

## VIP Pass to Markets: When Customs Certification Helps Firms to Face NTMs

Charlotte Emlinger & Houssein Guimbard

### Highlights

- This paper aims to assess how the Authorized Economic Operator (AEO) certification, a firm-level trade facilitation measure defined by the World Customs Organization, reduces the costs induced by non-tariff measures (NTMs).
- Using French firm-level data (2008-2018), we show that the AEO status enhances trade, but only when facing NTMs in the destination market.
- This confirms that some of the trade costs generated by NTMs are administrative in nature and can be reduced by pre-certifying firms.
- This analysis supports the expansion of trade facilitation programs by certifying firms, as it favors trade without lowering product standards.



## Abstract

This paper aims to assess how trade facilitation measures reduce the costs induced by non-tariff measures (NTMs). It focuses on the Authorized Economic Operator (AEO) certification, a firm-level trade facilitation measure defined by the World Customs Organization. This status allows firms to benefit from customs simplifications at the border, reduced physical and document-based controls, and priority treatment. We use an original and exhaustive dataset of French firms certified as AEO by the European Customs, merged with firm level trade from the French Customs. Our empirical strategy is to compare the export structure of firms before and after their certification to see whether the impact of NTMs on trade can be reduced by trade facilitation measures. Our results show that the AEO status enhances trade, but only when facing NTMs in the destination market. This confirms that some of the trade costs generated by NTMs are administrative in nature and can be reduced by pre-certifying firms. Our conclusion is informative about the kind of trade cost reductions that could be achieved by trade agreements that go beyond tariff reductions, without hindering the level of actual regulation.

## Keywords

Trade Facilitation, Customs Certification, Non-tariff-Measures.

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# 1 Introduction

While tariffs have been progressively reduced in most sectors through unilateral reductions, regional trade agreements, and the accession of new members to the WTO (Bureau et al., 2019), non-tariff measures (NTMs) remain major barriers to trade. These measures impose both fixed and variable costs to exporters. First, NTMs can increase the fixed costs of exporting when firms have to adapt their products to the sanitary, phytosanitary and technical requirements of the destination country. Second, inspections and customs formalities to verify that products meet the various standards at the border increase shipping times and result in variable administrative costs for firms.

Harmonizing non-tariff measures across countries is complicated by differences in consumer preferences and national regulations. While there have been attempts to establish international bases for setting standards, such as the Codex Alimentarius or the International Plant Protection Convention (IPPC), NTMs remains a sensitive topic in trade negotiations. Meanwhile, several initiatives have been launched in recent years to simplify administrative measures at the border and reduce trade frictions. The Trade Facilitation Agreement (TFA), signed within the WTO framework and implemented in 2017, aims to promote trade facilitation and customs compliance through cooperation between customs and other relevant authorities to expedite the release and clearance of goods. Ratified by two-thirds of members, it has, according to Beverelli et al. (2023), led to an increase in 1.17% of world trade (5% for agricultural goods). The World Customs Organization (WCO) has also developed programs to facilitate trade and reduce the "red tape" costs associated with customs formalities. Among these is the Authorized Economic Operator (AEO) certification which allows firms to benefit from customs simplifications at the border, with fewer physical and document-based controls and priority treatments.

This paper investigates how a trade facilitation program such as the AEO status helps firms cope with non-tariff measures. Since the aim of the AEO status is to reduce the administrative costs associated with customs clearance and inspections, it can be expected that firms benefiting from this certification have an advantage when exporting to markets with non-tariff measures. We use an original and exhaustive dataset of French firms certified as AEO from the French Customs. This list of AEO firms is merged with firm-level trade and characteristics data from the French customs and the French National Institute of Statistics (INSEE). Our empirical strategy compares exports patterns of firms before and after their certification for products subject to NTMs on destination markets. We show that becoming an AEO increase firm's trade margins, but only when facing

NTMs. This result suggests that part of NTM's costs are administrative, and can be reduced through trade facilitation programs.

Our paper contributes to several strands of the literature. The first strand deals with non-tariff measures. The empirical evidence on their effect on trade is mixed: some papers support the catalyst effect of NTMs while others show that NTMs act as trade barriers (see [Beghin et al. \(2015\)](#) for a summary). [Peterson et al. \(2013\)](#), [Fontagné et al. \(2015\)](#) and [Murina and Nicita \(2015\)](#) show that US and European SPS measures act as trade barriers. This is confirmed by [Grundke and Moser \(2019\)](#), demonstrating that enforcement of US standards induces a counter-cyclical, hidden protectionist effect. On the other hand, [Crivelli and Groeschl \(2015\)](#) and [de Frahan \(2006\)](#) suggest that NTMs can positively impact trade. The effect of NTMs is however shown to be heterogeneous according to the size and type of firms ([Fontagné and Orefice, 2018](#); [Fontagné et al., 2015](#); [Fugazza et al., 2018](#)). [Xiong and Beghin \(2014\)](#) confirm the ambiguous effect of NTMs on trade by showing that NTMs both enhance import demand and reduce foreign exporters' supply. [Santeramo and Lamonaca \(2019\)](#) conduct a meta analysis of the effect of NTMs in the agri-food sector and demonstrate that the heterogeneity in NTMs effects found in the literature is not only due to heterogeneity in NTMs types but also to methodological issues in NTMs' effect assessment. As noted in [Fugazza and Maur \(2008\)](#), under a common name, NTMs include a wide range of instruments which are not directly quantifiable and easy to collect. Their effect on trade is mixed. On the one hand, they may affect consumer demand by providing critical information in case of market failures. On the other hand, they can shift supply by preventing the sale of hazardous products or creating compatibility standards. They also raise both variable and fixed costs for exporting firms, including information, compliance, and administrative costs. Our contribution to this literature is to show empirically that NTMs do induce administrative costs for exporters, and that these costs can be reduced by firm-level trade facilitation program.

Our work is also related to papers that deal with the border-related costs. The variety of costs and the lack of data make the measurement of border administrative burdens complex and their trade impact difficult to assess. Using Spanish shipment-level export data and the World Bank Doing Business (which provides comparable data on business regulations for 190 countries to investigate costs induced by shipping), [Hornok and Koren \(2015\)](#) show that a 50% reduction in per-shipment cost is equivalent to a 9% percentage point reduction in tariffs. In the same spirit, using Egypt firm-level customs data and the World Bank Doing Business, [Hendy and Zaki \(2021\)](#) show that time to trade can be perceived both as a fixed and variable cost. [Hummels and Schaur \(2013\)](#)

rely on detailed U.S. imports data, and estimate that a day in transit corresponds to an *Ad Valorem* Equivalent (AVE) cost of 0.6 to 2.1%. [Volpe Martincus et al. \(2015\)](#) use data of Uruguay's export transactions and demonstrate that delays have a significant impact on firm's export, in particular for newer buyers. Several papers on administrative costs at the border also deals with trade facilitation measures, thanks to the publication by the OECD of the Trade Facilitation Indicators (TFIs). For instance, [Moisé et al. \(2011\)](#) identifies that better procedures and advance rulings are the areas where the most important trade cost reduction could occur. Using TFIs, papers also assess the impact of the TFA on trade by sector ([Beverelli et al., 2023](#)), on supply chains ([Moisé, 2013](#)), on export diversification ([Beverelli et al., 2015](#)), on logistic performance ([Hillberry and Zhang, 2017](#)) or according to exporter size ([Fontagne et al., 2020](#)). Our addition to this literature is to analyze the impact of another trade facilitation program, namely the AEO, that is defined at the firm level. We also link this issue of trade facilitation and administrative costs to non-tariff measures.

This paper is not the first to examine the Authorized Economic Operators status. Several studies on this subject have focused on the effect of the AEO status for logistic service providers. Since the benefits of status also apply to cargo owners or service providers, it gives them a comparative advantage over their competitors ([Jazdzewska-Gutta et al., 2020](#); [Houe and Murphy, 2018](#)). It also increases the perceived efficiency and effectiveness of firms according to [Park and Park \(2018\)](#). The majority of papers examining the impact of AEO on trade rely on a gravity model with country-level data. AEO programs are found to positively impact trade in general ([de Sa Porto et al., 2015](#)) and within COMESA ([Chikabwi and Chikiwa, 2021](#)) but not within the Organization of Islamic Countries ([Dincer and Tekin-Koru, 2019](#)). To our knowledge, only [Volpe Martincus \(2016\)](#) and [Zheng et al. \(2023\)](#) uses firm-level data to estimate the impact of AEO programs on trade. [Volpe Martincus \(2016\)](#) focus on the NECC certification, which corresponds to the Mexican AEO program.<sup>1</sup> He shows that NECC has resulted in increased firms' trade, associated with lower rates of physical inspections and shorter times in customs for shipments. NECC certified firms also have an increased extensive margin. [Zheng et al. \(2023\)](#) investigates the impact of the AEO status on export stability using Chinese customs data from 2002 to 2013 and propensity score matching. They show that the AEO reduces firms' export failures and that this effect is heterogeneous according to the localisation of firms, export destinations and trade modes. Price- time- and procedure-sensitive products are found to be more reactive to AEO certification. Our analysis differs from the work of [Zheng et al. \(2023\)](#) in several respects. First, rather to focus on export failure, we investigate

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<sup>1</sup>Nuevo Esquema de Empresas Certificadas

the effect of the AEO status on French firms' trade margins, distinguishing the intensive margin (trade value) from the extensive margin of trade (export probability). Second, we go further in analysing the heterogeneous impact of AEO on trade by focusing on Non-Tariff Measures. We show that the positive effect of AEO is limited to markets with NTMs, suggesting that this status mainly reduces the administrative costs induced by these measures at the border. Third, while [Zheng et al. \(2023\)](#) use a propensity score matching, we treat the endogeneity of AEO certification using different approaches, including an instrumental variable approach. Finally, we also test the impact of Mutual Recognition Agreements (MRAs) on exports. These agreements grant the benefit of the AEO status at the border of the signatory countries. We show that if the positive effect of certification on trade occurs mainly in non-MRA countries, signing the MRA only benefits AEO firms.

The contributions of this paper are the following. First, we show that the AEO program has a positive impact on French firms' trade margins by reducing fixed and variable costs. Second, we demonstrate that this positive effect is limited to product-destination with NTMs, suggesting that the AEO certification only reduces administrative costs induced by technical, sanitary and phytosanitary measures. Third, we show that the signing of Mutual Recognition Agreements (MRA) benefits AEO firms, by increasing both their export value and market access. Our results are robust to a variety of checks, and when we control for the endogeneity of the decision to obtain AEO certification. Finally, our work confirms that some of the trade costs generated by NTMs are administrative in nature and that these costs can be reduced by trade facilitation procedures through prior certification of firms. It suggests that, beyond tariffs, agreements containing provisions on the AEO status can have significant effects on trade by simplifying procedures at the border and through mutual recognition of certification bodies, without reducing the stringency of NTMs.

The remainder of the paper is structured as follows. In a first section, we further detail the status of Authorized Economic Operators defined by the World Customs Organization. In the next section, we describe our data sources and provide some empirical evidence. In the third section, we estimate the trade effect of the AEO certification by comparing trade margins before and after acquiring AEO status. In the fourth section, we assess the impact of signing a MRA on exports. Last section concludes.

## 2 Authorized Economic Operators

### 2.1 A custom's certification

Customs services have always played a key role in global trade, collecting duties, controlling the import and export of goods, fighting trafficking and organized crime, and compiling trade statistics. In recent years, they have also become increasingly involved in ensuring the security of the international trade supply chain and protecting the environment.<sup>2</sup> The World Customs Organization (WCO), an intergovernmental organization with 171 members that aims to improve cooperation and efficiency in customs administration, is therefore a major player in international trade. Its activities are complementary to those of the World Trade Organization (WTO), whose objectives are to define global trade rules, to act as a forum for trade negotiations and to facilitate international trade in goods and services.

After the terrorist attacks of September 11, 2001, the WCO developed several programs to facilitate and secure international trade, such as the Standards to Secure and Facilitate Global Trade Framework (SAFE Framework). The SAFE Framework was adopted in 2005 and consists of two pillars. The first one defines Customs-to-Customs cooperation while the second one deals with Customs-to-Business relations. One of the main issues of this second pillar is the implementation of the Authorized Economic Operator (AEO) status in 2007. According to the WCO definition, an AEO is *"a party involved in the international movement of goods, in whatever function, that has been approved by, or on behalf of, a national Customs administration as complying with WCO or equivalent supply chain security standards."*

As a partnership program between the Customs and the AEO ("Customs-to-Business partnership"), the AEO certification implies a relationship between Customs and the applicant/AEO based on mutual transparency, correctness, fairness and responsibility. To obtain this status, operators must demonstrate compliance with customs requirements for commercial and transportation records. They must prove their financial solvency and comply with appropriate safety and security standards. The status thus covers a wide range of issues, from the financial viability of the firm to its internal organization and the quality of its products. As a result, three types of AEO status coexist: "security/safety" AEO (AEOS), "customs facilitations" AEO (AEOC) and "full" AEO (AEOF), which is a combination of the AEOS and AEOC.

Mutual recognition is an important component of AEO programs within the SAFE framework.

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<sup>2</sup>[https://ec.europa.eu/taxation\\_customs/business/customs-controls/introduction-customs-controls\\_en](https://ec.europa.eu/taxation_customs/business/customs-controls/introduction-customs-controls_en)

Two countries that sign a Mutual Recognition Agreements (MRAs) "mutually recognize AEO authorizations that has been properly granted by one Customs administration" (WCO). These MRAs are intended to provide additional benefits through international recognition of the AEO status with partner countries.

In 2022, according to WCO's online platform AEO compendium, which tracks the development of AEO programmes and MRAs, there were 97 operational AEO programmes worldwide. Moreover, 20 AEO programmes are under development. At the same time, 91 MRAs have been concluded and are in force whereas 78 have been under negotiation. The European Union launched its AEO program in 2008 through the "security amendments" to the "Community Customs Code" (CCC) (Regulation (EC) 648/2005) and its implementing provisions.<sup>3</sup> The EU has signed MRAs with Switzerland (2009), Norway (2009), Japan (2010), the US (2012), China (2014), the United Kingdom (2021) and Moldova (2022).

## 2.2 Costs and benefits of the AEO status

The aim of AEO certification is to facilitate trade and simplify customs clearance. These facilitations apply both in the home country prior to shipment and at the border of the partner country. In their home countries, AEOs benefit from simplified declaration procedures under the Customs Freight Simplified Procedures (CFSP) and have the possibility to clear customs on their premises. They can self-assess the value of the products, are not required to present the goods, have reduced security and warranty requirements and fewer inspections. These simplified procedures also apply when the products arrive at the border of European countries or destinations with which the European Union has signed a MRA. AEOs benefit then from expedited release and pre-clearance with a priority treatment for inspections. Priority clearance also applies when a port or border is closed as a result of a high-threat situation due to security, sanitary or phytosanitary incidents.<sup>4</sup> On the European market, AEOs benefit from centralized clearance when exporting to more than one Member State.

Although the AEO application is free of charge, there are some fixed costs for firms to obtain certification. They must invest in security and operational processes and dematerialize some of their documentation. They are also required to conduct personnel screening and audit and control

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<sup>3</sup>See [taxation-customs.ec.europa.eu](https://taxation-customs.ec.europa.eu)

<sup>4</sup>The benefits of the status are not limited to manufacturing exporters. Intermediaries or transporters who are AEOs also benefit from the same level of confidence and are able to clear goods on behalf of others without additional restrictions.



their subcontractors. AEO certifications are free, but the process takes time and human resources, which is why some firms use the services of consultants to guide them through the process.<sup>5</sup> Audits and controls on personnel and subcontractors have to be renewed every five years, which means that these costs are partly variable for the firms.

The AEO certification can therefore be considered as a fixed cost paid by the firm in order to benefit from reduced variable costs when exporting to certain destinations (countries with MRA and the European market). Indeed, AEO status reduces red tape costs at the border by facilitating customs clearance, and can prevent theft or loss in transit by providing a level of security. AEO firms may also have lower insurance costs due to better internal management.

The reduction in variable costs makes us expect that the certification of firms will lead to an increase in the value of exports (the intensive margin), with a higher impact on the European market and on destination markets with an MRA, where the AEO status is recognized. We also anticipate a positive impact on market access (extensive margin), as AEO status can also improve customer confidence and visibility by improving security and communication with supply chain partners. We also anticipate the signing of MRAs that make the AEO status recognized to have a positive impact on trade for AEO certified firms.

The effect of certification is likely to be heterogeneous across products and destination markets. Neither the cost of certification nor the benefits of AEO status are product-specific. The firm is certified for all its export activities and the customs benefits granted apply to all exported products. However, we can assume that the benefits of AEO status are greater for products and/or markets where control and inspection costs are higher, such as markets with non-tariff measures. We will test this in the rest of the paper.

### 3 Data and Descriptive Evidence

#### 3.1 Firm-level Data

To assess the impact of the AEO certification on trade margins, we rely on a unique and exhaustive list of French exporting firms with the AEO status provided by the European Commission.<sup>6</sup> Even if the AEO status is technically granted by the French customs, this framework has been defined at the EU level, which explains why this information is available on the official website of the

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<sup>5</sup>See for example [vartanconsultancy](#)

<sup>6</sup>[ec.europa.eu](#)

European Commission.

The information provided for each certified firm includes its name, the type of AEO authorization (AEOC, AEOF or AEOS) it holds and the date of certification. It does not include firm's SIREN which is the French unique identifier used to identify firms in both customs and tax databases. We had to rely on the websites *www.societe.com* and *www.verif.com* which record administrative information about french firms, including their names and SIREN, and make the match manually. We keep all type of certification and end up with a dataset of 1,752 French firms which have been certified between 2009 and 2018. On average, 150 French firms is certified each year over the period (see Figure 1).

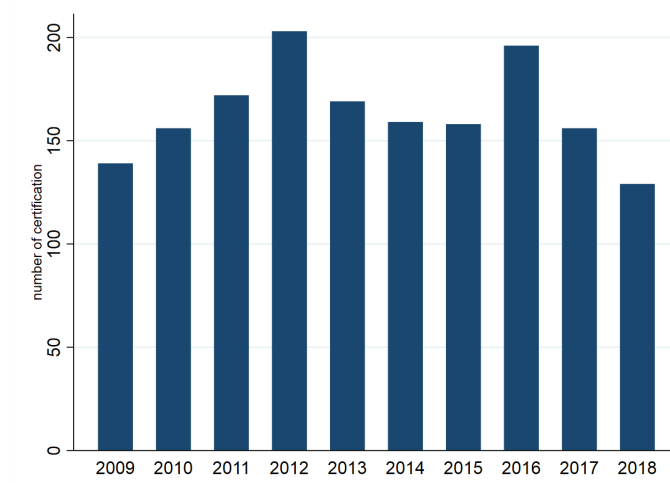


Figure 1: Number of AEO certification, 2008-2018

Information on AEO certification is merged with the FARE dataset of the French National Institute of Statistics (INSEE) which provides information on french firms' characteristics as value added, turnover and number of employees. Data on firms' main activity allow us to restrict our sample to producing firms by excluding trade intermediaries, wholesales and transportation activities. The determinants of exports by wholesalers or transporters are very different from those of manufacturing enterprises, and some of the controls are difficult to calculate (such as productivity). For this reason, we prefer to focus on a relatively homogeneous group of companies to measure the impact of certification on trade.

Using SIREN code, this list of AEO firms is merged with firm-level trade data from the French customs which provide exports in value and quantity by product (at the 8-digit level of the product classification of the EU statistics) and destination, for each firm. This database for the period 2009

to 2018 includes 301,246 French exporting and manufacturing firms, of which 625 are authorized.

### 3.2 AEO and French exports

In 2018, AEOs account for 15% of observed trade flows (figure 2(a)), but 35% of total French exports (figure 2(b)). This suggests that AEO have, on average, higher export values than others. The share of AEO firms (future and current certified) is growing both in figure 2(a) and figure 2(b). We therefore observe both an increase in the number of certified firms and an increase in their extensive and intensive trade margin between 2008 and 2018.

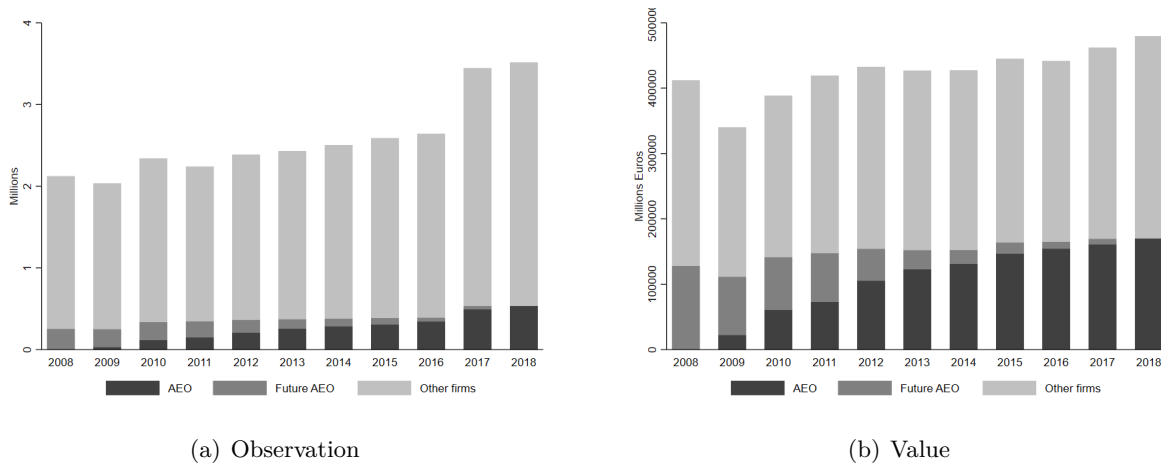


Figure 2: French exports and AEO firms, 2008-2018

Table 1 presents some statistics on the characteristics of French exporters in 2008 and 2018. The first two columns of the table compare the characteristics of pre-certified and non-certified firms in 2008. Future AEO firms appear to be more productive, with higher total turnover and more employees than other firms. Firms that will be certified tend to export more, to a greater number of destinations and a greater number of products. In 2018, the difference between current AEO exporters and other exporting firms appears even more pronounced (columns 3 and 4 of table 1). A comparison of columns (1) and (3) shows that AEO firms have not only increased their trade margins after certification, but also their productivity and size.

The marked difference between certified and non-certified companies makes it difficult to use non-certified firms as a benchmark in our analysis. They are much smaller, less productive and have lower trade margins than the firms applying for AEO status. This leads us to restrict our sample to the 625 manufacturing firms that obtain the AEO certification at some point during the period 2008-2018. We will compare exports of firms, before and after their certification.

Table 1: Firms' characteristics by type of firm, 2009-2018

		2008		2018	
		Future AEO	Other	AEO	Other
Productivity	<i>Mean</i>	1,339.8	568.9	2,808.5	757.1
	<i>Med.</i>	308.5	239.4	383.7	295.2
Sales (euros)	<i>Mean</i>	307,974.8	22,354.2	584,340.9	26,627.8
	<i>Med.</i>	49,209.5	2,086.1	64,732	2,277.7
Number of employees	<i>Mean</i>	703.2	73.3	749	63.5
	<i>Med.</i>	147.5	10.7	151	7
Export by firm (M euros)	<i>Mean</i>	108	3	167	3
	<i>Med.</i>	9	0.06	10	0.05
Number destination	<i>Mean</i>	29	6.5	31	7
	<i>Med.</i>	21	2	22	2
Number products	<i>Mean</i>	13.7	4.1	21	5.5
	<i>Med.</i>	6	2	8	2

Since we are interested in analyzing the impact of the AEO certification on exports to markets with NTMs, we also limit our sample to the 91 destination countries for which NTM data are available in the UNCTAD for researchers database.<sup>7</sup> This database displays the occurrence of NTMs by country and product at the HS 6-digit level. For consistency between collection years and countries, we only consider "Sanitary and Phytosanitary measures" (SPS) and "Technical Barriers to Trade" (TBT), i.e. the chapters A and B of MAST classification.<sup>8</sup>

Figure 3 displays the distribution of the export value by firm-destination-product-year for AEO firms, distinguishing between markets with NTM and other markets. Exports of AEO firms seems to be slightly higher when facing NTMs. In the rest of the paper, we will examine the extent to which AEO status helps French firms to cope with non-tariff measures in destination markets.

## 4 Trade effect of certification

### 4.1 Specification

The objective of this first empirical part is to investigate the impact of AEO certification on trade patterns, focusing both on the intensive margin of trade (value of exports of the firm  $f$  of product  $k$  to destination  $j$  at year  $t$ ) and on the extensive margin of trade (probability of export of the firm

<sup>7</sup><https://trainsonline.unctad.org/bulkDataDownload>

<sup>8</sup>We use UNCTAD data instead of data from the WTO as Fontagné and Orefice (2018) and Fontagné et al. (2015) because the WTO dataset only lists NTMs which raised concerns for exporters. We want to consider the entire universe of NTMs to assess the level of administrative costs they induced, even if they do not raise any trade concerns.

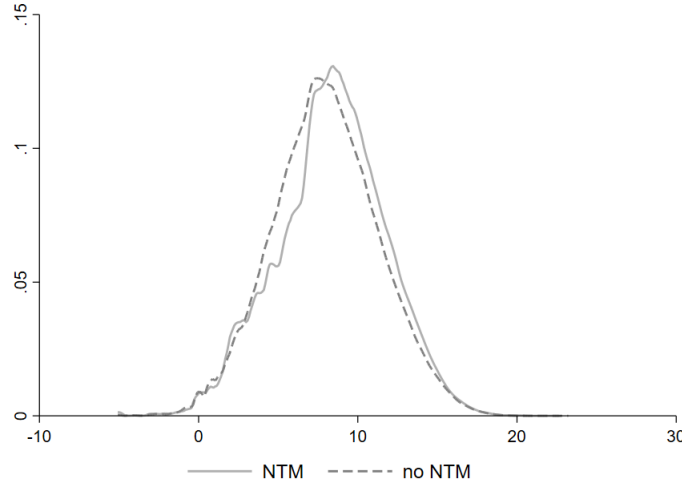


Figure 3: Distribution of export flows by destination market

$f$  of product  $k$  to destination  $j$  at year  $t$ ). We estimate the following equation on French AEO firms exports :

$$Exports_{fjkt} = \alpha_0 + \alpha_1 AEO_{ft} + \beta AVE_{jkt} + \Gamma productivity_{ft} + \delta_{jt} + \xi_{fjk} + \varepsilon_{fjkt} \quad (1)$$

where  $AEO_{ft}$  is a dummy indicating whether firm  $f$  is certified the year  $t$ ,  $productivity_{ft}$  the firms'  $f$  productivity the year  $t$  and  $AVE_{jkt}$  the *ad valorem* equivalent of the applied tariff applied by country  $j$  on product  $k$  coming from France the year  $t$  from the MAcMap-HS6 database (Guimbard et al., 2012).<sup>9</sup>

In the intensive margin estimation, the dependent variable is the logarithm of the value  $v_{fjkt}$  of exports of firm  $f$  to  $j$  for the product  $k$  at time  $t$ . In the extensive margin estimation, the dependent variable  $Export_{fjkt}$  is a binary variable  $X_{fjkt}$  that is equal to 1 in the case of an existing trade flow from firm  $f$  to  $j$  for the good  $k$  in the year  $t$ , and 0 otherwise.

We limit our analysis to firms that become certified over the 2009-2018 period. The use of a 10-year panel allows us to take advantage of within firm variation (when firms certified themselves). Our specification relies on trade variation before and after firms' certification by including firm-product-destination fixed effect  $\xi_{fjk}$ . Destination-year fixed effect  $\delta_{jt}$  are added to control for various trends such as demand or the evolution of competition on market  $j$ .

<sup>9</sup>Products which are defined at the 8 digit of the European Combined Nomenclature are aggregated at the 6-digits level of the the Harmonized system to merge with information on applied tariffs from MAcMap-HS6.

## 4.2 Effect of AEO certification on trade margins

Table 2 reports the estimate of equation 1 on the value of trade. In column (1) the dummy  $AEO_{ft}$  exhibits a positive and significant coefficient, suggesting that firms increase their level of export when they get the AEO status. In columns (2) to (4) we restrict our sample to countries with Mutual Recognition Agreements (2), EU countries (3), and non-EU-non-MRA countries (4), respectively. Surprisingly, certification does not seem to encourage trade with MRA countries, nor with EU destinations, while countries that have signed MRAs or are members of the European Union are more likely to recognize the status of AEO than other countries. We would expect the effect of certification to be observed in these markets, but also to be stronger. The coefficient  $AEO_{ft}$  only attracts a significant coefficient in column (4), on non European markets without MRA. Firm-level trade facilitation appears to be effective only on non-EU markets.<sup>10</sup>

Table 3 follows the same specification than table 2 but focuses on the extensive margin of trade. The variable  $AEO_{ft}$  has no significant coefficient in any column, meaning that AEO certification does not impact the probability of trade but only its value. This result suggests that certification reduces variable costs to export, but not fixed export costs.

In all columns of tables 2 and 3, control variables' coefficients have the expected sign. An increase in firms' productivity induces an increase in export values and export probability, while tariffs measured by the *Ad Valorem* Equivalent of applied customs duties reduce trade.<sup>11</sup>

Table 2: Effect of AEO certification on the intensive margin of trade in value

	$\ln v_{fjkt}$			
	All (1)	MRA (2)	EU (3)	Others (4)
$AEO_{ft}$	0.043* (0.024)	-0.031 (0.045)	0.040 (0.026)	0.070** (0.030)
$AVE_{jkt}$	-0.534*** (0.126)	-1.933*** (0.509)	-3.672*** (1.268)	-0.468*** (0.131)
$Productivity_{ft}$	0.202*** (0.045)	0.203*** (0.066)	0.227*** (0.058)	0.140*** (0.045)
Nber obs.	1,540,730	143,798	778,274	608,073
R2	0.85	0.85	0.87	0.84

Notes: All continuous variables are in logarithm.

Firm-destination-product and destination-year fixed effects included

Robust standard errors clustered by firm-year in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

<sup>10</sup>This result is robust to the use of interacted variable instead of estimating equation 1 on different samples of destination, as shown in appendix table 13

<sup>11</sup>This result is robust to alternative computations of firm's productivity, as shown in appendix table 9.

Table 3: Effect of AEO certification on the extensive margin of trade

	$X_{fjkt}$			
	All (1)	MRA (2)	EU (3)	Others (4)
$AEO_{ft}$	-0.007 (0.010)	0.005 (0.015)	-0.009 (0.015)	-0.006 (0.010)
$AVE_{jkt}$	-0.096*** (0.024)	-0.520*** (0.082)	0.362 (0.234)	-0.083*** (0.025)
Productivity $_{ft}$	0.028*** (0.009)	0.006 (0.016)	0.057*** (0.014)	0.008 (0.009)
Nber obs.	6,892,895	667,096	2,737,065	3,458,798
R2	0.43	0.44	0.47	0.40

Notes: All continuous variables are in logarithm.

Firm-destination-product and destination-year fixed effects included

Robust standard errors clustered by firm-year in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

### 4.3 Endogeneity issues

Certification is not exogenous to firms' export decisions. Indeed, a firm may decide to become an AEO because it wants to increase its exports to countries that have signed a mutual recognition agreement or its export of products with high level of standards, and therefore a higher likelihood of being inspected and rejected at the border. More generally, certification may be part of a firm's broader strategy to improve its reliability and efficiency, or to become more export-oriented. We perform different tests to ensure that our results presented in tables 2 and 3 are not biased by this potential endogeneity of the certification decision.

In table 4 we test whether our baseline results are not driven by the firm's overall export strategy by examining the impact of future certification on exports. We replicate the estimations of table 2 substituting the dummy  $AEO_{ft}$  by the variable  $AEO_{ft+1}$  equal to one if the firm  $f$  is getting the AEO certification one year after the year  $t$ , zero otherwise. The coefficients in columns (1) and (4) are insignificant. This suggests that the decision to certify is not linked to previous trade level. In other words, the positive and significant coefficients obtained in table 2 are not induced by the firm's prior trend in exports.

As a second exercise, we replicate our baseline estimates from table 2 restricting our sample to the 2008-2011 time frame. As AEO certification has only been available in France since 2008, we can assume that certification was relatively exogenous to exports for the first certified firms. These latter probably could not have foreseen the introduction of such a trade facilitation scheme by French customs. In table 5 the variable  $AEO_{ft}$  attracts positive and significant coefficients in

Table 4: Effect of AEO certification on the intensive margin of trade in value, forward variable

	$\ln v_{fjkt}$			
	All (1)	MRA (2)	EU (3)	Others (4)
$AEO_{ft+1}$	0.029 (0.024)	-0.001 (0.049)	0.043* (0.026)	0.030 (0.031)
$AVE_{jkt}$	-0.424*** (0.124)	-1.873*** (0.527)	-3.649*** (1.233)	-0.356*** (0.128)
Productivity $_{ft}$	0.203*** (0.047)	0.288*** (0.068)	0.205*** (0.058)	0.149*** (0.047)
Nber obs.	1,235,984	101,541	634,927	489,286
R2	0.85	0.83	0.87	0.83

Notes: All continuous variables are in logarithm.

Firm-destination-product and destination-year fixed effects included

Robust standard errors clustered by firm-year in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

all columns, with an even larger magnitude than in the full sample. This result shows that the effect of AEO certification on trade values is high and significant even when unanticipated. Table 10 in appendix confirms that AEO certification does not impact trade probability, even for the firms which were among the first to be certified.

Table 5: Effect of AEO certification on the intensive margin of trade, 2008-2011

	$\ln v_{fjkt}$			
	All (1)	MRA (2)	EU (3)	Others (4)
$AEO_{ft}$	0.276*** (0.071)	0.458*** (0.161)	0.244*** (0.063)	0.259*** (0.076)
$AVE_{jkt}$	-1.275*** (0.363)	-4.069** (1.811)	-6.291*** (2.092)	-0.932*** (0.277)
Productivity $_{ft}$	0.121* (0.065)	0.149* (0.082)	0.126 (0.088)	0.084 (0.057)
N	582,582	68,914	254,926	254,734
r2	0.86	0.84	0.88	0.85

Notes: All continuous variables are in logarithm.

Firm-destination-product and destination-year fixed effects included

Robust standard errors clustered by firm-year in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

As third test, we test whether getting the AEO certification impacts the other outputs of the firms. Aggregating data at the firm-year level, we estimate the impact of the dummy  $AEO_{ft}$  on the overall sales of the firm  $f$  the year  $t$  (column 1), its number of employees (column 2), its productivity (column 3), its total exports (column 4) and the share of export in the overall sales of the firm (column 5), including firm and year fixed effects.<sup>12</sup> None of the coefficients relating to

<sup>12</sup>Productivity is computed as the ratio of value added on number of employees



the  $AEO_{ft}$  variable of table 11 in appendix are significant in our estimates, which suggests that the AEO certification do not have any impact of the overall activity of the firm, or on its export orientation. The impact of certification is therefore limited to bilateral flows to specific destinations and is not linked to firms' strategies to expand their activities abroad or in general.

We finally propose an instrumental variable approach as an alternative way to address the endogeneity of AEO certification. We instrument the certification variable  $AEO_{ft}$  using the share of the firms' turnover made on foreign markets and the total exports of the firm the year before the certification. We consider that a firm will be more likely to certify if its exports represent an important share of its activity and are important the previous year. Results are displayed in table 12 in appendix. Our weak identification test comes from the F-test on the excluded instruments in the first-step regression. This F-statistic is over 10, which suggests that our instrument is not weak. The validity of our instruments is supported by the rejection of underidentification (a low p-value for the Kleibergen-Paap rk LM statistic). The coefficients relative to the variable  $AEO_{ft}$  are positive and significant, suggesting that the positive impact of AEO certification found in Table 2 is robust to an instrumental approach.

#### 4.4 AEO and Non-Tariff Measures

In this section, we investigate the heterogeneity of the trade impacts of AEO certification according to markets. More specifically, we test whether the positive effect of AEO certification found in our baseline estimation depends on the presence of non-tariff measures in the destination market.

In table 6, we interact our variable of interest  $AEO_{ft}$  with a dummy  $NTM_{jk}$  equal to one whether a non-tariff measure is applied at the entry of the country  $j$  for the product  $k$  and zero otherwise. Columns (1) to (3) focus on the impact of AEO certification on the intensive margin, respectively on all markets, on MRA markets and on non-EU and non-MRA markets.<sup>13</sup> The interacted variable  $AEO_{ft} \times \text{Dummy } NTM_{jk}$  exhibits positive and significant coefficients in columns (1) and (3) while the variable  $AEO_{ft}$  does not attract any significant coefficients. The catalyst effect of AEO certification on trade values found in table 2 only applies when exporters face non-tariff measures in their destination markets. This suggests that trade facilitation induced by the AEO status only reduces costs induced by non-tariff measures. This result is robust to the inclusion of the number of non-tariff measures in the estimation, see table 14 in the appendix.

<sup>13</sup>We do not consider European destinations here because the NTMs applied on the European market are the same as those that are applied on the French market.

Columns (4) to (6) show the results of the extensive margin estimates. Contrary to what we found in the table 3, the AEO certification appears to have a positive effect on export probability when a NTMs is applied at the border of the country  $j$  for the product  $k$ . This result demonstrates that certification can reduce not only variable costs, but also fixed costs induced by NTMs.

Overall, our analysis shows that the costs associated with non-tariff measures have an administrative component, both fixed and variable, which can be reduced by trade facilitation measures at the firm level through certification.

Table 6: Effect of AEO certification and Non-Tariff measures on trade margins

	lv <sub>fjkt</sub>			X <sub>fjkt</sub>		
	All (1)	MRA (2)	Others (3)	All (4)	MRA (5)	Others (6)
AEO <sub>ft</sub>	0.032 (0.024)	-0.050 (0.055)	0.028 (0.032)	-0.009 (0.011)	-0.010 (0.014)	-0.009 (0.010)
AEO <sub>ft</sub> × Dummy NTM <sub>jk</sub>	0.041** (0.020)	0.028 (0.042)	0.078*** (0.022)	0.006 (0.005)	0.021** (0.009)	0.007* (0.003)
AVE <sub>jkt</sub>	-0.525*** (0.127)	-1.934*** (0.509)	-0.450*** (0.132)	-0.094*** (0.024)	-0.525*** (0.082)	-0.081*** (0.026)
Productivity <sub>ft</sub>	0.202*** (0.045)	0.203*** (0.066)	0.141*** (0.045)	0.028*** (0.009)	0.006 (0.016)	0.008 (0.009)
N	1,540,730	143,798	608,073	6,892,895	667,096	3,458,798
r <sup>2</sup>	0.85	0.85	0.84	0.43	0.44	0.40

Notes: All continuous variables are in logarithm.

Firm-destination-product and destination-year fixed effects included

Robust standard errors clustered by firm-year in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

## 5 Trade effect of Mutual Recognition Agreement

### 5.1 Specification

We have previously examined the impact of certification on a firm's export margins by comparing the firm's trade before and after certification. In this second empirical section, we investigate the impact of MRAs on trade margins and compare, for a firm-destination-product triplet, exports before and after the conclusion of the  $j$  destination agreement. Our equation is the following :

$$Exports_{fjkt} = \alpha_0 + \alpha_1 MRA_{jt} + \beta AVE_{jkt} + \delta_{ft} + \xi_{fjk} + \varepsilon_{fjkt} \quad (2)$$

where our variable of interest is  $MRA_{jt}$  equal to one if the destination  $j$  have a mutual recognition agreement with the EU the year  $t$  and zero otherwise. As previously,  $AVE_{jkt}$  corresponds

to the *ad valorem* equivalent of the tariff applied by the country  $j$  to French export on product  $k$  the year  $t$ . We include a firm-destination-product fixed effect  $\xi_{fjk}$  and a firm-year fixed effect  $\delta_{ft}$  which allow us to control for all firm characteristics. Our identification relies on the within time variation before and after the signing of a MRA.<sup>14</sup>

## 5.2 Effect of Mutual Recognition Agreements on trade margins

Table 7 shows the results of the estimates of the equation 2 on trade margins. Columns (1) to (3) focus on the intensive margin and looks at the impact of MRA on export trade values. The estimated coefficient of the variable  $MRA_{jt}$  is significant and positive in column (1), indicating that firms have higher export values once an MRAs is signed between France and the specific destination. Columns (2) and (3), however, show that this positive effect of MRAs on trade value is limited to certified firms (column 2), but is not significant for other firms (column 3). Signing a MRA increases trade only for firms that are already certified. This result is not surprising given that the purpose of such agreements is to have the certification and reliability of firms recognized in the destination country.

We observe a different pattern on the extensive margin in columns (4) to (6) which concentrate on the impact of MRAs on the extensive margin (the probability of trade). All the coefficients of the variable MRA attract positive and significant coefficients, meaning that MRAs increase market access for all firms, certified or not. This result can be explained by the fact that the signing of an MRAs can promote regulatory cooperation between countries and help French exporting firms to have more information on the market access conditions in the destination country.

In table 15 in appendix we test the potential endogeneity of MRAs by looking at the effect of a future signature on trade margins. Indeed, the EU can sign a mutual recognition agreement with a country at a certain time because this specific country is an important destination country for European exporters with an already increasing value of trade.<sup>15</sup> In columns (1) and (2), the coefficients on the variable  $MRA_{jt+1}$  are insignificant, indicating that there was no surge in exports to the destination countries prior to the signing of the MRA. Thus, the positive effect of MRAs on trade exports is not induced by a pre-trend of exports to these specific markets. The columns (3)

<sup>14</sup>It is possible that MRAs are more likely to be signed with countries to which European firms already export a lot (or plan to export more), which raises the question of the endogeneity of MRAs. However, since we are only interested in French exports and compare certified and non-certified firms, this bias seems to be limited. It is unlikely that the European Union will sign agreements with certain countries because the few hundred French AEOs (0.21% of French exporting firms) want to export to these destinations.

<sup>15</sup>This endogeneity bias is however reduced as we are only considering French exporters.

and (4) however show that there were already an increase in the extensive margin (the probability of trade) the year before the agreement.

### 5.3 MRA and Non-Tariff Measures

We now investigate whether the effect of MRAs is heterogeneous across markets. More specifically, we want to test whether signing MRA have an higher impact for destinations and products with Non-Tariff measures. As in 4.4, we interact our variable of interest  $MRA_{jt}$  with the dummy  $NTM_{jk}$  indicating whether a NTMs is applied at entry of the country  $j$  for the product  $k$ . None of the coefficients of this interaction is significant in the table 8 while the coefficients of the MRA are positive and significant for certified firms at the intensive margin and for all firms at the extensive margin. The positive effect of Mutual Recognition Agreement observed in the table 7 does not depend on the presence of NTMs in the destination country.<sup>16</sup> As previously, our results show that MRAs foster trade value for certified firms only, but favor market access for all types of firm.

Table 7: Effect of the Mutual Recognition Agreement (MRA) on trade's margins

	$\ln v_{fjkt}$			$X_{fjkt}$		
	All Firms (1)	Certified Firms (2)	Other Firms (3)	All Firms (4)	Certified Firms (5)	Other Firms (6)
$MRA_{jt}$	0.077** (0.035)	0.175*** (0.058)	0.004 (0.030)	0.042*** (0.007)	0.035*** (0.011)	0.020*** (0.004)
$AVE_{jkt}$	-0.163 (0.129)	-0.486* (0.263)	0.047 (0.182)	-0.141*** (0.050)	-0.158*** (0.051)	-0.108 (0.075)
Nber obs.	1,548,979	890,090	545,996	6,945,516	3,623,763	3,116,117
R2	0.86	0.88	0.88	0.48	0.54	0.58

Notes: All continuous variables are in logarithm.

Firm-destination-product and firm-year fixed effects included

Robust standard errors clustered by destination-year in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

## 6 Conclusion

This paper focuses on a World Customs Organization trade facilitation program, the Authorized Economic Operator (AEO). This status grants firms preferential and priority treatment by customs, both at home and in destination markets. Our results using French firm-level data confirm previous findings that this type of certification promotes firms' exports. However, our results show that this advantage is limited to destinations with non-tariff measures. This finding suggests that

<sup>16</sup>This result is robust to the inclusion of the number of Non-Tariff measures in table 16

NTMs induce variable and fixed administrative costs, that can be reduced through trade facilitation programs.

This analysis supports the expansion of trade facilitation programs by pre-certifying firms that, as trusted partners, no longer have to deal with the full administrative burden of NTMs at the border. Such programs can be established under comprehensive preferential agreements that seek to promote trade between the parties without lowering standards on either side. This conclusion is supported by our findings on mutual recognition agreements, which show that these agreements favor trade by certified firms.

Table 8: Effect of the Mutual Recognition Agreement (MRA) and Non-Tariff measures on trade's margins

	$lv_{fjkt}$			$X_{fjkt}$		
	All Firms (1)	Certified Firms (2)	Other Firms (3)	All Firms (4)	Certified Firms (5)	Other Firms (6)
$MRA_{jt}$	0.060 (0.052)	0.170* (0.100)	-0.043 (0.055)	0.044*** (0.006)	0.034*** (0.011)	0.024*** (0.006)
$MRA_{jt} \times \text{Dummy NTM}_{jk}$	0.022 (0.037)	0.007 (0.072)	0.064 (0.059)	-0.002 (0.009)	0.002 (0.015)	-0.005 (0.006)
$AVE_{jkt}$	-0.163 (0.129)	-0.486* (0.263)	0.046 (0.182)	-0.141*** (0.050)	-0.158*** (0.051)	-0.108 (0.075)
N	1,548,979	890,090	545,996	6,945,516	3,623,763	3,116,117
r2	0.86	0.88	0.88	0.48	0.54	0.58

Notes: All continuous variables are in logarithm.

Firm-destination-product and firm-year fixed effects included

Robust standard errors clustered by destination-year in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

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## Appendix

Table 9: Effect of AEO certification on the intensive margin of trade using alternative measures of productivity

	$\ln v_{fjkt}$				
	(1)	(2)	(3)	(4)	(5)
AEO <sub>ft</sub>	0.043* (0.024)	0.045* (0.024)	0.043* (0.024)	0.045* (0.025)	0.041* (0.022)
AVE <sub>jkt</sub>	-0.534*** (0.126)	-0.291** (0.129)	-0.297** (0.128)	-0.531*** (0.127)	-0.530*** (0.124)
Productivity Output per worker <sub>ft</sub>	0.202*** (0.045)				-0.201*** (0.054)
Productivity Value added per worker <sub>ft</sub>		0.067** (0.033)			
Productivity Output per worker 12.31 <sub>ft</sub>			0.177*** (0.059)		
Productivity Value added per worker 12.31 <sub>ft</sub>				0.067** (0.029)	
Output <sub>ft</sub>					0.604*** (0.054)
Nber obs.	1,540,730	1,280,110	1,282,080	1,537,738	1,540,730
R2	0.85	0.84	0.84	0.85	0.85

Notes: All continuous variables are in logarithm.

Firm-destination-product and destination-year fixed effects included

Robust standard errors clustered by firm-year in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table 10: Effect of AEO certification on the extensive margin of trade, 2008-2011

	$\ln v_{fjkt}$			
	All (1)	MRA (2)	EU (3)	Others (4)
AEO <sub>ft</sub>	0.003 (0.019)	-0.048 (0.032)	0.031 (0.025)	-0.012 (0.016)
AVE <sub>jkt</sub>	-0.044 (0.043)	-0.270 (0.260)	1.129** (0.571)	-0.029 (0.044)
Productivity <sub>ft</sub>	0.035** (0.016)	0.032* (0.017)	0.052** (0.023)	0.026 (0.017)
N	2,375,444	251,049	825,765	1,287,151
r2	0.45	0.45	0.48	0.43

Notes: All continuous variables are in logarithm.

Firm-destination-product and destination-year fixed effects included

Robust standard errors clustered by firm-year in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table 11: Effect of certification on firms' other outcomes

	Sales <sub>ft</sub>	nber employees <sub>ft</sub>	productivity <sub>ft</sub>	total export <sub>ft</sub>	share export <sub>ft</sub>
	(1)	(2)	(3)	(4)	(5)
AEO <sub>ft</sub>	-0.020 (0.022)	0.014 (0.022)	-0.016 (0.021)	0.004 (0.046)	0.013 (0.011)
Nber obs.	5,703	5,620	5,613	4,966	4,970
R2	0.94	0.96	0.82	0.92	0.18

Standard errors in parentheses. Firm fixed effects and time fixed effects included.

Robust standard errors clustered by firm in parentheses.

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

Table 12: Effect of AEO certification on the intensive margin of trade in value, instrumental variable approach

	lv <sub>fjkt</sub>			
	All (1)	MRA (2)	EU (3)	Others (4)
AEO <sub>ft</sub>	1.831*** (0.701)	0.394 (0.500)	2.197** (0.905)	1.134** (0.554)
AVE <sub>jkt</sub>	-0.463*** (0.177)	-1.861*** (0.517)		-0.438*** (0.157)
Productivity <sub>ft</sub>	0.159* (0.085)	0.215*** (0.070)	0.090 (0.119)	0.162** (0.067)
Nber obs.	1,394,065	142,396	684,830	559,069
R2	-0.14	-0.01	-0.23	-0.04
Underidentification	3.53	3.80	3.45	2.74
Weak identification F-test	12.33	13.83	11.76	10.31
Weak identification p-value	0.01	0.00	0.01	0.02
Hausman Wu test p-value	0.02	0.91	0.40	0.01

Notes: All continuous variables are in logarithm.

Firm-destination-product and destination-year fixed effects included

Robust standard errors clustered by firm-year in parentheses. \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

Table 13: Effect of AEO certification on the intensive margin of trade in value, interacted variables

	lv <sub>fjkt</sub>	X <sub>fjkt</sub>
	(1)	(2)
AEO <sub>ft</sub> × MRA <sub>jt</sub>	-0.026 (0.038)	-0.002 (0.011)
AEO <sub>ft</sub> × EU <sub>j</sub>	-0.026 (0.028)	-0.002 (0.013)
AEO <sub>ft</sub> × Other <sub>jt</sub>	0.067** (0.030)	-0.007 (0.010)
AVE <sub>jkt</sub>	-0.533*** (0.126)	-0.096*** (0.024)
Productivity <sub>ft</sub>	0.202*** (0.045)	0.028*** (0.009)
N	1,540,730	6,892,895
r2	0.85	0.43

Notes: All continuous variables are in logarithm.

Firm-destination-product and destination-year fixed effects included

Robust standard errors clustered by firm-year in parentheses.

\* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

Table 14: Effect of AEO certification and the number of Non-Tariff measures on trade margins

	$lv_{fjkt}$			$X_{fjkt}$		
	All (1)	MRA (2)	Others (3)	All (4)	MRA (5)	Others (6)
$AEO_{ft}$	0.031 (0.024)	-0.049 (0.055)	0.026 (0.033)	-0.009 (0.011)	-0.009 (0.014)	-0.009 (0.010)
$AEO_{ft} \times \text{Dummy NTM}_{jk}$	-0.060*** (0.021)	-0.033 (0.045)	-0.018 (0.023)	0.012** (0.005)	0.038*** (0.011)	0.009** (0.004)
$AEO_{ft} \times \text{Number NTM}_{jk}$	0.016*** (0.002)	0.008*** (0.003)	0.017*** (0.002)	-0.001*** (0.000)	-0.003*** (0.001)	-0.000 (0.000)
$AVE_{jkt}$	-0.517*** (0.127)	-2.033*** (0.506)	-0.429*** (0.132)	-0.094*** (0.024)	-0.469*** (0.081)	-0.082*** (0.026)
$\text{Productivity}_{ft}$	0.202*** (0.045)	0.203*** (0.066)	0.140*** (0.045)	0.028*** (0.009)	0.006 (0.016)	0.008 (0.009)
N	1,540,730	143,798	608,073	6,892,895	667,096	3,458,798
r2	0.85	0.85	0.84	0.43	0.44	0.40

Notes: All continuous variables are in logarithm.

Firm-destination-product and destination-year fixed effects included

Robust standard errors clustered by firm-year in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table 15: Effect of the Mutual Recognition Agreement (MRA) on trade's margins, forward variable

	$lv_{fjkt}$		$X_{fjkt}$	
	Certified Firms (1)	Other Firms (2)	Certified Firms (3)	Other Firms (4)
$MRA_{jt+1}$	0.141 (0.090)	0.029 (0.043)	0.050*** (0.015)	0.024*** (0.004)
$AVE_{jkt}$	-0.452* (0.262)	0.045 (0.182)	-0.153*** (0.051)	-0.106 (0.074)
N	890,090	545,996	3,623,763	3,116,117
r2	0.88	0.88	0.54	0.58

Notes: All continuous variables are in logarithm.

Firm-destination-product and firm-year fixed effects included

Robust standard errors clustered by destination-year in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table 16: Effect of the Mutual Recognition Agreement (MRA) and Non-Tariff measures on trade's margins

	$lv_{fjkt}$			$X_{fjkt}$		
	All Firms (1)	Certified Firms (2)	Other Firms (3)	All Firms (4)	Certified Firms (5)	Other Firms (6)
$MRA_{jt}$	0.059 (0.052)	0.169* (0.100)	-0.043 (0.055)	0.044*** (0.006)	0.034*** (0.011)	0.024*** (0.006)
$MRA_{jt} \times \text{Dummy NTM}_{jk}$	-0.033 (0.040)	-0.006 (0.072)	0.046 (0.061)	-0.001 (0.009)	0.002 (0.015)	-0.010 (0.007)
$MRA_{jt} \times \text{Nber NTM}_{jk}$	0.007*** (0.002)	0.002 (0.002)	0.002 (0.003)	-0.000 (0.000)	-0.000 (0.000)	0.001*** (0.000)
$AVE_{jkt}$	-0.166 (0.129)	-0.487* (0.263)	0.045 (0.182)	-0.141*** (0.050)	-0.158*** (0.051)	-0.108 (0.075)
N	1,548,979	890,090	545,996	6,945,516	3,623,763	3,116,117
r2	0.86	0.88	0.88	0.48	0.54	0.58

Notes: All continuous variables are in logarithm.

Firm-destination-product and firm-year fixed effects included

Robust standard errors clustered by destination-year in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .