

Does Input Tariff Reduction Impact Firms' Exports in the Presence of Import Tariff Exemption Regimes?

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Development Prospects Group
Global Modeling and Analytics Team
April 2015

Abstract

In the last decade Morocco undertook substantial, if gradual, trade liberalization by reducing tariffs, reforming trade regulations and signing free and preferential trade agreements with several regions and countries, including the United States, Turkey, the European Union and Arab countries. This paper analyzes the impact of input tariff reduction on Moroccan exporting firms through the channel of intermediate goods. Gaining access to more varied and cheaper inputs can make exporting firms more competitive, and as a result they export more. To evaluate how this policy may impact firms' export performance, the paper analyzes the impact of input tariff reduction on

different margins of trade with emphasis on export markets and product diversification. The identification of the effect of input tariffs on exports relies on a difference-in-difference estimator using heterogeneous access to import tariff exemption as a measure of different levels of exposure to input tariff reduction at the firm level. Overall, the analysis finds that firms that are relatively more exposed to input tariff perform better in those sectors with the largest input tariff reduction, with better access to markets, higher probability to survive when exporting new products in those sectors and higher export value growth.

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JEL Classification: D22, F14, L25

Keywords: Trade liberalization; Export Performance; Input Tariff; Import Regimes, Morocco.

*We thank Jean-Louis Arcand, Nicolas Berman, Marcelo Olarreaga, Bernard Hoekman, Elena Ianchovichina, Jean-Pierre Chauffour, Abdoulaye Sy, Mariem Malouche, Souleymane Coulibaly, Denis Medvedev, Chad Brown, Bob Rijkers, Michael Hamaide, Dana Vorisek, participants of the Morocco Workshop on Trade, Integration and Competitiveness (Rabat, 2013) and participants of the ERF 20th Annual Conference (Cairo, 2014) for their useful comments. We also thank the *Administration des Douanes et Impôts Indirects* for the availability of the dataset. The usual disclaimer applies.

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1 Introduction

The Moroccan economy has substantially reduced its import tariffs in the last decades, especially through free and preferential trade agreements (FTAs and PTAs) with different regions and countries, including the European Union (EU), the United States (US), Turkey and Arab countries. There are at least three trade agreements signed by Morocco (with the EU, US and Turkey) in which the liberalization process can be characterized mainly as unilateral, as the average tariffs faced by Moroccan exporters were already low and did not substantially change. Therefore, an important channel through which these agreements may stimulate export is by reducing tariffs on intermediate goods used by domestic firms as inputs in their production.

There are important sources of gains from trade by facilitating access to more varied and cheaper inputs. First, increasing the variety and quality of inputs available may improve the quality and the variety of domestic firms' products. Second, boosting competition between domestic and foreign suppliers may decrease the cost of inputs. Third, providing easier access to new technologies available abroad facilitates their adoption by domestic firms, which in turn makes them more efficient. Assuming that these mechanisms affect productivity, they will likely impact firms' export performance.

This paper analyzes the impact of reducing import tariffs on exporting firms' performance by considering explicitly the channel of intermediate goods. We use a unique customs dataset provided by the *Administration des Douanes et Impôts Indirects* of Morocco, which contains detailed information on export and import transactions of Moroccan firms in terms of their value, product that is traded and destination or origin country with which the transaction takes place, between 2002 and 2010.¹

The strategy to identify the impact of changes in tariffs levied by Morocco on intermediate goods used as inputs by domestic exporting firms is based on a difference-in-difference estimator in the spirit of Rajan and Zingales (1998). Because the level of the tariff on inputs varies at the industry level, we rely on a cross-sectional (across firms) variation of exposure to input tariff reductions in order to identify its effect. We use the access to import tariff exemption regimes, available in the customs data, to differentiate groups of firms in similar industries that were more exposed to the input tariff reduction "treatment." The hypothesis is that firms with lower access to import tariff exemption regimes, are more exposed to shocks on input tariffs and will have relatively better export performance in industries with larger input tariff reduction.

To capture important changes in Morocco's import tariffs related to FTAs, we built an effectively applied rate (EAR) using the lowest available tariff at the tariff line level within each product category

¹The Moroccan customs data includes information on 8,878,970 monthly transactions for 84,405 firms. Among those, 19,845 exported at least once between 2002 and 2010.

(10-digits HS).² Whenever it exists, the lowest preferential tariff at the tariff line is used as the EAR. Otherwise, the most favored nation (MFN) tariff is the applied tariff. The EAR tariff measure takes into account the most important FTAs signed by Morocco over the 2000s and does not depend on whether a product was traded or not, which is critical to avoid endogeneity of tariff variation with respect to trade flows.³ The input tariff was built using the EAR and Morocco's input-output matrix, following a methodology similar to that used by Goldberg et al. (2010) and Bas (2012).

Most of the literature available regarding the impact of FTAs and PTAs has emphasized the gains from trade focusing on the effect of output tariff reduction.⁴ Although access to cheaper intermediate goods play a critical role in providing gains from trade (Gibson and Graciano, 2011), this channel has only recently been analyzed empirically in a new generation of trade models based on heterogeneous firms (Trefler (2004), Schor (2004), Amiti and Konings (2007), Goldberg et al. (2010), Topalova and Khandelwal (2011), Bas (2012), Bas and Strauss-Kahn (2013) and Yu (2014)).⁵ Overall, previous findings related to input tariff reduction have emphasized gains on increasing product diversification in the domestic market, improving domestic firms' productivity and increasing their probability to become exporters.⁶

This paper contributes to this literature in several ways. First, we analyze the relationship between the use of trade regimes at the firm-level and EAR tariff variation. Second, we provide evidence of the impact of input tariff reduction on diversification of the export market at the firm-industry level.⁷ To the best of our knowledge there is no empirical evidence on the causal link of input tariff reduction and export market diversification at the firm level nor on its link with the exports of a country from the Middle East and North Africa (MENA) region.⁸

²In WITS this measure is equivalent to the effectively applied minimum rate.

³We built the EAR using information provided by the Moroccan customs office, which includes the MFN tariffs and preferential tariffs related to the trade agreements with the EU, Arab League, Egypt, Arab Emirates, Guinea and Jordan. Furthermore, we use the tariff elimination's schedule for the FTA with the US and Turkey.

⁴We refer to output tariff as the tariff in the own industry.

⁵Previous literature concerning a similar subject used to emphasize the impact of effective protection rate in a general equilibrium perspective (see Bhagwati and Srinivasan (1973) and Ray (1973)).

⁶Amiti and Konings (2007) use Indonesian manufacturing firms' data to compare the impact of reducing tariffs on final and intermediate inputs. They find that the gains in productivity for firms that import their inputs are at least twice as high as the gains from reducing output tariffs. Goldberg et al. (2010) find a positive impact of gaining access to new intermediate inputs on the introduction of new products by domestic firms using a large sample of Indian firms. Bas (2009, 2012) analyzes the impact of input trade liberalization on firms' exporting status using Chilean and Argentinian firm-level data. In the case of Argentina, she shows that firms in industries with greater input tariff reductions were more likely to become exporters. Furthermore, there is evidence that it also affects firms' decisions on importing and investment. Bas and Strauss-Kahn (2013) shows that input tariff reduction also affects export prices at the firm level, based on the case of China.

⁷We define export market diversification as the number of foreign markets served by a firm in given industry. We define product diversification as the number of products at HS 6-digit exported by a firm in given industry.

⁸In the case of Morocco, this might have an important effect through trade diversification. When compared to the 1990's, in the 2000-2010 period Morocco reached a higher average economic growth with less volatility. A channel through which input tariff reduction may impact growth volatility is by promoting export market diversification, which may reduce demand uncertainty and improve firms' performance, by increasing the incentives to invest (Juvenal and Santos Monteiro, 2013). Although this paper is not going to disentangle any causality between trade and growth, by exploiting the effect on different margins of trade it shows some evidence of the impact of input reduction tariff on export diversification.

Overall, the findings suggest that tariff reduction had some positive effects on Moroccan firms' export outcomes. Input tariff reduction positively impacted firms' export market diversification by increasing the number of export markets in those industries with a larger reduction in input tariffs for those firms that did not have access to trade exemption regimes and therefore were more exposed to the tariff shock. Also, we found a positive effect on increasing export value and on the probability of these firms surviving as exporters of new products in those industries.

The remainder of this paper is structured as follows. Section 2 explains the dataset and the methodology used to build an input weighted tariff. It also provides some descriptive statistics on firms' export performance and the trade liberalization process in Morocco. Section 3 describes the identification strategy. Section 4 presents the empirical results and the last section concludes the paper.

2 Data and Descriptive Statistics

In this paper we combine several datasets. First, we rely on the Moroccan customs transactions data, which contain information about monthly transactions at the firm level regarding export and import value, products (at 10-digits Harmonized System (HS) product-level) and export destination countries. There are 8,878,970 transactions registered in the dataset, where 1,289,967 refers to export transactions. These numbers account for approximately 143,300 export transactions per year for an average of 5,637 exporting firms. We converted the transactions to yearly information regarding exported and imported value, country destination and products (6-digits HS). In addition to providing detailed information regarding export country destination and products, each transaction can be classified according to different trade regimes, which includes tariff reduction or exemption for imported inputs. This information allows us to define groups of firms with different exposure to input tariff reduction.

A second source of data is the import tariff provided by the *Administration des Douanes et Impôts Indirects* (ADII), which includes the MFN and preferential tariff (PTA) rates, both at the tariff-line (10-digits HS), with information for 17,484 products from 2001 to 2010. The dataset on PTA rates from ADII covers the trade agreements with the EU, the European Free Trade Association (EFTA), Arab League, the Arab Republic of Egypt, the United Arab Emirates and Jordan including information on the date the tariff took effect until the period it ends. Thus, we have a detailed schedule of tariff reduction with approximately 100,000 observations.⁹ In both cases, we use information at the tariff line (10-digits HS) disregarding whether these products were traded or not.

In addition to the dataset provided by the ADII, we built the preferential tariff rates for the FTA

⁹It includes preferential tariffs in effect since 1993.

signed with the US and Turkey. In the case of the US, we used the dataset on Morocco’s final FTA schedule with the USA (10-digits HS), provided by the Office of the United States Trade Representative, together with the information on the tariff elimination on the FTA by product, by year. In the case of Turkey, we used the information on the abolition of customs duties by year, described in the FTA. We combined this information with the PTA rates that were in force for Turkey in 2010, which was provided by the ADII, to build Morocco’s PTA rates for Turkey since 2006.

We used all the tariff information pieces to build an EAR for Morocco, which was used to calculate the input tariff rate.¹⁰ The EAR tariff corresponds to the lowest available tariff, at the tariff line (10-digits HS). Whenever it exists, the lowest preferential tariff used is the effectively applied tariff. Otherwise it is the MFN applied tariff. After merging the tariffs and calculating the EAR at 10-digits HS, we converted the product HS classification to GTAP industry classification, by taking the simple average, using the product concordance map available on WITS.¹¹

We used an input-output (I-O) matrix of the Moroccan economy composed by 57 sectors available from GTAP to estimate the share of intermediate goods used in the production by each sector.¹² The paper covers the full sectors, but the main results do not change if we keep a sub-sample of manufacturing products.¹³ We used the sectoral definition of GTAP. An input tariff is calculated as the weighted average of tariff on inputs used in the production of the final output for each industry, following Goldberg et al. (2010), Bas (2012) and Bas and Strauss-Kahn (2013). Therefore, the input tariff is defined as $\tau_{jt} = \sum_{\rho} \alpha_{\rho} \tau_{\rho t}$, where tariff (τ) of sector j at time t equals the sum of input tariff τ_{ρ} at period t , weighted by the share of input α_{ρ} on intermediate goods used by sector j . As an example, if an industry uses three intermediate goods and their value shares are 20%, 30% and 50% and their tariffs are 10%, 15% and 20%, respectively, the input tariff for this industry is 16.5% ($0.2*0.1 + 0.3*0.15 + 0.5*0.2$). The weight does not change through time as we use the same I-O matrix for all years. We used the EAR tariff to calculate the input tariff.

The final source of data is related to the tariff faced by Moroccan firms to export. We built the tariff faced by Morocco’s exporters based on the effectively applied tariff rate (AHS) from the Trade Analysis and Information System (TRAINS), available on the World Integrated Trade Solution (WITS), at 6-digits HS.

¹⁰The MFN and the preferential tariff used to build the EAR to Morocco do not depend on the trade status of the product. We used the tariff-line information disregarding whether the product (at 10-digit HS) was traded or not.

¹¹This procedure was necessary because the I-O used to calculate the input tariff was classified according to the GTAP industry.

¹²The I-O matrix available on GTAP is based on Bussolo and Roland-Holst (1993) updated to 2004. We converted the data from the HS to GTAP sectoral classification using the tariff line at 6-digit HS classification, provided by WITS. The map to convert the HS classification in GTAP classification does not include sector 11 in GTAP (Raw milk). Therefore, for this sector we used the same tariff used in sector 22, according to the GTAP classification (Dairy products).

¹³It is more likely that export is accounted for producers in manufacturing, though manufacturing firms also may trade goods they do not produce (see Bernard et al. (2012) and Crozet et al. (2013)).

2.1 Trade Liberalization in Morocco

Trade reforms in Morocco started at the beginning of the 1980s, more specifically in 1983; after two consecutive balance of payments crises (1978 and 1983). The pattern of liberalization was similar to that of developing economies in Latin America and Asia, such as Argentina, Brazil, Chile and India (Bas (2012) and Goldberg et al. (2010)).¹⁴ The unilateral tariff reduction process was intensified during the 2000s through FTAs and PTAs with some of Morocco's main trade partners, including the EU, US, Turkey and Arab countries.¹⁵ The reduction in input tariffs was very significant for all sectors, particularly for those more intensive in intermediate goods (figure 2 in section 6.1 of the appendix).

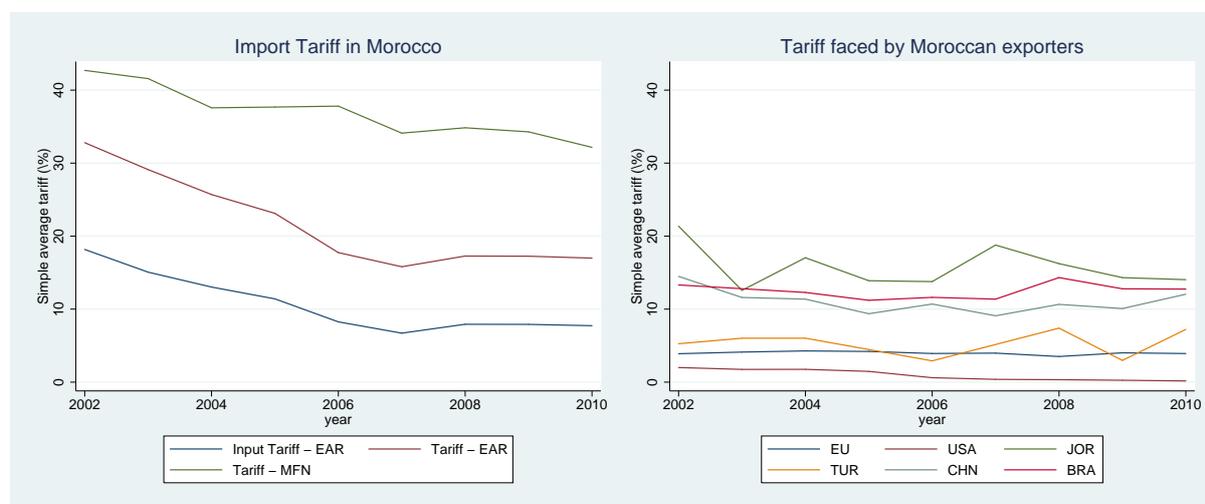


Figure 1: Import tariff in Morocco and faced tariff by Moroccan exporters

Note: These graphs were generated using simple average tariff at the GTAP sector classification level in order to be consistent with input tariff level used in the empirical analysis. The average import tariff in Morocco does not depend on the products that were traded. The tariff faced by Moroccan exporters is based on the TRAINS dataset.

An important characteristic of the FTAs signed by Morocco in the last decade is that they did not significantly alter the average tariff faced by Moroccan exporters, which reinforces the importance of input tariff reduction. This is especially the case for the EU and the US, since these countries were already allowing imports of Moroccan products with low tariffs (figure 1).¹⁶

There are different import tariff regimes in Morocco. Identifying these import regimes is relevant because it could be argued that input tariff reduction would not impact export due to the fact that imported inputs, used in the production of exported goods, can be exempted from tariff. The customs data allow us to classify an import transaction as following: First, there is the (1) *Ordinary import*,

¹⁴After a long period with a relatively closed economy, Morocco started a unilateral trade liberalization that was carried out with the aim of strengthening stability and growth.

¹⁵The agreement with the EU, Moroccan's largest trade partner, was signed in 1996 and was implemented in March 2000. This agreement is based on a progressive reduction of tariffs toward a free trade area of manufacturing products by 2012. Other important FTAs came into force in January 2006 with the US and Turkey. Finally, the Arab Mediterranean Free Trade Agreement (Agadir Agreement) that includes Jordan, Egypt, Tunisia and Morocco took effect in March 2007.

¹⁶Although there were not changes in the tariff level an FTA decreases uncertainties concerning tariff volatility.

which does not provide tariff exemptions. Then, there are the *Régimes Économiques en Douane* (RED), which include:¹⁷ (2) *Processing trade regime (PTR)*, (3) *Entrepot*, (4) *Temporary import regime*, (5) *Free trade zone*, (6) *Processing in domestic market* and (7) *Others*.¹⁸ Among them the most relevant for us are: (1), (2) and (5). RED regimes exempt Moroccan firms from import tariffs, including reduction or exemption of tariffs on intermediate goods if they are used as inputs in the production of goods that are exported.

Year	Exporting firms									
	Importing firms						Non-Importing		Non-RED	
	RED			Non-RED			Total			
	(Total)	(Share)	(FTZ)	(PTR)	(Total)	(Share)	(Total)	(Share)	(Total)	(Share)
2002	2,141	68%	6%	91%	1,020	32%	2,241	41%	3,261	60%
2003	2,097	67%	11%	88%	1,054	33%	2,219	41%	3,273	61%
2004	2,086	60%	12%	86%	1,382	40%	2,544	42%	3,926	65%
2005	2,051	62%	13%	84%	1,278	38%	2,321	41%	3,599	64%
2006	2,005	56%	11%	83%	1,570	44%	1,913	35%	3,483	63%
2007	2,068	57%	11%	82%	1,549	43%	1,863	34%	3,412	62%
2008	2,088	58%	11%	80%	1,536	42%	1,873	34%	3,409	62%
2009	2,020	52%	11%	77%	1,858	48%	2,078	35%	3,936	66%
2010	1,971	52%	12%	76%	1,829	48%	2,075	35%	3,904	66%

Table 1: Number of exporting firms that imported under *Régimes Économiques en Douane* (RED)

Note: The second column shows the number of firms that imported using RED in the same year they exported (RED). The third column shows the share of these firms among the exporting firms that imported by year. Column 4 (FTZ) shows the share of exporting firms that imported under FTZ regime by year. Column 5 (PTR) shows the share of exporting firms that imported under PTR regime by year. Column 6 shows the number of firms that imported without RED in the same year they exported (Non-RED), followed by their share in the total number of exporting firms that imported in the same year. Column 8 shows the number of exporting firms that did not import, followed by their share. Column 10 shows the total number of exporting firms that did not import using RED (including importing and non-importing firms) and the last column shows their share in the total number of exporting firms.

Table 1 shows the number of exporting firms according to their import status and under the condition of whether they had used RED for importing or not. It is noticeable that the share of exporting firms that are importing has increased, but this growth was driven by firms that are importing without using RED (Non-RED). These regimes are not necessarily extended for all intermediate goods. For example, if an exporting firm buys intermediate goods from a domestic supplier that uses imported inputs, the tariff may be included in the price of the intermediate goods. Moreover, imports by exporting firms are not only based on RED. Figure 3 (in section 6.2 of the appendix) shows that the share of imports without regime exemption has increased in the last years, even for exporting firms.¹⁹

¹⁷RED refers to the French acronym for import duty exemptions regimes adopted by the customs office in Morocco. For further details, see <http://www.douane.gov.ma>.

¹⁸In the customs data PTR is classified as *Processing a product in a customs regime*.

¹⁹We found similar behavior regarding Moroccan import from countries or regions with which Morocco has signed FTAs (the EU, the US, Turkey and Agadir).

2.2 Moroccan firms' export performance

When comparing the decades of 1990-2000 and 2000-2010, trade openness in Morocco appears to be followed by more diversification in terms of market, but the evidence in terms of products is not clear. For example, if we observe the Herfindahl Hirschman Index (HHI) for export market destination and the share of the 10 top markets for Morocco's exports, it is noticeable that there is a trend of diversification over the period from 2002 to 2010 (table 23 in section 6.5 of the appendix).²⁰ Although it became more evident after the 2008 financial crisis, this trends began in 2004. The pattern regarding product diversification is ambiguous. While the HHI for exported products suggests higher concentration, the share of the top 10 products decreased.²¹ Export diversification, both in terms of products and destinations, might be important to Morocco in order to avoid high volatility in its GDP, usually associated with the concentration in activities that are sensitive to adverse climatic conditions.²²

Over this period, imports significantly increased, but this behavior was not fully driven by consumption goods. Indeed, the imports of intermediate goods, capital goods and raw material and final goods increased dramatically between 2002 and 2010 (figure 5 in section 6.6 of the appendix). Furthermore, the export of consumption goods, intermediate goods and raw material also increased. Also, it is noticeable that there was a significant expansion in import of raw materials, intermediate goods and capital goods for those countries with which Morocco has signed FTAs (e.g. France, the most important trade partner from the EU; the US and Turkey (figure 6 in section 6.6 in the appendix)).²³

Table 2 provides some descriptive statistics on Moroccan exporting firms. To begin with, the value of exports increased substantially from 2002 to 2010, and this was mainly due to an increase in the average export value by firm. Moreover, the median of firms' export value rose from US\$ 76,000 in 2002 to US\$ 85,000 in 2010, after having peaked at US\$ 101,000 before the economic crisis, in 2008. This suggests that the growth of export value was not only concentrated among big exporters.²⁴ The large difference

²⁰Further details on the HHI, including its formal definition, is available in section 6.5 of the appendix.

²¹Between 2000 and 2010 there were significant changes in sector composition of Moroccan export. On the one hand, some initially large sectors such as food-animal (HS 01) and textile (HS 11) have increased their export value in US\$, but decreased their share on total export. On the other hand, sectors such as chemical (HS 06) and machinery (HS 16) became more important by increasing their export value in US\$, and their share on total export in the last decade.

²²The average growth per capita in Morocco between 2000 and 2010 (3.5%) was almost three times larger than between 1990 and 1999 (1.2%), while the standard deviation was almost three times smaller (from 6.3 in 1990's to 2.0 in 2000's). According to WTO (2003) Morocco had four droughts (1995, 1997, 1999 and 2000) that strongly affected its economic performance over the 1990's, which may explain the high volatility of growth in that period. Despite the fact that the higher volatility of growth may be correlated with liberalization reforms, the impact of the latter on export diversification may contribute to decrease dependence on performance of sectors that are more sensitive to natural shocks such as weather events (droughts, floods, etc.).

²³As highlighted by Giovanni and Levchenko (2009), trade openness is usually associated with higher volatility due to a combination of its association with higher sector-level volatility and higher specialization. However, if the effect of input tariff reduction is dominant, it may lead to higher diversification. Therefore, the combination of lower growth volatility with trade openness and higher diversification observed in the last decade in Morocco seems interesting. While it is hard to disentangle the relationship between growth volatility and trade openness, the detailed information provided by the Moroccan customs data allows us to identify the effect of input tariff reduction on different margins of export, thereby evaluating the impact of this policy change on export diversification at the firm level.

²⁴US dollars of 2010 deflated by the Production Price Index (PPI).

between the mean and the median suggests that the export value distribution is skewed to the right, which means that a few firms account for a large amount of exported value. This is common evidence observed in the trade literature using firm-level data.

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Export value (US\$ 10³)									
mean	2,029	2,149	2,045	2,284	2,569	2,929	3,581	2,501	3,020
sd	13,680	15,038	17,120	18,993	21,558	27,798	54,706	20,177	36,719
median	76	86	57	67	82	95	101	79	85
Products^(a)									
mean	7.63	7.59	6.88	6.70	7.46	7.54	7.35	7.27	7.27
sd	23.55	22.30	18.46	15.86	13.00	12.40	12.61	12.57	14.31
median	3	3	3	3	3	3	3	3	3
Market^(b)									
mean	2.40	2.42	2.26	2.37	2.50	2.53	2.56	2.43	2.47
sd	3.18	3.37	3.25	3.55	3.65	3.64	3.67	3.52	3.61
median	1	1	1	1	1	1	1	1	1
Number of:									
Firms	5,402	5,370	6,012	5,650	5,488	5,480	5,497	5,956	5,875
Products	5,145	5,109	5,217	4,894	5,153	5,327	5,421	5,718	5,780
Markets	159	169	164	166	161	171	170	173	175
Total export value (US\$ 10⁶)									
Sum)	10,959	11,540	12,293	12,903	14,102	16,053	19,686	14,896	17,743

Table 2: Descriptive statistics of Moroccan exporting firms

Note: Export value refers to the firms' average exported value in thousands US\$ of 2010, adjusted by US Producer Price Index (PPI); (a) Refers to the firms' average number of products at 6-digits HS; (b) Refers to the firms' average number of country destination.

During the same period, Moroccan exports increased, not only in terms of value but also in terms of products, markets and number of firms (table 2), which suggests that export expansion in Morocco was also accompanied by an increase in its diversification. The only exception is the mean of the number of exported products by firm, which displays a slight reduction. However, the standard deviation for the number of exported products by firm is also getting smaller, which suggests change in the distribution.²⁵

The indication that Morocco has diversified its exports in terms of market destinations or products can be better assessed by analyzing the different margins of trade (Chaney, 2008). We consider changes in the intensive margin as those that are due to changes in the export value of previously exporting firms resulting from selling previously exported products to previous export market destinations. The extensive margin is defined as the sum of the following four components: a) Exports by new firms (pure extensive margin); b) Exports by existing firms of a new product to a new market; c) Exports by existing firms of a new product to an existing market; d) Exports by existing firms of an existing product to a new market. Data on Moroccan exports suggest there has been growth in terms of both the intensive

²⁵For example, this may result from the fact that some large multiproduct firms are exporting fewer products, but it may also be consistent with the possibility of export diversification in terms of more products sold by smaller firms.

and extensive margins.²⁶

If we analyze the margins of trade decomposition for the export value between 2002 and 2010, we observe that the intensive margin represents the largest share of export value throughout the period (figure 7 in section 6.6 of the appendix). However, if we compare the performance of firms that were already exporting in 2002 and others that appear in the dataset after 2003 it is noticeable that the cumulative value of new exporters after 2003 became important (almost 30% of the total value in 2010).²⁷ There was a significant increase in the extensive margin, including new products and new markets.²⁸

Another important characteristic in terms of export performance and diversification refers to the dynamic of access and survival rate of new firms, new markets and new products. Table 24 (in section 6.6 of the appendix) shows the dynamic in terms of number of exporting firms, products and market destinations. There are many features regarding Moroccan firms that are similar to other countries:²⁹ i) the survival rate for new exporters is below 50%, but it increases for firms that remain exporters for more than one year; ii) there are more importing than exporting firms and both display a similar pattern in terms of new entrants and survival; iii) a significant number of exporters do also import in the same year.³⁰ In summary, there is a trend toward increasing the number of exporting firms, products and destination markets. Moreover, the survival rate of new firms has improved, reaching levels above 40% after 2005.³¹

²⁶These concepts of extensive margin at the firm-level are complementary to the empirical analysis that evaluates the impact of tariff reduction on export performance at the firm-industry level. Due to the fact that we built an input tariff measure using GTAP sector classification and many firms in the transaction data are multi-sector firms according to this definition, we split the outcome of interest at the firm-industry level. For example, regarding the number of markets if the same firm exports food and textile products, the analysis evaluates if input tariff reduction impacts the number of export market destination for each industry at the firm level.

²⁷The cumulative value refers the total export value of firms that did not export in 2002. Under the definition of new exporters based on an exclusion restriction of 1 year, these firms were considered new exporters at some point between 2003 and 2010.

²⁸Although the share of export in the extensive margin (new markets and new products) seems relatively low, figure 7 is based on a yearly definition and it does not capture the cumulative effect.

²⁹(Cebeci et al., 2012).

³⁰The share of exporting firms that are importing is almost 60% (see table 24). This is a group of firms that might be directly benefiting from decreasing input tariffs. The fact that some exporting firms do not import does not necessarily mean that these firms are not affected by tariff reduction on intermediate goods. There are potential indirect channels working such as through the impact on domestic input prices or through intermediate traders, which makes this potential transaction unobservable in the data. Nonetheless, this might be the group of firms that are directly affected by input tariff reduction.

³¹The trend includes exporting firms that import and those that do not import. The increase in the exporting survival probability is a critical question to be analyzed in terms of export performance in a country with a very low survival rate for new exporting firms. Although the export value of new exporters is relatively low, figure 7 suggests that its cumulative effect becomes important.

3 Identification Strategy

The key policy variable in this paper is tariffs levied by Morocco on intermediate and other goods used as inputs in production of exported goods. For the sake of brevity we will refer to it as “input tariff.” Although the data allow matching the information regarding export and import activities by Moroccan firms, additional assumptions are needed to identify whether the imported goods are being used as inputs in the production of exported goods. Moreover, the effect of input tariff reduction on firms’ performance may be independent of the fact that the firm is an importer as it can reduce prices of domestic inputs due to the competition with foreign suppliers. We define a representative production function, eq.(1), in terms of intermediate goods, and primary factors:

$$Q_{ijt} = f(L_{ijt}, K_{ijt}, M_{ijt}), \quad (1)$$

Where Q is the quantity produced by firm i , in industry j , at time t . L , K and M are respectively labor, capital and other intermediate goods, which can be imported, used in production. In cases in which multiproduct firms are producing goods belonging to different industries according to the GTAP classification, we assume that they are produced with different combinations of intermediate goods. Although we do not observe variations in inputs $L_{ijt}, K_{ijt}, M_{ijt}$ used by firm i , nor in its production Q_{ijt} , we assume that technologies used by the firm i to produce a product belonging to industry j do not change during this period, which allows us to control for time-invariant heterogeneity across units at the firm-industry level.

Our identification follows the approach of Rajan and Zingales (1998). To identify the impact of financial development, the approach in that paper was based on initially defining two groups of firms depending on the low or high degree of dependency on external financing. Then the expansion of these two groups of firms was compared across countries that enjoyed different paces of financial sector development. Similarly, this paper, to identify the impact of a reduction of the input tariff, also distinguishes two groups of firms: those who benefit (more) from special import regimes and those who do not. Then the performance in terms of growth of exports, diversification, etc of these two groups of firms is compared across sectors for which there were different tariff reductions.

We define “treatment” as being exposed to input tariff changes. Hence, the main control group (baseline specification) are those firms that imported at least once under an FTZ regime and the main treatment group are those firms that never exported under RED.³² Table 3 provides the details for different treatment status groups.

³²We ran some robustness checks where we varied the definition of treated and control group, according to the level of exposure to the “treatment.”

Group of firms	Definition	Exposure level	Baseline model	Alternative specifications		
				(1)	(2)	(3)
RED	Imported at least once under RED import regimes.	Low	-	Control	-	-
FTZ	Imported at least once under FTZ import regime.	Zero	Control	Control	-	Control
PTR	Imported at least once under PTR import regime.	Low	-	Control	Control	Treated
NON-RED	NEVER imported under non-ordinary import regimes.	High	Treated	Treated	Treated	-

Table 3: Treated and control group definition according to exposure to input tariff reduction

Note: FTZ and PTR are sub-groups of RED. Treatment status is based on the behavior of those firms between 2002 and 2010.

Based on the definition in table 3 we identify the impact of input tariff reductions on export firms' performance following a difference-in-difference (DID) approach with an interaction term between input tariff and treatment group status based on the level of exposure to the shock. We adopted the following general specification:

$$Y_{ijt} = \beta_1 \tau_{j(t-1)} + \beta_2 \tau_{j(t-1)} * T_i + \beta_3 Z_{j(t-1)} + \beta_4 X_{ijt} + \alpha_{ij} + g_{ijt} + \lambda_t + \epsilon_{ijt}, \quad (2)$$

Where Y_{ijt} is the outcome related to export performance of firm i exporting in industry j , in period t ; $\tau_{j(t-1)}$ is the input tariff in industry j in period $t-1$; T_i is the treatment status, which takes the value of 0 for the control group (FTZ firms, in the baseline specification) and the value of 1 for the treated group (never imported under RED, in the baseline specification); $Z_{j(t-1)}$ is a vector with covariates used as control variables at the industry level, which could confound the effect of the policy. This vector includes the EAR output tariff and tariff faced by Moroccan exporters abroad in the EU and US;³³ X_{it} are covariates at the firm level (e.g. importing status dummy); α_{ij} stands for firm-industry time invariant characteristics; g_{ijt} refers to the trend for firm i producing in industry j ; ϵ_{ijt} is the error term; β 's are the coefficients for the independent variables. Due to the fact that tariffs vary at the 2-digit GTAP industry level the standard errors are corrected for clustering across GTAP industry level.

The variable of interest is the interaction term $\tau_{j(t-1)} * T_i$ and the coefficient β_2 provides the effect of input tariff reduction for treated firms relative to the control group. We can estimate (2) by panel fixed effects (FE) or first difference (FD) to remove α_{ij} . However, β_1 may be correlated with firm-industry specific trends. In order to deal with time-invariant unobserved firm-industry heterogeneity, including non-tariff barriers that do not change over time, and allow for correlation between (α_{ij}, g_{ij}) and β_1 , we take the first difference of equation 2, which gives:

$$\Delta Y_{ijt} = \beta_1 \Delta \tau_{j(t-1)} + \beta_2 \Delta \tau_{j(t-1)} * T_i + \beta_3 \Delta Z_{j(t-1)} + \beta_4 \Delta X_{ijt} + g_{ij} + \theta_t + \epsilon_{ijt} \quad (3)$$

³³Output tariff refers to domestic import tariffs on the industry of the product exported by the firm. Faced tariff refers to tariffs faced by the exporting firm in destination markets.

Where Δ stands for the FD and $\theta = \lambda_t - \lambda_{t-1}$ is a new set of time effects. To deal with the potential correlation between (α_{ij}, g_{ij}) and β_1 , Wooldridge (2007) suggests estimating (3) by differencing again, or by using FE. The specifications adopted follow the former option.³⁴

Our strategy is based in two key assumptions: A) Input tariff reduction are exogenous at the firm level; B) Firms have different levels of exposure to input tariff reduction because they have different access to input tariff exemption through import special regimes.³⁵ There are two main concerns regarding endogeneity related to this strategy. We address them in section 6.3 of the appendix. The first concern is regarding reverse causality because some industries, or particular firms, might be more likely to lobby for lower input tariffs. The second concern is regarding the effect of tariff reduction on the decision of firms to benefit from tariff exemptions.

In section 6.3 of the appendix we show that there is no evidence of correlation between input tariff reduction with initial industry's export and import outcomes. Regarding selection of firms into different import regimes as a consequence of input tariff variation we rely on the fact that Morocco has different import duty exemption regimes to create different "control" and "treated" groups. Firms that never imported under special trade regimes over the period between 2002 and 2010 are defined as a "treated group." Among the firms that imported under special regimes, we define the main "control group" as those that imported under a free trade zone (FTZ) regime. The underlying assumption is that eligibility to import in an FTZ regime is conditional on the geographical location of the firm. Although the decision to be located in an FTZ may depend on input tariffs, we argue that a firm's location decision is a long term strategy that takes into account many other factors beyond input tariff variation in the short term.³⁶ Also, we show in section 6.3 that the decision of importing under FTZ is not correlated to input tariff changes, nor is the decision to import for those firms installed in the "FTZ control group".³⁷

³⁴This specification allows us to control for unobservable time-invariant firm-industry characteristics and trends at the firm-industry level. The main reason to adopt a firm-sector FE approach is because the input tariff measure uses an input-output matrix at the industry level. The transaction data does not identify for which sector firms belong, but it provides detailed on the products they export. Therefore, we are assuming that these firms are adopting specific production functions for different kinds of products classified among different sectors in which they are exporting.

³⁵One explanation for this difference might be related to their heterogeneous marginal cost to access import special regimes. For those firms under FTZ we assume zero marginal cost to access input tariff regime.

³⁶In addition, during this period (from 2002 to 2010) Morocco went through a continuous reduction in tariffs. Therefore, it is unlikely that tariff variation explains the incentives to make existing firms move for an FTZ, nor the other way around.

³⁷The FTZs were established in Morocco under the law 19-94 (dahir n. 1-95-1 of January, 1995). According to this law, the FTZs are defined by an act that determines the nature of business activities that can be installed there. FTZs are territories where industrial and services activities related to them are exempt from the laws and customs regulations related to the control of foreign trade, in agreement with the conditions determined by this law. According to the Moroccan Agency of Investment and Development, there are nowadays five areas defined as FTZs in Morocco: 1) *Zone franche d'exportation de Tanger*; 2) *Zones franches dans Tanger Med Ksar el Majaz Melloussa*; 3) *Zone franche de Dakhla et de Laayoune*; 4) *Zone franche de stockage des hydrocarbures: Kebdana et Nador* and 5) *Zone franche d'exportation de Knitra*. In addition, this Act established that in case this regime is suspended, firms that are benefiting from this regime will have a notice of 30 years starting from the date of suspension of the scheme, which reinforces the idea that the decision of being located in a FTZ involves long run determinants.

4 Empirical Results

In this section we show the econometric results based on estimating equation (3) using panel FE. The identification follows the DID assumption. We control for firm-industry time-invariant unobservable characteristics and specific firm-industry trends that do not vary over time. We assume that in the absence of input tariff reduction the average export performance regarding growth in the number of export market destinations, number of products, export value and export survival probability of new products in industry j would follow a parallel trend between those “treated” and “untreated” group of firms. The baseline specification test compares the effect of input tariff reduction between firms that were exposed to “treatment” (Non-RED) and those that were not exposed to the shock (FTZ).

We expect that if there is a causal effect of input tariff reduction on improving export performance, the interaction term $\Delta\tau_{jt} * T_i$ should have negative and significant coefficient β_2 . Also, we test different specifications, according to different levels of exposure to the shock. As a robustness check we show that input tariff reduction does not affect firm-industry performance within firms that belong to the FTZ or RED groups.

4.1 Does input tariff reduction impact the number of export markets?

Morocco has been trading with a large number of countries, but its exports has been historically concentrated to EU countries, particularly to France. In the last decade this share has changed substantially. Although France continues to be the top destination, its share decreased from 33.84% in 2002, to 22.30% in 2010. Moreover, the share of the top 10 destinations decreased from 81.2% in 2002 to 68.49% in 2010 and some emerging countries like India and Brazil became more important to Moroccan exports.³⁸ Hence, we first evaluate the effect of input tariff reduction on the number of export market destinations, which we see as an important measure of export diversification.

Table 4 shows the results with respect to the number of export market destinations for which a firm i exports products in industry j at time t . The input tariff reduction has a positive effect on the propensity to export to more countries. The coefficient is negative and significant at 5%. Also, it is not sensitive to additional covariates that could confound the effect, which includes variation in EAR output tariff, the tariff faced by Moroccan exporters in the UE and the USA and the variation in import tariff status at the firm level.

The endogenous variable in this specification is a count data. Nonetheless, to keep the standard DID identification assumptions and controlling for firm-industry time-invariant unobservables, we used

³⁸Further details about the top 10 destination countries for Moroccan exporting firms are available upon request.

a log-transformation of the count variable (number of countries) and identify β_2 by estimating equation (3). In the baseline model results (column 1) can be interpreted as follows: 1 percentage point (pp) of reduction in input tariff in industry j increases by approximately 1.3 percentage points (pp) the likelihood to export a product from industry j to an additional market destination for those firms exposed to the input tariff “treatment” (Non-RED firms) relative to those firms that are not exposed to the treatment (FTZ). In other words, firms exposed to input tariff reduction expand relatively faster to new and more market destinations in those industries with larger reduction in input tariff. The results for the variable of interest are consistent with results we obtain by estimating (2) under Poisson or negative binomial regression, to take into account the non-linearity of the dependent variable.

Table 4 also suggests that Non-RED firms increase their propensity to export to more market destinations in those industries with higher reduction in input tariff relative to RED firms (see the alternative specification (1)) and also, relative to PTR firms. However, there is no evidence of input tariff reduction effect on the alternative specification (3) (table 5). Thus, we found no evidence of input tariff reduction effect for PTR-firms relative to FTZ firms.

Dependent variable: $\Delta \text{Log}(\text{Number of export market destination})$										
Variable	Baseline specification					Alternative specification (1)				
	Treatment status: no access to Free Trade Zone					Treatment status: no access to RED				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\Delta \text{ Input Tariff}_{t-1} * T_{No-FTZ}$	-0.013*** (0.004)	-0.013*** (0.005)	-0.013** (0.005)	-0.014*** (0.005)	-0.014*** (0.005)					
$\Delta \text{ Input Tariff}_{t-1} * T_{No-RED}$						-0.010*** (0.002)	-0.010*** (0.003)	-0.010*** (0.003)	-0.011*** (0.003)	-0.011*** (0.003)
$\Delta \text{ Input Tariff}_{t-1}$	0.006 (0.004)	0.007 (0.005)	0.008 (0.005)	0.008 (0.005)	0.008 (0.005)	-0.000 (0.002)	0.001 (0.002)	0.001 (0.002)	0.002 (0.002)	0.002 (0.002)
$\Delta \text{ Output Tariff}_{t-1}$		-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.003)	-0.002 (0.003)		-0.002 (0.001)	-0.002* (0.001)	-0.002 (0.001)	-0.002 (0.001)
$\Delta \text{ Faced tariff (EU)}_{t-1}$			-0.002 (0.012)	-0.009 (0.013)	-0.009 (0.013)			-0.010 (0.008)	-0.013 (0.009)	-0.013 (0.009)
$\Delta \text{ Faced tariff (USA)}_{t-1}$				-0.003 (0.005)	-0.003 (0.005)				-0.003 (0.003)	-0.003 (0.003)
$\Delta \text{ Import (firm)}$					0.006 (0.018)					0.045*** (0.015)
Fixed effect										
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms-Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25,821	25,821	25,759	25,112	25,112	51,144	51,144	51,041	50,037	50,037
Number of units	10,647	10,647	10,618	10,402	10,402	17,972	17,972	17,927	17,622	17,622

Table 4: Export market destinations (baseline model)

Note: Standard errors clustered at the industry level in parentheses. In the baseline specification the sample is composed by FTZ (control group) and Non-RED (treated group). In the alternative specification (1) the sample is composed by RED (control group) and Non-RED (treated group).

Dependent variable: $\Delta \text{Log}(\text{Number of export markets})$										
Variable	Alternative specification (2) Treatment status: no access to PTR					Alternative specification (3) Treatment status: PTR (control) x FTZ (treated)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\Delta \text{ Input Tariff (PTR)}_{t-1}$	-0.010*** (0.002)	-0.010*** (0.002)	-0.010*** (0.002)	-0.010*** (0.002)	-0.010*** (0.002)					
$\Delta \text{ Input Tariff (FTZxRED)}_{t-1}$						-0.003 (0.004)	-0.003 (0.004)	-0.003 (0.004)	-0.003 (0.004)	-0.003 (0.004)
$\Delta \text{ Input Tariff }_{t-1}$	-0.000 (0.001)	0.001 (0.002)	0.001 (0.002)	0.002 (0.002)	0.002 (0.002)	0.001 (0.004)	0.002 (0.005)	0.002 (0.005)	0.001 (0.004)	0.001 (0.005)
$\Delta \text{ Output Tariff }_{t-1}$		-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)		-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)
$\Delta \text{ Faced tariff (EU)}_{t-1}$			-0.007 (0.008)	-0.010 (0.009)	-0.010 (0.009)			-0.008 (0.012)	-0.015 (0.012)	-0.016 (0.012)
$\Delta \text{ Faced tariff (USA)}_{t-1}$				-0.002 (0.003)	-0.002 (0.003)				0.002 (0.003)	0.002 (0.003)
$\Delta \text{ Import (firm)}$					0.043** (0.017)					0.096*** (0.017)
Fixed effect										
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms-Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	46,820	46,820	46,731	45,882	45,882	25,153	25,153	25,122	24,844	24,844
Number of units	16,255	16,255	16,220	15,957	15,957	7,466	7,466	7,456	7,377	7,377

Table 5: Export market destinations (alternative specifications)

Note: Standard errors clustered at the industry level in parentheses. In the alternative specification (2) the sample is composed by PTR (control group) and Non-RED (treated group). In the alternative specification (3) the sample is composed by FTZ (control group) and PTR (treated group).

4.2 Does input tariff reduction impact the number of exported products at the firm-industry level?

The next baseline specification refers to the extensive margin regarding number of products within industry. The outcome of interest is the variation in the number of different products (at 6-digits HS classification), for firm i exporting in industry j in time t . We are analyzing the effect of variation in input tariff on the number of products that belong to a given GTAP industry j .³⁹

We did a similar procedure of log transformation for the number of products (at 10-digit HS) at the firm-industry level. Table 6 shows a negative sign for the interaction term of input tariff and treatment group, but it is not statistically significant at 5% of confidence. However, the effect is significant if we assume linearity (without log-transformation) for the baseline estimation.

When compared to the alternative specifications (1), (2) and (3), input tariff variation has no significant effect on number of products (tables 6 and 7) within industry. Nonetheless, in the case of specification (3), trade liberalization still matters through outcome tariff reduction. The coefficient for output tariff is significant and robust for additional covariates (table 7).

³⁹A constraint to the identification adopted to analyze the number of products is that we split the number of products produced by each firm through different GTAP sectors. Hence, we do not capture the effect on the total number of products by firm, but the number of products at the firm-industry level, conditional on being an exporter for at least three periods, which is a necessary condition to evaluate difference in the variation of number of products rate.

Dependent variable: $\Delta \text{Log}(\text{Number of products})$										
Variable	Baseline specification					Alternative specification (1)				
	Treatment status: no access to FTZ					Treatment status: no access to RED				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\Delta \text{ Input Tariff}_{t-1} * T_{No-FTZ}$	-0.009 (0.005)	-0.009* (0.005)	-0.009* (0.005)	-0.009* (0.005)	-0.009* (0.005)					
$\Delta \text{ Input Tariff}_{t-1} * T_{No-RED}$						-0.006* (0.003)	-0.006* (0.003)	-0.006* (0.003)	-0.005 (0.003)	-0.006* (0.003)
$\Delta \text{ Input Tariff}_{t-1}$	0.003 (0.006)	0.002 (0.008)	0.001 (0.008)	-0.000 (0.008)	-0.000 (0.008)	-0.001 (0.002)	0.005 (0.004)	0.005 (0.004)	0.003 (0.005)	0.003 (0.005)
$\Delta \text{ Output Tariff}_{t-1}$		0.002 (0.004)	0.001 (0.004)	0.001 (0.004)	0.001 (0.004)		-0.007* (0.004)	-0.007* (0.004)	-0.007* (0.004)	-0.007* (0.004)
$\Delta \text{ Faced tariff (EU)}_{t-1}$			0.018 (0.011)	0.015 (0.013)	0.015 (0.013)			-0.000 (0.009)	-0.004 (0.011)	-0.004 (0.011)
$\Delta \text{ Faced tariff (USA)}_{t-1}$				0.011 (0.011)	0.011 (0.011)				0.008 (0.007)	0.008 (0.007)
$\Delta \text{ Import (firm)}$					0.013 (0.021)					0.078** (0.033)
Fixed effect										
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms-Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25,821	25,821	25,759	25,112	25,112	51,144	51,144	51,041	50,037	50,037
R-squared	0.007	0.007	0.008	0.008	0.008	0.008	0.009	0.009	0.009	0.010
Number of units	10,647	10,647	10,618	10,402	10,402	17,972	17,972	17,927	17,622	17,622

Table 6: Number of products (baseline model)

Note: Standard errors clustered at the industry level in parentheses. In the baseline specification the sample is composed by FTZ (control group) and Non-RED (treated group). In the alternative specification (1) the sample is composed by RED (control group) and Non-RED (treated group).

Dependent variable: $\Delta \text{Log}(\text{Number of products})$										
Variable	Alternative specification (2)					Alternative specification (3)				
	Treatment status: no access to PTR					Treatment status: PTR (control) x FTZ (treated)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\Delta \text{ Input Tariff}_{t-1} * T_{PTR}$	-0.006* (0.003)	-0.006* (0.003)	-0.006* (0.003)	-0.005 (0.003)	-0.006* (0.003)					
$\Delta \text{ Input Tariff}_{t-1} * T_{FTZ \times PTR}$						0.004 (0.007)	0.007 (0.008)	0.007 (0.008)	0.006 (0.008)	0.006 (0.008)
$\Delta \text{ Input Tariff}_{t-1}$	-0.001 (0.002)	0.005 (0.004)	0.005 (0.004)	0.003 (0.004)	0.004 (0.004)	-0.007 (0.008)	-0.000 (0.009)	0.000 (0.009)	-0.001 (0.009)	-0.001 (0.010)
$\Delta \text{ Output Tariff}_{t-1}$		-0.007* (0.004)	-0.007* (0.004)	-0.007* (0.004)	-0.007* (0.004)		-0.012*** (0.003)	-0.011*** (0.003)	-0.011*** (0.003)	-0.011*** (0.003)
$\Delta \text{ Faced tariff (EU)}_{t-1}$			0.008 (0.008)	0.004 (0.010)	0.004 (0.010)			-0.014 (0.015)	-0.022 (0.019)	-0.023 (0.018)
$\Delta \text{ Faced tariff (USA)}_{t-1}$				0.007 (0.007)	0.008 (0.007)				0.008 (0.006)	0.008 (0.006)
$\Delta \text{ Import (firm)}$					0.076** (0.034)					0.163*** (0.055)
Fixed effect										
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms-Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	46,820	46,820	46,731	45,882	45,882	25,153	25,153	25,122	24,844	24,844
Number of units	16,255	16,255	16,220	15,957	15,957	7,466	7,466	7,456	7,377	7,377

Table 7: Number of products (alternative specifications)

Note: Standard errors clustered at the industry level in parentheses. In the alternative specification (2) the sample is composed by PTR (control group) and Non-RED (treated group). In the alternative specification (3) the sample is composed by FTZ (control group) and PTR (treated group).

4.3 Does input tariff reduction impact export survival probability?

Another important dimension regarding export diversification in a dynamic perspective is related to the probability of firm i surviving as an exporter in industry j , conditional on the fact that it did not export in that industry in the previous year. Diversification in terms of products and markets will depend not only on firms gaining access to new markets and exporting new products (which means expanding at the extensive margin) but also on their capacity to keep these achievements over time. Table 24 (in section 6.6 of the appendix) shows that the survival rate of new exporting firms in Morocco was approximately 40% (between 2003 and 2010) in their first year as an exporter. Although the share of new exporters in total export value is usually low, it becomes much more relevant for whether the firm survives as an exporter. The dependent variable is now a dummy that identifies export status as the following:

$$Y_{ijt+1}|(Y_{ijt} = 1 \ \& \ Y_{ijt-1} = 0) = \begin{cases} 1 & \text{if } \textit{Exporter} \\ 0 & \textit{Otherwise} \end{cases}$$

Where conditioning on firm i starting to export in industry j in period t , it takes the value of 1 if it continues as an exporter in $t + 1$ or 0 otherwise. For example, let us assume that an average firm i is exposed to input tariff reduction (e.g. Non-RED group) and it did not export any product classified as textile industry j in period $t-1$, but it becomes an exporter of a given 6-digits HS product that belongs to the textile industry j in period t . Then we tested the effect of input tariff variation in industry j on the probability of firm i exporting a product in the textile industry j in period $t+1$ with respect to an average firm c that was not exposed to the shock (e.g. FTZ group).

We used the same identification strategy as for the previous questions using a linear probability model (LPM).⁴⁰ Therefore, the coefficients for the interaction term $\Delta\tau_{j(t-1)}*T_i$ in table 8 provides the marginal effect of input tariff at the mean.

⁴⁰Lechner (2011) suggests that a linear probability estimation as an alternative to identify the impact of a program, in this case an economic policy change, in a nonlinear setup.

Dependent variable: Exporting status										
Variable	Baseline specification					Alternative specification (1)				
	Treatment status: no access to FTZ					Treatment status: no access to RED				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Δ Input Tariff $_{t-1} * T_{No-FTZ}$	-0.023** (0.010)	-0.023** (0.010)	-0.022** (0.010)	-0.022** (0.010)	-0.015* (0.008)					
Δ Input Tariff $_{t-1} * T_{No-RED}$						-0.020** (0.007)	-0.020** (0.007)	-0.020** (0.007)	-0.020** (0.007)	-0.014** (0.006)
Δ Input Tariff $_{t-1}$	0.009* (0.005)	0.009* (0.004)	0.006 (0.005)	0.007 (0.005)	0.003 (0.004)	0.004 (0.003)	0.003 (0.002)	0.003 (0.002)	0.003 (0.002)	0.000 (0.002)
Δ Output Tariff $_{t-1}$		0.000 (0.003)	0.001 (0.003)	0.001 (0.003)	0.001 (0.003)		0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)
Δ Faced tariff (EU) $_{t-1}$			0.074*** (0.015)	0.075*** (0.019)	0.077*** (0.019)			0.022* (0.012)	0.024 (0.015)	0.027 (0.017)
Δ Faced tariff (USA) $_{t-1}$				-0.006 (0.009)	-0.007 (0.010)				-0.003 (0.005)	-0.003 (0.006)
Δ Import (firm)					-0.139*** (0.029)					-0.076** (0.032)
Fixed effect										
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms-Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,944	12,944	12,912	12,743	12,275	24,434	24,434	24,362	24,074	23,263
Number of units	5,689	5,689	5,678	5,629	5,629	10,704	10,704	10,676	10,596	10,594

Table 8: Export survival (baseline model)

Note: Standard errors clustered at the industry level in parentheses. In the baseline specification the sample is composed by FTZ (control group) and Non-RED (treated group). In the alternative specification (1) the sample is composed by RED (control group) and Non-RED (treated group).

Dependent variable: Exporting status										
Variable	Alternative specification (2)					Alternative specification (3)				
	Treatment status: no access to PTR					Treatment status: PTR (control) x FTZ (treated)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Δ Input Tariff (PTR) $_{t-1}$	-0.021*** (0.007)	-0.021*** (0.007)	-0.020*** (0.007)	-0.020*** (0.007)	-0.015** (0.006)					
Δ Input Tariff (FTZxRED) $_{t-1}$						0.003 (0.006)	-0.000 (0.005)	-0.001 (0.005)	-0.001 (0.005)	0.000 (0.005)
Δ Input Tariff $_{t-1}$	0.004 (0.003)	0.004 (0.003)	0.003 (0.003)	0.003 (0.003)	0.000 (0.003)	-0.001 (0.007)	-0.003 (0.007)	-0.003 (0.007)	-0.003 (0.007)	-0.005 (0.006)
Δ Output Tariff $_{t-1}$		0.000 (0.002)	0.000 (0.002)	0.001 (0.002)	0.001 (0.003)		0.005 (0.004)	0.005 (0.004)	0.005 (0.004)	0.005 (0.004)
Δ Faced tariff (EU) $_{t-1}$			0.050** (0.020)	0.054** (0.024)	0.055** (0.026)			-0.021 (0.025)	-0.016 (0.031)	-0.014 (0.034)
Δ Faced tariff (USA) $_{t-1}$				-0.002 (0.005)	-0.002 (0.007)				0.001 (0.009)	-0.001 (0.009)
Δ Import (firm)					-0.098*** (0.028)					0.077 (0.058)
Fixed effect										
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms-Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	20,053	20,053	20,000	19,776	19,021	12,703	12,703	12,676	12,547	12,216
Number of units	8,808	8,808	8,789	8,730	8,728	5,543	5,543	5,533	5,499	5,497

Table 9: Export survival (alternative specification)

Note: Standard errors clustered at the industry level in parentheses. In the alternative specification (2) the sample is composed by PTR (control group) and Non-RED (treated group). In the alternative specification (3) the sample is composed by FTZ (control group) and PTR (treated group).

The baseline model shows a positive effect of input tariff reduction on the propensity to survive as an exporter in industries affected by the shock, for those firms that were more exposed to input tariff reduction treatment (table 8). The effect is also positive for the alternative specifications (1) and (2).

Dependent variable: Exporting status (EU, US and TUR)										
Variable	Baseline specification					Alternative specification (1)				
	Treatment status: no access to FTZ					Treatment status: no access to RED				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Δ Input Tariff $_{t-1} * T_{No-FTZ}$	-0.013*	-0.013*	-0.013*	-0.013	-0.005					
	(0.007)	(0.007)	(0.007)	(0.007)	(0.006)					
Δ Input Tariff $_{t-1} * T_{No-RED}$						-0.012*	-0.011*	-0.011*	-0.011*	-0.005
						(0.006)	(0.006)	(0.006)	(0.006)	(0.005)
Δ Output Tariff $_{t-1}$	0.005	0.005	0.004	0.004	0.001	0.004	0.002	0.002	0.002	-0.000
	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)
Δ Output Tariff $_{t-1}$		0.000	0.001	0.000	0.001		0.002	0.002	0.001	0.002
		(0.003)	(0.003)	(0.003)	(0.003)		(0.002)	(0.002)	(0.002)	(0.002)
Δ Faced tariff (EU) $_{t-1}$			0.049**	0.038	0.040			0.006	-0.007	-0.007
			(0.021)	(0.025)	(0.026)			(0.019)	(0.020)	(0.020)
Δ Faced tariff (USA) $_{t-1}$				-0.000	-0.001				0.006	0.004
				(0.011)	(0.010)				(0.006)	(0.007)
Δ Import (firm)					-0.170***					-0.090***
					(0.031)					(0.031)
Fixed effect										
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms-Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,827	11,827	11,801	11,650	11,182	22,875	22,875	22,820	22,560	21,749
Number of units	5,457	5,457	5,447	5,399	5,305	10,399	10,399	10,375	10,296	10,170

Table 10: Export survival (EU, USA and TUR) (baseline model)

Note: Standard errors clustered at the industry level in parentheses. In the baseline specification the sample is composed by FTZ (control group) and Non-RED (treated group). In the alternative specification (1) the sample is composed by RED (control group) and Non-RED (treated group).

Dependent variable: Exporting status (UE, US and TUR)										
Variable	Alternative specification (2)					Alternative specification (3)				
	Treatment status: no access to PTR					Treatment status: PTR (control) x FTZ (treated)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Δ Input Tariff (PTR) $_{t-1}$	-0.012**	-0.011**	-0.011**	-0.011**	-0.005					
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)					
Δ Input Tariff (FTZxRED) $_{t-1}$						0.002	-0.001	-0.001	-0.000	0.002
						(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Δ Input Tariff $_{t-1}$	0.003	0.002	0.002	0.002	-0.001	0.000	-0.002	-0.001	-0.002	-0.004
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)
Δ Output Tariff $_{t-1}$		0.001	0.001	0.001	0.001		0.005	0.004	0.004	0.004
		(0.002)	(0.002)	(0.002)	(0.002)		(0.003)	(0.003)	(0.003)	(0.003)
Δ Faced tariff (EU) $_{t-1}$			0.028	0.021	0.020			-0.027	-0.046*	-0.048*
			(0.019)	(0.021)	(0.022)			(0.024)	(0.026)	(0.028)
Δ Faced tariff (USA) $_{t-1}$				0.006	0.005				0.005	0.002
				(0.006)	(0.007)				(0.009)	(0.009)
Δ Import (firm)					-0.101***					0.063
					(0.028)					(0.055)
Fixed effect										
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms-Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	18,749	18,749	18,705	18,498	17,743	12,296	12,296	12,272	12,152	11,821
Number of units	8,550	8,550	8,533	8,474	8,356	5,481	5,481	5,472	5,437	5,411

Table 11: Export survival (UE, USA and TUR) (alternative specification)

Note: Standard errors clustered at the industry level in parentheses. In the alternative specification (2) the sample is composed by PTR (control group) and Non-RED (treated group). In the alternative specification (3) the sample is composed by FTZ (control group) and PTR (treated group).

We then tested for heterogeneous effect with respect to the propensity to survive in different markets with emphasis on those that had input tariff reduction between 2002 and 2010 through FTAs signed with Morocco. Hence, we tested for the propensity to survive as a new exporter in industry j in one of the markets including the EU, US and Turkey. The coefficient of interest has the expected signal, but it is not significant at 5% of confidence to the baseline model (table 10). Nonetheless, input tariff

reduction is significant for the alternative specification (2), which suggests that Non-RED firms have higher propensity to survive as an exporter in those industries with larger input tariff reduction than firms that imported under PTR (table 11), although it is not robust when controlling for import status.

4.4 Does input tariff reduction impact export value?

Finally, we analyzed the impact of input tariff reduction on export value by firm in each different industry. The dependent variable is the first difference of the log of export value for firm i , at industry j at time t .

Table 12 shows a significant and robust effect for the baseline model. The results suggest that industries with larger input tariff reduction have a relatively higher growth of export value in those firms that were more exposed to input tariff reduction (Non-RED group), if compared to the FTZ group. Although we found the expected signals to the other specifications (1), (2) and (3), the coefficients are not statistically significant at 5% of confidence.

The results on the intensive margin for the baseline specification suggest that input tariff reduction not only promotes export diversification in terms of market and products for those firms that are exposed to the shocks, but it also boosts their exporting value in those industries with larger reduction of input tariff relative to other firms in the control group.

Finally, the main results are followed by a robustness check regarding the impact of input tariff reduction on a sub-sample of firms used as a control group. An important assumption for identification is that input tariff reduction does not affect export performance in the control group of the baseline model. Tables 18, 19, 20, 21 and 22 in section 6.4 of the appendix show that $\text{input tariff}_{t-1}$ is not significant to explain any of the endogenous variables used in the econometric exercise (number of export destination countries, number of products by industry, export survival and export value) in a sub-sample of the FTZ firms, which is used as the main control group.

Dependent variable: Δ Export value										
Variable	Baseline specification					Alternative specification (1)				
	Treatment status: no access to FTZ					Treatment status: no access to RED				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Δ Input Tariff $_{t-1}$ * T_{No-FTZ}	-0.041*** (0.012)	-0.041*** (0.012)	-0.040*** (0.012)	-0.040*** (0.012)	-0.040*** (0.012)					
Δ Input Tariff $_{t-1}$ * T_{No-RED}						-0.015* (0.007)	-0.015* (0.007)	-0.014* (0.007)	-0.014* (0.008)	-0.016** (0.008)
Δ Input Tariff $_{t-1}$	0.020* (0.011)	0.016 (0.010)	0.015 (0.010)	0.018 (0.011)	0.018 (0.011)	-0.008 (0.005)	-0.007 (0.007)	-0.007 (0.007)	-0.007 (0.007)	-0.006 (0.007)
Δ Output Tariff $_{t-1}$		0.004 (0.006)	0.004 (0.006)	0.004 (0.007)	0.004 (0.007)		-0.001 (0.005)	-0.002 (0.005)	-0.002 (0.005)	-0.002 (0.005)
Δ Faced tariff (EU) $_{t-1}$			0.046 (0.029)	0.060 (0.035)	0.060* (0.035)			-0.000 (0.025)	0.012 (0.032)	0.012 (0.031)
Δ Faced tariff (USA) $_{t-1}$				-0.020 (0.021)	-0.020 (0.021)				0.001 (0.014)	0.002 (0.013)
Δ Import (firm)					0.169*** (0.051)					0.306*** (0.050)
Fixed effect										
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms-Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25,793	25,793	25,731	25,086	25,086	51,103	51,103	51,000	49,998	49,998
Number of units	10,631	10,631	10,602	10,387	10,387	17,950	17,950	17,905	17,601	17,601

Table 12: Export value (baseline model)

Note: Standard errors clustered at the industry level in parentheses. In the baseline specification the sample is composed by FTZ (control group) and Non-RED (treated group). In the alternative specification (1) the sample is composed by RED (control group) and Non-RED (treated group).

Dependent variable: Δ Log(Export value)										
Variable	Treatment status: no access to PTR					Treatment status: PTR (control) x FTZ (treated)				
	Treatment status: no access to Other Regimes					Treatment status: access to other regimes bu no FTZ				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Δ Input Tariff (PTR) $_{t-1}$	-0.014* (0.008)	-0.014* (0.008)	-0.014* (0.008)	-0.014 (0.008)	-0.015* (0.008)					
Δ Input Tariff (FTZxRED) $_{t-1}$						-0.015 (0.017)	-0.015 (0.017)	-0.015 (0.018)	-0.014 (0.018)	-0.014 (0.017)
Δ Input Tariff $_{t-1}$	-0.008 (0.005)	-0.006 (0.007)	-0.005 (0.007)	-0.005 (0.008)	-0.004 (0.008)	0.002 (0.015)	0.003 (0.015)	0.003 (0.015)	-0.002 (0.014)	-0.002 (0.013)
Δ Output Tariff $_{t-1}$		-0.003 (0.005)	-0.003 (0.005)	-0.004 (0.005)	-0.003 (0.005)		-0.002 (0.006)	-0.002 (0.006)	-0.002 (0.005)	-0.001 (0.005)
Δ Faced tariff (EU) $_{t-1}$			0.026 (0.028)	0.036 (0.034)	0.035 (0.032)			-0.014 (0.034)	-0.012 (0.044)	-0.015 (0.042)
Δ Faced tariff (USA) $_{t-1}$				-0.002 (0.014)	-0.002 (0.014)				0.018 (0.013)	0.018 (0.012)
Δ Input Tariff $_{t-1}$					0.307*** (0.052)					0.526*** (0.084)
Fixed effect										
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms-Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	46,782	46,782	46,693	45,846	45,846	25,143	25,143	25,112	24,834	24,834
Number of units	16,234	16,234	16,199	15,937	15,937	7,461	7,461	7,451	7,372	7,372

Table 13: Export value (alternative specification)

Note: Standard errors clustered at the industry level in parentheses. In the alternative specification (2) the sample is composed by PTR (control group) and Non-RED (treated group). In the alternative specification (3) the sample is composed by FTZ (control group) and PTR (treated group).

5 Conclusion

In the 2000s Morocco undertook a set of reforms, including increasing trade liberalization as an important step toward upgrading technologies, diversifying its economy and boosting exports. This process was intensified by signing FTAs with some important trade partners including the EU, the US, Turkey and Arab countries. Trade liberalization in Morocco mainly consisted of lowering its own tariffs and the impact on Moroccan export performance may thus be due to a reduction of input tariffs.

This paper brings evidence to the discussion on the effect of trade liberalization on firms' export performance. Due to the fact that Morocco offers different import regimes, which may include tariff reduction or tariff exemption for inputs used in the production of exported goods, common sense may suggest that liberalization on intermediate goods does not affect exports because firms already have access to these inputs. We showed that this does not seem to be the case because some firms react to input tariff reduction by decreasing their option of importing through special import regimes. Usually, any sort of duty exemption regime that requires conditionality of using an imported good as an input to export involves a sophisticated monitoring process and not negligible administrative economic costs, which may be incurred by the firm and or the customs office. Under zero tariff, there is no reason for tariff exemptions. Thus, firms can use these resources to better focus on their own activities.

The findings suggest that firms that are more exposed to input tariffs perform relatively better in those sectors with the largest input tariff reduction. We found evidence of impact of input tariff reduction on export market diversification, export survival and export value. The results are robust after controlling for output tariffs and foreign tariffs faced by Moroccan exporting firms.

6 Appendix

6.1 Input tariff reduction

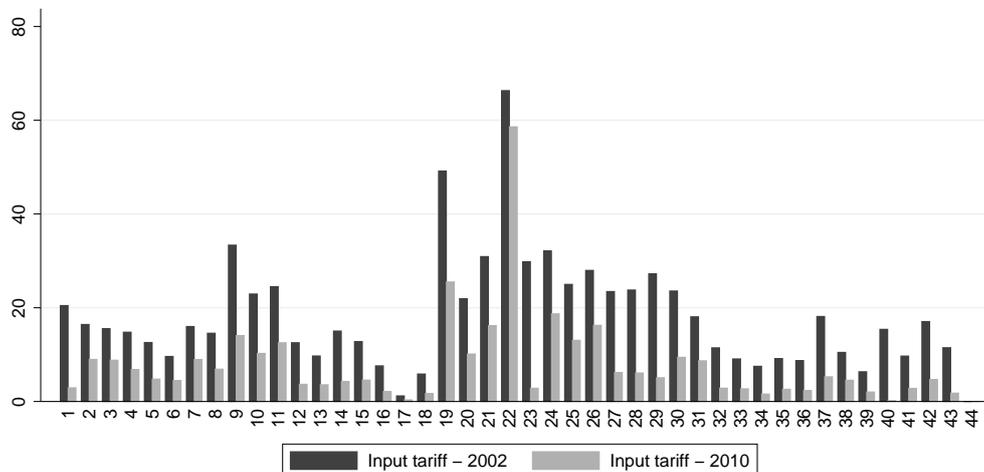


Figure 2: Input tariff changes by sector (GTAP classification)

Note: See GTAP sector classification at www.gtap.agecon.purdue.edu/databases.

6.2 Import customs regimes in Morocco:

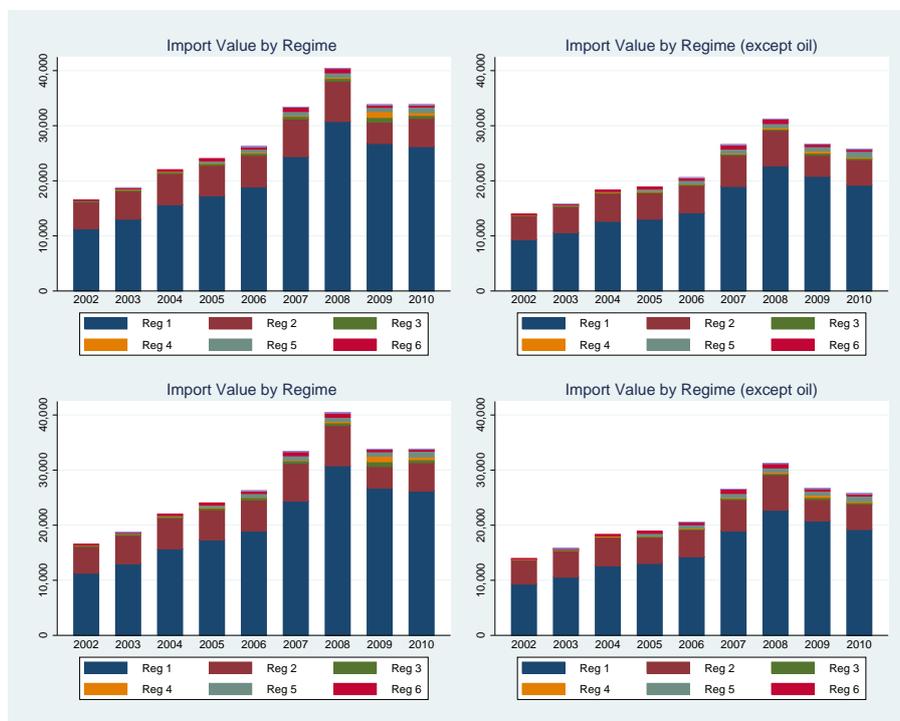


Figure 3: Import value by regime and exporting status

Note: Reg1: Ordinary import; Reg2: Processing trade regime (PTR); Reg3: Entrepôt; Reg4: Temporary import regime; Reg5: Free trade zones; Reg6: Processing in domestic market; Reg7: Others.

The most important customs regime in terms of import transaction flows for exporting firms in Morocco are respectively the PTR and the FTZ. In this subsection we provide further details about these programs, including their eligibility rules. The main source of information is the website of the Morocco's customs office, on www.douane.gov.ma, the laws that determine the benefits of FTZs in Morocco and the rules of implementation in the Tanger FTZ.⁴¹

- **Free Trade Zone**

- Main benefit: FTZs are territories where industrial and services activities related to them are exempt from the laws and customs regulations related to the control of foreign trade. Firms located in FTZs are exempted from all duties related to imported inputs.
- Eligibility rule: Firms must submit an application to the FTZ administration requesting the right to be installed in the FTZs. For example, in the case of Tanger Free Zone, there is a questionnaire to fulfill requesting detailed information on their plans of investment, including infra-structure the firm will need. Also, there is a fee of Dhs 20,000 (approximately \$ 2,400) for the application.

- **Processing Trade Regime**

- Main benefit: This regime allows firms to import, free of duties and taxes, intermediate goods to be processed and exported. They must be granted under specific legislation, with total or partial exemption from duties and taxes on imports.
- Eligibility rule: Firms should apply for this regime following standard procedures determined by the Morocco's customs office, which includes a registration process in the customs' system and the identification of the manager. The firm also needs to provide a guarantee of duties and taxes for which payment will be suspended.

- Other regimes: These regimes include Temporary admission, Entrepot and Transit. Overall these

⁴¹For further details, see adala.justice.gov.ma, www.douane.gov.ma and www.tangerindustrialfreezone.com.

6.3 Testing some identification assumptions

A - Tariff reduction and export performance

We observed reduction in EAR input tariff for all the sectors. For example, in chemical and machinery (both sectors that increased their export share) the average (EAR) input tariff in 2010 was significantly lower than the level observed in 2002. However, in order to analyze the relationship between export performance and input tariff reduction it is necessary to address some concerns with potential reverse causality because some industries, or particular firms, might be more likely to lobby for lower input tariffs. Although we cannot fully exclude the possibility that some sectors with better export performance were benefited by larger reductions in tariffs due to lobbying, we can test if sectors or firms that exported or imported more in 2002 (previous to the changes in tariffs) were benefited by larger tariff reductions in the period from 2002 to 2010. We adopted a procedure similar to that of Goldberg et al. (2010) and Bas (2012) to test if tariff reductions are not correlated with initial industry's export and import outcome. We tested for input tariff at the industry and firm level, using the specifications 4 and 5, respectively.

$$\Delta\tau_{j2010-2002} = \beta_1 + \beta_2 Y_{j2002} + u_j, \quad (4)$$

$$\Delta\tau_{ij2010-2002} = \beta_1 + \beta_2 Y_{ij2002} + \alpha_i + u_{ij}, \quad (5)$$

Where $\Delta\tau_{j2010-2002}$ is the difference in input tariff between 2010 and 2002 in industry j , Y_{j2002} is the aggregate outcome (export or import values and weights) of industry j in 2002 and Y_{ij2002} is the outcome firm i in industry j in 2002. In the specification 5 we also controlled for the fact that firms have received import tariff exemption from FTZ or any other import regime (RED).

Table 14 shows that there is no statistical correlation between changes in input tariffs and export value in 2002 at the industry level. We also tested for export weight, import value and import weight. In all the cases, the R-squared is low and the coefficients are not statistically significant.

Dependent variable: Δ Input tariff τ_{010-02}				
Variable	(1)	(2)	(3)	(4)
Export Value (2002)	0.012 (0.170)			
Export weight (2002)		0.207 (0.206)		
Import Value (2002)			0.337 (0.386)	
Import weight (2002)				0.046 (0.104)
N	38	38	36	38
R-squared	0.009	0.033	0.002	0.015

Table 14: Exogenous tariff changes to initial industry characteristics (2002)

Note: Robust standard errors are in parentheses. Customs data provides information on weight of traded products, which is used as a proxy for quantity.

We then tested for the correlation at the firm-industry level, using specification (5). Here we also included number of export destination countries and number of countries from which Moroccan firms import. Again, the correlation is low and the coefficients are not statistically significant at 5% of confidence. For each specification we included a dummy controlling for the fact that firms imported under FTZ or any special import regime during the period of 2002 and 2010. Table 14 shows that changes in input tariffs between 2002 and 2010 were not correlated with sector's export value (output) in 2002 nor export weight, import value or import weight. This is evidence that we do not observe a larger reduction in input tariffs for those industries or firms that had better export performance prior to the changes in tariff, which could be an outcome from lobbying activity that would raise concerns about reverse causality.

Dependent variable: Δ Input tariff τ_{010-02}									
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Exports									
Export Value (2002)	-0.276 (0.171)	-0.270 (0.168)	-0.243 (0.155)						
Export destination (2002)				-0.021 (0.040)	-0.043 (0.051)	0.013 (0.048)			
Export weight (2002)							0.024 (0.153)	0.035 (0.150)	0.047 (0.146)
Observations	11,648	11,648	11,648	11,648	11,648	11,648	11,648	11,648	11,648
R-squared	0.027	0.037	0.033	0.000	0.011	0.014	0.000	0.011	0.015
Imports									
Import Value (2002)	-0.025 (0.098)	-0.053 (0.098)	0.057 (0.109)						
Import - countries (2002)				0.009 (0.142)	-0.025 (0.142)	0.131 (0.160)			
Import weight (2002)							0.044 (0.209)	-0.024 (0.210)	0.156 (0.212)
Observations	11,648	11,648	11,648	11,648	11,648	11,648	11,648	11,648	11,648
R-squared	0.001	0.015	0.017	0.0001	0.011	0.022	0.001	0.011	0.020
Control for:									
FTZ		Yes			Yes			Yes	
RED			Yes			Yes			Yes

Table 15: Exogenous tariff changes to initial firm-industry characteristics (2002)

Note: Standard errors clustered at the industry level in parentheses. FTZ refers to a dummy that takes the value of 1 if the firm imported under FTZ regime in the same year and 0 otherwise. RED refers to a dummy that takes the value of 1 if the firm imported under any special import regimes that provides reduction or exemption in the tariff and 0 otherwise.

B - Tariff reduction and import regimes

Table 1 on section 2 suggests that the decision of importing under RED may depend on input tariff. Considering administrative costs related to the procedures to import under RED it is reasonable that a reduction in EAR input tariff would lead to a reduction of import under RED (Ianchovichina, 2007). In this regard, it is interesting to observe that the share of firms importing under FTZ do not follow this pattern. The reason is that eligibility for tariff exemption under FTZ is conditional on being geographically located in a FTZ. Although some firms may be attracted to FTZ for avoiding import duties, the decision of moving a production plant involves important sunk costs and long term determinants, which makes it less sensitive to short term variation in import tariffs. Nonetheless, once installed in a FTZ, the marginal cost to access tariff exemption is reduced. To check if this assumption is consistent with what is observed in the data, we run the following specification:

$$I_{ijt}^{Import\ Regime} = \beta_1 \tau_{j(t-n)} + \eta_{ij} + \epsilon_{ijt}, \quad (6)$$

Where $I_{ijt}^{Import\ Regime}$ refers to the import status under import regime (RED, FTZ or PTR); τ_{jt} is the input tariff in industry j in period $t-n$, such that $n=\{0, 1\}$; η_{ij} refers to firm-industry time-invariant

characteristics and ϵ_{ijt} is the error term. Table 16 shows the results for (6). It is noticeable that there is a negative and significant correlation between the decision of importing under RED and input tariff.

First, there is no significant contemporaneous correlation between changes in input tariff $_t$ and importing status under RED (in general) nor under FTZ or PTR, in particular. Nonetheless, the results suggest a positive correlation between import under RED and input tariff $_{t-1}$. This result seems to be driven by importing under PTR. We observe no significant correlation between input tariff $_{t-1}$ and importing status under FTZ. The results are in line with what we observed in table 1.

Dependent variable: Importing status under RED										
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Tariff	0.001*		-0.0004*		-0.001		0.001*		0.001	
	(4.5e-04)		(2.3e-04)		(0.001)		(0.001)		(0.001)	
Tariff $_{t-1}$		0.001***		-0.00037*		-0.001*		0.001***		0.001**
		(3.1e-04)		(2.0e-04)		(0.001)		(3.4e-04)		(4.2e-04)
Observations	229,244	229,244	229,244	229,244	43,617	43,617	229,244	229,244	126,207	126,207
R-squared (within)	0.004	0.004	0.002	0.002	0.008	0.008	0.006	0.006	0.009	0.009
Number of units	87,151	87,151	87,151	87,151	12,193	12,193	87,151	87,151	32,489	32,489
Fixed Effect	.	.	.	.	.	.	.	.	.	.
Year	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm-industry	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 16: Correlation between input tariff and special import regime

The results in table 16 suggest that firms that imported under RED are exposed in different levels to “input tariff variation.” Thus, we defined four different groups: RED, FTZ, PTR and Non-RED. We then tested if import status decision disregarding its regime is correlated to variation in input tariff, conditional on belonging to one these groups (RED, FTZ, PTR and Non-RED). Table 17 shows that import decision at the firm level in a given year, disregarding the import regime, is correlated to input tariff in periods t and $t-1$ only for Non-RED firms.

Variable	RED		FTZ		PTR		Non-RED	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ Tariff	-0.0003		-0.0007		-0.0007		-0.0036***	
	(0.000)		(0.000)		(0.001)		(0.001)	
Δ Tariff $_{t-1}$		-0.0007*		-0.0006*		-0.0008**		-0.0032***
		(0.000)		(0.000)		(0.000)		(0.001)
Observations	43,617	43,617	126,207	126,207	154,118	154,118	75,126	75,126
R-squared (within)	0.002	0.002	0.000	0.000	0.000	0.000	0.010	0.010
Fixed Effect	.	.	.	.	.	.	.	.
Firm-Industry	YES	YES	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES	YES	YES

Table 17: Correlation between input tariff and import decision

6.4 Robustness check

Dependent variable: $\Delta \text{Log}(\text{Number of export markets})$ - robustness										
Variable	Sub-sample: FTZ					Sub-sample: RED				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\Delta \text{ Input Tariff }_{t-1}$	0.002 (0.003)	0.003 (0.004)	0.004 (0.005)	0.002 (0.005)	0.002 (0.005)	-0.002 (0.002)	-0.000 (0.002)	-0.000 (0.002)	-0.001 (0.002)	-0.001 (0.002)
$\Delta \text{ Output Tariff }_{t-1}$		-0.001 (0.004)	-0.001 (0.004)	-0.001 (0.003)	-0.001 (0.003)		-0.002* (0.001)	-0.002* (0.001)	-0.002* (0.001)	-0.002* (0.001)
$\Delta \text{ Faced tariff (EU)}_{t-1}$			-0.011 (0.016)	-0.033** (0.016)	-0.033** (0.016)			-0.016 (0.010)	-0.021* (0.011)	-0.021* (0.011)
$\Delta \text{ Faced tariff (USA)}_{t-1}$				0.010 (0.011)	0.011 (0.011)				0.002 (0.003)	0.002 (0.003)
$\Delta \text{ Import (firm)}$					0.143** (0.069)					0.094*** (0.015)
Fixed effect										
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms-Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,179	7,179	7,147	7,004	7,004	32,502	32,502	32,429	31,929	31,929
Number of units	2,311	2,311	2,300	2,263	2,263	9,636	9,636	9,609	9,483	9,483

Table 18: Export market destinations - robustness

Note: Standard errors clustered at the industry level in parentheses. Columns (1) to (5) refer to a sub-sample of FTZ firms. Columns (6) to (10) refer to a sub-sample of RED firms.

Dependent variable: $\Delta \text{Log}(\text{Number of Products})$ - robustness										
Variable	Sub-sample: Free Trade Zone					Sub-sample: IER				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\Delta \text{ Input Tariff }_{t-1}$	-0.000 (0.005)	-0.001 (0.006)	-0.000 (0.010)	-0.006 (0.006)	-0.006 (0.006)	-0.003 (0.002)	0.006*** (0.002)	0.006 (0.005)	0.003 (0.003)	0.004 (0.003)
$\Delta \text{ Output Tariff }_{t-1}$		0.001 (0.005)	0.001 (0.008)	0.000 (0.005)	0.000 (0.005)		-0.010*** (0.002)	-0.010** (0.004)	-0.010*** (0.002)	-0.010*** (0.002)
$\Delta \text{ Faced tariff (EU)}_{t-1}$			-0.017 (0.020)	-0.039 (0.025)	-0.040 (0.025)			-0.017 (0.012)	-0.026** (0.011)	-0.026** (0.011)
$\Delta \text{ Faced tariff (USA)}_{t-1}$				0.034** (0.015)	0.034** (0.015)				0.010** (0.005)	0.010** (0.005)
$\Delta \text{ Import (firm)}$					0.162 (0.128)					0.156*** (0.019)
Constant	0.003 (0.032)	0.004 (0.035)	0.005 (0.025)	-0.016 (0.037)	-0.016 (0.037)	0.024 (0.015)	-0.016 (0.017)	-0.016 (0.041)	-0.025 (0.018)	-0.021 (0.018)
Fixed effect										
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms-Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,179	7,179	7,147	7,004	7,004	32,502	32,502	32,429	31,929	31,929
Number of units	2,311	2,311	2,300	2,263	2,263	9,636	9,636	9,609	9,483	9,483

Table 19: Number of products - robustness

Note: Standard errors clustered at the industry level in parentheses.

Dependent variable: Exporting status										
Variable	Sub-sample: Free Trade Zone					Sub-sample: IER				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Δ Output Tariff t_{-1}	-0.001 (0.004)	-0.002 (0.004)	-0.003 (0.004)	-0.003 (0.004)	-0.003 (0.004)	-0.001 (0.002)	-0.002 (0.002)	-0.003 (0.002)	-0.002 (0.002)	-0.002 (0.002)
Δ Output Tariff t_{-1}		0.002 (0.004)	0.002 (0.004)	0.002 (0.004)	0.001 (0.004)		0.002 (0.002)	0.002 (0.002)	0.003 (0.003)	0.002 (0.003)
Δ Faced tariff (EU) t_{-1}			0.016 (0.019)	0.009 (0.027)	0.008 (0.027)			-0.014 (0.015)	-0.020 (0.020)	-0.022 (0.020)
Δ Faced tariff (USA) t_{-1}				-0.002 (0.013)	-0.002 (0.014)				-0.003 (0.007)	-0.001 (0.007)
Δ Import (firm)					-0.320*** (0.053)					-0.312*** (0.032)
Fixed effect										
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms-Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,236	6,236	6,213	6,106	6,106	16,894	16,894	16,836	16,625	16,625
Number of units	2,699	2,699	2,692	2,663	2,663	7,714	7,714	7,690	7,627	7,627

Table 20: Export survival - robustness

Note: Standard errors clustered at the industry level in parentheses. Columns (1) to (5) refer to a sub-sample of FTZ firms. Columns (6) to (10) refer to a sub-sample of RED firms.

Dependent variable: Exporting status (EU, TUR and US)										
Variable	Sub-sample: Free Trade Zone					Sub-sample: IER				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Δ Input Tariff t_{-1}	0.002 (0.003)	-0.000 (0.003)	-0.000 (0.003)	-0.001 (0.003)	-0.001 (0.003)	0.001 (0.004)	0.002 (0.005)	0.000 (0.006)	0.000 (0.006)	0.001 (0.007)
Δ Output Tariff t_{-1}		0.003 (0.002)	0.002 (0.003)	0.001 (0.002)	0.002 (0.002)		-0.002 (0.004)	-0.002 (0.004)	-0.003 (0.004)	-0.001 (0.004)
Δ Faced tariff (EU) t_{-1}			-0.002 (0.024)	-0.010 (0.024)	-0.012 (0.024)			0.087* (0.045)	0.073 (0.046)	0.079 (0.048)
Δ Faced tariff (EU) t_{-1}				0.009 (0.006)	0.008 (0.008)				0.011 (0.017)	0.013 (0.018)
Δ Import (firm)					-0.107*** (0.027)					-0.208*** (0.023)
Fixed effect										
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms-Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16,633	16,633	16,598	16,443	15,680	5,585	5,585	5,579	5,533	5,113
Number of units	7,736	7,736	7,719	7,668	7,545	2,794	2,794	2,791	2,771	2,680

Table 21: Export survival (EU, TUR and USA) - Robustness

Note: Standard errors clustered at the industry level in parentheses. Columns (1) to (5) refer to a sub-sample of FTZ firms. Columns (6) to (10) refer to a sub-sample of RED firms.

Dependent variable: Δ Log of export value (robustness)										
Variable	Sub-sample: Free Trade Zone					Sub-sample: IER				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Δ Input Tariff $t-1$	0.003 (0.011)	-0.002 (0.014)	-0.003 (0.014)	-0.003 (0.014)	-0.002 (0.014)	-0.012** (0.005)	-0.009 (0.009)	-0.009 (0.009)	-0.013 (0.008)	-0.013 (0.008)
Δ Output Tariff $t-1$		0.007 (0.012)	0.005 (0.012)	0.004 (0.013)	0.003 (0.013)		-0.004 (0.007)	-0.004 (0.007)	-0.004 (0.006)	-0.003 (0.006)
Δ Faced tariff (EU) $t-1$			0.012 (0.036)	0.020 (0.041)	0.013 (0.044)			-0.035 (0.024)	-0.028 (0.033)	-0.032 (0.034)
Δ Faced tariff (USA) $t-1$				0.004 (0.041)	0.004 (0.041)				0.017 (0.014)	0.017 (0.014)
Δ Import (firm)					0.344 (0.203)					0.466*** (0.084)
Fixed effect										
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms-Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,176	7,176	7,144	7,001	7,001	32,486	32,486	32,413	31,913	31,913
Number of units	2,311	2,311	2,300	2,262	2,262	9,630	9,630	9,603	9,476	9,476

Table 22: Export value - Robustness

Note: Standard errors clustered at the industry level in parentheses. Columns (1) to (5) refer to a sub-sample of FTZ firms. Columns (6) to (10) refer to a sub-sample of RED firms.

6.5 Market diversification indexes

The HHI measures the dispersion of trade value across exported products or markets. Its value ranges from 0 to 1; the higher the index, the more concentrated in few market or sectors is the economy. Equation 7 presents the definition of the HHI.

$$HHI = \frac{\sum_{k=1}^{n_i} \left(\frac{x_{ik}}{X_i} \right)^2 - \frac{1}{n_i}}{1 - \frac{1}{n_i}} \quad (7)$$

Where i stands for Morocco, X is the total value of Morocco's export, x is the value of Morocco's export of product k and n is the number of products exported by Morocco. The same definition can be applied with respect to markets. In this case, x stands for the value of Morocco's export to country k and n is the number of partner markets to which Morocco exports.

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010
Market									
HHI Market	0.149	0.158	0.153	0.138	0.131	0.128	0.084	0.112	0.088
Share of Top 10	81.21	81.51	81.77	79.25	77.00	75.39	70.01	71.54	68.49
Product									
HHI Product	0.019	0.019	0.019	0.019	0.019	0.0186	0.042	0.016	0.0241
Share of Top 10	76.42	78.25	75.58	74.78	73.54	73.26	78.13	70.53	70.56

Table 23: Moroccan export diversification

Note: The HHIs are extracted from WITS (2014). The shares of top 10 markets and products were calculated by the authors using Morocco's customs data.

6.6 Trade dynamics

Figure 4 shows the pattern of Moroccan export and import market diversification from 2002 to 2010. Other countries apart from the EU, including developing and emerging economies, are becoming more important trade partners. In addition, this pattern is observed not only in terms of total export value (Exports), but also for total import value (Imports) and import value carried by exporting firms (Import of exporting firms).

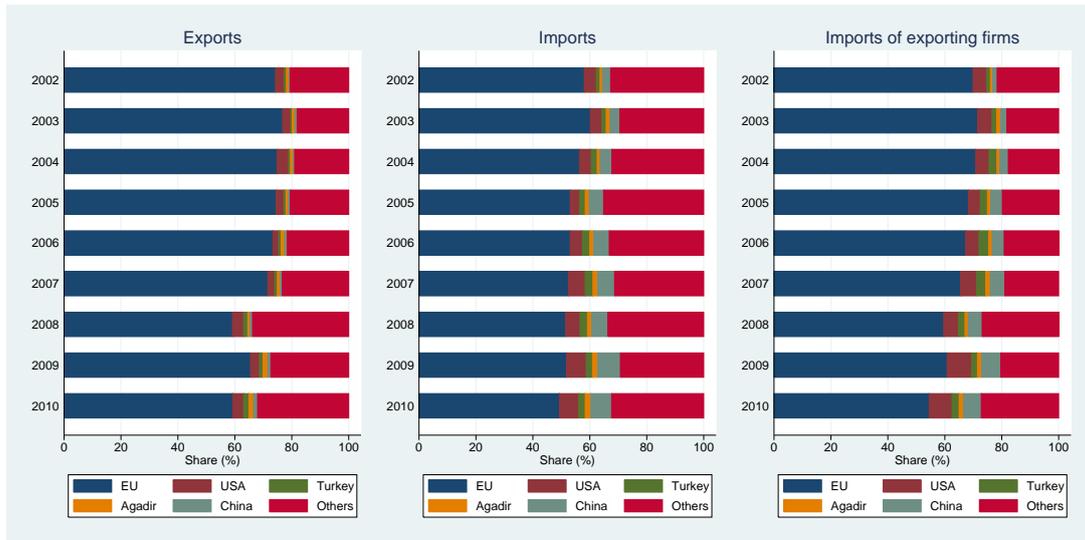


Figure 4: Share of Moroccan export and import by region

Note: Prices in US dollars of 2010. European Union (EU); Agadir (Jordan, Egypt and Tunisia).

In addition, if input tariff reduction leads firms to use more inputs from abroad, which can be a channel that promotes export diversification, we should expect an increase in import of raw material, intermediate goods and capital goods together with an increase in export (figures 5 and 6).

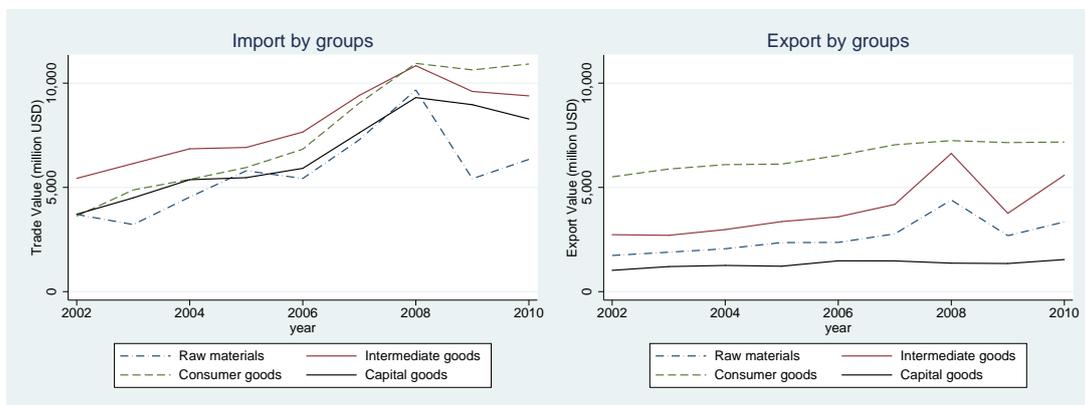


Figure 5: Trade flow by group of products

Note: Source: Comtrade (2012). Prices in US dollars of 2010.

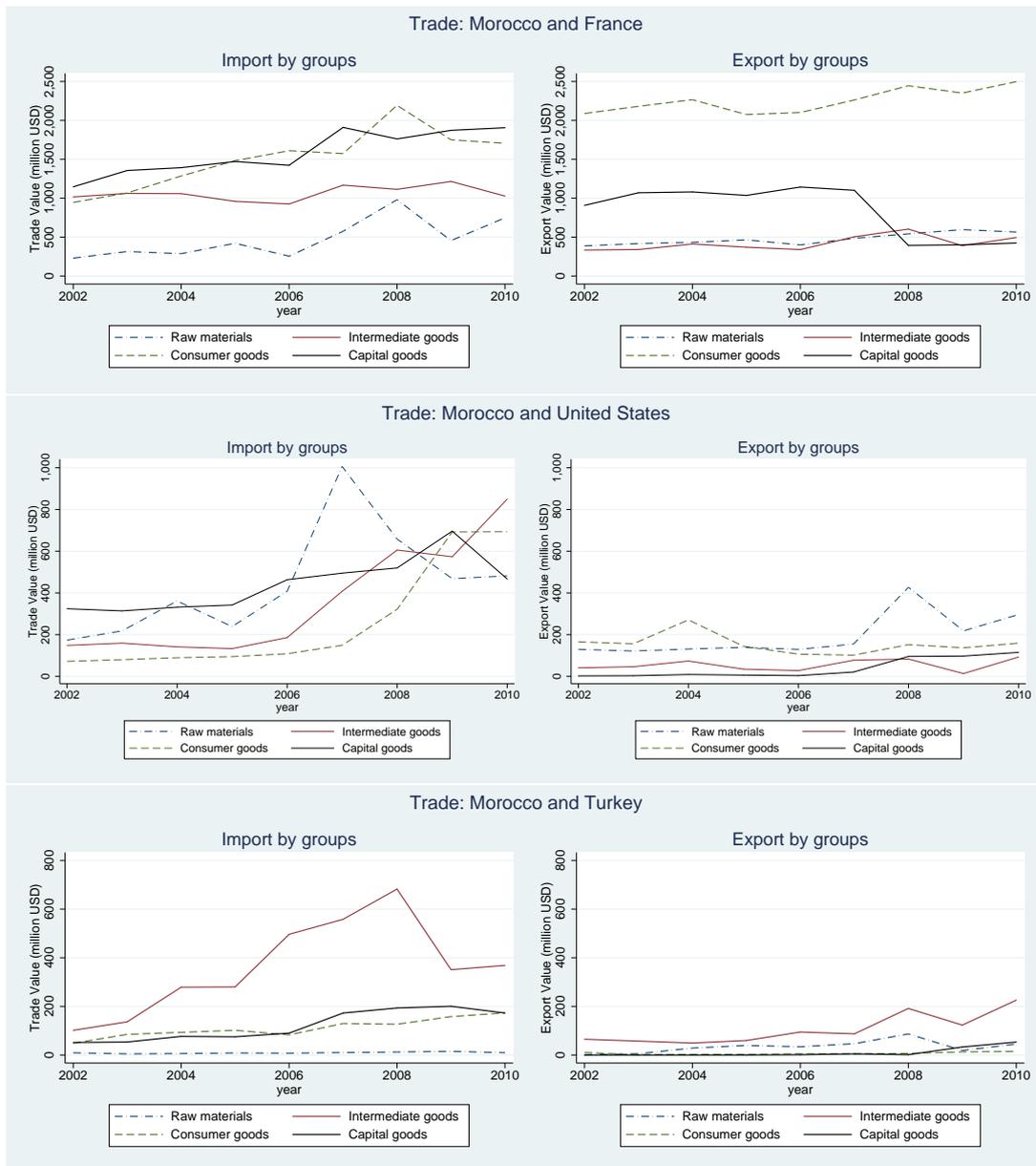
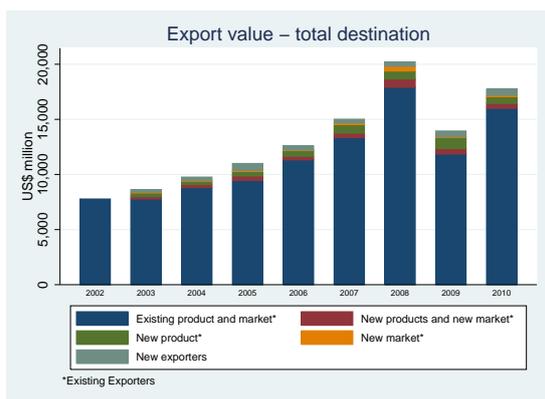
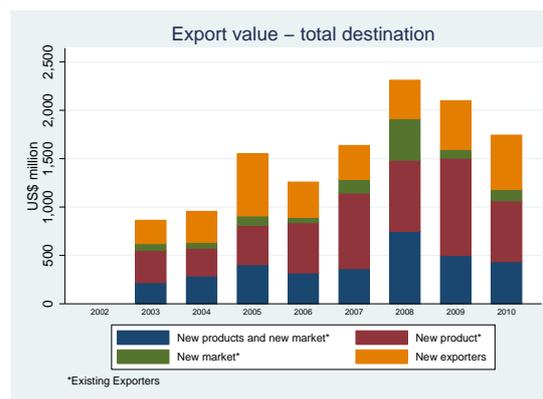


Figure 6: Trade flow by group of products
 Note: Source: Comtrade (2012). Prices in US dollars of 2010.



(a) Extensive and Intensive Margin



(b) Extensive Margin Decomposition

Figure 7: Intensive margin and extensive margin decomposition - Morocco - 2003-2010

Note: New exporters are considered as firms that had not exported in the previous year. (a) Extensive and Intensive Margin decomposition; (b) Extensive Margin decomposition.

TABLE A . Number of Firms (Total)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
2002	5,398									5,398
2003	3,448	1,922								5,370
2004	2,752	718	2,540							6,010
2005	2,347	458	794	2,039						5,638
2006	1,983	316	428	689	2,065					5,481
2007	1,754	249	326	460	944	1,747				5,480
2008	1,592	215	272	364	610	767	1,675			5,495
2009	1,439	182	215	291	417	508	678	2,225		5,955
2010	1,286	159	183	229	319	382	432	997	1,885	5,872
Survival rate										
2002	1.00									1.00
2003	0.64	1.00								0.64
2004	0.51	0.37	1.00							0.65
2005	0.43	0.24	0.31	1.00						0.60
2006	0.37	0.16	0.17	0.34	1.00					0.61
2007	0.32	0.13	0.13	0.23	0.46	1.00				0.68
2008	0.29	0.11	0.11	0.18	0.30	0.44	1.00			0.70
2009	0.27	0.09	0.08	0.14	0.20	0.29	0.40	1.00		0.68
2010	0.24	0.08	0.07	0.11	0.15	0.22	0.26	0.45	1.00	0.67

TABLE B . Number of Firms (Exporting - Importing)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
2002	3,161									3,161
2003	2,206	945								3,151
2004	1,836	420	1,210							3,466
2005	1,573	277	450	1,027						3,327
2006	1,381	191	261	434	1,307					3,574
2007	1,244	152	204	291	539	1,187				3,617
2008	1,138	134	175	231	348	491	1,107			3,624
2009	1,044	112	135	189	252	332	474	1,340		3,878
2010	940	90	123	153	194	241	299	582	1,178	3,800
Survival rate										
2002	1.00									1.00
2003	0.70	1.00								0.70
2004	0.58	0.44	1.00							0.72
2005	0.50	0.29	0.37	1.00						0.66
2006	0.44	0.20	0.22	0.42	1.00					0.68
2007	0.39	0.16	0.17	0.28	0.41	1.00				0.68
2008	0.36	0.14	0.14	0.22	0.27	0.41	1.00			0.70
2009	0.33	0.12	0.11	0.18	0.19	0.28	0.43	1.00		0.70
2010	0.30	0.10	0.10	0.15	0.15	0.20	0.27	0.43	1.00	0.68

TABLE C . Number of Products (Total)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
2002	5,144									5,144
2003	3,772	1,336								5,108
2004	3,269	666	1,282							5,217
2005	2,902	372	494	1,124						4,892
2006	2,624	273	288	517	1,448					5,150
2007	2,497	220	223	354	717	1,314				5,325
2008	2,393	185	174	279	499	610	1,280			5,420
2009	2,287	162	141	238	396	415	612	1,467		5,718
2010	2,214	141	120	209	324	320	422	734	1,292	5,776
Survival rate										
2002	1.00									1.00
2003	0.73	1.00								0.73
2004	0.64	0.50	1.00							0.77
2005	0.56	0.28	0.39	1.00						0.72
2006	0.51	0.20	0.22	0.46	1.00					0.76
2007	0.49	0.16	0.17	0.31	0.50	1.00				0.78
2008	0.47	0.14	0.14	0.25	0.34	0.46	1.00			0.78
2009	0.44	0.12	0.11	0.21	0.27	0.32	0.48	1.00		0.78
2010	0.43	0.11	0.09	0.19	0.22	0.24	0.33	0.50	1.00	0.78

TABLE D . Number of Destinations (Countries)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
2002	159									159
2003	153	16								169
2004	142	11	11							164
2005	139	10	3	13						165
2006	136	8	2	8	7					161
2007	134	7	2	7	5	16				171
2008	133	7	2	5	3	8	12			170
2009	133	7	2	4	3	7	6	11		173
2010	133	7	2	4	3	3	4	9	10	175
Survival rate										
2002	1.00									1.00
2003	0.96	1.00								0.96
2004	0.89	0.69	1.00							0.91
2005	0.87	0.63	0.27	1.00						0.93
2006	0.86	0.50	0.18	0.62	1.00					0.93
2007	0.84	0.44	0.18	0.54	0.71	1.00				0.96
2008	0.84	0.44	0.18	0.38	0.43	0.50	1.00			0.92
2009	0.84	0.44	0.18	0.31	0.43	0.44	0.50	1.00		0.95
2010	0.84	0.44	0.18	0.31	0.43	0.19	0.33	0.82	1.00	0.95

Table 24: Export dynamic in Morocco

Note: A. Number of exporting firms by year; B. Number of firms that exported and imported at the same period, by year; C. Number of products (SH 08 digits) by year; D. Number of countries by year.

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