WORKING PAPER

Mind the Measure:
On the Effect of Anti-Dumping Investigations in Egypt

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Abstract

The Anti-Dumping Agreement of the World Trade Organisation (WTO) determines when governments can or cannot respond to dumping. Indeed, the latter happens when a company exports a product at a price lower than the price it charges to its own home market. While this tool has been widely used by developed and developing countries, the literature on anti-dumping is rather scarce. Thus, this paper examines the impact of the anti-dumping measures initiated by the Government of Egypt on imports during the period 2001-2015. Our contribution is twofold. First, the paper distinguishes between the effect of anti-dumping measures on the value, the volume and the price of imports. Second, it differentiates between the investigation, destruction and diversion effects of anti-dumping measures. Our main findings show that, once the investigation is approved, whilst prices increase and quantities decrease, the latter is stronger than the former. Moreover, once the investigation is initiated, there is an investigation effect. This effect means that imports are likely to decrease during the investigation review period before the final decision of the WTO is announced. Second, anti-dumping measures have a significant destruction effect. This refers to imports coming from countries included in the investigation decreasing once the latter is approved. This decrease is even higher in the year following the anti-dumping duty being imposed. Finally, and as a consequence of the anti-dumping measure, a diversion effect is observed. This can be explained by the fact that the origin of imports will shift from countries targeted by the measure to those that are non-targeted.

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1. Introduction

Protectionism has substantially increased in recent years with higher tariffs being implied by the trade war between the US and China, the UK's Brexit negotiations and the frequent use of non-tariff measures (restrictions under the temporary trade barrier policies of anti-dumping, countervailing (anti-subsidy) duties, or safeguards). Such policies have a negative effect on cross-border supply chains and global trade in parts and components which, in turn, affects emerging countries, particularly Egypt, which relies heavily on imported intermediate inputs. One of the protectionist measures that has been used recently is anti-dumping. This can be defined as measures taken by a government when exporters sell products at a price lower than the domestic price. The effects of dumping are heterogenous; whilst consumer welfare improves with lower prices, domestic producers are negatively affected because of unfair competition. Moreover, whilst exporters who sell at lower prices are likely to gain larger market shares, this is an expensive policy to maintain.

The WTO, in order to guarantee fairer competition in international markets, gives its members the right to adopt anti-dumping measures as a means of protection, so as to protect domestic producers. In fact, the "Anti-Dumping Agreement" focusses on how and when governments can or cannot react to dumping. In general, the procedure starts when a country is disadvantaged by imported products whose price is lower than the "normal value[3]". Next, a detailed investigation has to be conducted, based on the rules provided by the Agreement. If there is evidence that dumping is taking place and domestic industry is being adversely affected, the investigation is approved. Thus, the complainant country proceeds with the imposition of anti-dumping duties that can be retrospective under specified circumstances, if injury may have occurred during the period of investigation. Finally, it is important to note that, generally, anti-dumping measures must expire five years after the date of imposition, unless an investigation shows that ending the measure would lead to injury.

At the global level, the number of anti-dumping investigations initiated has increased significantly in both developed and developing countries since the ratification of the *Anti-Dumping Agreement* in 1994. Indeed, they increased from 157 in 1995 to 248 in 2017, with a peak of 372 in 2001, before China joined the WTO. At the regional level, Egypt is the most prominent country that initiates anti-dumping measures, numbering over 100 measures during the period 1995-2017, whilst for Morocco it is only 14, for the Gulf Cooperation Countries 5 and Jordan 1. This is why it is worth examining the Egyptian case, in order to see whether such measures produce this hoped-for protectionist effect when other factors are involved.

Several empirical papers have been conducted recently investigating the different possible effects of anti-dumping measures. From this, the literature has detected three key effects of anti-dumping measures. First, anti-dumping duties

[3] Three methods can be used to determine the normal value: first the price in the exporter's domestic market; second, when this cannot be used, two alternatives are available: either the price charged by the exporter in another country, or a calculation based on the combination of the exporter's production costs, other expenses and normal profit margins.

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increase the price of the imported goods, implying a possible contraction of imports from the countries under investigation. This *destruction effect* was the subject of consensus between the majority of theoretical and empirical papers on anti-dumping. They shed light on a price and quantity effect. Whilst the latter shows that quantity will decline, the former is related to higher prices because of the anti-dumping duty. Secondly, only the initiation of the anti-dumping investigation could have an impact on trade, even in the event of a subsequent rejection of the imposition of tariffs. For example, the dumping country would have an incentive to reduce the injection of its product into the importing market, for fear of a likely tariff in the future. This effect, known as the *investigation effect*, was detected in the United States by Staiger and Wolak (1994), Krupp and Pollard (1996), and Prusa (2001) and Cuyvers and Dumont (2005) in the case of the EU. Third, anti-dumping could have the effect of diverting imports from countries concerned by the anti-dumping measures to those non-concerned countries. Other trading partners could, therefore, benefit from increased exports through the elimination of their most effective competitor. This trade *diversion effect* was detected by Prusa (1997) in the United States, by Brenton (2001) in the European Union and by Park (2009) in China.

Against this background, this paper examines the impact of the anti-dumping measures initiated by the Government of Egypt on imports during the period 2001-2015. Our contribution is twofold. First, the paper distinguishes between the effect of anti-dumping measures on the value, the volume and the price of imports. Second, it differentiates between the investigation, destruction and diversion effects of anti-dumping measures. Moreover, our paper is the first to tackle the effect of anti-dumping measures in the Middle East and North Africa (MENA) region, since most of the previous studies have focussed more on the cases of the United States, the EU and the Asian countries.

Our main findings show that, once the investigation is approved, whilst prices increase and quantities decrease, the latter is stronger than the former. Moreover, once the investigation is initiated, there is an *investigation effect*. This effect means that imports are likely to decrease during the investigation review period, before the final decision of the WTO is announced. Second, anti-dumping measures have a significant *destruction effect*. This refers to imports coming from countries being included in the investigation decrease, once the latter is approved. This decrease is even higher in the year following the anti-dumping duty being imposed. Finally, and as a consequence of the anti-dumping measure, a *diversion effect* is observed. This can be explained by the fact that the origin of imports will shift from countries targeted by the measure to those countries that are non-targeted.

The rest of the paper is organised as follows. Section 2 reviews the literature. Section 3 presents some stylised facts on anti-dumping measures in developing countries in general and in Egypt, in particular. Section 4 is dedicated to the econometric specification and data. Section 5 analyses the results and Section 6 provides the conclusion.

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2. Literature review

a. Theoretical Framework

Relevant theoretical papers have mainly tackled the reaction of firms to the initiation of anti-dumping measures against their exports. In the light of these studies, the behaviour of firms was analysed using a two-period duopoly model. Based on the analysis conclusions, the studies were divided into three main branches.

First, Fischer (1992) and Pauwels et al. (1997) constructed a model consisting of two firms: one domestic, one foreign. If the foreign firm was accused of dumping in the first period, it will be punished by the imposition of an anti-dumping duty on its exports in the second period. The value of the duty is determined upon the dumping margin (the difference between the export price and the price of the product in the local market of the exporting firm) detected in the first period. With the aim of eliminating its foreign competitor, the domestic firm will have an incentive to increase its production level in the first period in order to reduce the home-market price, thus compelling its foreign competitor to increase its dumping margin. In turn, a higher dumping margin leads to a higher anti-dumping duty in the second period. Consequently, the two papers claimed that the foreign firm would likely reduce its exports in the first period, so as to reduce the encountered anti-dumping duty in the following period.

In the same context, Reitzes (1993) analysed the impact of anti-dumping measures on the welfare of the domestic economy in the second period. He concluded that the effect on the total surplus will depend on the nature of competition between the two firms. Under quantity competition (the case of a Cournot duopoly), there will be an improvement in the domestic welfare, as long as the increase in output of the domestic firm completely offsets the reduction in exports of the foreign firm. The transfer of sales from the foreign firm to the domestic one does not affect the consumer surplus. However, selling additional output increases the domestic firm's profits and, hence, the producer surplus. On the other hand, under price competition (the case of a Bertrand duopoly) with perfectly substitutable goods, the domestic welfare tends to decline in the second period. The imposition of an anti-dumping duty reduces the consumer surplus by increasing the price of the dumped product in the home market.

Second, Anderson (1992) concluded that the foreign firm will tend to increase its exports in the first period when there is a positive probability of a future imposition of voluntary export restraints (VERs) by the foreign economy. Since VER restricts the country's exports of a certain product to another country, export licences are allocated to firms based on their market share prior to the VER. Therefore, an exogenous increase in the probability of a VER incites the firm to increase its exports in order to raise its market share, thus gaining a greater share of export licences. In the context of perfect competition, firms are likely to engage in dumping by exporting at a price below their marginal cost in order to increase their sales. Consequently, a VER threat is likely to stimulate dumping which, in turn, stimulates anti-dumping measure enforcement by the importing country. The anti-dumping threat increases then

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follows the probability of a VER. It is a domino effect, according to which anti-dumping measures may increase dumping, instead of eliminating it.

Third, Blonigen and Ohno (1998) introduced the idea that the reaction of the foreign firm will depend on its ability to engage in future foreign direct investments (FDI) instead of exporting. They used a Cournot duopoly model in which two foreign firms from different countries compete in terms of the exported quantity to the home country. The threat of a duty imposition, following the launch of an anti-dumping investigation by the domestic country, could generate different reactions. If the two firms do not intend to engage in FDI in the domestic country in the second period, they will reduce their exports in the first period, in order to reduce the duty in the following period. In contrast, if the two firms intend to engage in FDI in the second period, they will continue to export the static Cournot output levels in both periods. Finally, if one of the two firms decides to engage in FDI, it will tend to increase its first-period exports, in order to raise the anti-dumping duty imposed on the other foreign firm in the second period. This phenomenon is called "protection-building trade." The firm intensifies its dumping activity in order to build stronger trade barriers against its foreign competitor in the future.

b. Empirical Studies

The majority of empirical papers tackling the effects of anti-dumping measures have mainly focussed on the investigations initiated by the United States and the European Union. On the other hand, papers focussing on developing countries represent a minority. In general, almost all the studies have concluded that anti-dumping duties exert a significantly negative impact on imports coming from countries named in the investigation. Moreover, empirical studies have extended the analysis to detect other possible effects of anti-dumping measures.

First, regarding the case of the United States, a part of the empirical research has focussed on detecting the effect of initiation of an anti-dumping investigation before the imposition of a duty (investigation effect). Staiger and Wolak (1994) estimated the impact of the anti-dumping investigations initiated by the United States between 1980 and 1985. Imports subject to anti-dumping measures fell by 50% following the initiation of the investigation, reflecting an important investigation effect. Similarly, Krupp and Pollard (1996) detected an investigation effect in the majority of cases related to the US chemical industry during the period from 1976 to 1988. The imports subject to anti-dumping measures declined during the period of the investigation.

In the same context, Prusa (2001) covered the anti-dumping investigations initiated by the US during the period 1980-1994. The value of imports from countries subject to investigation fell broadly by 50% to 70% during the first three years of imposition of the anti-dumping duty. As an aside, the study has concluded that imports were affected during the investigation period. Even when the case was closed, without leading to the imposition of a duty, the decrease in the value of imports was similar to the cases where a duty was imposed. The investigation phase also seemed to

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have a more pronounced effect on import volumes than import prices. The price increases were relatively small and insignificant.

Another area of the studies proved the existence of a significant effect of trade diversion that can largely offset the protectionist effect of anti-dumping measures. They found that imports from countries that were not named in the investigation were positively affected by anti-dumping measures. Prusa (1997) tackled a group of 428 anti-dumping investigations, initiated by the United States between 1980 and 1988. Lee, Park and Cui (2013) covered 62 cases filed between 1994 and 2011. Both studies showed that anti-dumping measures had significantly reduced imports, subject to investigation from named countries. However, this reduction was almost offset by the increase in US imports from unnamed countries. Imports were, hence, diverted from countries that were subject to investigation to the other non-subject countries. Therefore, trade diversion mitigates the effectiveness of anti-dumping measures in protecting domestic producers against foreign competition.

On the other hand, Prusa (2001) found that the effect of trade diversion towards unnamed countries counterbalances only one third of the decline in imports from named countries. Similarly, Lee, Park and Saravia (2017) covered anti-dumping investigations initiated by the US against China between 1998 and 2006. They found that the trade diversion effect was positive but weak. The paper also confirmed the significant effect exerted by the size of the anti-dumping duty: the higher the size of the duty, the sharper the decline in the volume, as well as the value of imports.

In the case of the European Union (EU), there is a consensus amongst the various papers that anti-dumping duties reduce imports from countries targeted by the investigation. However, studies have not reached a single conclusion regarding the effect of trade diversion towards the non-subject countries.

In fact, the trade diversion effect was found to be significant in some of the studies conducted on the EU. Brenton (2001) focussed on anti-dumping investigations initiated by the EU between 1989 and 1994. He detected a significant increase in the volume of imports from unnamed countries, specifically from non-EU countries, two years after the initiation of the investigation. The diversion of imports to these countries was also found to be stronger when three or more countries were named in the investigation. On the other hand, imports from other EU members that were not named in the investigation, were not significantly affected. In addition, the initiation of the investigation had a significantly positive effect on prices of imports from unnamed countries in the rest of the world. This observation led to the conclusion that unnamed exporters may have decided to increase their prices in order to avoid the risk of being subject to any EU anti-dumping investigations in the future.

Falvey et al. (2004), using a robust regression technique, proved the presence of a trade diversion effect. But, unlike Brenton (2001), they found that the size of the imposed duty had a significant impact on imports. When the anti-dumping duty is higher, the drop in imports from named countries is greater. Cuyvers and Zhou (2009) focussed solely on EU imports from the US and China. Their main conclusion was that anti-dumping measures, initiated by the EU against US products, implied a significant

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increase in the EU imports of these subject products from China. In this case, the anti-dumping measures created a trade diversion effect that benefitted the Chinese firms.

Meanwhile, some other studies that were conducted on the EU did not find any significant evidence of the trade diversion effect. Konings, Vandenbussche and Springael (2001) studied the impact of anti-dumping measures on EU imports from countries that are not named in the investigation. They used two techniques, allowing for the estimation bias: the robust regression method and the Heckman selection method (1976). However, no diversion effect was detected. Cuyvers and Dumont (2005) focussed on EU imports from ASEAN countries between 1991 and 2001. Similarly, in order to avoid an estimation bias, the paper conducted fixed effects estimation, instrumental variables (IV) estimation, as well as the generalised method of moments (GMM) estimation used by Prusa (2001). The trade diversion effect was not observed, but they noticed the presence of a significant investigation effect on the volume of imports. The launch of the anti-dumping investigation reduced the import volumes more than proportionally to the increase in import prices from named countries.

At the developing countries level, Niels (2003) studied the trade effects of anti-dumping measures initiated by Mexico during the period 1992-1997. The paper found neither trade diversion nor investigation effect. By contrast, it found that anti-dumping measures led to a strong fall in the volume of imports from named countries by 81% and an increase in their price by 42%. The anti-dumping measures, therefore, had the desired protectionist effect, since the reduction in imports from named countries was not offset by an increase in imports from unnamed countries.

India was also a country of interest for some authors, given its large number of anti-dumping investigations. Ganguli (2008) covered 285 anti-dumping investigations initiated by the Indian authorities between 1992 and 2002. In order to estimate the anti-dumping trade effects, he used a generalised method of moments (GMM) following Arellano and Bond (1991, 1993). Aggarwal (2011) used panel data that covered all the Indian cases filed between 1994 and June 2001. Three types of estimators were used in the regression: LSDV estimators, IV estimator and the GMM estimator of Arellano and Bond (1991). Both papers confirmed the significant negative impact of anti-dumping measures on Indian imports from named countries. They have also concluded that there was a trade diversion effect that benefitted the unnamed countries. But, unlike the case of the United States in some studies, the increase in imports from unnamed countries was not sufficient to offset the initial reduction in imports from named countries. Therefore, in the light of these two studies, in the case of India, the anti-dumping measures were found to be effective. They were able to provide a sort of protection for Indian producers from foreign competition.

Park (2009) examined the impact of anti-dumping measures initiated by China during the period 1995-2004. Similarly, following Arellano and Bond (1991), a GMM estimation was used in order to avoid a possible bias in the estimated coefficients. The study inferred a significant reduction in the share of imports from named countries following the initiation of the anti-dumping investigation. In addition, the study concluded that there was a significant effect of trade diversion. The decline in imports from named countries was largely offset by the rise in imports from unnamed

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countries. The expected gain by Chinese producers was reduced, therefore, since the protectionist effect of the anti-dumping measures was more or less neutralised.

To conclude, the literature has underlined the existence of three key effects of anti-dumping measures. The first one is the protectionist effect that reduces imports subject to anti-dumping from named countries. The second one is the investigation effect through which imports are affected by the initiation of the anti-dumping investigation before the final decision is made. The third one is the trade diversion effect through which imports are diverted from countries named in the investigation towards unnamed countries. In some cases, this latter effect may be very important in a way that counterbalances the anti-dumping protectionist effect. The effectiveness of anti-dumping measures is eliminated, therefore, when the increase in imports from unnamed countries equals or exceeds the decline in imports from named countries.

This paper contributes to the literature in two main aspects. First, the paper distinguishes between the trade effects of anti-dumping measures initiated by Egypt on the value, the volume and the price of imports. Second, it assesses both the direct and indirect effects of anti-dumping measures on Egypt's trade partners. Also, this paper is the first to tackle the case of Egypt, a country in the MENA region, unlike other papers in the literature that have mainly focussed on the cases of the United States, the EU and the Asian countries.

c. Stylised Facts

Procedures for the imposition of anti-dumping measures were introduced under the "*Anti-Dumping Agreement*" between WTO member countries in 1994. The Agreement provides detailed rules/conditions to which members must comply with, in order to impose an anti-dumping measure. First, the initiating country must prove the existence of dumping by the country under investigation. Second, the initiating country must show actual injury or threat of potential injury to a domestic industry. Third, the country must prove a causal link between the dumped imports and the injury to the domestic industry. After the initiation of the investigation and its review by the authorities of the initiating country, a decision is made as to whether or not to impose an anti-dumping duty on the country's imports, subject to the investigation. The amount of the duty is normally determined by the margin of dumping which measures the difference between the price at which the product is imported and its price in the country of origin. The period of imposition of duty under the Anti-Dumping Agreement is approximately five years. Thus, the initiating country must notify the WTO of the anti-dumping measures initiated (World Trade Organisation, Anti-Dumping Agreement).

This section will provide a general overview of anti-dumping measures using two datasets. First, trade data is extracted from Trade Map (developed by the International Trade Centre). We rely on products disaggregated at the 6-digit level (HS6). As per anti-dumping, initiated investigations are obtained from the "Global Anti-dumping Database" built by the World Bank.

Globally, Figure 1 highlights the increase in the number of anti-dumping investigations initiated by different countries between 1995 and 2017 by 57%. From

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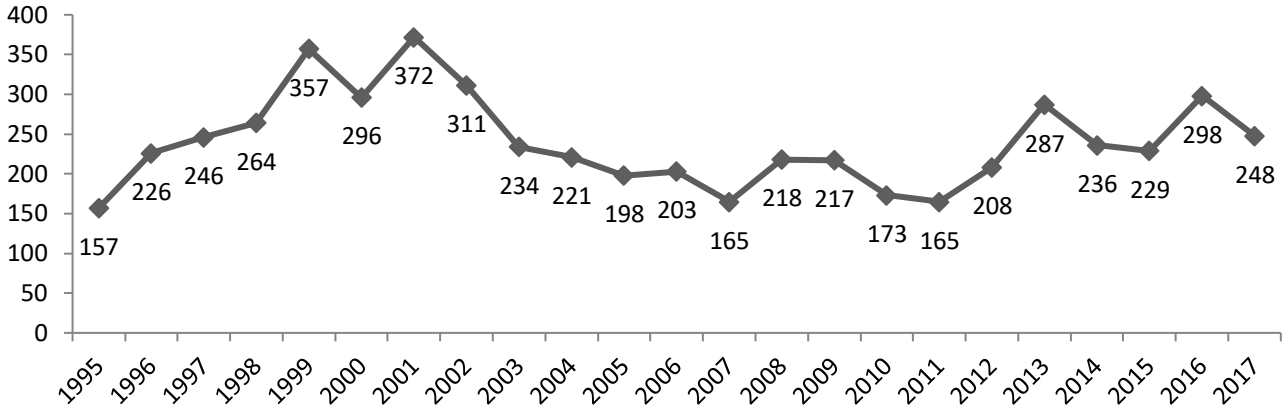
1995 (the year of the signing of the Anti-Dumping Agreement), the number of investigations initiated increased exponentially, reaching its highest level of 372 investigations in 2001.

Figure 1: Number of Anti-Dumping Investigations at the World Level (1995-2017)



Source: Constructed by the authors using the WTO dataset.

According to Figure 2, the top six users of anti-dumping measures are both developing countries, such as India, Brazil and Argentina, and developed countries such as the United States, the Union European and Australia. India is the world's largest user of anti-dumping measures, having initiated 888 investigations during the period 1995-2017. According to Aggarwal (2011), the exponential increase in the number of anti-dumping investigations initiated by India is the result of the trade liberalisation policies adopted by the Indian government since the 1990s. The more the country is open to international competition, the more it tends to engage in anti-dumping measures to protect its domestic producers. Whilst China has a low number of investigations (258), it ranks first in terms of accusations, with more than 1000 investigations raised against her by both developed and emerging countries.

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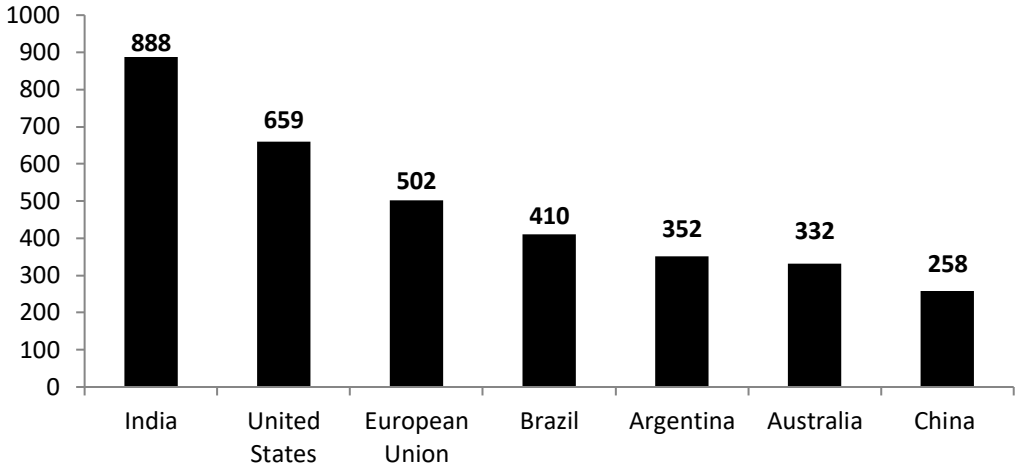
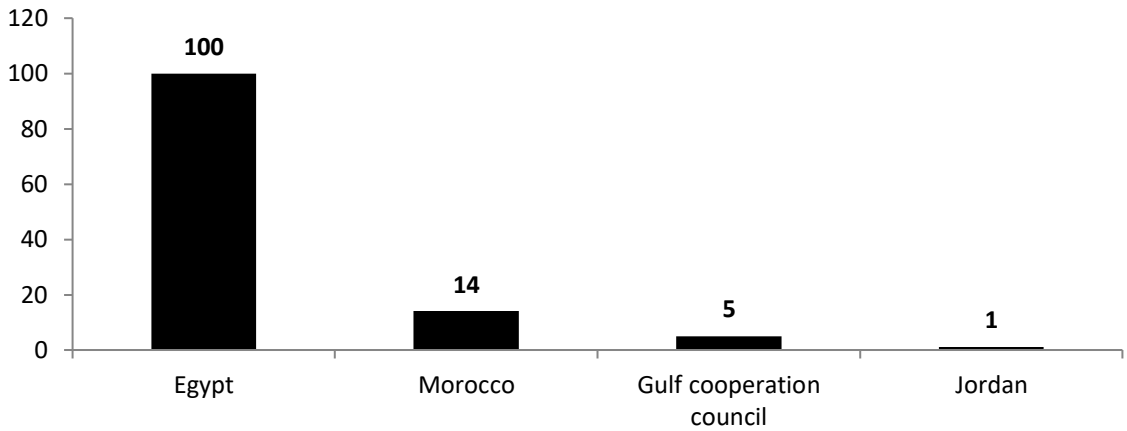
Figure 2: Number of Anti-Dumping Investigations by Country (1995-2017).



Source: Constructed by the authors using the WTO dataset.

At the MENA region level, Figure 3 shows that Egypt is the main user of anti-dumping measures in the MENA region. According to WTO anti-dumping data, during the period 1995-2017, MENA countries initiated 120 anti-dumping investigations, 100 of which were initiated by Egypt. Morocco comes in second place with 14 open investigations, then the Gulf Cooperation Council with 5 investigations and finally Jordan with a single investigation.

Figure 3: Investigations Initiated by the MENA Countries (1995-2017)



Source: Constructed by the authors using the WTO dataset.

Figure 4 compares Egypt with some economies that have a similar share of imports of manufactured goods amongst total merchandise imports. Indeed, it is worth seeing whether similar countries with similar import shares initiate more or fewer anti-dumping investigations. This set of countries includes some in the MENA region with a trade structure and a level of income similar to Egypt, such as Tunisia, Morocco and Jordan. It also includes Algeria, an oil-exporting country in the MENA region and other emerging countries outside the MENA region, such as Chile and

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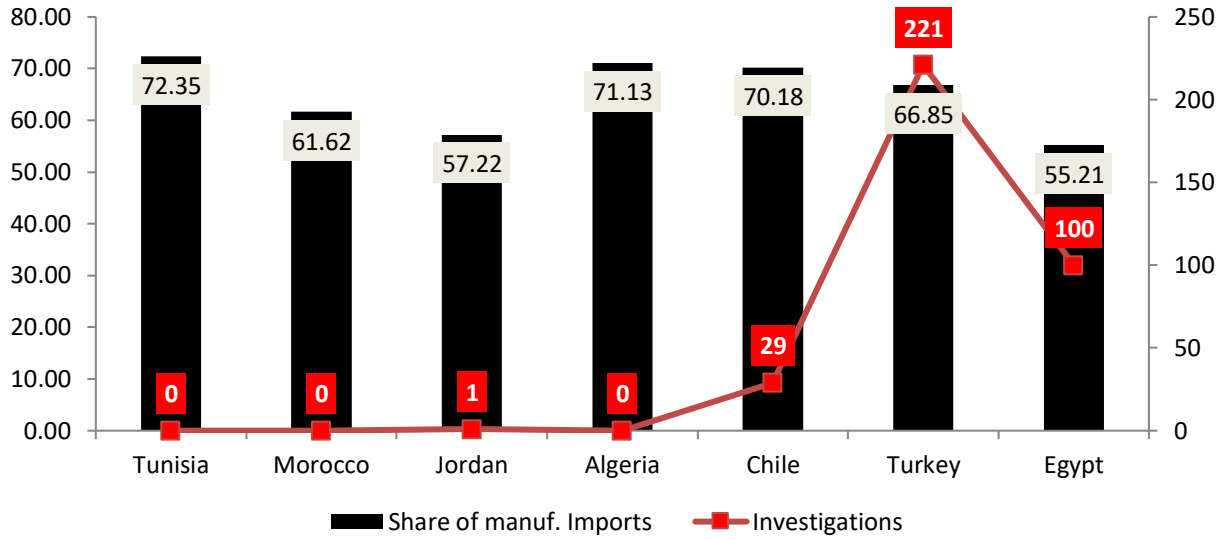
Turkey. Whilst Egypt and Jordan have approximately the same share of imports of manufactured goods of around 55%, Egypt initiated 100 anti-dumping investigations and Jordan only one. Tunisia, Morocco and Algeria did not initiate any investigations during the period 1995-2017 and their imports of manufactured products contribute between 60% and 70% of imported goods. As for Turkey and Chile, the share of imports of manufactured goods is slightly higher than that of Egypt, however, 29 investigations were initiated by Chile and 221 by Turkey. Therefore, there is a wide disparity between the countries selected in terms of the number of investigations, although the shares of imports of manufactured goods are quite similar. In addition, it is important to note that, compared to other countries, Egypt initiates more investigations than other countries who have a similar structure of trade.

Figure 4: Share of Manufactured Imports in Total Imports and the Number of Initiated Investigations (1995-2017)



Source: Constructed by the authors using the WTO dataset.

Hence, it is important to further analyse the Egyptian case. Between 2001-2015 (latest data available), Egypt opened 55 investigations against 16 countries according to the half yearly reports submitted by Egypt to the WTO Anti-Dumping Committee. Figure 5 shows that China, by being cited in 15 investigations, is the country most targeted by anti-dumping investigations. Second is India, cited in 9 surveys. When we compare the number of investigations initiated to the number of approved cases, one can note that more than half the investigations initiated against each country are approved. From the 55 investigations initiated by Egypt, 34 investigations were approved. In these cases, the WTO allowed the Egyptian Government to impose an anti-dumping duty on the product imported from the country under investigation, in order to protect Egyptian producers from unfair foreign competition.

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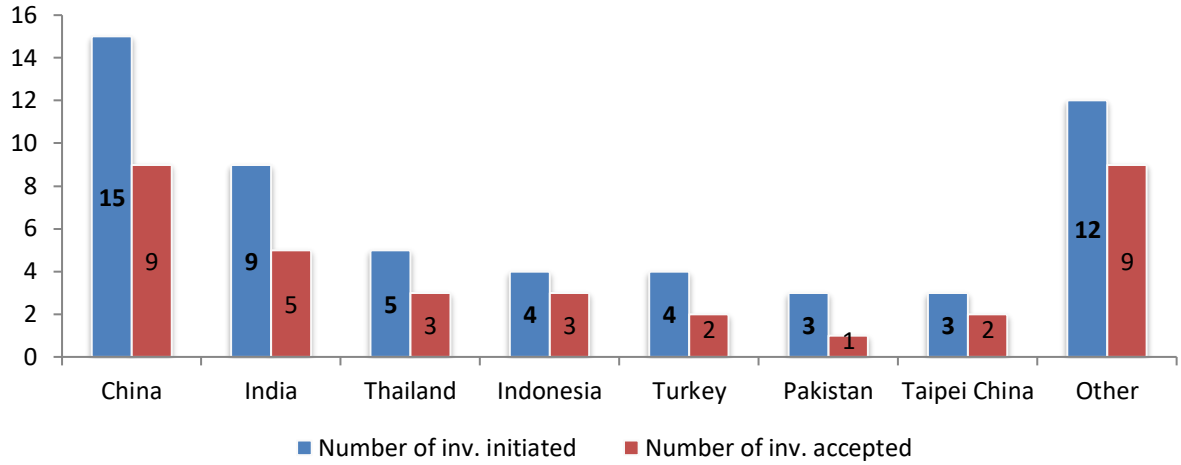
Figure 5: Initiated and Accepted Investigations by Egypt (2001-2015)



Source: Constructed by the authors using the WTO dataset.

At the product level, Table 1 shows the products which were subject to anti-dumping measures initiated by Egypt over the same period. Polyethylene terephthalate ranks first, with 8 anti-dumping investigations. Lamps, tyres and matches were the subject of between 4 and 6 investigations. The other investigations are fairly equally distributed over a wide range of products, as highlighted in Table 1.

Table 1: Anti-Dumping Measures Initiated by Egypt (2001-2015)

Organic chemicals		
Dioctyl Ortho-phthalates (DOP)	291732	2
Essential oils, perfumes, cosmetics, toiletries		
Wet Wipes	330710 - 330720 330749 - 330790	1
Explosives; pyrotechnic products		
Matches	360500	4
Plastics and articles thereof		
Polyethylene Terephthalate	390760	8
PVC Floor and Wall Coverings	391810	1
Plastic Containers (Boxes)	392310	1
Rubber and articles thereof		
Passenger Car Tyres and Light Truck Tyres	401110	5
Passenger Car Tyres and Light Truck Tyres	401120	2
Man-made staple fibres		
Synthetic Staple Fibres	550320	2
Other man-made textile articles		
Blankets of Synthetic Fibres (excluding Electric Blankets)	630140	1
Ceramic products		
Porcelain and Ceramic Tableware	691110	3
Iron and steel		
Steel Rebar (Bars/Rods/Coils)	721210 - 721310 721391 - 721399 721420 - 721491 721499 - 721590	1

Articles of iron or steel		
Wood Screws and Self-Tapping Screws made of Iron or Steel	731812 - 731814	1
Miscellaneous articles of base metal		
Coated Electrodes of Base Metal for Electric Arc-welding (Welding Wires)	831110	2
Electrical machinery and equipment		
Electric Motors	850152	1
Electric Filament Lamps	853929	6
Fluorescent Lamps	853931	5
Miscellaneous manufactured articles		
Slide Fasteners	960711	1
Ball Point Pens	960810	2
Felt Tip Colouring Pens	960820	1
Pencils	960910	4

Source: Constructed by the authors using the WTO dataset.

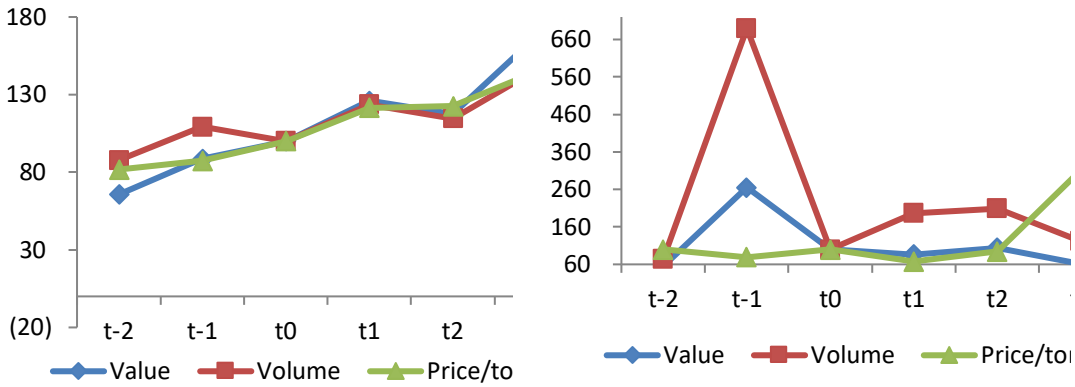
Next, we examine the effect of each initiated investigation on the evolution of Egyptian imports affected by anti-dumping in terms of value, volume and price. To do so, we compare the development of imports before and after the initiation of the anti-dumping investigation with *t0* being the year of investigation initiation; *t1* the year of the final decision that takes the form of imposing a duty if the investigation is accepted. Whereas years *t-1* and *t-2* represent the two years preceding the year the investigation is initiated, *t2* and *t3* are the following two years after the final decision is made. Across our analysis, we compare both approved and rejected investigations.

Figure 6(a) shows the evolution of total imports, subject to approved anti-dumping investigations and, therefore, giving rise to the imposition of a duty in *t1*. The value of total imports increased by 11.4% in the year of investigation and by 26% in the year in which the anti-dumping duty was imposed. This increase, in terms of value in *t0,* is explained by the increase in the price of imports by 12.7%, which is sufficient to overcome the decrease in volume by 9.3% in the same year. Thus, these trends show that foreign producers are likely to increase their prices and reduce their export quantities in order to avoid potential anti-dumping duties. We describe this as being the "*investigation effect*". As per rejected investigations, Figure 6 (b) shows that the value and volume of total imports fell significantly in *t0* with the initiation of the investigation, whilst the price increased. Thus, this chart suggests that the *investigation effect* could also be valid in the case of rejected investigations, given the evolution of volume and price following its initiation. Yet, once the investigation is dismissed, once again foreign producers reduce their prices and increase the quantity they export[4].

[4] In the case of rejected investigations, there is a peak in the volume of imports because of the exceptional increase by 96.26% in the share of the product "Bars of iron or non-alloy steel" having the code HS 721420, whose volume has been multiplied by 27.3 in t -1.

Figure 6: Total Imports of Products subject to Anti-Dumping Measures

(a) Approved Investigations **(b) Rejected Investigations**



Source: Constructed by the authors using the WTO dataset and TradeMap (ITC).
Note: t-1 and t-2 represent the years preceding the investigation initiation, to is the reference year (where the investigation was initiated, t1 the year where the decision was made and t2 and t3 the years after the decision was taken.

For a more detailed analysis, it is important to compare the change in imports for both the two groups: countries targeted by the anti-dumping investigations (Figure 7) and those that are not (Figure 8). First, for targeted countries, Figure 7 (a) shows that the value of imports remains unchanged with the initiation of the investigation in *to* whilst the quantity of imports falls and prices rise for approved investigations. With the imposition of an anti-dumping duty in *t1*, the value and quantity of imports fell by around 20% whilst prices increased by 26%. Afterwards, the value of imports continues its downward trend and prices maintain their upward trend. Imported quantities do not start increasing again until *t3*. As per rejected investigations (Figure 7(b)), value and quantities of imports from the investigated countries decrease in *to* and prices increase. After the rejection of the investigation, prices decrease to a level lower than before the investigation and continue to decrease in *t2* and *t3*. Yet, quantities increase slightly but do not reach their pre-investigation level. In a nutshell, the investigation effect can be validated in both cases, in either approved or rejected investigations.

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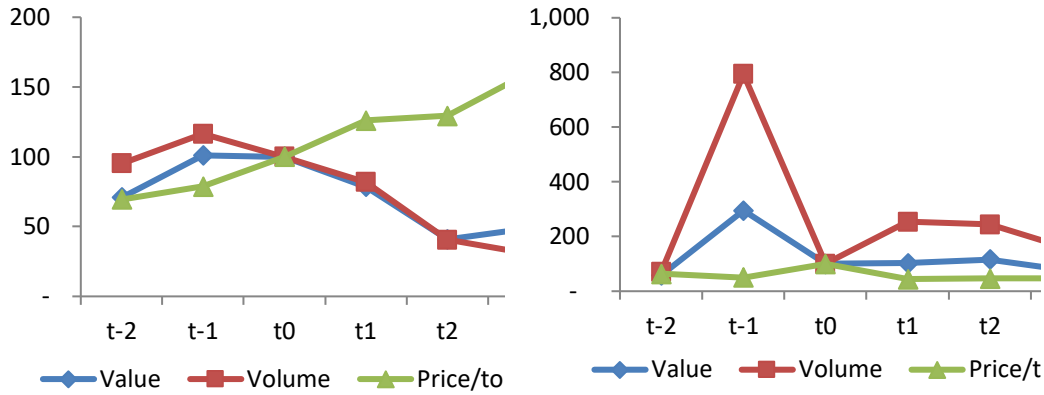
Figure 7: Imports from Targeted Countries

(a) Approved Investigations **(b) Rejected Investigations**



Source: Constructed by the authors using the WTO dataset and Trade Map (ITC).
Note: t-1 and t-2 represent the years preceding the investigation initiation, t0 is the reference year (where the investigation was initiated, t1 the year where the decision was made and t2 and t3 the years after the decision was taken.

Whilst the effect is evident for targeted countries, it is important to compare this with non-targeted countries. Indeed, if imports from targeted countries are likely to decrease, one can expect trade diversion from targeted to non-targeted countries. Figure 8(a) shows that, in the case of approved investigations, the value and volume of imports increased by 60% when an anti-dumping duty is imposed in *t1* and continue to increase until *t3*. This upward trend starts with the investigation initiation, even before imposing any duty. Thus, the data suggests the possibility of trade diversion to countries that are not targeted by the investigation. In other words, producers in these countries should increase the quantities they export to Egypt, in order to take advantage of the declining competitiveness of their competitors, whose products become more expensive. As for rejected investigations, Figure 8(b) shows that value and volume of imports also fell in *t0* once the investigation is initiated. One possible explanation behind this result is that countries that are not targeted by the investigations might opt for decreasing their exports to avoid being cited later in the investigations. In the following years, the value of imports from non-targeted countries continued to decrease whilst the volume increased in *t1* and *t2*.

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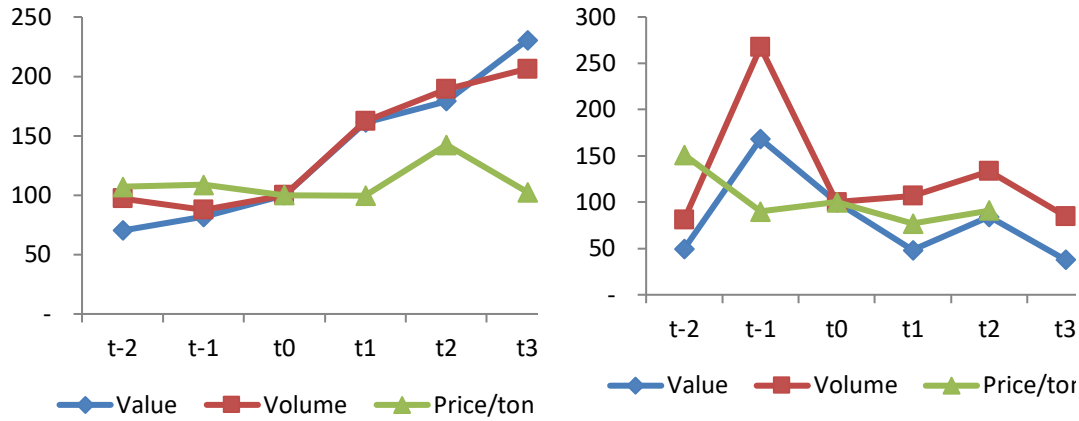
Figure 8: Imports from Non-Targeted Countries

(a) Approved Investigations **(b) Rejected Investigations**



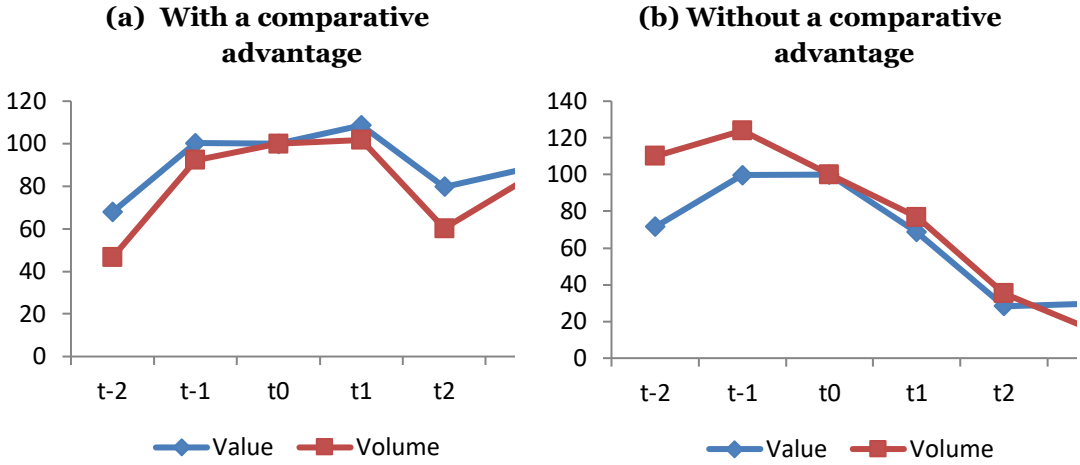
Source: Constructed by the authors using the WTO dataset and TradeMap (ITC).
Note: t-1 and t-2 represent the years preceding the investigation initiation, to is the reference year (where the investigation was initiated, t1 the year where the decision was made and t2 and t3 the years after the decision was taken.

Finally, we examine the same effects for products where Egypt has a comparative advantage, compared to those where it does not. Of the 55 investigations initiated between 2001 and 2015, only 7 investigations are related to products in which Egypt had a comparative advantage[5]. This can potentially be explained by a tendency towards protecting sectors that do not have a comparative advantage, whose share is 86% of the total number of investigations. Figure 9 displays the same figures presented above, but for sectors with (9a) and without (9b) there is a comparative advantage in the case of approved investigations. It is obvious that the value and quantity of imports originating from countries subject to approved investigations decrease significantly, as previously shown. Yet, it is worth noting that the decrease in sectors without a comparative advantage (a decline of 70% in *t3*) is much more pronounced than those with a comparative advantage.

In a nutshell, the use of anti-dumping measures has been intensified since the signing of the anti-dumping agreement in 1995 between members of the WTO, especially Egypt in the MENA region. At the aggregate level, an investigation effect is evident, since once Egypt files an anti-dumping case, imports from targeted countries decrease. This effect is obviously more pronounced for approved investigations when compared to those that are rejected and more for sectors where Egypt does not have a comparative advantage. At the same time, imports from non-targeted countries increase significantly after the initiation of the investigation.

[5] We used data from the International Trade Center to calculate the Revealed Comparative Advantage index in order to identify sectors that have a comparative advantage.

Figure 9: Imports from Targeted Countries and Approved Anti-Dumping Measures



Source: Constructed by the authors using the WTO dataset and TradeMap (ITC).
Note: t-1 and t-2 represent the years preceding the investigation initiation, t0 is the reference year (where the investigation was initiated, t1 the year where the decision was made and t2 and t3 the years after the decision was taken.

3. Model and Data

In order to estimate the impact of the anti-dumping measures initiated by Egypt on Egyptian imports, we adopt an augmented specification of Prusa (2001) and Falvey et al. (2004) as follows:

$$ln\, x_{i,j,t} = \alpha + \beta_0\ ln\, x_{i,j,t-1} + \beta_1\ ln\left(x_{i,j,t-1}/x_{i,j,t-2}\right) + \beta_2\ Targ_{i,j,t} + \beta_3\ NumNamed_{i,j,t} + \beta_4\, ln\, Duty_{i,j,t} + \beta_5\, t_n + +\beta_6\ \left(t_n\ dec_{i,j,t}\right) + \varepsilon_{i,j,t}\ n = 0,1,2,3 \quad (1)$$

where $x_{i,j,t}$ indicates imports of product i from country j in year t, *Targ* is a dummy variable that takes the value of 1 when the partner is subject to an anti-dumping investigation and 0 otherwise. This variable captures the imports reaction when the trading partner is subject to an anti-dumping investigation. It is important to note that, at the time of the investigation initiation, imports could already be high because of the potential dumping exerted by the targeted country. Moreover, the investigation period normally takes one year from its initiation. For this reason, the target variable is constructed in a way that it takes the value of 1 starting the following year after the initiation of the investigation, until the end of the anti-dumping measures against the concerned country. The end date of the measure corresponds to that of the termination of the investigation, in the event of a rejection, or that of the elimination of the anti-dumping duty if the investigation has been approved. *NumNamed* is a dummy variable that takes the value of 1 when three or more countries are included in the

investigation and 0 otherwise. Theoretically, according to Prusa (1997), when the number of countries named in the investigation is high, the diversion of imports to other non-targeted countries is expected to be higher. *Duty* indicates the value of the anti-dumping duty imposed on product *i* from country *j* in year *t*. We include several year dummies t_n as follows: t_0 represents the year of initiation of the investigation, t_1 corresponds to the year of final decision-making, t_2 and t_3 are the first and second year following the outcome of the investigation. We include an interaction variable between the time dummy and *Dec* which is a dummy variable that takes the value of 1 if the investigation is approved and zero otherwise. Finally, we include lagged values of imports, since they generally capture the inertia characterising imports that are determined by their past levels. ε is the error term.

We run three sets of regressions with three different dependent variables: the value, the quantity and the price of imports, in order to disentangle the quantity effect from the price effect of the anti-dumping measure. Indeed, whilst imposing an anti-dumping duty is expected to increase the price of the imported product[6], the volume of imports is supposed to decrease when prices increase.

Our sample includes data on the value, volume and price of Egyptian imports of 33 products from 135 countries during the period 2001-2015. Imports data is extracted from TradeMap on the International Trade Centre website at the HS6 level. Details of the initiated investigations related to the date of initiation, the final decision and the amount of the anti-dumping duty imposed, are obtained from the Global Antidumping Database (GAD) developed by the World Bank. GAD is a global database that includes all anti-dumping investigations initiated by all countries. Given the availability of data on Egyptian imports, the paper only covered the investigations initiated by Egypt between 2001 and 2015. We run our regressions using a fixed effects estimation technique, as suggested by the Hausman test.

4. Empirical Findings

Table 2 shows the results of the effect of anti-dumping measures on the value, volume and price of Egyptian imports. To start, results indicate that the volume of imports is negatively and significantly affected by the anti-dumping investigation, as suggested by the negative coefficient of the target variable. Indeed, the volume of imports from the targeted countries decreases by 31% compared to non-targeted countries. In the meantime, the price of imports increases by 28%. Yet, the coefficient of the value of imports turns to be insignificant. The number of countries included in the investigation has no significant effect on the value, volume or price of imports. Likewise, the amount of the anti-dumping duty imposed has an insignificant effect on the value and volume of imports, which supports the results of Brenton (2001) in the case of the EU. However, the duty effect on prices is significantly positive. When the

[6] It is important to note that some firms in the investigated country may reduce the profit margin of the exported good to offset the effect of the anti-dumping duty. This scenario will be more frequent if the amount of the duty imposed is low and the firm is able to reduce its margin.

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amount of the duty imposed increases by 1%, the price of imports increases by 0.12%, *ceteris paribus*.

The coefficient of the year of the final decision (t_1) is significantly positive for both the value and quantity of imports. This means that the value and volume of total imports of the product increase by 10% and 11.7% respectively in t_1 compared to t_0 (the year where the investigation is launched). One possible reason behind this increase is that imports from non-targeted countries increase more than the decline in imports from targeted countries. This trade diversion effect has been proved by Prusa (1997), Prusa (2001), and Lee, Park and Saravia (2017) in the case of the United States. In the same vein, Brenton (2001), Falvey et al. (2004), and Cuyvers and Zhou (2009) found similar results for the EU and Park (2009) for China. Indeed, anti-dumping measures fail to provide the desired protectionist effect, as the decline in imports from the countries under investigation is offset by the increase in imports of similar products originating from non-targeted countries.

The results also show that the increase in imports continues to be significant in t_2 and t_3 (the two years following the investigation result) for the value, quantity and prices of imports. This result suggests, consequently that, following the increase in the price of the products coming from targeted countries, Egypt continues to import the same products, but from other trading partners whose prices have become relatively lower. In addition, the significance of the dummy variable t_1 highlights the presence of an investigation effect in the Egyptian case. The initiation of the anti-dumping investigation affects total imports of the products concerned, even during the investigation period between t_0 and t_1. In other words, imports are immediately affected once the investigation has been initiated. This is in line with the results of Staiger and Wolak (1994), Krupp and Pollard (1996 and Prusa (2001) for the United States and Brenton (2001) and Cuyvers and Dumont (2005) for the EU. Finally, the interaction coefficient between *t* and *Decision* shows that, when the investigation is approved, both the value and quantity of imports from the targeted countries fall significantly one year after the implementation of the duty (in t_2). This decrease amounts to 38.7% for the value and 34% for the quantity of imports. This confirms the *destruction effect*. This is in line with the findings of Fischer (1992) and Pauwels et al. (1997) who argue that imports decrease in the wake of the approval of the anti-dumping investigation in the cases of the United States, the EU, Mexico, India and China. By contrast, it is worth noting that the effect vanishes in the following year, as suggested by the interaction coefficient *Dec* x t_3.

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Table 2: Total Imports and Anti-Dumping Measures

	(1) Value	(2) Volume	(3) Price
Ln(imports t-1)	0.340***	0.310***	0.190***
	(0.00599)	(0.00611)	(0.00660)
% Δ between t-1 and t-2	-0.0131	-0.0000952	-0.00947
	(0.0121)	(0.0118)	(0.0107)
Targeted	-0.176	-0.373***	0.248***
	(0.145)	(0.123)	(0.0650)
Number of count. ≥ 3	0.0493	0.0276	0.0205
	(0.0459)	(0.0391)	(0.0206)
Ln(Duty)	0.0839	-0.0141	0.118***
	(0.0607)	(0.0520)	(0.0274)
t1	0.0957**	0.111***	-0.000435
	(0.0373)	(0.0316)	(0.0166)
t2	0.125***	0.0947***	0.0444***
	(0.0366)	(0.0310)	(0.0163)
t3	0.164***	0.105***	0.0477***
	(0.0368)	(0.0310)	(0.0164)
t1 × Decision	-0.0448	0.122	-0.187
	(0.257)	(0.226)	(0.119)
t2 × Decision	-0.490*	-0.414*	-0.111
	(0.261)	(0.227)	(0.120)
t3 × Decision	-0.418	-0.291	-0.0734
	(0.281)	(0.237)	(0.125)
Constant	0.965***	0.694***	0.318***
	(0.0139)	(0.0109)	(0.00546)
Observations	25,142	24,966	24,966
R-squared	0.128	0.108	0.040
Number of id	1,479	1,479	1,479

Note: Standard errors between brackets.
*** p<0.01, ** p<0.05, * p<0.1

In order to check the trade diversion effect that takes place in the wake of the anti-dumping measure, we examine the impact on imports from countries that are not subject to the investigation. Table 3 illustrates the results for the value, volume and price of imports. Interestingly, the quantity of imports from non-targeted countries increases by 14.5% in t_1 (the year of final decision) compared to t_0 (the year of initiating the investigation). Similarly, the value of imports from non-targeted countries increases significantly in t_2 by 14.8% and in t_3 by 16.8% compared to t_0. Therefore, these results confirm the existence of a diversion effect of imports from the targeted countries to non-targeted ones, since Egypt imports less from the former and more from the latter, which explains why total imports are likely to increase. As for the price of imports, it is noted that the price decreases significantly in t_1 and t_3. This result could be justified by the fact that non-targeted countries tend to have lower relative prices (compared to the country that is accused of dumping) once duties are imposed and, hence, this helps them export more to Egypt and benefit from a higher market share.

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Table 3: Results for Non-Targeted Countries

	(1) Value	(2) Volume	(3) Price
Ln(imports t-1)	0.431***	0.334***	0.136***
	(0.0158)	(0.0180)	(0.0206)
% Δ between t-1 and t-2	-0.109***	-0.0659***	0.0300*
	(0.0142)	(0.0156)	(0.0158)
t1	0.0577	0.135*	-0.130***
	(0.0727)	(0.0750)	(0.0422)
t2	0.138*	0.120	-0.0625
	(0.0707)	(0.0735)	(0.0413)
t3	0.155**	0.0882	-0.114***
	(0.0695)	(0.0725)	(0.0409)
Constant	9.713***	2.719***	1.279***
	(0.0806)	(0.0754)	(0.0326)
Observations	5,100	4,106	4,106
R-squared	0.155	0.102	0.033
Number of id	688	587	587

Note: Standard errors between brackets.
*** p<0.01, ** p<0.05, * p<0.1

In a nutshell, the results of our regressions indicated that the volume of imports from targeted countries is negatively affected by the anti-dumping measures. Whilst the size of the duty imposed significantly increases import prices, it does not affect the volume of imports. Furthermore, in the year following the decision, both the value and quantity of imports decrease more when the investigation is approved than when it is dismissed. The investigation effect was found also to be valid in the Egyptian case, given the significant variation in imports upon the investigation initiation. Finally, our results point out the importance of the trade diversion effect, since the decrease in imports from targeted countries is coupled by an increase from non-targeted ones.

5. Conclusion

The contribution of this paper is twofold. First, it distinguishes between the effect of anti-dumping measures on the value, the volume and the price of imports. Second, it also distinguishes between the direct and indirect effects of such measures on Egypt's trade partners. Our main findings show that anti-dumping measures had a significantly negative impact on imports coming from countries covered by the investigations. For approved investigations, this decrease is even higher in the following year when the anti-dumping duty is imposed. A significant import response during the investigation review period was also detected, highlighting the presence of an "*investigation effect*". Finally, a *diversion effect* of imports from the countries concerned with the investigation to other countries was found.

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At the policy level, it is important to note that the implementation of anti-dumping measures is costly at the procedural and time levels. Indeed, producers must bear the costs of the lengthy procedures related to the filing of the petition. The authorities also incur administrative costs during the period of investigation until the final decision is made. Second, the costs involved in economic well-being must be taken into account. The anti-dumping gains made by domestic producers must be sufficient to exceed the loss suffered by consumers who face rising prices. Third, the political economy of anti-dumping is also an important dimension of trade policy. Indeed, domestic lobbies or politically connected firms can exert pressure on a government's decision to initiate an anti-dumping investigation. This is an important dimension for future research, especially using firm-level data.

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