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Antidumping protection hurts exporters: firm-level evidence from France

Jozef KONINGS[1] and Hylke VANDENBUSSCHE[2]

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Abstract

Firms protected by antidumping measures do not unequivocally benefit from them. Antidumping protection benefits non-exporters active on the protected market by raising their domestic sales, but hurts exporters of similar products as the protected ones. Export sales of protected firms fall by almost 8% compared to a relevant control group of unprotected firms. This effect more than doubles for firms that are global, i.e. firms with foreign affiliates. Measured at the product-level, extra-EU exports of goods protected by antidumping fall by 36% while exports to target countries fall by as much as 66% following protection. Protection also has an effect on the extensive margin, by raising the probability to start exporting for firms that were initially non-exporters. Existing exporters face a higher probability to stop exporting during protection. Finally, we find that the productivity of exporters falls while that of non-exporters rises during antidumping protection. We offer a number of plausible explanations for our findings that stem from the heterogeneous firm literature. We also discuss the importance of our findings for policy.

Keywords: antidumping, firm-level exports, intensive margin, extensive margin, productivity, dif-in-dif.

JEL Classification: F13, L41, O30, C2

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I. Introduction

Rising protectionism is one of the greatest fears in the aftermath of the global financial crisis that started in 2008. Despite a promise by the G20 leaders not to increase protectionism[3], a recent World Bank report (2009) documented an alarming rise of 22% in the imposition of antidumping import duties in the course of 2008 compared to the previous year.[4] While the upward trend of antidumping (AD) protection is not new and coincides with a process of general tariff reductions, in recent years there had been a slowdown in the number of antidumping cases which now seems to be reversed, as illustrated in Figure 1.[5]

A likely explanation for the recent surge in antidumping is the presumption of policymakers that protection can be used for industrial purposes i.e. to safeguard domestic production, sales and employment at the expense of foreign imports. While this argument may partially hold in a world where import-competing firms produce and sell mainly domestically,[6] results may be very different when firms are internationally oriented.[7]

This paper uses French firm-level and product data and shows that the effects of import protection are very different for exporting than for non-exporting firms. One of the striking differences is that while domestic sales by non-exporters of goods similar to the protected ones rise during protection, foreign sales by exporters in these goods drop drastically. To our knowledge this paper is the first to empirically document the effect of antidumping measures on the exports of protected firms and in doing so we aim to contribute to the growing literature on the effects of trade policy on heterogeneous firms.

It is important to note that antidumping measures protect domestic firms that produce similar goods as the targeted foreign imports. To give just one example, when a European antidumping case involves the imports of say bicycles from China, we identify all producers of similar bicycles and collect their firm-level data including export values. Also important to note is that antidumping policy is an EU wide policy that applies to all European countries which will prove a useful feature for our empirical identification strategy in estimating the effects of the antidumping protection on French firms. Another useful feature of antidumping policy is the availability of a natural candidate for a control group of firms. A substantial number of antidumping cases involve firms that do not get

[3] Paragraph 22 of the G20 leaders' statement , London, 2 April 2009: "We will not repeat the historic mistakes of protectionism of previous eras".
[4] Bown (2009) reports the more recent numbers and confirms a similar trend for the first quarter of 2009.
[5] In addition to AD, other more murky forms of protectionism are also on the rise (Baldwin and Evenett, 2009).
[6] The extent to which domestic producers benefit from antidumping protection depends amongst others on the extent of trade diversion (Prusa 1997; Konings et al. 1999).
[7] Helpman (2006) discusses the implications of the international orientation of firms previously absent in trade theory but does not explicitly discuss trade policy which is where we aim to contribute.

protection. These are the so-called "termination cases". Firms in termination cases constitute a natural counterfactual group of firms that share a number of similar properties with those firms that succeeded in obtaining AD protection but at the same time did not get protection.

Our main findings can be summarized as follows. Antidumping protection raises firm-level domestic sales of non-exporters by 5%. The beneficial effect of protection on domestic sales of non-exporters is easily understood since a duty at the border increases the market for domestic goods at the expense of foreign imports. But for exporters we find that antidumping protection lowers their exports abroad by about 8% and this fall is not compensated by an increase in their domestic sales. The fall in exports may be explained by a set of reasons some of which may differ on a case by case basis.

A first plausible explanation is that antidumping protection at home limits French exporting firms' ability to lower their prices on extra-EU export markets. Whenever exporters price-discriminate between their home market and abroad, they run the risk of being themselves charged with dumping practices. Antidumping protection at home may therefore limit their flexibility in terms of price setting in export markets thereby negatively affecting their export sales.

A second argument is that antidumping protection tends to lower the volume of cheap imported varieties and keeps the prices of domestically produced import-competing varieties high (Prusa, 1997). Theoretically, it has been shown that AD can act as a collusive device aimed at aligning the low price of foreign goods on higher domestic prices (Zanardi,2004 and Veugelers & Vandenbussche,1999). High domestic prices resulting from protection combined with the reduced ability of exporters to price-discriminate abroad are likely to reduce exporters' competitiveness in export markets and to lower exports.

A third likely explanation is that antidumping protection may adversely affect those exporters that outsource part of their production to the countries targeted by the antidumping protection. Outsourcing entails a fixed cost (Antras and Helpman, 2004; Grossman, Helpman and Seidl, 2005) which only more productive firms can cover. Since exporters tend to be more productive than non-exporters, exporters may engage more in outsourcing than non-exporters. Imagine a French exporting firm that outsources bicycle assembly to China for the purpose of importing these bicycles into France, while keeping activities such as branding, labeling and other types of distribution activities in France. French exporters that outsource their bicycle production face more expensive imports when they have to incur the antidumping duty imposed on bicycle imports from China.

While our data do not allow us to directly measure outsourcing at the firm-level, we use the presence of affiliates abroad as an indication of a firm's ability to engage in intra-firm outsourcing.

About 10% of initial exporters in our sample have affiliates abroad as opposed to only 2% of the non-exporters which suggests that access to a global network is an important difference between the two groups of firms. Firm-level exports of these "global firms" fall by 16% during antidumping protection which is substantially higher than the average fall in firm-level exports of all exporters of 8% during that same period. Incidentally domestic sales of "global firms" drop by 22% compared to only a 3% reduction for "non-global" exporters. The results suggest that antidumping protection negatively affects all exporters both in terms of their exports and domestic sales but especially those that are likely to outsource.

Individual case evidence both in the EU and the US suggests that the international orientation of firms or the lack thereof is what divides the domestic import-competing industries protected by antidumping policy as argued by Isakson (2007) for the EU[8] and by Shapiro (2008)[9] for the US. Both these studies discuss individual instances where antidumping protection was not well equipped to deal with the international fragmentation of production. Our empirical findings based on a wide range of cases seem to confirm this allegation.

A fourth potential explanation for the fall in exports is that exporters may experience reduced market access abroad if domestic trade protection results in retaliatory action whereby trade partners protect themselves in turn (Prusa, 2001).[10] Such retaliatory actions are difficult to capture empirically since they may or may not occur in the same sector and may take some time to materialize (Blonigen and Bown, 2003).[11] Complementing our firm-level analysis with product-level trade data we show that while extra-EU exports across destinations decrease by 36% during AD protection, exports to target countries outside Europe fall by as much as 66%. But despite the statistical significance, the economic significance of exports going to targeted countries is low. Exports to target countries represent only 1% of the total export value of products in our AD cases.

[8] Antidumping protection on leather shoe imports from China was not supported by all EU shoe producers. The "globalized" EU shoe producers argued that they were harmed by the antidumping protection. Shoe outsourcers argued that despite the fact that they imported their shoes from China, more than 50% of the value added of their shoes was created inside the EU. Activities such as research, design, logistics, development and marketing involved most of the value added making the shoe a European shoe and not a Chinese one which should exempt them from paying antidumping duties on the shoes they imported from China but the EU Commission ruled otherwise.

[9] In a recent US antidumping case on "enriched uranium", the Supreme court had to decide whether to install a duty on US outsourcers. Opponents pointed out that if the Obama Commerce department would use antidumping laws to punish outsourcers such a decision could raise costs throughout global supply chains.

[10] Lindsey and Ikenson (2001) argue that patterns of AD filings are consistent with retaliatory use. Prusa & Skeath (2005) and Feinberg and Reynolds (2006) also confirm that new users of AD use it for retaliation. Retaliation is also singled out as a motive for AD law *adoption* by Vandenbussche and Zanardi (2008).

[11] Retaliation can take the form of petition against an industry in a specific country that has filed against the petitioning industry in the past. This is the most transparent form of retaliation. But it can also entail the filing against an industry in a country that has other industries that have filed petitions against industries in the home country previously.

This suggests that while retaliation adds to the fall in exports, it is unlikely to account for the majority of the decrease in exports.

Each of the four explanations discussed above is likely to contribute to the reduction in exports that we observe as a result of AD protection. Which of the explanations applies is likely to differ case by case and it is not our purpose to determine their individual importance. These explanations identify different channels through which trade policy may adversely affect exporters suggesting that antidumping has not kept pace with the increasingly international orientation of firms. Our findings suggest that the beneficial effects for domestic producers usually associated with antidumping protection only appear to accrue to the more "traditional" firms without international activity. However, the world has changed and firms increasingly engage in international activities (Helpman, 2006) where the effects of trade policy are not well understood which is where we aim to contribute. Some of the stylized facts that we present are in line with the theoretical models on heterogeneous firms as discussed in section 2. Other facts may offer inspiration for new models to allow us to better understand what it is that firms do and how trade policy affects different firms differently.

The effects of antidumping protection are very different for exporters compared to non-exporters. In terms of initial conditions, exporters in our sample are typically larger and on average more productive than non-exporters which confirms earlier results (Eaton et al., 2004; Mayer and Ottaviano, 2008; Helpman, Melitz and Yeaple, 2004). While the non-exporters in our sample experience a modest increase in firm-level productivity during protection, exporters' productivity falls during protection.

A likely explanation for non-exporters' gain in productivity is the increase in their market size (Lileeva and Trefler, 2007; Tybout and Westbrook, 1995).[12] The loss in exporters' productivity can be driven by several factors. One is that exporters' output drops faster than input factors adjust. Output typically responds faster to a change in market conditions than physical capital what may explain the reduction in exporters' measured productivity. Indeed, we find that the capital intensity of exporters does not change significantly during protection.

Also, according to the "learning-by-exporting" literature, a drop in exports would reduce learning from exporting and negatively impact firm-level productivity for exporting firms (De Loecker, 2007; Van Biesebroeck, 2005). The fall in imports that typically results from antidumping protection may also negatively affect firms' productivity. Several papers have pointed out that

[12] While Lileeva & Trefler (2007)'s analysis is on trade liberalization , its results can be transposed to the context of import protection. Firms that experience an increase in market size invest in productivity improvement which raises their productivity.

imports affect technology adoption which in turn affects domestic firms' productivity (Rodrik 1992; Amiti and Konings, 2007).

Our analysis is different from Kasahara and Lapham (2008) who analyze the "vertical" effects i.e. the link between protection of intermediate imports and exports of final goods that use the protected intermediate. Their analysis is one where protection on intermediates feeds through to final goods and undermines the competitiveness of final good exporters. The research question in our paper is different in the sense that we study the "horizontal" effects, i.e. how AD protection affects the exports of the protected import-competing firms. In particular, we study firms that produce similar varieties of products than the protected ones on which we do not know of any other study dealing with the same issue.

The effect of AD policy that we measure is likely to be a lower bound of the true effect as firms in our data are multiple-product firms. As an extra robustness check we therefore complement our firm-level analysis with a product-level (8-digit CN) one. Trade data on exports offer the additional advantage of exports by export destination. We will distinguish between intra-EU exports and extra-EU exports since EU antidumping policy is an EU wide policy. We find that the fall in firm-level exports is predominantly driven by the fall in product-level extra-EU exports. Export prices and domestic prices measured by the unit values of products do not seem to be significantly affected during the protection period but remain stable over time. The price stability of exports may be a reflection of several forces. As explained before, antidumping protection tends to reduce price competition on the protected market by keeping prices high while at the same time it limits exporters in the protected country in setting lower prices abroad since otherwise they would face dumping allegations by their partners. A possible explanation for the moderate effect that European AD policy has on domestic EU prices is the "Public interest" clause. In principle this clause prevents the EU from imposing AD protection if consumer interests - in the form of rising prices - would be hurt by it.[13] Interestingly Liebman (2006) for the US, using disaggregated product-level monthly panel data for steel, also fails to finds a significant increase in U.S. steel prices after a safeguard was put in place by the US government but concludes that prices were more affected by business cycle conditions and industry rationalization than by the safeguard protection. Due to this price stability it is safe to infer that the fall in exporters' productivity that we measure during antidumping protection cannot be explained by a mere price effect.

[13] The EU argued that antidumping duties on shoes from China and Vietnam were justified given that the price of European shoes would at most go up by 1.5 Euros a pair (http://ec.europa.eu/trade/issues/respectrules/anti_dumping/pr230206_en.htm)

The methodology that we use is a difference-in-difference (DD) approach with firm-level fixed effects. We evaluate the effect of EU wide AD protection on French firms using a control group of firms that did not get protected. Our preferred control group is firms in termination cases. While termination cases involve different products and firms, they belong to the same broad sectors as the protected firms and therefore share similar sector specific characteristics and institutions. Another useful feature of using termination cases as a counterfactual is that this will generate more prudent estimates than any other counterfactual. When comparing protected firms with unprotected firms in termination cases, we may overlook a "filing effect" common to firms in both types of cases. If filing would already have a negative effect on firm-level exports, comparing protected firms to unprotected firms is likely to underestimate the true export effects. Therefore using firms in termination cases is likely to yield smaller estimates than any other control group and offers a lower bound for the true effects.

From a policy point of view our results are highly relevant. Currently antidumping laws almost entirely focus on the effects of dumped imports on domestic production but are silent on the link between protection and domestic exports.[14] Our findings clearly show that while AD protection can be used to foster the interests of non-exporters, it hurts the interests of exporters. The negative externality of trade policy on exports is likely to have negative long-run effects not considered previously for any country using AD as an instrument to protect its domestic industry.

In the next section we discuss related literature, section III discusses our data and in section IV we present the empirical methodology and results. Section V concludes.

II. **Related literature**

In neo-classical models of trade theory, imported goods are very different from exported goods and therefore these models are not well equipped to explain how protection of imported goods can explain a fall in exports of similar goods than the ones that are imported. An early model by Krugman (1984) with a representative firm and increasing returns, suggests that import protection can act as an instrument of export promotion. Import protection increases the home market size which results in an increase in home sales that allows a representative domestic firm to slide down its average cost curve. This in turn enables domestic firms to sell more and cheaper products abroad.

[14]The diverging interests between domestic firms and export-oriented firms became very apparent in a recent "leather shoe" case. In 2006, the EU imposed import duties on leather shoes from China and Vietnam. The dumping complaint had been much supported by relatively small Italian shoe producers mainly selling locally, but was opposed by large and more outward oriented shoe producers in the EU. In the end reforms did not go through due to the lack of political support from the majority of member states.

However, our empirical findings clearly point in the opposite direction i.e. that exporting firms are hurt by import protection of similar goods than the ones they produce. Recent advances in theoretical work offer new insights into the factors at work and seem to be more closely related to our findings. One important insight introduced in theoretical modeling recently is that firms are not all the same. Models have gone from a representative firm to heterogeneous firms where non-exporters differ from exporters.

While models of monopolistic competition, increasing returns and firm heterogeneity have become workhorse models in international trade, they are less suited to study issues of trade policy. One reason is that its analysis in this setting is complex as shown by Demidova and Rodriguez-Clare (2009). Typically the analysis of trade policy in these type of models has been limited to the analysis of trade liberalization modeled as a change in the transport costs. Empirically it has been confirmed that a reduction in transport costs results in an increase in the number of exporters, the so-called extensive margin and an increase in the volume of exports, the so-called intensive margin (Helpman, Melitz and Rubinstein, 2008).

Another insight incorporated in recent models is that import protection no longer tends to be unilateral but bilateral where retaliatory aspects have become important which was less the case twenty years ago.[15] One example is the heterogeneous firm model by Melitz and Ottaviano (2008) where two countries export to each other and engage in reciprocal dumping.

Arguably, one can think of antidumping protection as an increase in short-run trade costs. Transposing the results for an increase in short-run trade costs, the above models would predict a decrease in the extensive and intensive margin. Our empirical results appear in line with these predictions. Conditional on the firm being an initial exporter, the probability of stopping to export is marginally higher for firms that get protection. This suggests that antidumping protection reduces the extensive margin of initial exports. In addition we also find that antidumping protection results in a significant reduction in the volume of exports i.e. the intensive margin.

However, most of the monopolistic competition models focus on the effect of trade costs on "between-firm" productivity effects and do not provide inferences on "within-firm" productivity. Recent models focusing on the "within-firm" level productivity effects of trade policy have further shown the differential impact of trade policy on firms (Acharya and Keller,2008; Bustos,2007); Verhoogen,2008 and Bas & Ledezma,2008). Their findings suggest that trade liberalization is biased towards the initially high-productivity firms that become even more efficient after trade liberalization. Transposed to AD protection this would imply that we expect trade protection to yield

[15] In 1980 there were 49 countries with an AD law, but twenty years later in 2000, this number doubled to 103 (Vandenbussche and Zanardi, 2008)

efficiency gains for the initially lowly productive firms i.e. non-exporters and to result in efficiency losses for initial exporters which is confirmed by our empirical findings.

III. Data

An AD-case typically involves an investigation of the evolution of the volume of imports and of import prices from countries that are accused of dumping by the import-competing domestic industry. The dumping complaint is investigated by the EU Commission and can result in 'Protection' or in 'Termination'.[16] If protection is decided upon, a final AD measure is imposed on the 'dumped' imports to protect all the firms in the EU import-competing industry. When the Commission decides to 'terminate' the AD case, the dumping complaint is rejected and the EU industry does not get further import relief.

For the purpose of analyzing the relationship between AD-protection and firm-level exports, we use income statements of unconsolidated firms[17], covering the period 1995-2005, obtained from a commercial database sold under the name of AMADEUS. This database includes information on various financial and economic variables, such as sales, employment, material costs, tangible fixed assets for European listed and non-listed firms. European firms in AMADEUS in principle do not report exports, with the exception of France, where firms also report export turnover. We identify 3,695 French firms that operate in the same sector as the dumped products and that are affected by the protection. The protected firms include non-exporters and exporters. About 25% of all firms in our sample are exporters and their share of exports in total sales on average is about 26% with shares ranging between 0 and 100%.[18] The frequency distribution of firm-level export shares of exporters at the start of our sample is illustrated in Figure 2. Less than one-third of the firms we consider and that are involved in AD cases, export. Of those that export, the sales from exports are on average less than one third of their total sales.

In Table 1 we give an overview of all the new AD cases[19] that were initiated in 1997 and 1998 and for which we could retrieve all the variables from the income statements required for our analysis and for which AMADEUS gave us observations in the years before and observations during

[16] In the U.S. many cases end in "withdrawals" by the complaining industry as shown by Prusa (1992). This is hardly ever the case in the EU where a "Termination" usually refers to a negative ruling by the EU Commission.
[17] Unconsolidated financial statements are similar to plant level information. In contrast, consolidated financial statements group together the information of several affiliates domestic and abroad.
[18] After dropping firms with missing variables i.e. operating revenue, employment etc., the share of exporters rises to 33% suggesting that missings occur amongst the smaller non-exporters.
[19] 'New' implies that these cases were not subject to protection when the case was initiated.

the AD protection. In total, our dataset includes 20 new[20] AD investigations when we count by product group which corresponds to 57 cases when we count cases by defending country. For each case Table 1 lists the year of initiation, the corresponding 4 digit industry NACE revision 1, the average number of 8-digit HS codes involved, the year of decision, the average duty and the importing countries involved. We collect firm-level data for the firms in the French import-competing sector based on the 4-digit NACE sector the product under investigation was classified in.[21] In 12 of the new cases (by product group), the outcome of the case was protection. Under the Sunset Clause, AD protection stays in place for five consecutive years. Duties range between 10% and 67%, with an average duty of 30%. In 8 other cases (by product group), the EU Commission did not grant import relief, after which the case was terminated.

Table 2 provides summary statistics of exporters versus non-exporters which confirm earlier findings i.e. initial exporters are larger both in terms of number of employees, turnover and assets. Furthermore we observe that exporters are more productive and have more foreign subsidiaries than non-exporters.

III. Empirical Methodology and Results

III.1. Antidumping Protection and Exporters

III.1.A. The Intensive Margin

To evaluate the effects of antidumping protection on firm-level exports, we pursue a difference-in-difference approach on the exports of protected versus unprotected firms as given by the following equation:

$$\ln Exports_{it} = \alpha_i + \alpha_1 AD\_EFFECT_{it} + YEAR\_Dummies + \varepsilon_{it} \quad (1)$$

Where α_i is a firm-level fixed effect; AD_EFFECT is a dummy that takes a value of 0 for the years before AD protection and 1 in the years during AD protection but only for the protected firms. In

[20] Table 1 lists 22 AD cases but there are two overlaps. i.e. more than one AD case falls into the same NACE 4 digit sector. A first one is in sector 1720 and another one in sector 1752. We deal with overlaps in the following way i.e. in the case of 1720, both the first and the second case was initiated in 1997. In both cases the case was terminated so we classified both as Terminations. In the case of sector 1752, a first case was initiated in 1997 and a second one in 1998. In both cases a duty was imposed. This led us to consider the firms in this sector as being protected from the first year after the case was introduced in 1997 since the investigation usually takes about a year.

[21] The NACE classification is a detailed industry classification used by the European Union with 622 different 4 digit NACE codes.

addition we also include a set of year dummies to control for common time effects that may affect the exports of both the protected and the unprotected exporters. The control group we use consists of the firms in the "terminations" i.e. French firms that in the same period of our analysis filed for protection but did not obtain it. One concern is that Antidumping policy may be endogenous. However, we exploit the fact that AD policy is an EU wide policy which facilitates our identification strategy. Since trade policy is determined by all European countries the effect that French firms have on it is bound to be small. Moreover trade policy of the EU has changed a lot over time with the entry of the new Member states making the influence of individual French firms arguably even smaller.[22] Hence, the exogeneity of EU AD policy for French firms seems reasonable.

We start in Table 3 by estimating the dif-in-dif regression in equation (1) on the total set of initial exporters i.e. we only include firms that prior to the protection period were involved in exporting activity. Column 1 in Table 3 shows the results when using the log of real export turnover as a dependent variable where we deflated exports with a simple four digit producer price deflator. Ideally, we should use an export price deflator, but then we would require destination markets at the firm level, which is not available in our firm-level data[23]. From column 1 we note that AD protection results in a significant decrease in export turnover of about 8% on average over the protected sectors. One potential explanation for the decline in exports is that mainly "global firms" are negatively affected. We define global firms as firms with foreign affiliates. Indeed when we control for firms that have one or more affiliates abroad, we can observe their exports fall more drastically. The coefficient reported in column 2 of Table 3 suggests that exports of "global firms" fall by as much as 17%. While we have no direct information of firm-level outsourcing activities, "global firms" are natural candidates for these type of activities. Firms that "outsource" goods and produce them in affiliates abroad for the purpose of re-importing them to France are particularly vulnerable to this type of import protection. Antidumping laws currently stipulate that they are aimed to protect the *domestic producers* of goods. French producers that have engaged in a fragmentation of production and engage in outsourcing activities may have little industrial production left in France although they may have kept activities in the final stages of the production process that require little if any transformation of the product but may entail a large chunk of the total production cost such as

[22] Disdier and Mayer (2005) use a similar argument. When studying the link between trade and public opinion they argue that an EU wide trade policy shock is exogenous to the public opinion within individual EU countries.

[23] We also experimented with using the export share in total sales instead as a dependent variable, which avoids the deflation problem. Export shares also declined after AD protection.

advertising, marketing, labeling and branding.[24] Our data allows us to distinguish between the location of the affiliates in terms of intra- or extra-EU. When we consider "global firms" with only affiliates outside the EU, we find the effect of antidumping protection on exports to be much more negative which can be seen from column 3. This is what one would expect since AD policy is an EU wide policy and mainly affects outsourcers outside the EU.

In order to know whether it is the global status of a firm that explains the drop in exports, in column 4 of Table 3 we only include the non-global firms. The effect of AD protection on firm-level exports is still negative and significant. This suggests that even those exporting firms that do not have affiliates abroad suffer from AD protection in terms of their sales abroad. The exporting firms included in column 4 may still include outsourcers but those that work with independent suppliers rather than intra-firm outsourcing. The results in column 4 may also just reflect that other channels apart from outsourcing can have an adverse effect on firms exports such as the inability of protected exporters to price-discriminate or retaliation issues.

An explanation worth investigating is whether exporting firms substitute away their exports towards more domestic sales. If protection increases the domestic market size, firms that were previously exporting may suddenly find it more profitable to increase their sales at home especially since by selling locally they would save on transport costs. If this is the true explanation behind our observations than we would expect to see a simultaneous rise in domestic sales accompanying the fall in exports of the protected firms. Empirically however we fail to find support for that explanation. In Table 4 we report the results of a similar equation as in (1) but now focus on the effect of AD protection on domestic sales. Our results indicate that after antidumping protection sets in, domestic sales significantly drop for firms that are initial exporters (column 1, 2 and 3 in Table 4). For "global firms" the drop in domestic sales is much larger than for the purely domestic firms.

In contrast, for traditional firms that do not export and that do not have affiliates abroad, domestic sales significantly increase after AD protection which can be seen from column 4 and 6. Put differently, for traditional firms with most of their sales on the domestic market, antidumping protection appears to be an effective way to increase their market size and their sales.

[24] The outsourcers argue that when more than fifty percent of the value added is created inside the EU, they should be exempted from paying antidumping duties. They argue that the EU should use domestic manufacturing costs and not domestic production to decide who pays and who does not pay the AD duty (Isakson, 2007).

III.1.B. The Extensive Margin

Thus far we have focused on the effects of AD protection on exporters' intensive margin. But a related question is whether import-competing protection alters the number of exporters referred to as the extensive margin. In the first two columns of Table 5 we report the results of a dif-in-dif analysis where the dependent variable is dummy with a value of zero if a firm does not export and a value of 1 when a firm starts exporting. Since including firm level fixed effects in a probit equation is not possible we include instead a dummy equal to 1 for all firms that ever received protection (Ever_protection dummy) and equal to 0 for all other firms i.e. those in the control group. AD protection has a small but significantly positive effect on the probability to start exporting for those firms that were not initial exporters before the protection. AD protection raises the exporting probability by 3% compared to the unprotected firms. The expansion in domestic market size for the non-exporters resulting from the AD protection is a likely explanation for this observation. Domestic firms benefit from protection and can increase their domestic sales. This allows firms to spread their fixed costs of production over more units than before thereby reducing their average cost per unit and possibly also lowering their marginal costs. This increase in productivity brought about by the protection may be such as to allow them to incur a fixed cost of entering export markets after which they become exporters which was not possible to them before.

In columns (3) and (4) of Table 5 we look at the opposite question i.e. whether AD protection affects the probability of exporters to quit exporting. We report the results of a dif-in-dif analysis where the dependent variable is a dummy with a value of zero if a firm continues to export and a value of 1 when a firm quits exporting. The results are more mixed. Without the inclusion of initial-productivity, which we define as the labor productivity of exporters when a case is initiated, we find a positive but not a significant difference between the probability of export stoppers between the protected and the control group of firms. When controlling for initial conditions, the probability to stop exporting becomes positive and significant. Initial exporters under AD protection have only about 1% more chance to stop exporting than unprotected firms. The effect of AD protection on the extensive margin is small especially when compared to the effect AD protection has on the intensive margin of trade documented in the previous section. Several reasons may account for that. Hysteresis in export activity is one possible explanation. Since protection is in principle limited to 5 years, exporters may "hang in" there and despite lower volumes being shipped out still continue their exporting activity. Given that exporting initially requires a fixed cost to enter the export market, this explanation would be in line with the real option theory (Dixit and Pindyck, 1994) observed whenever activities require a substantial amount of sunk cost outlays. Empirical evidence to date on

exporting activity supports the hysteresis argument (Roberts and Tybout, 1997). AD protection at best only seems to have a limited effect on the extensive margin.

III.2. Antidumping and Product-level Exports

To overcome some of the limitations of our firm-level data which typically involves their multi-product nature and the absence of export destination markets, we complement our approach with a product-level one where we turn to the 8-digit product level (CN) trade data available from EUROSTAT. We identify all product level flows which allow us to check whether there is a different response of intra- versus extra-EU exports. In principle, antidumping protection applies to the whole EU market. In that sense we would expect the effect of AD protection to have a different effect on intra-versus extra-EU exports. We would expect the fall in exports to predominantly occur on exports to markets outside the EU i.e. on extra-EU exports. While we do not have a firm-level indication of which volume of exports is intra-EU and which volume is extra-EU trade, we collect this information from trade data at the product-level.[25]

The results of the effect of AD protection are listed in Table 6 where we show the results of the following dif-in-dif estimation

$$\ln Exports_{kt} = \beta_k + \beta_1 AD\_EFFECT_{kt} + YEAR\_Dummies + \varepsilon_{kt} \qquad (2)$$

Where subscript k refers to the product(s) in the AD cases and where we use products in termination cases as a control group. From the results in Table 6 we clearly see that AD protection has a strong negative effect of about 37% on the volume of extra-EU exports while intra-EU exports only go down by 28%. This is in line with what we expected i.e. the fall in exports' volume seems to be predominantly driven by exports shipped to destinations outside the EU. These results also indicate that the AD-effect measured previously at the firm-level, where we estimated the effect of AD protection to depress firm-level exports between about 8 and 24%, is a "lower bound" estimate due to the multi-product nature of firms. The results in Table 6 clearly show that when we look at product-level export volumes, the numbers are substantially larger with extra-EU exports going down by as much as 37%.

When interacting the AD_Effect with year dummies we note that the effects on extra-EU export volumes tend to kick in especially in the first three years during protection.

[25] Product- level trade data come from EUROSTAT and refer to French intra- and extra-EU trade.

In Table 6 we also look at the AD effect on prices, proxied by the unit values as in Trefler (2004). It can be noted that internal EU prices proxied by intra-EU unit values as well as export prices appear to be pretty stable over time and do not show a significant increase under AD protection. As discussed previously this can be consistent with AD used as a collusive device where the protection aligns the prices of foreign imported varieties to the higher level of EU prices but due to the Public interest clause, prices in the EU itself do not significantly go up.

A potential explanation for the decline in exports is that there are retaliatory measures taken by non-EU countries. To explicitly test for retaliation effects is difficult as explained before, since retaliation may not occur simultaneously. It can occur in a different sector/product than the protected one, or can occur in a different way than through trade. The most direct form of retaliation would be that countries targeted by EU antidumping policy, take measures affecting French exports in the same product to the target country. To test for this we look at product-level trade flows to target countries in isolation. A first observation is the existence of bilateral trade flows between the target country and France in the same product. In fact, for the products in the AD protection cases, there is a strong positive correlation between product-level imports and exports of 79%. However, in the bilateral relationship with target countries, the import volumes in these products always exceed the export volumes to the target countries. The results in Table 7 show that export volumes to the non-EU targeted countries went down[26] by as much as 66% which is greater than the average fall in extra-EU exports as shown in Table 6. But exports to target countries only represent 1% of total exports of AD products which suggests that while retaliation can not be excluded it can only be part of the explanation as to why exports of French firms fall.

In the same Table 7 we also document the import volumes and prices. Product-level imports fall significantly as a result of antidumping protection which confirms earlier findings (Prusa, 1997). The average price effect appears limited with only a positive and significant price increase in the fourth year of protection.

III.3. Antidumping and Firm-level Productivity

Now that we have established that import-protection seems to be detrimental for the export performance of firms we can turn to another related question. What happens to the productivity of exporters compared to non-exporters? This is an important question as there is by now a large literature showing that exporters are typically more productive than non-exporters and for some

[26] Several target countries became member of the EU during the period of our analysis. When we include these countries in the group of target countries, we fail to find evidence of retaliation. This suggests that countries close to EU membership did not take any measures that adversely affected French exports towards them. But limiting target countries to non-EU members as in Table 3b suggests otherwise.

countries at least, there also seem to be learning effects from exporting. We start by first documenting the productivity ranking of exporters versus non-exporters and use a simple measure of labor productivity to test this by running the specification below:

$$\ln real\ labor\ \ productivity_{it} = \alpha_i + \alpha_1 Cap\_Intensity_{it} + \alpha_2 Export\_Status_i + \alpha_3 Year\_dummies + \varepsilon_{it} \quad (3)$$

We regress the log of real labor productivity on Capital Intensity (Cap_Intensity) measured by the ratio of Fixed Tangible assets over firm-level employment, where we deflate capital by a country specific capital deflator[27], and an export dummy taking a value 1 when the firm is an exporter and 0 otherwise and year dummies. We check the robustness of our results by adding firm-level or sector-level fixed effects. Results are reported in Table 8. In line with Melitz (2003) and Bernard and Jensen (1999) we find that the productivity of exporters on average is higher than the productivity of non-exporters. This can be seen by the positive and highly significant coefficient on the Export-dummy which is an indication of the export status of a firm over time.

Next, we analyze the effect of antidumping protection (AD_EFFECT) on the productivity of exporters. As shown by Konings and Vandenbussche (2008), AD protection can induce protected firms to engage in restructuring allowing especially the laggard firms to catch up in productivity, while frontier firms operating close to the technological frontier lose productivity. Since exporters are typically more productive, they are more likely to belong to the group of frontier firms. Here we expect that the effect of antidumping protection on productivity to be negative for the initial exporters. For this purpose we estimate the following specification:

$$\ln TFP_{it} = \alpha_i + \alpha_1 AD\_EFFECT_{it} + \alpha_2 AD\_EFFECT\ x\ Initial\_Exporter + Year\_dummies + \varepsilon_{it} \quad (4)$$

Where α_i controls for firm-level fixed effects and again the AD_EFFECT gives the average effect of protection across all firms. The interaction effect indicates whether the productivity effect of AD protection for initial exporters is different than for purely domestic firms. In what follows we use several productivity estimates ranging from a simple measure of labor productivity to the more sophisticated Olley and Pakes productivity measure to verify our results.

In Table 9 the first two columns report results when using a simple metric of labor productivity. The third column uses total factor productivity computed from estimating a Cobb-

[27] Ameco data base, European Commission

Douglas production function with input factors labor, capital and material costs using OLS, while the fourth column uses the Olley-Pakes method to compute TFP. For these two last measures of TFP we first estimate the relevant coefficients of the production function for each sector separately to take into account differences in technology between sectors before computing TFP at the firm level using these coefficients. For the specifications using labor productivity we also included the capital intensity as an additional control. In all specifications we find similar results. Extending the findings of Konings and Vandenbussche (2008), the effect of AD protection on productivity is positive and statistically significant. However, this is only so for non-exporting firms. The interaction of the AD effect with initial exporter status is always negative and larger than the direct effect of AD protection. This suggests that exporters' productivity decreases during protection. This result is unlikely to be driven by price-effects as prices, proxied by unit values, did not change much after AD protection as shown in table 6.

While the results in table 9 seem robust with respect to various measures of productivity, there may be some problems with hidden dynamics inherent to productivity. In particular, as Bertrand et al. (2004) point out if there is serial correlation in the error term then the estimated standard errors may be deflated. We therefore report in table 10 a number of robustness checks in order to deal with this potential problem. As in Trefler (2004) we report in the first three columns results based on difference equations. By differencing we implicitly control for the unobserved firm-level fixed effects. Furthermore, when differences are taken we avoid potential biases arising from first order serial correlation. We report second and third difference specifications in columns 1 and 2 respectively. The results in Table 10 remain in line with the results reported in earlier tables. When we interact instead of an initial_exporter dummy, with the initial share of exports in turnover in column (3) of Table 10 we notice again that the interaction effect is negative and significant and larger than the effect of the AD protection dummy. In fact, column (3) suggests that the effect of AD protection is especially negative for firms that are intensive exporters. The AD effect on productivity turns negative when the initial share of exports in turnover is 60%. Finally in the fourth column we apply an approach suggested by Bertrand et al. (2004) which collapses the treatment period into one period and the pre and post treatment period in another period. This implies averaging total factor productivity over these three periods and as a result our panel is reduced from a 10 year period to three time periods, pre-treatment, treatment and post-treatment period. We find again a negative interaction term between the AD effect and initial exporter status, although the magnitude of the coefficient is now lower.

IV. Conclusion

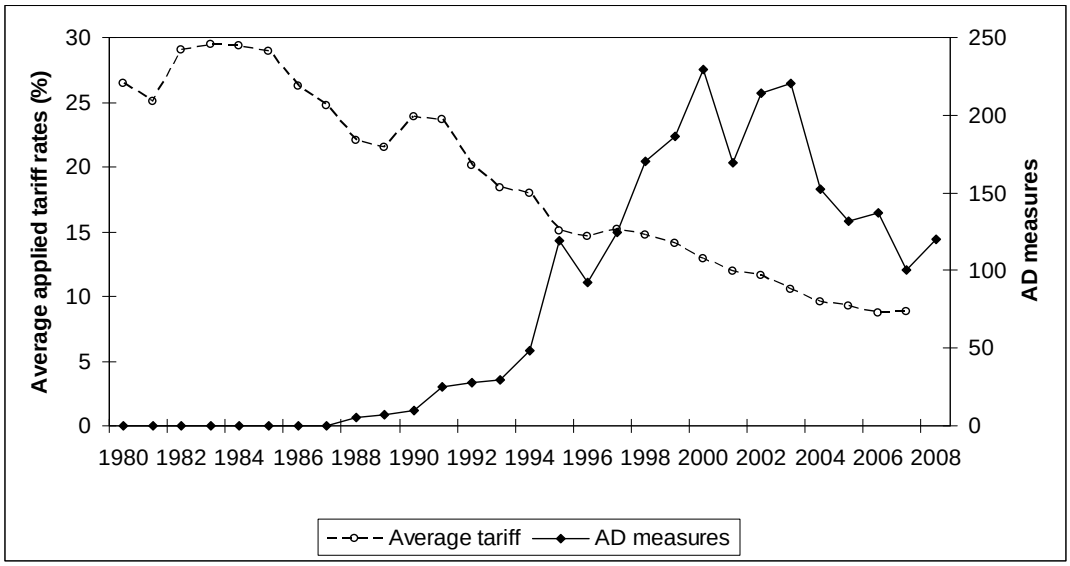
This paper analyzes the effect of antidumping protection on the firm-level exports of French firms protected by Antidumping measures. We find that antidumping protection affects the intensive margin of exports i.e. the amount of exports but leaves the extensive margin i.e. the number of exporters in the protected sector, relatively intact. The fall in exports is especially evident on French extra-EU exports. This fall in exports is not compensated by a rise in domestic sales since for exporting firms, domestic sales go down. The fixed cost necessary for entering the export market may explain why despite a drastic fall in the volume of exports during protection, exporting firms do not massively exit the export markets. In terms of productivity we observe a fall in productivity of exporters during antidumping protection.

Several explanations seem to account for the results we find. First, a market size argument, where non-exporters benefit relatively more from import protection in terms of market share than exporters. Second, exporters may face retaliation abroad when exporting to targeted countries. We find some evidence in support of this retaliation hypothesis. Thirdly, Antidumping protection tends to raise the price of imported varieties and helps to uphold the price of domestically produced varieties. This may undermine the competitiveness of firms exporting domestic varieties that are refrained from setting a lower price in extra-EU export markets in order not to be accused of dumping practices by others. And fourthly, exporters that belong to a global network and engage in the fragmentation of production can be subject to antidumping measures which raises their production costs and lowers exports.

Our evidence further suggests that antidumping protection benefits non-exporters. Their domestic sales go up significantly during protection and their average firm-level productivity increases. These results shed a different light on the benefits of antidumping protection. In general, antidumping policy is felt to be a mechanism fostering the interests of domestic producers. This paper is the first to show that while this is true for those that predominantly sell locally, it is not true for exporters. Not taking the interests of exporters into account when deciding to protect a particular industry is bound to have detrimental long run effects which need to be considered before deciding to impose protection. These considerations are particularly relevant given the recent steep surge in the number of new antidumping investigations. In the first half of 2008, the figure was 22% higher than in the same period of the previous year. Expectations for the future are that countries will be tempted to use temporary protection even more to shelter their firms from the adverse affects of the global financial crisis that started end of 2008. Based on this paper it is safe to conjecture that that this would result in a substantial contraction of exports and of trade in general which is likely to go

against firms and countries' long run interests. Our dataset was too short to observe what happens when the protection comes off but clearly that is a question for future research. This paper should clearly temper policy makers enthusiasm to use antidumping as an easy way to improve domestic conditions.

Figure 1: Evolution of Tariffs versus Antidumping Measures



Source: The tariff data for 1980-2007 from UNCTAD TRAINS (WITS, 2009) which runs to 2007. The antidumping data are from the WTO and the Bown database.

Figure 2: Initial Export Shares of Exporters

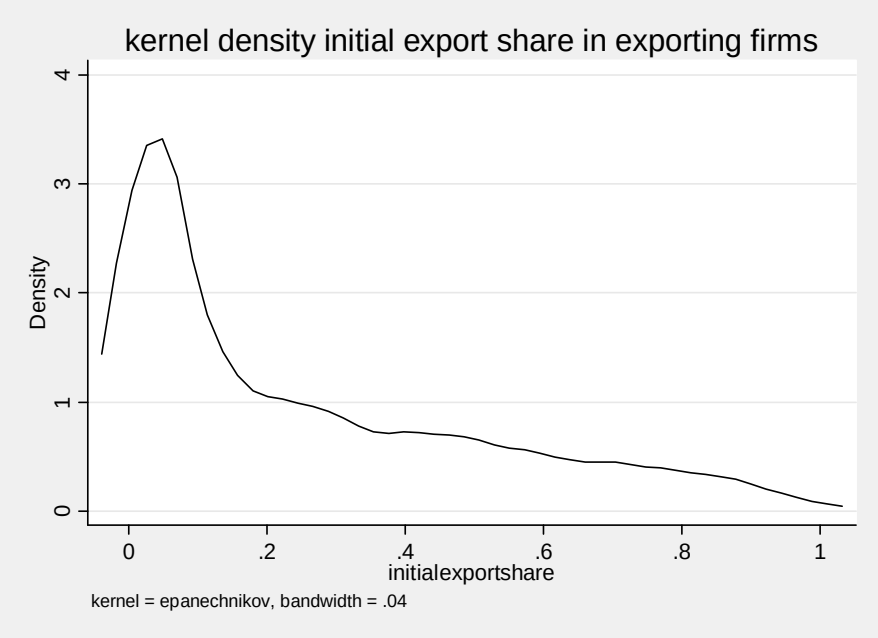


Table 1: New Antidumping Cases Initiated by the EU between 1997-98								
Year of AD Initiation	**Product**	**# HS per case**	**NACE rev.1**	**Decision (Duty/ Undertak/Termination)**	**Year of AD Decision**	**Average Duty[(a)] (%)**	**Decision of Review**	**Defendants**
1997	Fax machines	1	3220	D	1998	43		China, Japan, S-Korea, Malaysia, Singapore, Taiwan, Thailand
	Potassium permanganate	1	2413	D	1998	21		India, Ukraine
	Polysulphide polymers	1	2417	D	1998	13		USA
	Synthetic fibre ropes	4	1752	D	1998	82	D	India
	Monosodium glutamate	1	2441	T	1998	0		Brazil, USA, Vietnam
	Cotton fabrics	15	1720	T	1998	0		China, Egypt, India, Indonesia, Pakistan, Turkey
	Strips of iron or non-alloy steel	4	2732	T	1998	0		Russia
	Synthetic fibre ropes	4	1752	T	1998	0		S-Korea
	Unwrought magnesium	2	2745	D	1998	32		China
	Stainless steel bright bars	4	2731	D	1998	25		India
	Thiourea dioxide	2	2414	T	1998	0		China
	Hardboard	10	2020	D/U	1999	16		Japan, Korea, Malaysia, China, Taiwan
	Bicycles	2	3542	D	1999	18		Brazil, Bulgaria, Estonia, Latvia, Lithuania, Poland, Russia
	Electrolytic alumin. Capacitators	3	3210	T	1999	0		Taiwan
	Woven glass fibre	1	1720	T	1998	0		USA, Thailand
1998	Polypropylene binder	1	1752	D /U	1999	26		Japan
	Steel stranded rope & cables	1	2873	D/U	1999	45	T	Poland, Czech. Republic, Hungary
	Stainless steel wire	4	2734	D/U	1999	56		China, India, South Africa, Ukraine
	Steel stranded rope & cables	1	2873	D/U	1999	44		India, Korea
	Polyester filament yarn	4	2470	T	1999	0		Hungary, Mexico, Poland
	Stainless steel heavy plates	1	2710	T	1999	0		Korea, India
	Seamless pipes and tubes	2	2722	D /U	2000	31		Slovenia, South Africa

(a) The average duty is the country wide duty that applies to "all other exporting producers". Exporters that co-operate in the EU antidumping (AD) investigation often get a lower duty.

Table 2: Summary Statistics of the sample

	Non-Initial Exporters	Initial Exporters
Operating revenue 000€	5860 (23171)	15516 (35705)
Employees In number of full-time equivalents	41 (108)	92 (177)
Labor productivity In 000€	52 (70)	57 (89)
Tangible fixed assets In 000€	876 (4690)	2892 (9450)
Foreign subsidiary dummy	0.02 (0.15)	0.094 (0.29)

Notes: 1) standard deviation in brackets
2) In the original data set, initial-exporters represent 25% of all firms, but when dropping those firms with missing observations on operating revenue and employment, the number of initial exporters rises to 33%, which means that especially small non-exporters do not report all variables.
3) Initial Exporter is defined as a firm exporting in the year of the antidumping case initiation

Table 3: Antidumping Protection and the Intensive Margin of Exports

	(1) **EXPORT** **Turnover of** **Initial Exporters**	**(2)** **EXPORT** **Turnover of** **Global firms**	**(3)** **EXPORT** **Turnover of** **global firms with only** **affiliates outside the EU**	**(4)** **EXPORT** **Turnover of** **non-Global firms**
AD-Effect	-0.077*** (0.035)	-0.166** (0.09)	-0.248** (0.125)	-0.070** (0.037)
Year dummies	Yes	Yes	Yes	Yes
Firm fixed eff.	Yes	Yes	Yes	Yes
N° Obs.	7,053	546	305	6,347

Notes: 1) Export Turnover is the log of real export turnover
2) standard errors in brackets.
2) */**/*** indicate significance at the 10, 5 and 1% level respectively
3) Control group in the dif-in-difs are Termination firms
4) AD_EFFECT takes a value of 0 before Antidumping protection and a value of 1 for the 5 years after protection but only for the protected firms
5) Initial_Exporter are firms that are exporting in the year of case initiation
6)"Global firms" are those firms that have foreign subsidiaries

Table 4: The Effect of AD protection on Domestic Sales

	Initial_Exporters			Non-Exporters		
	(1) All Initial Exporters	**(2) Global firms**	**(3) Non-Global**	**(4) Non-exporters**	**(5) Global firms**	**(6) Non-Global**
AD-Effect	-0.044*** (0.018)	-0.228*** (0.080)	-0.030** (0.018)	0.050*** (0.016)	0.08 (0.126)	0.049*** (0.164)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	yes	Yes	Yes
N° Obs.	6893	546	6,347	15,180	282	14,898

Notes:

1) Domestic sales is the log or real domestic sales
2) Standard errors in brackets
3) */**/*** indicate significance at the 10, 5 and 1% level respectively
4) Control group in the dif-in-difs are Termination firms
5) Initial_Exporter is an exporter in the year of case initiation
6) Global firms" are those firms that have foreign subsidiaries

Table 5: Antidumping Protection and the Extensive Margin.

	(1) Start to export	**(2) Start to export**	**(3) Quit to export**	**(4) Quit to export**
AD-effect	0.030*** (0.006)	0.024** (0.013)	0.001 (0.004)	0.014** (0.007)
Ever_Protection	-0.034*** (0.004)	-0.033*** (0.011)	-0.002 (0.004)	-0.008 (0.006)
Trend	0.008*** (0.0006)	0.0029** (0.0016)	-0.002*** (0.0007)	-0.001** (0.0008)
Initial productivity	-	0.0006 (0.006)	-	-0.005* (0.003)
Log likelihood	-3045	-445	-1040	-489
# observations	15,188	2,577	8,237	4,728

Notes:

1) The dependent variable in columns (1) and (2) is a dummy taking a value of 0 for a non-exporting firm in the years it does not export and a value of 1 for an exporting firm in exporting years
2) The dependent variable in columns (3) and (4) is a dummy taking a value of 0 in the years if the firm is an initial exporter and a value of 1 in the years exporting stops

Table 6: Antidumping Protection and Intra- versus Extra EU Product level Exports

	Intra-EU Exports				**Extra-EU Exports**			
	Volume		**Prices**		**Volume**		**Prices**	
AD-EFFECT	-0.284** (0.133)	-	-0.037 (0.087)	-	-0.369*** (0.1215)	-	0.003 (0.052)	-
AD-EFFECT x year1		-0.104 (0.253)		-0.017 (0.166)		-0.506*** (0.235)		0.021 (0.099)
AD-EFFECT x year 2		-0.282 (0.232)		-0.061 (0.152)		-0.344* (0.215)		-0.137* (0.092)
AD-Effect x year 3		-0.250 (0.238)		0.053 (0.156)		-0.298* (0.220)		-0.034 (0.094)
AD-EFFECT x year 4		-0.339 (0.237)		0.0147 (0.155)		-0.243 (0.211)		0.0006 (0.092)
AD-EFFECT x year 5		-0.325 (0.228)		0.018 (0.150)		-0.177 (0.211)		-0.064 (0.081)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	690	690	690	690	724	724	724	724

Notes: (1) Products in Termination cases serve as a control group in the dif-in-dif regressions reported in the Table; (2) standard errors in parentheses

Table 7: Antidumping Protection and Product level Exports to and Imports from targeted countries

	Exports to target countries				**Imports from target countries**			
	Volumes		**Prices**		**Volumes**		**Prices**	
AD-effect	-0.666** (0.286)		0.131 (0.137)		-0.801*** (0.211)		0.046 (0.074)	-
AD-EFFECT x year1	-	-1.05** (0.272)	-	0.269 (0.272)	-	-0.747** (0.39)		-0.050 (0.137)
AD-EFFECT x year 2	-	-0.475 (0.483)	-	-0.150 (0.230)	-	-0.700** (0.38)	-	0.061 (0.132)
AD-Effect x year 3	-	-0.738* (0.458)	-	0.046 (0.218)	-	-1.13** (0.367)	-	0.094 (0.128)
AD-EFFECT x year 4	-	-0.417 (0.481)	-	0.393* (0.22)	-	-1.261*** (0.390)	-	0.432** (0.136)
AD-EFFECT x year 5	-	-0.656 (0.504)	-	0.109 (0.240)	-	-0.540* (0.373)	-	-0.165 (0.130)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Product Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# observations	363	363	363	363	506	506	506	506

Note: the estimates above involve export and import volumes to target countries as reported in last column of Table 1 on a case-by-case basis where we only consider target countries outside the EU.

Table 8: Are Exporters more Productive?

	(1)	**(2)**
Dependent variable	**Log of real Labor productivity**	**Log of real Labor productivity**
Explanatory Variables:		
Capital Intensity ratio	0.14*** (0.0085)	0.075*** (0.006)
Exporter_status	0.072*** (0.015)	0.022** (0.12)
Year Dummies	YES	YES
Sector Fixed effects	YES	-
Firm fixed effects	-	YES
N° of Observations	12246	12246

Notes: 1) Export_status takes a value of 1 in case the firm ever exports during the period of analysis
2) Capital Intensity Ratio is the log of Fixed Tangible Assets over Employment
3) Robust standard errors in parentheses

Table 9: Antidumping Protection and the Productivity of Exporters

	(1)	**(2)**	**(3)**	**(4)**
Dependent variable	log labor productivity	log labor productivity	TFP_OLS	TFP_OP
Capital intensity	0.074*** (0.006)	0.074*** (0.006)	-	-
AD_EFFECT	0.021** (0.012)	0.061*** (0.017)	0.038*** (0.009)	0.039*** (0.009)
AD_EFFECT x Initial_Exporter	-	-0.072*** (0.021)	-0.064*** (0.012)	-0.066*** (0.012)
Year Dummies	YES	YES	YES	YES
Firm Fixed Effects	YES	YES	YES	YES
N° Observations	12246	12246	14664	14664

Notes: 1) Capital Intensity Ratio is the log of Fixed Tangible Assets over Employment
2) Robust standard errors
3) Clustering for firm-level observations

Table 10: Robustness Checks: Dependent variable TFP (Olley-Pakes)

	(1)	**(2)**	**(3)**	**(4)**
	Second Differences	Third Differences	First Differences (using export share instead)	Bertrand approach
AD_EFFECT	0.028*** (0.013)	0.033** (0.016)	0.024*** (0.009)	0.076*** (0.019)
AD_EFFECT x Initial_Exporter	-0.031** (0.016)	-0.033** (0.019)	-0.036*** (0.021)	-0.058*** (0.022)
Year Dummies	yes	yes	yes	Yes
Firm Fixed Effects	No	No	No	Yes
N° Obs	7062	4988	9984	6021

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