 2010-15, is 4 times larger than the one covering solely positive flows. Table 4 reproduces the results of Table 3 using the Poisson estimator. The results confirm a clear difference in the relative evolution of imports from Bangladesh depending on whether the firms were sourcing from the Rana Plaza or not. We measure a relative increase in supplies from Bangladesh before the collapse of the building for both groups of firms. While the increase continued after the disaster for the firms not involved, it seems to have stopped abruptly in 2013 for the firms involved. For the latter, the coefficients of the interaction terms (measured relative to 2012) after the shock are insignificant. In contrast, for the remaining firms, the interaction of Bangladesh×Post is positive and significant. The point estimate suggests that for firms not involved, the difference in the logs of expected counts is 0.247 unit higher after the Rana plaza collapse compared to before. The similarity of the results whether or not zeros are taken into account is reassuring that the endogenous selection of months in which imports take place does not pose a major threat to the analysis.

5.2 Triple difference results

We now present triple difference estimates based on Equation 2, which compare the relative dynamics of imports from Bangladesh versus other origins, between firms directly involved in the disaster and others. Table 5 reports the results when fixed effects are introduced gradually to observe the sign of double terms in addition to our key triple interaction term Rana firm×Post×BGD. Throughout all columns, fixed-effects for firm-country-product-month combinations control for seasonality.

In columns 1 and 2, controls for the time-specific import capacity of each firm are introduced through two time-varying proxies of firm-level import performance: We calculate the total value of imports (all products all origins) by the firm in the period (year-month) considered, as well as the value imported by the firm in the period for the product in question (but all origins combined). In addition, we include product-year-month fixed-effects. They account for supply shocks and demand-specific shocks that are common to all importers in France. In both columns (1) and (2), the non-inclusion of firm-product-year-month fixed-effects allows to show how overall imports by Rana firms evolve (see the interaction Rana firm×Post). Similarly, controls for the time-specific export capacity of countries are temporarily performed by country-level variables in columns (1) and (2). This allows to assess the overall change in import intensity from Bangladesh following the Rana Plaza collapse through the term Bangladesh×Post. Country-product-year-month fixed-effects are added from column (3) and additional firm-product-year-month fixed effects are included from column (5). This gets us to the baseline specification of Equation 2 with the three-way fixed effects for time-varying firm-product dummies, firm-country dummies and country-product dummies. Finally, columns 2, 4 and 6 decompose the Post dummy into its three subcomponents corresponding to the three years after the incident. This makes it possible to determine whether the overall coefficient stems from a trend that seems consistent over time.

The results confirm the findings from the double difference estimates in Section 5.1. The

Table 5: Firm-level Triple difference: baseline

Explained variable	Ln import quantity of apparel product p by firm f from country j in month m of year y (2010-2015)					
	1	2	3	4	5	6
Rana firm × Post × BGD	-0.353^a (0.066)		-0.393^a (0.065)		-0.462^a (0.091)	
Rana firm × May-Dec. 2013 × BGD		-0.374^a (0.076)		-0.405^a (0.083)		-0.442^a (0.054)
Rana firm × 2014 × BGD		-0.417^a (0.095)		-0.460^a (0.090)		-0.520^a (0.099)
Rana firm × 2015 × BGD		-0.283^a (0.072)		-0.324^a (0.053)		-0.418^a (0.114)
Rana firm × Post	0.089 (0.056)		0.090 (0.061)			
Rana firm × May-Dec. 2013		0.115^a (0.041)		0.124^a (0.043)		
Rana firm × 2014		0.074 (0.058)		0.071 (0.062)		
Rana firm × 2015		0.089 (0.075)		0.091 (0.080)		
Bangladesh × Post	0.185^a (0.028)					
Bangladesh × May-Dec. 2013		0.170^a (0.017)				
Bangladesh × 2014		0.170^a (0.024)				
Bangladesh × 2015		0.217^a (0.045)				
Ln country GDP$_{jy}$	0.243^b (0.113)	0.228^c (0.115)				
Ln country population$_{jy}$	0.846 (1.024)	0.838 (1.015)				
Ln exchange rate$_{jy}$	-0.043 (0.047)	-0.044 (0.047)				
Ln Firm imports$^f_{p,ym}$	0.708^a (0.056)	0.708^a (0.056)	0.724^a (0.055)	0.724^a (0.055)		
Ln Firm imports$^f_{ym}$	0.065^b (0.025)	0.065^b (0.025)	0.068^b (0.026)	0.068^b (0.026)		
Observations	1,582,158	1,582,158	1,582,158	1,582,158	1,582,158	1,582,158
Adjusted R-squared	0.831	0.831	0.833	0.833	0.783	0.783
Fixed effects by						
Product-year-month	Yes	Yes	-	-	-	-
Firm-country-product-month	Yes	Yes	Yes	Yes	Yes	Yes
Firm-product-year-month	No	No	No	No	Yes	Yes
Country-product-year-month	No	No	Yes	Yes	Yes	Yes

Heteroskedasticity-robust standard errors two-way clustered at the firm level and at the country level appear in parentheses. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% confidence levels. Firm-country-product-month fixed effects are firm-product-country fixed effects interacted with 12 dummies (one for each of the 12 months of the year from January to December). Apparel is defined as HS4 products in HS2 categories 61, 62 and 63.

interaction Bangladesh×Post attracts a positive and significant coefficient, while the variable Rana firm×Post has a positive but insignificant coefficient. This means that Table 5 depicts an economic framework in which Bangladesh's clothing exports to France increase over time and therefore the propensity of companies to import from Bangladesh is higher after the Rana Plaza than before.In this context, overall imports (all origins combined) from the retailers most closely linked to the disaster seem to follow a similar trend to those of other importers. In sharp contrast, our key triple term Rana firm×Post×BGD is negative and significant suggesting that the specific evolution of imports from Bangladesh is different from other countries of origin.

The results confirm that the impact of Rana Plaza was felt more particularly on imports from Bangladesh for the firms exposed and that only imports from Bangladesh by these firms are affected by the incident.[18] The magnitude of the estimated effect found in column 5 appears relatively important: being directly linked to the Rana Plaza is associated with a 37 percent relative fall in the imports from Bangladesh.[19] Note that these outcomes inform about the existence of spillovers effects in the reputation shock. The consequence of the Rana Plaza event on Rana firms' imports from Bangladesh did not seem to affect their imports from other origin countries. Similarly, apparel items imported by non-Rana firms from Bangladesh, did not either suffer from the shock when compared to other origin countries (see Table 3). If interpreted as a consumption effect, this means that individuals did not turn their back on all products sold by these multinationals, nor on all products made in Bangladesh.

Table A-4 reproduces the results of the first four columns of Table 5 using the Poisson estimator. The results confirm the relative import decline from Bangladesh for the firms sourcing from the Rana Plaza. We encounter computation problems when controlling for more than two sets of fixed effects, that is time-varying firm-product and country-product fixed-effects on top of firm-country-product-month dummies as in columns 5 and 6 of Table 5. However, we show in Section 6.4 that the collapse of the Rana Plaza does not seem to have any repercussions on the propensity of firms to import (i.e. on the extensive margin): the intensity of zero flows of Rana companies evolved over time in a way that is identical to that of companies not affected by the disaster. This suggests that the failure to take into account zero flows in our log specification is not likely to produce significant biases.

5.3 Pre-trends

Table 6 investigates for possible pre-trends in the measured widening gap between Rana and non-Rana firms' imports from Bangladesh. Column 1 reproduces the baseline estimates for the triple

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[18]Table A-3 in the Appendix looks at whether the specific evolution of Rana firms' imports from Bangladesh also appears for other countries of origin. The results correspond to a double difference estimate where the key term is the interaction between Rana firm and Post. The columns successively cover imports from Bangladesh (column 1), all countries excluding Bangladesh (column 2), the 25 main countries of origin of clothing imports by France (column 3) and then different countries (China, Italy, Turkey, and India). The results confirm that Rana firms do not differ from other firms in terms of the average evolution of their imports, with the exception of imports from Bangladesh. The results of column 6 on Turkey suggests a possible trade diversion from Bangladesh to Turkey. It will be discussed further in Section 6.5.

[19]This is calculated as 100×[exp(-0.462)-1].

Table 6: Firm-level Triple difference: pre-trends

Explained variable	Ln import quantity of apparel product p by firm f					
	from country j in month m of year y (2010-2015)					
Countries	All		Top 25 sourcing countries		Non-OECD countries	
	1	2	3	4	5	6
Rana Firm $\times$ Post $\times$ BGD	-0.462[a]		-0.468[a]		-0.419[a]	
	(0.091)		(0.095)		(0.089)	
Rana Firm $\times$ 2010 $\times$ BGD		-0.109		-0.109		-0.124
		(0.153)		(0.159)		(0.187)
Rana Firm $\times$ 2011 $\times$ BGD		-0.080		-0.084		-0.114
		(0.082)		(0.086)		(0.096)
Rana Firm $\times$ Jan-April 2013 $\times$ BGD		-0.156		-0.173		-0.148
		(0.120)		(0.126)		(0.151)
Rana Firm $\times$ May-Dec. 2013 $\times$ BGD		-0.500[a]		-0.499[a]		-0.478[a]
		(0.054)		(0.055)		(0.045)
Rana Firm $\times$ 2014 $\times$ BGD		-0.584[a]		-0.598[a]		-0.561[a]
		(0.107)		(0.114)		(0.121)
Rana Firm $\times$ 2015 $\times$ BGD		-0.483[a]		-0.492[a]		-0.441[a]
		(0.121)		(0.124)		(0.131)
Observations	1,582,158	1,582,158	1,378,480	1,378,480	1,080,858	1,080,858
Adjusted R-squared	0.783	0.783	0.784	0.784	0.790	0.790
Fixed effects by						
Firm-country-product-month	Yes	Yes	Yes	Yes	Yes	Yes
Firm-product-year-month	Yes	Yes	Yes	Yes	Yes	Yes
Country-product-year-month	Yes	Yes	Yes	Yes	Yes	Yes

Heteroskedasticity-robust standard errors two-way clustered at the firm level and at the country level appear in parentheses. [a], [b] and [c] indicate significance at the 1%, 5% and 10% confidence levels. Firm-country-product-month fixed effects are firm-product-country fixed effects interacted with 12 dummies (one for each of the 12 months of the year from January to December). Apparel is defined as HS4 products in HS2 categories 61, 62 and 63.

interaction Rana firm$\times$Post$_{ym}\times$Bangladesh (from column 5 of Table 5). Column 2 decomposes Post into various year dummies before and after the Rana Plaza collapse, keeping 2012, the year before the incident, as the benchmark. The coefficients relative to pre- or post-2012 periods thus inform about the relative level of imports with respect to the benchmark. The estimated pre-Rana Plaza coefficients are negative and insignificant for all periods. The coefficient in the second half of 2013 is negative and significant, whereas it is insignificant at the beginning of 2013 and before the benchmark in 2011. This seems consistent with a change affecting negatively the supply dynamics of companies linked to Rana following the accident.

The following columns of Table 6 ensure that the findings are robust when restricting the list of countries used in the control group to better match the specific dynamics of imports from Bangladesh. Given Bangladesh's importance in supplying textiles to French households, columns 3 and 4 concentrate on the top 25 countries of origin listed in Table 1 and exclude others. Columns 5 and 6 restrict the sample to non-OECD countries. Products imported by French firms from Bangladesh are indeed likely to be more similar and hence subject to similar supply and demand shocks to those coming from other developing countries than from developed countries. Hence the set of fixed-effects by product-year-month are likely to do a better job in accounting for time-varying

characteristics that are common to the two groups of firms. The results obtained using these fewer, but more similar countries, as control groups for Bangladesh, confirm that imports from Bangladesh decline relative to other origins for the Rana firms after May 2013. To summarize, the negative, significant, and robust coefficient on the interaction Rana firm×Post×Bangladesh suggests that the negative repercussions we attribute to the Rana Plaza incident does not reflect a change in quality differentials. Neither does it seem to reflect unobserved heterogeneity in sourcing patterns across countries between Rana firms and other firms.

5.4 Placebo

We run a series of falsification tests in which we falsely assign firms to the Rana firm group. As evidenced in Table A-2, the firms contracting with the Rana Plaza are among the main French importers of textiles. Table 7 investigates whether the relative decline in import propensity of the Rana firms does not reflect the repercussions of their size.[20]

In Table 7, we falsely assign the "treated" Rana status to firms that are similar in the value of textile imports to the "true" Rana firms. We rank importers by order of importance in the total imports of apparel in 2013 and replace the Rana firms by the previous or next firm in that list. Column 1 uses the previous firm, which thus reports imports with a value just above that of the Rana firm it replaces. Column 2 uses the following firm, which reports imports with a value just below that of the firm Rana which it replaces. In column 3, for every Rana firm, we pick both the firm above and below in the list and we code it as Rana firm^{False}. In this exercise we exclude the "true" Rana firms from the sample in order to zoom on the difference between a selection of importers exactly comparable in size to the Rana firms and the remaining firms, exclusive of the "Rana" firms. In all three specifications the coefficient on the triple interaction is positive and insignificant. It is quite distinct from the negative and significant coefficient obtained in the baseline with the true Rana firm group. This suggests that the relative decline in imports for the Rana firms does not reflect the patterns specific to the main textile importing firms. In the remaining columns we conduct a random data-generating process to select the same number of firms as we identified Rana firms and assign them as "treated" Rana firms. We then construct a false triple-difference variable, i.e. Rana firm^{False}×Post×BGD. Compared to column 4, column 5 forces the selection of "false" Rana firms to be done within the list of the top 1000 textile importers (based on their total textile imports in 2013). In column 6, only the top 100 importing firms are considered for the random selection of the "false" Rana firms. The randomization means that the newly-constructed regressor of interest should have no effect on import flows. In other words, any significant results would indicate that there are important omitted variables. We conduct this random data-generating process 1000 times to avoid contamination by rare events. The results correspond to the mean value of the estimates from the 1000 random assignments. In all cases, the mean value is not different from zero. This indicates that the true estimates are clear outliers in

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[20]In unreported results available upon request, we exclude each of the Rana firms from the sample one by one. The coefficient on the triple interaction term Rana firm×Post×Bangladesh remains negative and significant in all cases, suggesting the results are not fully driven by one of these brands.

Table 7: Firm-level Triple difference: Placebo

Explained variable	Ln import quantity product p by firm f					
	from country j in month m of year y (2010-2015)					
Products	HS4 p Apparel					
Selection criteria	Closest firm by import value			Random selection		
	above	below	above & below		Top 1000	Top 100
	1	2	3	4	5	6
Rana firm^{False} × Post × BGD	0.296^b	0.156	0.141	-0.018	-0.017	0.006
	(0.124)	(0.138)	(0.102)	(0.136)	(0.149)	(0.132)
Observations	1,530,889	1,530,889	1,530,889	1,582,158	1,582,158	1,582,158
Adjusted R-squared	0.779	0.779	0.779			
Fixed effects by						
Firm-product-year-month	Yes	Yes	Yes	Yes	Yes	Yes
Country-product-year-month	Yes	Yes	Yes	Yes	Yes	Yes
Firm-country-product-month	Yes	Yes	Yes	Yes	Yes	Yes

Heteroskedasticity-robust standard errors two-way clustered at the firm level and at the country level appear in parentheses. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% confidence levels. Firm-country-product-month fixed effects are firm-product-country fixed effects interacted with 12 dummies (one for each of the 12 months of the year from January to December). Apparel is defined as HS4 products in HS2 categories 61, 62 and 63. In columns 1 to 3 each Rana firm is replaced by the previous and/or next firm in the list of importers ranked in order of their total apparel imports in France in 2013. Rana firm^{False} is the firm reporting imports with a value just above that of the Rana firm in column 1. In column 2, Rana firm^{False} is the firm reporting a value just above that of the Rana firm it replaces. Column 3 uses both the firm above and below in the list to define Rana firm^{False}. Columns 1 to 3 exclude the "true" Rana firms from the sample so that we zoom on the difference between a selection of importers exactly comparable in size to the Rana firms and the remaining firms, exclusive of the "Rana" firms. In columns 4 to 6, each Rana firm is replaced by a randomly drawn firm. In column 5, the selection of Rana firm^{False} takes place within the top 1000 firms in terms of the imported apparel value in 2013. In column 6, Rana firm^{False} are taken within the top 100 firms.

the placebo tests and suggests that they are not strongly biased by omitted variables.

6   Characterizing the post Rana-Plaza effect

At this point we have investigated whether retailers connected to the Rana Plaza reacted differently to the shock. Note that our estimates quantify the total effect of the event on those firms' imports. To make progress on identifying whether the outcome channels through demand or through the deliberate reallocation of imports to suppliers out of Bangladesh, we now discuss suggestive evidence. We review different mechanisms that could explain the decrease in Rana firms' import values after the shock, namely: the destruction of production capacities, the increase in sourcing prices caused by new investment, and upward trends in sourcing from alternative countries. We also document two further characteristics of the effect on imports, which are the role of the extensive margin, and the possible spread of the reputation shock to other firms.

6.1 Destruction of production capacities

When the Rana Plaza collapsed, the five factories manufacturing the clothes inside the building were destroyed and many employees perished in the disaster. From the point of view of orders placed by contracting multinationals, the event assimilates to a sudden stop in the functioning of supply chains. Could it be that the relative slowdown of Rana firms' imports from Bangladesh captures exclusively the effect of the production capacity destruction?

To answer this question we investigate the detailed time profile and persistence of the effect identified in Table 6. In parallel, we document the time necessary for the produced textile items to cross the border back in France, once the manufacturing order is placed. We finally compare both. Our first step reestimates Equation (2), further decomposing the yearly triple interaction terms into their monthly components. The estimates thus correspond to the relative import performance from Bangladesh (compared to other sources) of Rana firms compared to others, using the full year of 2012 as the reference. Figure 4 graphs the coefficients. Each diamond represents the estimated coefficient for a given month between January 2010 and December 2015. The months during the year 2012 are all aligned on the zero horizontal line since they represent the benchmark.

The figure displays a break in the trend between, on the one side, the pre-2012 months, and on the other side the second half of 2013 and the following months. There seems to be no specific difference between the benchmark year 2012 and the months of the years preceding it. On the contrary, coefficients estimated for the months consecutive to the disaster are clearly beneath the benchmark level, even though not all of them are significant. The relative decline starts in June 2013, i. e. one month after the disaster, and persists at a remarkably stable level for 24 months.

Given the average of 30 days necessary to ship products from Bangladesh to France, the drop for the month of June could correspond to the destruction of orders that had been placed, but which never arrived in France. However the fact that the effect remains over a long period of time suggests that the repercussions are not limited to a destruction effect. Data documenting the time frame for manufacturing and shipping products from Bangladesh to Europe point to an average duration of 60 days between the order being sent to a factory in Bangladesh and the production being finalised and ready to be shipped. The date on which the effect we find can no longer be interpreted as a capacity destruction effect depends on how much time the fashion retailers need to find alternative providers in Bangladesh. We know that the building hosted five factories: this is a small number compared to the thousands of textile factories that existed in Bangladesh in 2013. Also it is a small number compared to the hundreds of suppliers in Bangladesh listed by H&M on its website (530 in 2019). Even with half of this number of factories six years ago, it seems reasonable to expect that the multinational firms could find alternative knitting factories within a few weeks. The observation of an effect that persists beyond 3 to 4 months after the collapse of the Rana Plaza is thus not compatible with the duration for locating and arranging a new contract with new producers to which the standard two/three months of manufacturing and shipping are added. Accordingly, it points to an additional effect that applies to the orders that were placed after the disaster (see footnote 16).
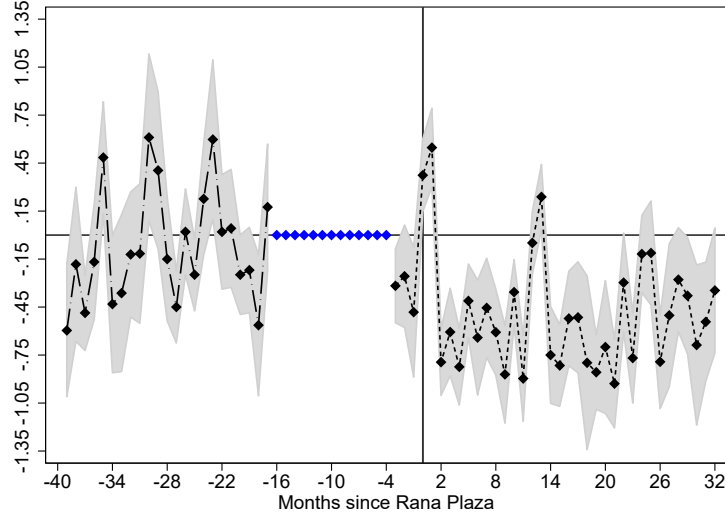
Figure 4: Monthly triple difference estimates on import quantities

6.2 Price effects

Our data allow to be more precise about the potential role of price mechanisms in the decrease in firm-level imports. Indeed, one could imagine that higher investment costs caused by security requirements could have increased the price of clothes manufactured in Bangladesh following the event. A decrease in the value of imports in the post-Rana Plaza period might hence be the result of higher sourcing prices, and not that of a reputation shock. The decrease in perceived quality is on the contrary expected to decrease quantities without affecting prices.

Table 8 reproduces the specifications of the last two columns of Table 5 with the average price (calculated as the value divided by the volume) as the explained variable. None of the coefficients in columns 1 and 2 are significant, suggesting that import prices followed similar trends for both groups of firms irrespective of their exposure to the Rana Plaza scandal. In order to be exhaustive, we also report the results on import values as the explained variable in columns 3 and 4. The point estimates for import values are logically identical to those for import quantities found in Table 5. These results suggest that the repercussions of the collapse are being felt entirely on the import volumes of the Rana firms, without affecting average prices.

The next table refines the comparison to a group that fits better with the characteristics of Rana firms. Indeed, with two exceptions, all the firms present in the French customs and sourcing from the Rana Plaza are part of the top 100 clothing importers in 2013. In order to compare the Rana firms with a control group containing similar companies in terms of size, we restrict the sample to include the largest importers. Similarly to what was done in Table 7, we rely on the total textile import value by firms in 2013 to successively consider the top 1000 importers and the top 100 importers. Table 9 reports the results for the import quantity (columns 1 and 3) and for the unit value (columns 2 and 4). The point estimates are unchanged compared to the results obtained on the full sample (column 1 of Table 6 for quantities and column 1 of Table 8 for prices). The

Table 8: Firm-level Triple difference: price and value

| Explained variable | Imports of apparel product p by firm f from country j in month m of year y (2010-2015) | | | |
| | Ln Unit value | | Ln Value (in euros) | |
	1	2	3	4
Rana Firm $\times$ Post $\times$ BGD	-0.035		-0.428^a	
	(0.029)		(0.098)	
Rana Firm $\times$ May-Dec. 2013 $\times$ BGD		-0.036		-0.406^a
		(0.027)		(0.059)
Rana Firm $\times$ 2014 $\times$ BGD		-0.039		-0.487^a
		(0.026)		(0.100)
Rana Firm $\times$ 2015 $\times$ BGD		-0.031		-0.383^a
		(0.035)		(0.126)
Observations	1,582,158	1,582,158	1,726,854	1,726,854
Adjusted R-squared	0.697	0.697	0.745	0.745
Fixed effects by				
Country-product-year-month	Yes	Yes	Yes	Yes
Firm-Product-year-month	Yes	Yes	Yes	Yes
Firm-country-product-month	Yes	Yes	Yes	Yes

Heteroskedasticity-robust standard errors two-way clustered at the firm level and at the country level appear in parentheses. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% confidence levels. Firm-country-product-month fixed effects are firm-product-country fixed effects interacted with 12 dummies (one for each of the 12 months of the year from January to December). Apparel is defined as HS4 products in HS2 categories 61, 62 and 63.

decline in import volumes by companies involved in the Rana Plaza scandal thus does not only reflect their particularity in terms of size.

6.3 Effect on retailers signing the Accord

So far, the outcome has shown to be focused on retailers whose name was linked to the factories located inside the building. We now wish to understand how trade flows evolved for firms associated indirectly to the scandal, namely those which did not subcontract with Rana Plaza's factories, but whose brand was still heavily cited in the media. Let us quickly provide background information: Immediately after the collapse, while compensation to victims was secured by the Rana Plaza Arrangement and the Donor Trust Fund, another initiative concentrated on installing the legally-binding "Accord on Fire and Building Safety in Bangladesh". The objective was to have foreign retailers commit to safety inspections within their subcontractors and pay for the repairs identified by the safety committees. The Accord was led by trade unions and NGOs, and was ultimately signed by over 200 foreign fashion companies.

Of interest for our analysis, is the fact that several companies' names were at the time densely mentioned in the press and on NGOs' websites, due to the importance of the commitment. Table 10 lists the name of those companies, which we call the "Accord firms" in the following. Firms directly involved in the Rana Plaza were promptly asked to sign the document. As shown in Table 10, many other companies soon agreed to put their name on the Accord, like H&M which was the

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Table 9: Firm-level Triple difference: firm control group check

Explained variable	Imports of apparel product p by firm f			
	from country j in month m of year y (2010-2015)			
	Ln quantity	Ln unit value	Ln quantity	Ln unit value
Restrictions	Top 1000 importers in 2013		Top 100 importers in 2013	
	1	2	3	4
Rana firm $\times$ Post $\times$ BGD	-0.480^a	-0.036	-0.485^a	-0.043
	(0.094)	(0.029)	(0.095)	(0.030)
Observations	1,065,835	1,065,835	549,697	549,697
Adjusted R-squared	0.761	0.688	0.745	0.687
Fixed effects by				
Country-product-year-month	Yes	Yes	Yes	Yes
Firm-Product-year-month	Yes	Yes	Yes	Yes
Firm-country-product-month	Yes	Yes	Yes	Yes

Heteroskedasticity-robust standard errors two-way clustered at the firm level and at the country level appear in parentheses. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% confidence levels. Firm-country-product-month fixed effects are firm-product-country fixed effects interacted with 12 dummies (one for each of the 12 months of the year from January to December). Apparel is defined as HS4 products in HS2 categories 61, 62 and 63. Our sample only considers firms that import textile from Bangladesh in 2013 and that are in the Top 1000 of textile importers into France in 2013. Columns 3 and 4 further exclude firms not in the Top 100 of textile importers into France in 2013.

first brand to sign on May 15, 2013.[21]

We show the estimation results of the after-shock effect for both being a Rana firm and being a signatory of the Accord. From 31 at the beginning of the agreement, the number of signatories gradually increased to 119 in September 2013 and then nearly 200 at the end of 2015 (Ahlquist and Mosley, 2018). To verify the significance of the impacts on the signatory companies of the agreement, we duplicate our estimations using both an early list of signatories by May 2013 and a later list validated in September 2013. Note that five of the Rana firms signed the Accord by May 15, 2013. In September 2013 all Rana firms had signed it. Table 11 displays the results for the May version.[22] Our variables of interest are the two interaction terms Accord$\times$Post$\times$BGD and Rana$\times$Post$\times$BGD. In column 1, Accord$\times$Post$\times$BGD is introduced alone and is not significant suggesting that imports from Bangladesh of signatories of the binding security agreement are no different from those of the control group. In column 2 where both interaction terms Accord$\times$Post$\times$BGD and Rana$\times$Post$\times$BGD are present in the regression, the Accord interaction measures the additional effect of signing the document for the Rana firms that did sign it and also the effect of its signature by non-Rana firms. The absence of significance means that for both groups of firms, there is no specificity linked to being named as having taken part in the Accord. The results for the interaction on Rana firms, however, are similar to the one estimated in our previous triple difference tables: the relative decrease in their imports from Bangladesh is still visible.

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[21]https://ethique-sur-etiquette.org/Bangladesh-31-marques-signent-l-Accord-pour-la-securite-des-usines

[22]The results based on the latter list of September are similar. They are available upon request.

Table 10: List of Accord firms

Accord firms not present in France in 2013	Accord firms present in France in 2013	
	in Rana	not in Rana
El Corte Ingles	Benetton	Abercrombie & Fitch
Hess Natur	Carrefour	Aldi
JBC	C&A	Esprit
Kik	Inditex (Zara)	G-Star
Loblaw	Mango	Helly Hansen
N Brown Group		H&M
Next		Lidl
Primark		Marks & Spencer
Rewe		New Look
Sainsbury's		Mothercare
Stockmann		PVH (Calvin Klein, Tommy Hilfiger)
Switcher		WE Group
Tchibo		
Tesco		

The list of firms corresponds to the signatories of the Accord on Fire and Building Safety in Bangladesh (the Accord) which was signed on May 15th 2013. More firms joined in later but here we only consider the initial signatories. Inditex operates different brands beyond Zara: Berschka, Pullbear, Stradivarius, Massimo Dutti and Oysho that are present in France in 2013.

6.4 Extensive margin

Our triple-difference estimates of the impact of the Rana Plaza collapse only cover strictly positive import flows. The analysis has so far left aside the possible reaction of the extensive margins of imports, namely the fact that the collapse of the Rana Plaza led to a cessation of monthly imports for a given product by the affected firms. To characterize the extensive margin of imports from Bangladesh after the shock we estimate Equation 2 using a 0/1 dummy and define strictly positive import flows as the explained variable. The sample similar to that in Table A-4 includes all 72 monthly observations for all the firm-product-country triads which report a least one positive imports over the sample period 2010-15. In the presence of fixed-effects accounting for demand and supply shock common to all importers, the triple interaction term Rana firm×Post×BGD measures whether there is a relative change in the propensity of importing a given product from Bangladesh in a given month, after the Rana Plaza collapse, between firms sourcing from the building or not.

Table 12 reports the results from this linear probability model. Column 1 uses the whole sample of firms and destinations countries, while the following three columns exploit a reduced number of firms and countries to ensure better comparability of the control group. Column 2 only considers the Top 1000 textile importers and column 3 further restricts to the Top 100. In column 4, imports from OECD countries are removed to limit the comparison of the intensity of supplies from Bangladesh with sources with more comparable levels in terms of price and quality.

With the exception of column 1 where the coefficient is significant at the confidence level of 10%, the interaction term Rana firm×Post×BGD never comes out significantly. This suggests that the import propensity (the fact of having a non-zero flow) of firms sourcing from the Rana Plaza

Table 11: Firm-level Triple difference with Accord firms

Explained variable	Ln imports quantity of apparel product p by firm f from country j in month m of year y (2010-2015)		
	1	2	3
Accord Firm $\times$ Post $\times$ BGD	-0.052	0.104	
	(0.106)	(0.088)	
Accord Firm $\times$ June-Dec. 2013 $\times$ BGD			-0.019
			(0.075)
Accord Firm $\times$ 2014 $\times$ BGD			0.131
			(0.091)
Accord Firm $\times$ 2015 $\times$ BGD			0.146
			(0.112)
Rana Firm $\times$ Post $\times$ BGD		-0.523^a	
		(0.112)	
Rana Firm $\times$ May-Dec. 2013 $\times$ BGD			-0.426^a
			(0.069)
Rana Firm $\times$ 2014 $\times$ BGD			-0.598^a
			(0.121)
Rana Firm $\times$ 2015 $\times$ BGD			-0.508^a
			(0.141)
Observations	1,582,158	1,582,158	1,582,158
Adjusted R-squared	0.745	0.745	0.745
Fixed effects by			
Country-product-year-month	Yes	Yes	Yes
Firm-Product-year-month	Yes	Yes	Yes
Firm-country-product-month	Yes	Yes	Yes

Heteroskedasticity-robust standard errors two-way clustered at the firm level and at the country level appear in parentheses. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% confidence levels. Firm-country-product-month fixed effects are firm-product-country fixed effects interacted with 12 dummies (one for each of the 12 months of the year from January to December). Apparel is defined as HS4 products in HS2 categories 61, 62 and 63. Accord firms are those listed in Table 10.

Table 12: Firm-level Triple difference: extensive margin

Explained variable	Dummy for non-zero imports of apparel product p by firm f			
	from country j in month m of year y (2010-2015)			
Control group restriction		Top 1000 importers	Top 100 importers	Non-OECD origin countries
	1	2	3	4
Rana firm $\times$ Post $\times$ BGD	0.020^c	0.002	-0.001	0.001
	(0.011)	(0.011)	(0.011)	(0.015)
Observations	8,943,684	4,694,760	2,099,148	5,519,928
Adjusted R-squared	0.467	0.504	0.532	0.495
Fixed effects by				
Country-product-year-month	Yes	Yes	Yes	Yes
Firm-Product-year-month	Yes	Yes	Yes	Yes
Firm-country-product-month	Yes	Yes	Yes	Yes

Heteroskedasticity-robust standard errors two-way clustered at the firm level and at the country level appear in parentheses. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% confidence levels. Firm-country-product-month fixed effects are firm-product-country fixed effects interacted with 12 dummies (one for each of the 12 months of the year from January to December). Apparel is defined as HS4 products in HS2 categories 61, 62 and 63. Our sample only considers firms that import textile from Bangladesh in 2013 and that are in the Top 1000 of textile importers into France in 2013. Columns 3 and 4 further exclude firms not in the Top 100 of textile importers into France in 2013.

has followed the same trend as that of other major importers. From this outcome and from the one on the intensive margin from Table 8, we are able to conclude that the repercussions of the Rana Plaza are exclusively felt on the volumes of imports: the named firms maintained the same import frequency but reduced the quantities from their Bangladeshi manufacturers.

The absence of impact on the decision to import or not is also reassuring with regard to the potential problem of bias associated with the failure to take zeros into account in the log specification. This increases our confidence in the baseline estimate of the decrease of imported volumes from Bangladesh consecutive to the shock for firms whose name was associated to the accident.

6.5 Reallocation of production to other countries

We have seen that French retailers increased their supplies from Bangladesh over time, following a trend that has not been affected by the Rana Plaza shock (column 7 of Table 3). In this context, the imports of companies involved in the scandal are discordant, as they experience a smaller increase in their import volumes from Bangladesh, while their overall imports of apparel are not affected (see Table 5). We should thus logically expect Rana firms' relative decline of imports from Bangladesh to be paralleled by increases in procurement from other origins. Indeed, substitution of contracts may be occurring, by which supplies from Bangladesh are being replaced by imports from other countries. This section is dedicated to investigating this issue. A subsidiary but difficult question to answer is whether, if there is substitution, it is strategically initiated by the retailers to anticipate the effects of a reputation shock, or whether they are forced to do so by a diversion

Table 13: Firm-level Triple difference: Reallocation

| Explained variable | Ln import quantity of apparel product p by firm f | | | | | | | | |
| | from country j in month m of year y (2010-2015) | | | | | | | | |
Country	Random among Top 25	China	Italy	Turkey	India	Morocco	Portugal	Vietnam	Pakistan
Rana firm×Post×Country	-0.213	0.184	0.064	0.185^b	-0.093	0.267^a	0.555^a	-0.238	0.046
	(0.142)	(0.147)	(0.155)	(0.087)	(0.120)	(0.065)	(0.099)	(0.164)	(0.087)
Observations	1,471,412	1,471,412	1,471,412	1,471,412	1,471,412	1,471,412	1,471,412	1,471,412	1,471,412
Adjusted R-squared		0.771	0.771	0.771	0.771	0.771	0.771	0.771	0.771
Fixed effects by									
Firm-product-year-month	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-product-year-month	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-country-product-month	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Heteroskedasticity-robust standard errors two-way clustered at the firm level and at the country level appear in parentheses. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% confidence levels. Firm-country-product-month fixed effects are firm-product-country fixed effects interacted with 12 dummies (one for each of the 12 months of the year from January to December). Apparel is defined as HS4 products in HS2 categories 61, 62 and 63. Our sample only considers firms that import textile from Bangladesh in 2013. Imports from Bangladesh are excluded from the sample.

of consumers from clothing labeled as produced in Bangladesh.

Note that requirements made by activists following the collapse, specifically mentioned that firms should commit not to relocate production outside of Bangladesh. Any relocation captured through changes in import flows are thus likely to express firms' willingness to anticipate or reverse negative shocks on demand.

The following results focus on apparel-exporting countries other than Bangladesh. Before detailing, we should note that the triple-difference approach used so far is based on the assumption that the collapse of the Rana Plaza had an exclusive impact on supplies from Bangladesh, and therefore that other textile-producing countries were not affected and can be used as a control group. Results from Table A-3 provide confidence on the validity of this assumption, since the Rana firms' overall imports from countries other than Bangladesh did not experience a trend break that was consistent with the collapse of the Rana Plaza (columns 2 and 3). Column 1 of Table 13 provides an additional check using the triple difference specification. We use our baseline sample, without the import flows from Bangladesh, and estimate Equation 2 where the key variable of interest is Rana firm×Post×Country, Country being a dummy equal to one for an origin country of textile imports taken at random. The idea is to ensure that on average no country other than Bangladesh has seen any relative change in the particular imports of firms associated with the disaster. This strategy thus resembles a false assignment of the shock to another country of origin. The first column of Table 13 shows the average values, obtained over 1000 random draws, of the coefficient estimated on the triple interaction term and its standard deviation. We measure an insignificant effect.

The following columns of Table 13 look at the possibility that some specific destinations have been impacted because they benefited from the reallocation of orders that the brands in the turmoil of the Rana Plaza did not renew in Bangladesh, following the threat of important repercussions.

We select one by one, each country in the top 5 of respectively apparel suppliers to France and apparel suppliers to Rana-connected firms (see Table 1) and estimate the coefficient on the triple interaction term between Rana firm, Post and a dummy for this country. From left to right, the countries appear according to their rank when sorting French apparel import values in decreasing order: China, Italy, Turkey and India represent French importers' first four origins for apparel when not considering Bangladesh. Morocco, Portugal, Vietnam, and Pakistan are displayed according to the same logic applied to Rana firms.

The interaction term is positive and significant for three countries out of the eight: Turkey, Morocco and Portugal. Within the top 10 apparel suppliers for Rana firms, these countries share the common characteristic of being geographically close to Western markets, as they are either European (Portugal) or located in the Mediterranean area (Morocco, Turkey). The positive and significant coefficients on those three apparel manufacturing countries suggest that clothing supplies from these origins grew faster compared to the other sourcing countries in the period following the scandal in Bangladesh. Whether the impulse for the relative reorientation of Rana firms' imports towards Turkey, Morocco and Portugal originally came from consumers or from companies is difficult to answer. The fact that the reorientation is observed for Rana firms' products and towards three specific countries provides hints for interpretation.

One possible assumption is that consumers have chosen to turn away from products labeled as originating in Bangladesh and replace them with equivalent ones made in countries they imagine more concerned about the well-being of workers. In this case the reorientation would need to target all garments manufactured in Bangladesh and not, as we observe, items imported by the Rana firms more specifically. Alternatively, we can impagine consumers have turned their back to products made in Bangladesh, however specifically those sold by Rana firms. Indeed consumers might want to avoid Bangladesh as an origin, precisely to punish these companies for not taking care of safe work conditions.

The concentration of positive and significant coefficients on the three countries (Portugal, Morocco, Turkey) is however less compatible with a consumer-driven explanation. Note that the absence of significant coefficients on alternative countries does not eliminate the possibility that reallocation takes place in many different countries, diluting the estimated coefficient and making the effect less visible.

However, the focus on three countries means that consumers have deliberately chosen to turn away from made-in-Bangladesh products by Rana firms and to favour made-in-proximate-countries products, and this only for these companies and not for other retailers. Since this explanation requires assuming very specific and hardly realistic decisions by individuals, we tend to believe that the estimations do not back a consumer-driven behavior to explain the positive effect highlighted in this section. A firm-driven decision seems more convincing. Retailers named for their implication in the Rana Plaza surely underwent a period of uncertainty, anticipating negative repercussions of the event and looking for new subcontractors to place their orders. In this context it is easy to assume that those firms are thinking about adopting a more ethical behavior and thus choose to import their new orders from places that appear proximate and safe to their consumers.

7   Conclusion

Public revelations of damages and accidents that occurred within global supply chains are expected to undermine the reputation of companies involved in the production process. Activist reports highlighting the responsibility of multinational companies for environmental damage or inappropriate working conditions among their suppliers, are often widely reported by the media in countries hosting a large proportion of demand.[23] While NGOs claim success in their interactions with multinational companies,[24] the effect of such information disclosure on firms' behavior and performance is the object of very little academic work. Indeed, analyzing the effect of private regulation by activists on global value chains requires to observe distinct variables about companies decisions and production modes: sales, shipments, contracts, wages, location of suppliers, damages to the environment, indicators of labor conditions, among others.

The collapse of the Rana Plaza in 2013 brought a very large amount of criticism to the final beneficiary of the supply chain, i.e. the multinational retailers sourcing from the factories in the building. Our paper investigates the capacity of such a shock to tarnish the reputation of named companies and affect the intensity of their sourcing. Zooming on French fashion retailers' imports, we estimate the changes that may have occurred in firms' imports from Bangladesh, comparing those whose responsibility in the collapse was publicly denounced by NGOs to others firms.

Two mechanisms could explain changes in firm-level imports. Consumers' decisions to stop buying items made in Bangladesh by criticized retailers may lead to an observed decrease in purchases, as may the decision of retailers themselves to change their sourcing behaviour in order to limit negative effects on reputation. Results underline a very contrasted situation, in which textile imports from Bangladesh by denounced firms experienced a substantial slowdown after the shock, in a context of continuous rise of French apparel sourcing from Bangladesh.

Our results may be summarized as follows. First, the role of Bangladesh as a supplier of apparel for French households did not die out: French import volumes from Bangladesh, relative to other origins are 23 percent higher after the Rana Plaza collapse compared to before. Second, retailers directly targeted for their responsibility went through an important period of turmoil after the collapse: the relative deterioration of imports measured for Rana firms represents a 36% change, compared to the volume they would have imported without the shock. Third, the effect on imports is extremely focused: we identify a relative decline in imports exclusively on retailers connected to the Rana Plaza factories and only for their imports from Bangladesh. Fourth, the effect is paralleled by a relative increase in the named firms' imports from three specific origin countries, which are all non-Asian and located close to the Mediterranean area (Portugal, Morocco and Turkey). We interpret these four pieces of evidence as originating from two elements: on the one side, a targeted contraction of demand created by the tumult and criticism against companies directly involved in the event. On the other side, the tendency of retailers to select destinations for their future contracts which are familiar to Western consumers and associated to values of proximity.

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[23]See the latest broadcasts about the French firm Total being sued by six NGOs for breaching the Duty of vigilance law in Uganda

[24]Greenpeace's website contains a timeline on successes and victories.

Table A-1: Top 15 apparel products in France's imports from Bangladesh (2013)

Product code HS4	Product description	French total imports value (million euros)	French imports from Bangladesh value (million euros)	Share of Bangladesh in French imports (%)
6109	T-shirts, knitted or crocheted	1 670	315	18.9
6110	Jerseys, pullovers, cardigans	2 273	292	12.8
6203	Men's suits (not knitted or crocheted)	1 711	214	12.5
6204	Women's suits (not knitted or crocheted)	2 406	165	6.9
6205	Men's shirts (not knitted or crocheted)	522	82	15.6
6105	Men's shirts (knitted or crocheted)	345	71	20.5
6104	Women's suits (knitted or crocheted)	975	65	6.7
6302	Linen for bed, table or toilet	789	48	6.1
6111	Babies' garments (knitted or crocheted)	390	37	9.4
6209	Babies' garments (not knitted or crocheted)	198	28	14.0
6108	Girls' underwear (knitted or crocheted)	491	27	5.4
6106	Girls' blouses (knitted or crocheted)	225	24	10.5
6206	Girls' blouses (not knitted or crocheted)	560	20	3.5
6107	Boys' underwear (knitted or crocheted)	240	18	7.3
6202	Women's coats (not knitted or crocheted)	688	12	1.7

Data source: French customs. Products are shown in decreasing order of Bangladesh's exports to France.
Apparel is defined as HS4 products in HS2 categories 61, 62 and 63.

Appendix

Table A-2: Statistics on Top apparel importers from Bangladesh to France (2013)

Group of firms	Average value of apparel imports (million euros)		Share in France's apparel imports in %	Share in France's apparel imports from Bangladesh in %	Bangladesh share in apparel imports in %
	All origins	from Bangladesh			
Top 25 importers[a]	212.0	29.6	28.9	50.0	14.0
Top 100 importers	96.5	11.8	52.6	79.9	12.3
Top 1000 importers	15.9	1.4	87.0	97.4	9.1
All importers from Bangladesh[b]	1.4	10.2	61.2	100.0	13.2
9 "Rana" firms	104.2	15.9	7.4	14.0	15.3
Top 100 importers from Bangladesh	75.6	13.4	41.2	90.5	17.7

Source: French Customs, 2013. [a] Top 25 importers are defined in terms of their importance in French apparel imports in 2013. [b] This corresponds to our regression sample which contains the 1,095 firms importing from Bangladesh in 2013 into France. Among those, 9 were identified as sourcing from the Rana Plaza as reported in Table 2. Six of them belong to the top 25 importers. Apparel is defined as HS4 products in HS2 categories 61, 62 and 63

Figure A-1: Evolution of French apparel imports from Bangladesh (million euros)
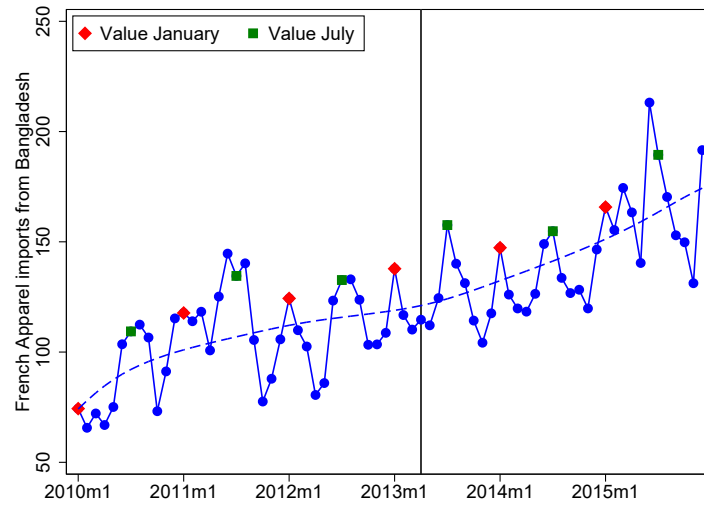
Note: The dots indicate the value of French clothing imports from Bangladesh in a given month. The values for January and July have been highlighted by diamonds and squares. The dashed line corresponds to the Lowess smoothing. Source: French Customs data.
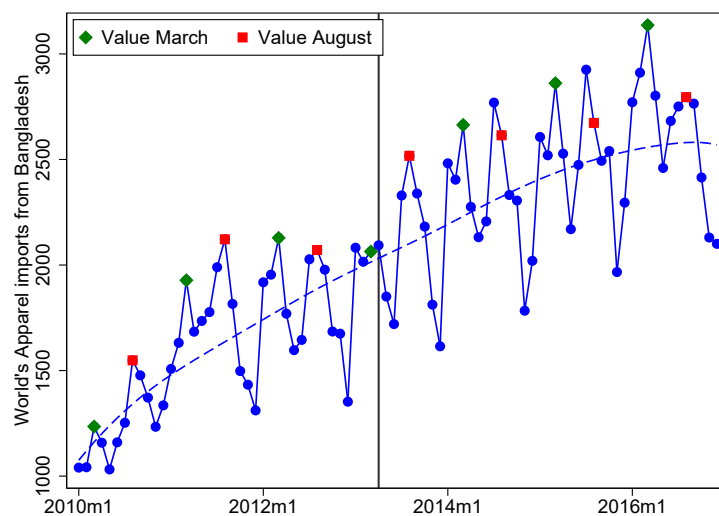
Figure A-2: Evolution of World's apparel and clothing imports from Bangladesh (million US dollars). Source: UN Comtrade database.
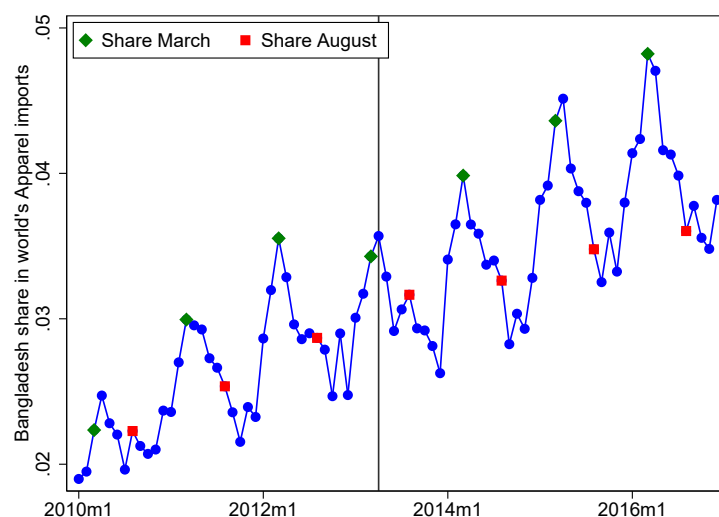

Figure A-3: Evolution of Bangladesh's share in World's apparel and clothing imports. Source: UN Comtrade database.

Table A-3: Double difference on Rana firms: Heterogeneity among source countries

Explained variable	Ln Imports quantities of apparel product p by firm f						
	from country j in month m of year y (2010-2015)						
Origin country	Bangladesh	All except BGD	Top 25 origins	China	Italy	Turkey	India
	1	2	3	4	5	6	7
Rana firm $\times$ Post$_{ym}$	-0.312^b	0.091	0.098	0.161	0.098	0.309^b	-0.068
	(0.123)	(0.061)	(0.065)	(0.155)	(0.105)	(0.146)	(0.122)
Ln Firm imports$^f_{p,ym}$	0.820^a	0.718^a	0.725^a	0.843^a	0.660	0.710^a	0.649
	(0.017)	(0.060)	(0.061)	(0.007)	(0.023)	(0.016)	(0.013)
Ln Firm imports$^f_{ym}$	0.075^b	0.067^b	0.067^b	0.048^a	-0.0122	0.088^b	0.146
	(0.037)	(0.028)	(0.027)	(0.016)	(0.043)	(0.037)	(0.034)
Observations	110,746	1,471,412	1,267,734	348,947	67,485	109,694	67,485
Adjusted R-squared	0.867	0.826	0.831	0.892	0.7540	0.816	0.823
Country-product-year-month	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-country-product-month	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Heteroskedasticity-robust standard errors two-way clustered at the firm level and at the country level appear in parentheses.. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% confidence levels. Firm-country-product-month fixed effects are firm-product-country fixed effects interacted with 12 dummies (one for each of the 12 months of the year from January to December). Apparel is defined as HS4 products in HS2 categories 61, 62 and 63. Our sample includes 1,095 firms that import from Bangladesh in 2013.
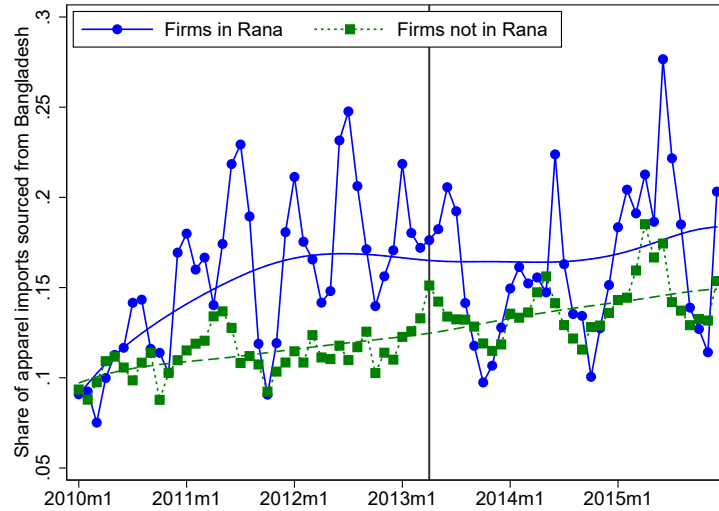

Figure A-4: Evolution of the share of clothing imports from Bangladesh : importers in or out of Rana Plaza (Source: French customs data using firms importing from Bangladesh in 2013.)

Table A-4: Firm-level Triple difference: Poisson (accounting for zeros)

Explained variable	Import quantity of apparel product p by firm f from country j in month m of year y (2010-2015)			
Estimator	Poisson pseudo-maximum likelihood estimator			
	1	2	3	4
Rana firm × Post × BGD	-0.142^b		-0.225^a	
	(0.061)		(0.007)	
Rana firm × May-Dec. 2013 × BGD		-0.252^a		-0.312^a
		(0.067)		(0.039)
Rana firm × 2014 × BGD		-0.165		-0.267^a
		(0.104)		(0.061)
Rana firm × 2015 × BGD		-0.053		-0.135^a
		(0.074)		(0.017)
Rana firm × Post	0.109		0.128^c	
	(0.084)		(0.071)	
Rana firm × May-Dec. 2013		0.150^c		0.159^b
		(0.080)		(0.067)
Rana firm × 2014		0.078		0.113
		(0.087)		(0.069)
Rana firm × 2015		0.110		0.123
		(0.098)		(0.083)
Bangladesh × Post	0.186^a			
	(0.049)			
Bangladesh × May-Dec. 2013		0.165^a		
		(0.029)		
Bangladesh × 2014		0.128^b		
		(0.052)		
Bangladesh × 2015		0.288^a		
		(0.085)		
Ln country GDP$_{jy}$	-0.446^c	-0.527^c		
	(0.261)	(0.272)		
Ln country population$_{jy}$	1.408	1.272		
	(2.756)	(2.748)		
Ln exchange rate$_{jy}$	-0.060	-0.061		
	(0.236)	(0.237)		
Ln Firm imports$^f_{p,ym}$	0.991^a	0.991^a	0.994^a	0.994^a
	(0.013)	(0.013)	(0.014)	(0.014)
Ln Firm imports$^f_{ym}$	0.022	0.024	0.028	0.028
	(0.023)	(0.024)	(0.022)	(0.022)
Observations	8,943,684	8,943,684	8,943,684	8,943,684
Fixed effects by				
Product-year-month	Yes	Yes	-	-
Firm-country-product-month	Yes	Yes	Yes	Yes
Country-product-year-month	No	No	Yes	Yes
Firm-product-year-month	No	No	No	No

Heteroskedasticity-robust standard errors two-way clustered at the firm level and at the country level appear in parentheses. ^{a}, ^{b} and ^{c} indicate significance at the 1%, 5% and 10% confidence levels. Firm-country-product-month fixed effects are firm-product-country fixed effects interacted with 12 dummies (one for each of the 12 months of the year from January to December). Apparel is defined as HS4 products in HS2 categories 61, 62 and 63.

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