

Sandkamp, Alexander; Yalcin, Erdal

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Different antidumping legislations within the WTO: What can we learn from China's varying market economy status?

Alexander Sandkamp¹  | Erdal Yalcin² 

¹University of Kiel (CAU), Kiel Institute (IfW) & KCG, Kiel, Germany

²University of Applied Sciences Konstanz & CESifo, Konstanz, Germany

Correspondence

Alexander Sandkamp, Kiel Institute (IfW) & KCG, University of Kiel (CAU), Wilhelm-Seelig-Platz 1, 24118 Kiel, Germany.

Email: sandkamp@economics.uni-kiel.de

Abstract

This paper examines how varying antidumping methodologies applied within the World Trade Organization differ in the extent to which they reduce targeted exports. We show that antidumping duties, on average, hit Chinese exporters harder than those of other targeted countries. This difference can be traced back in part to China's non-market economy status, which affects the way antidumping duties are calculated. Furthermore, we show that the type of imposed duty matters, as ad-valorem duties affect exports differently compared to specific duties or duties conditional on the export price. Overall, however, antidumping duties remain effective in reducing imports independent of market economy status.

JEL CLASSIFICATION

F10; F13; F21

1 | INTRODUCTION

The World Trade Organization (WTO) has been credited for promoting a steady and strong increase in global trade (Subramanian & Wei, 2007).¹ Although the WTO's rules limit member states' abilities to set tariffs freely, they do provide countries with several different trade defence instruments with which to protect themselves from unfair trade practices by essentially abandoning bound tariff rates (Rosendorff & Milner, 2001). With almost 1,900 measures in force globally in 2019 (WTO, 2020),

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antidumping (AD) duties are by far the most common trade defence instrument.² Interestingly, WTO rules do not codify a general AD law but define so-called basic principles that have to be implemented into national law to govern the investigation, determination, and application of AD duties.³ Within certain boundaries, each WTO member has the right to design its own AD legislation.

This paper combines export data at the country-pair-product-level for the years 2000–2014 with information on AD duties to investigate how national antidumping legislations (methodologies) within the WTO differ in their ability to reduce targeted imports. On the one hand, AD methodologies can be assessed based on the observed total reduction in imports, which we refer to as effectiveness of AD legislation. On the other hand, AD duties can have different marginal effects in reducing imports (i.e., the effect of a one percentage point change in the duty), which we refer to as efficiency of AD methodologies. Along these two dimensions, this paper shows that effects of AD duties vary across different AD methodologies applied within the WTO. It also explains why exports from China—with 638 cases in force in 2019 by far the largest target of AD worldwide (WTO, 2020)—react differently to AD duties.

One major difference in existing AD regimes arises from the fact that WTO member states use different methods to determine the normal value—the price that is compared to the export price to calculate dumping margins—of potentially dumped imports. Many countries have codified AD rules by assigning international trade partners either a so-called market economy status (MES) or non-market economy status (NMES).⁴ For MES countries, the normal value is generally determined on the basis of domestic prices charged by the exporter in her own market. In contrast, for imports from NMES countries, normal value can be based on prices charged by different exporters located in third countries. These are often above domestic prices, so that the NMES methodology results in the imposition of higher AD duties (Detlof & Fridh, 2007; Felbermayr et al., 2016). Assuming that MES and NMES exporters face the same elasticity of demand, one would expect a larger drop in export quantities following the imposition of AD duties against NMES exporters.

Furthermore, most MES exporters receive an individual (firm specific) AD duty based on their own export price. This can be reduced by the imposing country if the firm raises its export prices. For NMES countries, authorities often use average export prices across all exporting firms selling a particular product in the destination market to set one single AD duty. MES, hence, provides exporting firms with greater incentives to raise prices, resulting in larger positive price effects.⁵ We show that MES exporters respond differently to AD duties than NMES exporters both with respect to export quantities and prices. On average, the trade destructing effect of AD duties is smaller for exporters that are granted MES by the importer than for those that are treated with NMES.

China is the only exporter in our sample for which MES varies over time and not just across importers. Several WTO member states have—at least de jure—granted China MES shortly after it joined the WTO. Others, including the European Union and the United States, still treat the People's Republic as a non-market economy in the period of investigation.⁶

Chinese exports—in terms of values, quantities and prices—react differently to AD duties compared to other exporting countries. Specifically, we find that the value of Chinese exports falls on average by 55% following the imposition of AD duties. In contrast, targeted exports from other countries on average fall by slightly less than 40%. Exports to certain countries that officially announced to grant China MES do not respond differently to AD duties after the announcement. This suggests that some countries—such as the EU and the US—treat MES seriously in the sense that they apply different rules to MES and NMES exporters. Other importers, however, simply treat China differently from other countries, with MES just being a label of no deeper meaning.

Finally we investigate whether the type of AD duty imposed plays a role in the effectiveness of AD regulation. We find that ad-valorem duties on average have the strongest trade destructing effect, followed by specific duties and conditional duties that are only imposed if the price falls below a certain

level. This order is reversed when it comes to price effects. Duties imposed if the price falls below a certain level have the largest positive impact on average export prices.

To date, investigating differences between MES and NMES granting countries has received limited attention in the literature Detlof and Fridh (2007), Felbermayr et al. (2016) and Felbermayr and Sandkamp (2020) compare levels of AD duties across MES and NMES exporters, showing that the NMES methodology results in higher AD duties. Urdinez and Masiero (2015) show that granting MES is associated with a reduction in the number of AD investigations.

This paper is perhaps most closely related to Sandkamp (2020), who exploits the EU enlargement in 2004 as a natural experiment to investigate the impact of AD duties on EU imports. The author shows that import quantities from NMES exporters fall by more following the imposition of AD duties than those from MES countries. Import prices from MES countries increase, whereas this is not the case for NMES exporters. The author identifies these effects by relying on variation across exporters that are treated differently with respect to MES by EU. He thus compares differential effects across exporters within the same (EU) legislation.

Complementary, this paper investigates different importing countries applying different methodologies (MES or NMES). This is a novel approach, as individual importers may apply WTO rules differently, so that other institutional factors may also play a role. It turns out that the differentiation between MES and NMES is only relevant if the former is applied rigorously rather than just on paper.

Beyond MES, AD duties have attracted significant research attention.⁷ Many studies investigating the trade effects of AD duties focus on individual importers. For the US, Prusa (1997, 2001) finds that AD duties reduce imports from targeted countries by up to 50%; Messerlin (1989), Lasagni (2000) and Konings et al. (2001) present similar findings for the EU. Blonigen and Haynes (2002) and Blonigen and Park (2004) provide evidence that exporter prices increase following the imposition of US AD duties. Lu et al. (2013) use firm-level data to show that a 1 percentage point increase in final AD duties reduces Chinese exports to the United States by 0.6%, with exporter prices remaining unchanged. Besedeš and Prusa (2017) show that US AD duties induce firm exit. Jabbour et al. (2019) also use firm-level data, finding that EU AD duties reduce imports from China.

Vandenbussche and Zanardi (2010) extend the scope to several importing countries, showing evidence for trade-chilling effects on bilateral trade flows from duties by so-called new adopters. Similarly, Egger and Nelson (2011) apply a gravity framework, and find negative but modest effects of AD duties on trade. To the best of our knowledge, Felbermayr and Sandkamp (2020) are the only ones comparing the effect of AD duties on Chinese exports across different imposing countries (the EU and the US).

This paper extends the scope of the analysis, considering all importing countries that imposed AD duties as well as all exporting countries that became subject to duties in the period of investigation. The aim is to paint a more comprehensive picture of the true effects of AD duties across all affected country-pairs. In addition, our data structure allows us to specifically investigate differences between MES and NMES granting countries.

The remainder of the paper is structured as follows. Section 2 provides an overview of the data and presents summary statistics on AD duties. The empirical strategy is presented in Section 3. Section 4 shows the main results, followed by extensions and robustness checks in Section 5. Section 6 concludes.

2 | DATA

Our empirical investigation requires information on trade, AD duties as well as MES treatment. Data on bilateral export values (free on board, before tariffs and duties) and quantities is taken from the

CEPII BACI world trade database, which provides information on trade flows at the HS6-digit level.⁸ We consider the period from 2000 to 2014.

Information on AD cases is taken from the World Bank's Global Antidumping Database (Bown, 2015), which provides information on dates of implementation and withdrawal of duties by exporter, imposing country and product. For our analysis, all AD cases that were imposed between 2001 and 2013 are taken into consideration. Since our trade data ranges from 2000 to 2014, this gives us a pre- and post-treatment period of at least one year for all cases included.

The duty we use is the final countrywide AD duty imposed by the importing country as reported in Bown (2015).⁹ Treatment is assumed to begin with the year in which the final duty was imposed and to end in the year the duty was officially revoked. Since duties are imposed throughout the year, this practice may result in attenuation bias if the duty is not imposed in January. As duties are typically in force over several years, this bias is likely to be small and should not impact differences in efficiency and effectiveness of AD duties across MES and NMES exporters.

Several countries do not always report the final AD duty for each AD case. Instead they sometimes provide one of the following three alternatives: First, the minimum and maximum dumping margin; second, the minimum and maximum final antidumping duty; or third, the minimum and maximum of the margin or duty officially reported to the WTO. In these cases we construct the final AD duty as a simple mean of the minimum and maximum dumping margin or duty reported.¹⁰

AD duties can be imposed at different levels of aggregation (HS4 to HS12). Since our trade data provide information only at the HS6-digit level, the datasets are merged at this level of aggregation. Aggregating AD duties means that some products are wrongly assigned treatment, which may lead to an underestimation of the true treatment effect (bias toward zero). In addition, MES granting countries (and also some NMES granting countries such as the EU and the US) often impose firm-specific AD duties. In our analysis we rely on product-specific duties reported in Bown (2015). For the regressions relying on the duty rate, this could result in an underestimation of the treatment effect. However, the dummy regressions remain unaffected.

Finally—and perhaps most challenging—information on bilateral MES/NMES treatment is needed. As noted by Puccio (2015), no official data is available that provides a comprehensive overview of countries that have granted other countries MES. We hence rely on several sources to obtain information on MES. For the EU, Detlof and Fridh (2007) identify 15 countries that are assigned NMES (Table A2 in the Appendix).¹¹ These countries are mentioned specifically in the EU's AD regulation. Following Sandkamp (2020), we therefore assume that all other countries are treated with MES in the context of EU AD duties. Out of the 15 countries listed, only Armenia, Belarus, China, Kazakhstan and Vietnam become subject to EU AD duties in the sample period.

Information on countries granted MES by the US is taken from Morrison (2019). The author identifies 11 countries that are currently assigned NMES by the US (Table A2 in the Appendix). In addition, Russia and the Ukraine were granted MES in 2002 and 2006 respectively. Five of these 13 countries (Belarus, China, Moldova, the Ukraine and Vietnam) have been targeted by AD duties under the NMES regime in the sample period.¹² As with the EU, the list of NMES is mentioned specifically in the context of AD. We therefore assume that all countries not mentioned by Morrison (2019) are treated with MES in the context of US AD legislation. Perhaps not surprisingly, the lists of countries assigned NMES by the EU and the US are very similar. There are only four countries that are treated with NMES by the EU but not by the US. The only country that was assigned NMES by the US but not the EU was the Ukraine, which, however, received MES by the US in 2006.

The third importing country for which we found more detailed information with regard to MES is Canada. According to Nedumpara and Zhou (2018), Canada treats three countries (China, Tajikistan and Vietnam) with NMES, although no duties were imposed against Tajikistan in the period of

investigation (Table A2 in the Appendix). However, since it is not clear whether this list is exhaustive, we choose not to treat all other exporters to Canada with MES. Instead, we neither assign MES nor NMES to these countries.

Information on importing countries that have granted MES to China is taken from Puccio (2015), Urdinez and Masiero (2015) and WTO (2015). Out of all active users of AD duties in the sample period, the sources identify 17 countries that formally granted China MES shortly after the country joined the WTO in December 2001 (Table A1 in the Appendix).¹³ 14 of them imposed AD duties against the People's Republic in the sample period. According to Puccio (2015), the reasons for countries granting China MES so quickly after it joined the WTO were manifold and included MES as precondition for free trade agreements with China, promoting Chinese investment in the partner country or mutual recognition by other NMES countries.¹⁴

While the EU and the US clearly differentiate between MES and NMES exporters with regard to their AD legislation, this is not necessarily the case for other importing countries. Puccio (2015) notes that six out of the 14 countries that imposed AD duties against China in the sample period and that granted China MES only signed a memorandum of understanding (Table A1 in the Appendix). This can be interpreted as a declaration of intent and does not necessarily mean that countries treated China differently in their AD legislation (by means of lowering AD duties) after granting it MES.¹⁵ Urdinez (2014) and Urdinez and Masiero (2015) show that Argentina and Brazil still treat China as a non-market economy, despite having officially granted the country MES in the form of a memorandum. In our regression analysis, we show that countries that signed a memorandum of understanding indeed continued to treat China as an NMES exporter.

Puccio (2015) also remarks that the list of countries which granted China MES can only be indicative, as the list, based on data from Kennedy and Cheng (2012), is collected mainly from news releases.¹⁶ This means that countries that have not explicitly granted China MES must not necessarily treat the country as NMES in their AD investigations. We therefore do not automatically treat importers that have not granted China MES as NMES importers. Instead, as with non-named exporters to Canada, we neither assign Chinese exports to these countries MES nor NMES.¹⁷ Overall, this means that three AD imposing countries treat China as a NMES exporter throughout the period of investigation, 14 countries switch from NMES to MES at some point and six countries do not clearly position themselves against China. AD duties that were imposed while China was assigned NMES are treated as NMES cases even after China is granted MES.

Overall, the merged dataset covers a total of 1,381 AD cases, imposed by 28 importing countries against 65 exporting countries, covering 1,049 HS6 products. Out of these, 299 cases covering 389 HS6 products fall under the MES methodology, while 193 cases covering 327 HS6 products are covered under the NMES methodology. For the remaining cases, MES/NMES cannot clearly be identified so that they are treated separately. Looking at exports from China, 156 (172) cases covering 266 (324) HS6 products were imposed under MES (NMES) methodology.¹⁸

Panel (a) of Figure 1 shows the average size of AD duties imposed against China by AD regime. Average AD duties imposed by NMES countries (101%) are higher than those imposed by MES granting countries (31%). For countries which signed a memorandum of understanding with China, the average AD duty even increased from 186% under NMES to 276% under MES. This provides evidence that these countries did not change their AD legislation with respect to China after granting the country MES.

Panel (b) of Figure 1 presents average AD duties imposed by Canada, the EU and the US against exporters with MES and NMES. Average AD duties imposed by the US are much higher than those imposed by the EU, both for MES and NMES exporters. One reason for this difference is that the EU applies the so-called lesser duty rule, which means that investigating authorities consider both

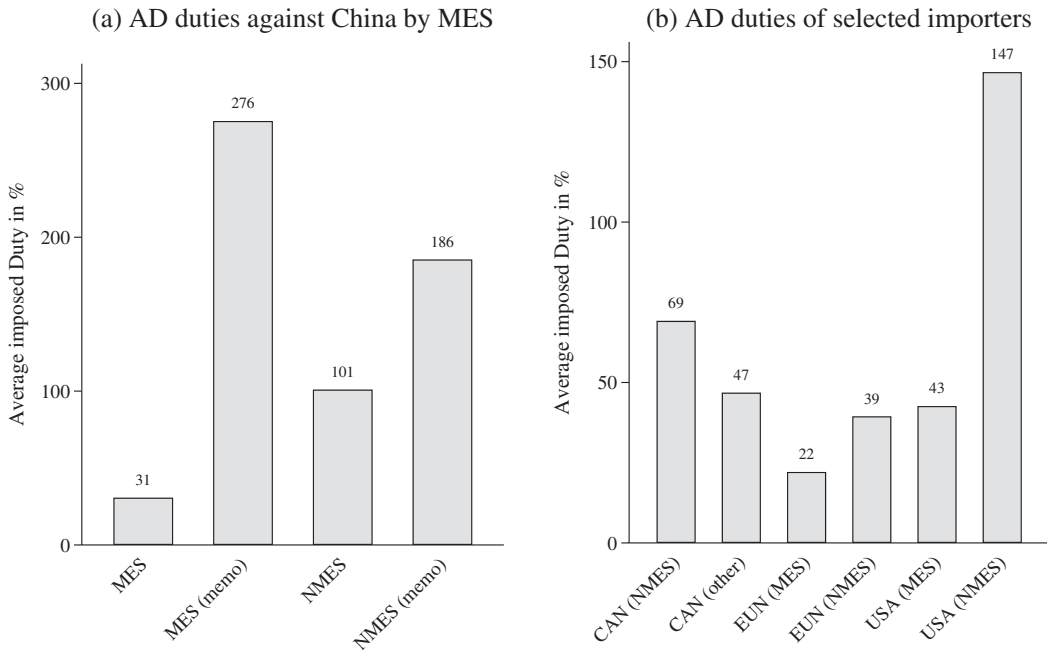


FIGURE 1 Average AD duties. *Note:* Simple averages across treated products. Panel (a) shows average AD duties imposed against China by NMES and MES granting countries. It differentiates between countries that signed a memorandum of understanding and those that did not. Panel (b) shows average AD duties imposed against MES and NMES exporters by selected countries. *Source:* Bown (2015) and authors' own calculations

the dumping margin and the injury margin when deciding on the level of the AD duty. Since the injury margin is typically below the dumping margin, this practice results in lower average duties. Felbermayr and Sandkamp (2020) show that this results in US duties against China having a larger trade destructing effect than EU duties. This example demonstrates that there may well be other aspects beyond MES that drive the effectiveness of AD duties.

Canadian duties are, on average, smaller than US duties but larger than EU duties. Recall that while we specifically identify three countries that are assigned NMES by Canada, we choose not to automatically assign MES to other exporters because the Canadian legislation is not clear on that. Nevertheless the graph shows that average Canadian duties imposed against NMES exporters are larger than those imposed against other countries.

While Canada has not officially granted China MES, the country applies NMES only to specific sectors and only on a case-by-case basis (Ciuriak, 2012). Canadian companies have to prove that Chinese exporters should be treated with NMES, whereas in the United States and the EU, the burden of proof lies with Chinese exporters.¹⁹

3 | EMPIRICAL STRATEGY

Our empirical strategy quantifies the impact of AD duties on international trade and investigates whether the effect of AD duties varies across several dimensions. In particular, we test if China reacts differently to AD and whether assignment of MES makes a difference for the impact of AD duties on exports. However, evaluations of trade policies typically face the challenge of sufficiently addressing endogeneity. AD duties in particular reduce imports but are also more likely to be implemented for

products that recently experienced a surge in imports. According to Bown and Crowley (2013) this may lead to simultaneity bias and thus an underestimation of the treatment effect.

The literature has dealt with this through the use of firm-level data (Felbermayr & Sandkamp, 2020; Lu et al., 2013) or by identifying exogenous sources of variation in trade policy (Sandkamp, 2020). The first strategy is not feasible since firm-level data is not freely available for the number of countries we aim to investigate. The second strategy would restrict the sample to such an extent that we cannot answer our research questions. To deal with endogeneity in the best permissible way, we follow the structural gravity model of trade and employ an extensive fixed effects estimation similar to Kinzius et al. (2019) who use it to estimate the trade effects of non-tariff barriers.²⁰ Our starting point is the following estimating equation:

$$\ln Y_{ijht} = \beta_{nonChina} AD_{ijht}^{nonChina} + \beta_{China} AD_{ijht}^{China} + v_{ijh} + v_{iht} + v_{jht} + v_{ijt} + \epsilon_{ijht}, \quad (1)$$

where $\ln Y_{ijht}$ denotes the natural logarithm of nominal export flows in USD, export quantity, or export price of product h shipped from origin country i to destination country j at time t . AD_{ijht} is the treatment variable and either equals the AD duty rate in percent or a dummy that equals one if country j imposes AD duties on imported products h from country i at time t , and equal to zero otherwise. To investigate whether Chinese exports react differently to AD duties, we interact our treatment variable AD_{ijht} once with a dummy that equals one if the exporter is China (and zero otherwise) and once with a mutually exclusive dummy that equals one for all exporters other than China (and zero otherwise).²¹ v_{ijh} , v_{iht} , v_{jht} and v_{ijt} are exporter-importer-product, exporter-product-time, importer-product-time and exporter-importer-time fixed effects, respectively; ϵ_{ijht} is an error term.

Using importer-exporter-product fixed effects means that the treatment effect is estimated through a difference-in-differences approach. In the case of the dummy regression, the estimated coefficient tells us how a country's exports of a particular product that becomes subject to AD duties in a particular importing country change over time relative to untreated exporter-importer-product combinations. This is our measure of effectiveness of AD duties. The coefficient estimated using the AD duty rate tells us how a one percentage point increase in AD duties affects a country's exports to the imposing country and serves as a measure for the efficiency of AD duties. Exporter-importer-product fixed effects control for all unobserved time-invariant bilateral trade costs at the product-level that may correlate with both the AD duty and exports and could result in omitted variable bias.

The use of importer-product-time fixed effects is motivated by the gravity equation and accounts for unobserved demand-side variables at the product-level such as income shocks or changes in tastes and preferences in the importing countries. Such unobserved shocks may affect both imports as well as the importing country's desire to protect its domestic industry through the use of AD duties. Felbermayr and Sandkamp (2020) show explicitly that not accounting for such demand side effects in the context of AD leads to biased estimates of the treatment effect. Importer-product-time fixed effects also control for lobbying, as industry associations in the importing country may lobby for protection of specific products.

Similarly, exporter-product-time fixed effects control for unobserved supply-side factors in the origin country such as technological advances, market distortions and changes in the price index of intermediates or product-specific subsidies. These would also simultaneously affect exports as well as the desire of importing countries to protect themselves from such subsidized exports. Together, importer-product-time and exporter-product-time fixed effects also account for inward and outward time-varying multilateral resistance terms at the product-level (Head & Mayer, 2014; Feenstra, 2015; Yotov et al., 2016). Finally, exporter-importer-time fixed effects control for a number of unobserved time varying bilateral characteristics such as bilateral exchange rates and preferential trade agreements. These could potentially correlate with an importer's decision to grant China MES.

4 | RESULTS

4.1 | Baseline estimations—Is China different?

We start by investigating whether Chinese exports react differently to AD duties compared to exports originating from other countries. Regression results from estimating Equation (1) are reported in Table 1. Column (1) shows that a one percentage point increase in AD duties against a non-Chinese exporter decreases affected exports, on average, by 0.31%. The effect is highly significant at the 1% level. In contrast, Chinese exports seem to react less sensitively to AD duties. A one percentage point increase in AD duties against a Chinese exporter only reduces affected exports by 0.15% (significant at the 1% level). The difference between the two coefficients is not statistically significant at conventional levels (p value = .12).

We further decompose the AD effect by accounting for changes in quantity (Column 3) and prices (Column 5).²² Column (3) shows that the drop in the export value is driven by a drop in quantity. A one percentage point increase in AD duties leads to a drop in the respective export quantity by 0.41% and 0.18% for non-Chinese and Chinese exporters respectively. The difference in estimated coefficients is now significant at the 10% level.

Price effects, reported in Column (5), are positive and significant for non-Chinese exporters (0.1%) and Chinese exporters (0.03%). The difference in estimated coefficients is highly significant at the 1% level. Non-Chinese exports seem to react more sensitively to AD duties than Chinese exports in terms of quantities and prices. Intuitively, if export prices rise more strongly, it is not surprising to see a larger decline in exported quantities following a one percentage point increase in duties. The stronger price effect of non-Chinese exporters is in line with expectations, as China is treated as a non-market economy by many importing countries which should result in smaller price adjustments following the imposition of AD duties.

TABLE 1 Trade effects of AD duties

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. var.	ln value	ln value	ln quantity	ln quantity	ln price	ln price
AD var.	Duty	Dummy	Duty	Dummy	Duty	Dummy
AD duty (non China)	−0.0031*** (0.0010)	−0.5080*** (0.0339)	−0.0041*** (0.0012)	−0.5872*** (0.0389)	0.0010*** (0.0003)	0.0792*** (0.0134)
AD duty China	−0.0015*** (0.0002)	−0.7941*** (0.0394)	−0.0018*** (0.0002)	−0.9075*** (0.0445)	0.0003*** (0.0001)	0.1134*** (0.0154)
Non- China = China (p value)	0.1172	0.0000	0.0551	0.0000	0.0083	0.0822
Observations	46,045,247	46,047,736	46,045,247	46,047,736	46,045,247	46,047,736
R^2	0.8634	0.8634	0.8801	0.8801	0.8765	0.8765
Clusters	6,421,907	6,421,936	6,421,907	6,421,936	6,421,907	6,421,936

Note: Standard errors clustered by exporter-importer-product in parentheses, *** $p < .01$, ** $p < .05$, * $p < .1$. All regressions include exporter-importer-product, exporter-product-time, importer-product-time and exporter-importer-time fixed effects. “ln” stands for the natural logarithm.

Columns (2), (4), and (6) of Table 1 present results of estimation specifications using AD dummies instead of duty rates. This allows us to see the overall effect of the duty. Column (2) shows that non-Chinese exports drop, on average, by 40% following the imposition of AD duties.²³ Chinese exports even fall by 55% (difference significant at the 1% level). Hence, even though non-Chinese exports seem to react more sensitively to AD duties, taking into account both the elasticity as well as the average size of the duty reveals that overall, Chinese exports on average fall by more if AD duties are imposed. This is in line with the observation made in the literature that NMES exporters in general and China in particular face, on average, higher AD duties.

The decomposition into quantity and price effects shows that looking only at the change in export values hides part of the true trade-dampening effect of AD duties. The drop in export quantities by 44% (non-Chinese exports) and 60% (Chinese exports, Column 4) following the imposition of AD duties is larger than the drop in export value. This is because export prices increase following the imposition of AD duties (Column 6). However, it is not clear, whether the positive coefficient is driven by exporters raising their prices or by low price exporters exiting the market. The price coefficient for China in Column (6) is significantly larger than the one for non-Chinese exporters. This finding seems to contradict the results presented in Column (5). It will be argued further down that it is driven by the special type of duties that are often imposed by countries that signed a memorandum of understanding with China.

4.2 | AD effects on exports conditional on MES

In the previous subsection, we have demonstrated that Chinese exports respond differently to AD duties than exports from other countries. The literature suggests that this may be driven by China's NMES. In a second step, we therefore investigate whether exporting countries that are assigned MES by the importer react differently to AD duties than exporters assigned NMES. The AD duty is interacted once with a dummy that equals one if the exporter is assigned MES by the importer (and zero otherwise) and once with a dummy that identifies whether the exporter is assigned NMES by the importer (and zero otherwise). Bilateral relationships for which we could not clearly identify the status of the exporter are treated as zeros for both MES and NMES. They are aggregated in a third dummy, "other" that is also interacted with the AD duty.²⁴

Table 2 presents the results. Note that in this subsection we treat countries that have signed a memorandum of understanding with China as having granted the country MES. Column (1) shows that NMES exporters react significantly more sensitively to AD duties than MES exporters. A one percentage point increase in AD duties reduces exports of MES (NMES) exporters by 0.13% (0.37%). This is again largely driven by quantity effects (Column 3). Export prices of NMES exporters also seem to react significantly more sensitively to AD duties than those of MES exporters (Column 5). Note that these results do not necessarily contradict the previous finding that Chinese exports on average react less sensitively to AD duties than those of other countries, as some importers treat China as a NMES country, whereas others treat it as an MES country.

Comparing the average AD effects based on the AD dummy reveals only minor differences in the effects between the two AD methodologies. Export values drop by 55% and 62%, respectively in response to AD duties imposed by MES and NMES granting destination countries (Column 2). The difference in estimated coefficients is significant at the 10% level. However, this significant difference disappears when comparing estimated quantity coefficients in Column (4). Export prices of MES and NMES exporters increase by 15% and 10% respectively following the imposition of AD duties. As with quantity effects this difference is, however, not statistically significant.

TABLE 2 Trade effects of AD duties by MES of the exporter

Dep. var.	(1)	(2)	(3)	(4)	(5)	(6)
	ln value	ln value	ln quantity	ln quantity	ln price	ln price
AD var.	Duty	Dummy	Duty	Dummy	Duty	Dummy
AD duty MES	−0.0013*** (0.0002)	−0.8076*** (0.0566)	−0.0015*** (0.0002)	−0.9432*** (0.0656)	0.0002*** (0.0001)	0.1356*** (0.0228)
AD duty NMES	−0.0037*** (0.0007)	−0.9708*** (0.0667)	−0.0042*** (0.0008)	−1.0657*** (0.0734)	0.0005*** (0.0002)	0.0949*** (0.0214)
AD duty other	−0.0016*** (0.0004)	−0.4820*** (0.0324)	−0.0022*** (0.0004)	−0.5624*** (0.0372)	0.0006*** (0.0002)	0.0805*** (0.0135)
MES = NMES (<i>p</i> value)	0.0013	0.0611	0.0006	0.2113	0.0448	0.1879
Observations	46,045,247	46,047,736	46,045,247	46,047,736	46,045,247	46,047,736
R ²	0.8634	0.8634	0.8801	0.8801	0.8765	0.8765
Clusters	6,421,907	6,421,936	6,421,907	6,421,936	6,421,907	6,421,936

Note: Standard errors clustered by exporter-importer-product in parentheses, *** $p < .01$, ** $p < .05$, * $p < .1$. All regressions include exporter-importer-product, exporter-product-time, importer-product-time and exporter-importer-time fixed effects. "ln" stands for the natural logarithm.

These findings have two important implications. First, countries applying AD duties based on the NMES methodology appear to be more efficient in reducing exports. The drop in export values and quantities, as well as the increase in export prices, in the case of a one percentage point increase in AD duties is stronger for NMES granting countries. The price effects are particularly surprising since the literature suggests stronger positive price effects for exports to MES countries.

However, and this is the second surprising empirical result, when it comes to the effectiveness of the two AD methodologies, we find no statistical difference between estimated quantity and price coefficients for MES and NMES exporters. It seems as if the average total drop in export quantity, as well as the average increase in prices, is similar under both AD methodologies. The following subsection sheds some light on these rather puzzling results.

4.3 | AD effects on exports conditional on MES—The role of memoranda

Following the discussion in Section 2, we now treat all importers from the sample that only signed a memorandum of understanding (henceforth memorandum countries) as not having granted China MES. Both the MES and the NMES dummy are set to zero for these countries. A new dummy, "memorandum" is created that specifically identifies these countries. It is also interacted with the AD duty to estimate separate treatment effects for memorandum countries.

Results reported in Table 3 provide evidence for the stronger protection through AD duties under the NMES methodology. NMES countries' export values drop, on average, by 62% following the imposition of AD duties, whereas the reduction in exports is only around 52% for MES granting economies (Column 2). The difference in coefficients is significant at the 5% level. AD duties imposed against China by countries that signed a memorandum of understanding reduce Chinese exports on average by 60%. The coefficient is significantly larger in magnitude than the MES coefficient and

TABLE 3 Trade effects of AD duties by MES, controlling for memorandum countries

Dep. var.	(1)		(2)		(3)		(4)		(5)		(6)	
	In value	Duty	In value	Dummy	In quantity	Duty	In quantity	Dummy	In price	Duty	In price	Dummy
AD duty MES	-0.0165*** (0.0024)	-0.7333*** (0.0734)	-0.0194*** (0.0028)	-0.7990*** (0.0853)	-0.0194*** (0.0028)	-0.7990*** (0.0853)	-0.7990*** (0.0853)	-0.7990*** (0.0853)	0.0029*** (0.0010)	0.0029*** (0.0010)	0.0657** (0.0298)	0.0657** (0.0298)
AD duty NMES	-0.0051*** (0.0006)	-0.9739*** (0.0706)	-0.0056*** (0.0007)	-1.0520*** (0.0778)	-0.0056*** (0.0007)	-1.0520*** (0.0778)	-1.0520*** (0.0778)	-1.0520*** (0.0778)	0.0004** (0.0002)	0.0004** (0.0002)	0.0781*** (0.0216)	0.0781*** (0.0216)
AD duty memorandum	-0.0011*** (0.0002)	-0.9279*** (0.0802)	-0.0013*** (0.0002)	-1.1770*** (0.0900)	-0.0013*** (0.0002)	-1.1770*** (0.0900)	-1.1770*** (0.0900)	-1.1770*** (0.0900)	0.0002*** (0.0001)	0.0002*** (0.0001)	0.2491*** (0.0317)	0.2491*** (0.0317)
AD duty other	-0.0016*** (0.0004)	-0.4822*** (0.0324)	-0.0022*** (0.0004)	-0.5632*** (0.0372)	-0.0022*** (0.0004)	-0.5632*** (0.0372)	-0.5632*** (0.0372)	-0.5632*** (0.0372)	0.0006*** (0.0002)	0.0006*** (0.0002)	0.0810*** (0.0135)	0.0810*** (0.0135)
MES = NMES (<i>p</i> value)	0.0000	0.0176	0.0000	0.0274	0.0000	0.0274	0.0274	0.0274	0.0105	0.0105	0.7324	0.7324
MES = memorandum (<i>p</i> value)	0.0000	0.0737	0.0000	0.0023	0.0000	0.0023	0.0023	0.0023	0.0050	0.0050	0.0000	0.0000
NMES = memorandum (<i>p</i> value)	0.0000	0.6666	0.0000	0.2936	0.0000	0.2936	0.2936	0.2936	0.2914	0.2914	0.0000	0.0000
Observations	46,045,247	46,047,736	46,045,247	46,047,736	46,045,247	46,047,736	46,047,736	46,047,736	46,045,247	46,045,247	46,047,736	46,047,736
<i>R</i> ²	0.8634	0.8634	0.8801	0.8801	0.8801	0.8801	0.8801	0.8801	0.8765	0.8765	0.8765	0.8765
Clusters	6,421,907	6,421,936	6,421,907	6,421,936	6,421,907	6,421,936	6,421,936	6,421,936	6,421,907	6,421,907	6,421,936	6,421,936

Note: Standard errors clustered by exporter-importer-product in parentheses, *** $p < .01$, ** $p < .05$, * $p < .1$. All regressions include exporter-importer-product, exporter-product-time, importer-product-time and exporter-importer-time fixed effects. "ln" stands for the natural logarithm.

not significantly different from the NMES coefficient. This indicates that countries that only signed a memorandum of understanding indeed on average treat China as a NMES country.

Value effects are driven by a drop in export quantities (65% for NMES exporters and 55% for MES exporters, difference significant at the 5% level; Column 4). Once again the estimated coefficient for memorandum countries is significantly larger in magnitude than the MES coefficient (at the 1% level) but not significantly different from the coefficient for NMES granting countries. While the price coefficient is now larger in magnitude for NMES imposing countries than for MES imposing countries (Column 6), the two coefficients are not significantly different from each other. Interestingly, the price coefficient of memorandum countries is significantly larger than the coefficients for MES and NMES countries. It seems that this is also what is driving the positive price coefficient for exports from China observed in Column (6) of Table 1, which was significantly larger than the one for non-Chinese exporters.

Turning to the efficiency of AD duties, Column (1) of Table 3 shows that a one percentage point increase in AD duties reduces a country's export value of affected products to NMES granting countries by 0.51%, whereas export value to MES granting countries falls by 1.65%. The difference is even more pronounced for export quantities (−1.94% for MES compared to −0.56% for NMES, difference significant at the 1% level; Column 3). Estimated coefficients for countries that signed a memorandum of understanding are significantly smaller in magnitude than MES and NMES coefficients.

In line with theoretical considerations and the literature, the marginal price increase following the imposition of AD duties is larger for MES countries (0.29%; Column 5) than for NMES granting countries (0.04%, difference significant at the 5% level). The coefficient for countries that signed a memorandum is also significantly smaller than the MES coefficient, but not significantly different from the NMES coefficient.

Summing up, our analysis indicates that within the WTO, members that grant MES are more efficient, meaning that for each percentage point of imposed AD duties, these countries reduce imports to a significantly larger extent compared to NMES granting countries. At the same time, higher average AD duties imposed by NMES granting countries more strongly reduce overall imports, despite larger elasticities for MES granting importers. Exports to countries which signed a memorandum of understanding generally react similarly to exports to NMES granting countries. This provides evidence that signing a memorandum is indeed nothing more than a symbolic act that does not influence the way AD duties are calculated.

The positive price coefficient for NMES importers and memorandum countries in Columns (5) and (6) remains a curious result, as NMES does not provide exporters with an incentive to raise prices. However, there are four reasons for which to expect a positive (albeit smaller) coefficient for NMES exporters: First, the EU and the US treat some Chinese exporting firms similar to exporters from MES countries (Felbermayr & Sandkamp, 2020), thus providing the same incentives to raise prices as for MES exporters.

Second, even if AD duties are calculated using the NMES methodology, large exporting firms with significant market power might be able to influence average prices and thus the duty they receive. They could therefore raise prices and apply for a reduction of the duty. However, Sandkamp (2020) points out that they may also reduce prices further, thus driving up the duty paid by all firms exporting the product, forcing competitors to exit the market.

Third, positive coefficients may be explained by extensive margin effects if AD duties drive out low-price exporters. In line with results in Column (5), this effect should be more pronounced for MES exporters, as low-price firms are *ceteris paribus*—subject to higher AD duties than high-price firms selling the same product only under MES.

Fourth, Sandkamp (2020) shows that low-price CN8-digit products are more likely to become subject to AD duties than high-price products. Since we are using HS6-digit products, it is possible that AD duties target low-price CN8 products more often, thus reducing exports of these products and leading to an increase in average prices at the HS6-digit level.

The above reasoning does not, however, explain the significantly larger price coefficient for memorandum countries observed in Column (6). In the next section, we therefore take a closer look at the type of duties imposed by these countries.

5 | EXTENSIONS AND ROBUSTNESS

5.1 | The trade effects of AD duties by type of duty

MES and NMES are not the only source of variation in AD legislation that may impact the effectiveness of AD duties. The type of duty applied may also play a role. The Global Antidumping Database differentiates between different types of duties (Bown, 2015). The three most common ones are ad-valorem duties (AVD), specific duties (SD) and duties imposed if the export price falls under a given level (DPU). Most AD duties (56% of cases in the sample) are ad-valorem, meaning that they are equal to a percentage of the targeted product's price. In contrast, a specific duty (30% of cases) assigns a particular duty in currency terms to a unit of the product in question (e.g., USD per kilogram). The third type of duty is a conditional duty that is only imposed if the price falls below a certain level (8% of cases in sample).

The type of duty used is not evenly distributed across importing countries. MES and NMES granting countries mainly apply AVD duties (92% for MES granting countries and 94% for NMES granting countries) as well as a few specific duties (4% and 3% for MES and NMES granting importers respectively). DPUs are only used in 1% of cases for both MES and NMES granting countries. However, countries that signed a memorandum of understanding with China use DPUs much more frequently. 18% of duties imposed by these countries against China are DPUs, with an additional 8% being labelled as either SD or DPU in Bown (2015). Specific duties are also more common, constituting 35% of duties imposed by these countries against China. In contrast, AVD duties are only applied in 34% of cases.

Given the above distribution of AVDs, SDs and DPUs, we investigate whether the different types of duties affect exports differently. To do so, the AD dummy is interacted with three different dummies indicating if the duty is ad-valorem, specific, or a DPU. It should be noted that this exercise is not possible with using the duty rate as the AD variable because it is typically only reported for AVDs, even though it is sometimes inferred for DPUs and SDs.

Results are reported in Table 4. All types of duties significantly reduce export values and quantities, while positively affecting prices. AVDs are significantly more effective in reducing export value and quantities than SDs and DPUs (Columns 1 and 2). The estimated coefficients for SDs and DPUs are not significantly different from each other. Column (3) indicates that DPUs have a significantly larger positive impact on prices than SDs and AVDs. The findings are intuitive. In the case of a DPU, the duty can be avoided completely by the exporter if she raises her price above a specified level. In contrast, in the case of AVDs and SDs, the duty remains in place—at least temporarily—even if the export price is raised, reducing the incentive to adjust prices.

The price coefficient for SDs is significantly larger than the one for AVDs. In the case of an AVD which is a constant percentage of the product's price, a price increase by the exporter implies an automatic—again temporary—increase of the duty in absolute terms, reducing the exporter's incentive

TABLE 4 Trade effects of AD duties by type of duty

Dep. var.	(1)	(2)	(3)
	ln value	ln quantity	ln price
AD var.	Dummy	Dummy	Dummy
AVD	−0.8147*** (0.0390)	−0.8936*** (0.0440)	0.0789*** (0.0139)
SD	−0.5610*** (0.0495)	−0.6830*** (0.0577)	0.1220*** (0.0212)
DPU	−0.4303*** (0.1035)	−0.6723*** (0.1170)	0.2419*** (0.0399)
Observations	46,047,736	46,047,736	46,047,736
R ²	0.8634	0.8801	0.8765
Clusters	6,421,936	6,421,936	6,421,936

Note: Standard errors clustered by exporter-importer-product in parentheses, *** $p < .01$, ** $p < .05$, * $p < .1$. All regressions include exporter-importer-product, exporter-product-time, importer-product-time and exporter-importer-time fixed effects. “ln” stands for the natural logarithm.

to raise prices. Overall, a deeper analysis of the imposed AD tariff type allows a better understanding of the previous empirical results. Countries that signed a memorandum of understanding with China rely more heavily on SDs and DPUs. This explains the surprisingly large price coefficient observed in Column (6) of Table 3.²⁵

5.2 | EU and US duties

The EU and the US are the only importers for which we can confidently claim to have (a) a complete list of countries assigned NMES and (b) that these countries are really treated differently in AD legislation than MES exporters. In an extension, we therefore only consider exports from countries which are granted MES (NMES) by the EU or the US. Exports to all other countries are lumped together in a third category, “other”. This allows us to focus explicitly on the EU and the US methodology.

Regression results are reported in Table 5. Estimated coefficients in Columns (1), (3) and (5) are significantly larger for MES exporters than for NMES exporters. In line with previous results, this suggests that the MES methodology is more efficient in reducing targeted exports and increasing prices. A one percentage point increase in the AD duty reduces exports by more if it is imposed against an MES exporter.

The dummy regressions in Column (2) and (4) reveal that estimated coefficients for MES exporters are significantly smaller than those for NMES exporters. Considering both the elasticity as well as the average size of the duty, the NMES methodology applied by the EU and the US is therefore more effective in reducing targeted exports, with total export values and quantities falling by more. This is also true when excluding China from the NMES sample (Table A3 in the Appendix).

Estimated MES and NMES coefficients are both significantly larger in magnitude than the coefficient estimated for targeted exports to all other countries. This suggests that the EU and the US seem on average more effective in reducing targeted export values and quantities than other countries, irrespective of the methodology applied.

TABLE 5 Trade effects of AD duties by MES; EU and US only

Dep. var.	(1)	(2)	(3)	(4)	(5)	(6)
	ln value	ln value	ln quantity	ln quantity	ln price	ln price
AD var.	Duty	Dummy	Duty	Dummy	Duty	Dummy
AD duty MES	−0.0168*** (0.0024)	−0.7430*** (0.0813)	−0.0204*** (0.0029)	−0.8410*** (0.0969)	0.0036*** (0.0011)	0.0980*** (0.0356)
AD duty NMES	−0.0051*** (0.0006)	−0.9704*** (0.0729)	−0.0055*** (0.0007)	−1.0456*** (0.0805)	0.0004** (0.0002)	0.0753*** (0.0233)
AD duty other	−0.0013*** (0.0002)	−0.5584*** (0.0300)	−0.0016*** (0.0002)	−0.6560*** (0.0343)	0.0003*** (0.0001)	0.0975*** (0.0122)
Observations	46,045,247	46,047,736	46,045,247	46,047,736	46,045,247	46,047,736
R ²	0.8634	0.8634	0.8801	0.8801	0.8765	0.8765
Clusters	6,421,907	6,421,936	6,421,907	6,421,936	6,421,907	6,421,936

Note: AD duties imposed by other countries are controlled for through the variable AD Duty other. Standard errors clustered by exporter-importer-product in parentheses, *** $p < .01$, ** $p < .05$, * $p < .1$. All regressions include exporter-importer-product, exporter-product-time, importer-product-time and exporter-importer-time fixed effects. “ln” stands for the natural logarithm.

Overall price effects do not significantly differ between MES and NMES exporters (Column 6 of Table 5). However, it is worth noting that the price coefficient for NMES exporters turns insignificant when excluding China (Columns (5) and (6) of Table A3 in the Appendix). The EU and the US often impose firm specific duties against Chinese exporters, providing them with an incentive to raise prices. Price effects for China may therefore be expected to be larger than for other NMES exporters.

5.3 | AD duties against China, before and after granting MES

Results reported in Table 3 suggest that Chinese export values and quantities to countries which signed a memorandum of understanding with China react similarly to exports from countries assigned NMES by the importer. To investigate this further, we perform a robustness check to test whether Chinese exports reacted differently to AD duties before and after the country was granted MES. We therefore only look at importers that granted China MES at some point in the period of investigation. We differentiate between countries that signed a memorandum and those that did not. As before, all other countries' AD duties against both China and other exporters are controlled for and lumped together in the category “other”.

Table 6 reports the results. The coefficients “AD Duty NMES memo” and “AD Duty MES memo” refer to the effects of duties imposed by memorandum countries before and after signing the memorandum respectively. Except for Column (5), estimated MES and NMES coefficients for memorandum countries are all not significantly different from each other. This indicates that these countries indeed did not change their AD methodology vis-à-vis China after officially granting the country MES.

Estimated coefficients for AD duties imposed by non-memorandum importers before granting China MES (“AD Duty NMES non-memo”) are all not significantly different from zero. This is, however, not surprising as the sample only includes three AD cases that were imposed by these countries before granting China MES, yielding unreliable estimates.

Estimated coefficients of values and quantities for non-memorandum countries are, however, significantly negative after having granted China MES (Columns 1 to 4). Furthermore, the estimated

TABLE 6 Trade effects of AD duties, before and after granting China MES

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. var.	ln value	ln value	ln quantity	ln quantity	ln price	ln price
AD var.	Duty	Dummy	Duty	Dummy	Duty	Dummy
AD duty MES memo	-0.0011*** (0.0002)	-0.9325*** (0.0874)	-0.0013*** (0.0002)	-1.1809*** (0.0987)	0.0002*** (0.0001)	0.2484*** (0.0332)
AD duty NMES memo	-0.0008 (0.0006)	-0.9371*** (0.1987)	-0.0016* (0.0008)	-1.1897*** (0.2174)	0.0008*** (0.0003)	0.2526*** (0.0910)
AD duty MES non-memo	-0.0144** (0.0056)	-0.7364*** (0.1643)	-0.0138*** (0.0051)	-0.6863*** (0.1749)	-0.0006 (0.0012)	-0.0501 (0.0454)
AD duty NMES non-memo	-0.0022 (0.0033)	-0.7107 (0.6420)	-0.0025 (0.0035)	-0.7770 (0.6836)	0.0002 (0.0006)	0.0663 (0.1045)
AD duty other	-0.0027*** (0.0004)	-0.6001*** (0.0281)	-0.0033*** (0.0005)	-0.6823*** (0.0321)	0.0006*** (0.0001)	0.0822*** (0.0112)
Observations	46,045,247	46,047,736	46,045,247	46,047,736	46,045,247	46,047,736
R ²	0.8634	0.8634	0.8801	0.8801	0.8765	0.8765
Clusters	6,421,907	6,421,936	6,421,907	6,421,936	6,421,907	6,421,936

Note: AD duties imposed by other countries are controlled for in the variable AD Duty other. Standard errors clustered by exporter-importer-product in parentheses, *** $p < .01$, ** $p < .05$, * $p < .1$. All regressions include exporter-importer-product, exporter-product-time, importer-product-time and exporter-importer-time fixed effects. "ln" stands for the natural logarithm.

quantity coefficient for non-memorandum importers is significantly smaller in magnitude than the coefficient for memorandum importers (Column 4). This provides further evidence that memorandum countries did not adjust their AD methodology after signing the memorandum of understanding with China.

5.4 | Non-linear effects of AD duties

Besedeš and Prusa (2017) show that AD duties of different size can impact trade flows quite differently. Our dummy regressions show average effects over all imposed duties and should not be affected by such non-linearities. However, our measure of efficiency of AD, which uses the duty rate to estimate semi-elasticities, may not capture such non-linearities. In another robustness check, we therefore divide duties into three quantiles and regress exports on three corresponding dummies.²⁶

Table 7 shows that high duties have a stronger trade destructing effect than small duties. On average, duties in the highest bin reduce export values by 58%, whereas duties in the bottom third of the distribution only reduce export values by 31% (Column 1). The trade destructing effect of higher duties is therefore twice as large as that of lower duties. The average duty in the high group is, with around 180%, almost 14 times higher than average duties in the low group (13.2%). The efficiency of the duty (defined as the marginal effect of a one percentage point increase in the duty) therefore seems to decline with its size. This provides an explanation for the lower marginal effects of duties imposed

TABLE 7 Trade effects of AD duties by size cluster

	(1)	(2)	(3)
Dep. var.	ln value	ln quantity	ln price
AD var.	Dummy	Dummy	Dummy
Low duty	-0.3751*** (0.0483)	-0.3979*** (0.0531)	0.0228 (0.0163)
Medium duty	-0.6066*** (0.0430)	-0.6643*** (0.0495)	0.0578*** (0.0191)
High duty	-0.8621*** (0.0517)	-1.0262*** (0.0586)	0.1640*** (0.0198)
Observations	46,040,154	46,040,154	46,040,154
R ²	0.8634	0.8801	0.8765
Clusters	6,421,204	6,421,204	6,421,204

Note: Standard errors clustered by exporter-importer-product in parentheses, *** $p < .01$, ** $p < .05$, * $p < .1$. All regressions include exporter-importer-product, exporter-product-time, importer-product-time and exporter-importer-time fixed effects. "ln" stands for the natural logarithm.

against NMES exporters, which on average receive larger duties. Quantity effects, reported in Column (2), provide a similar picture.

Price effects are insignificant for low duties, while they are larger in magnitude and positively significant for medium and high duties (Column 3). The reason for the absence of significant price effects for low duties could be an absence of extensive margin effects for such duties. If duties are relatively low they are less likely to force low price exporters out of the market.

6 | CONCLUSION

Methods for calculating antidumping duties vary substantially across WTO member states. Whether exporters are treated as having MES or NMES has a large influence on how dumping margins are calculated. In particular, average AD duties imposed against NMES exporters are larger than those imposed against MES exporters. Politically, the concept of MES has received renewed attention in light of the debate over whether China can still be treated as a non-market economy in AD methodologies after December 2016, given the provisions in its Accession Protocol to the WTO.

This paper has examined a large panel of bilateral exports at the HS6 product level to investigate if China reacts differently to AD duties than other exporters and whether varying AD methodologies within the WTO differ in their efficiency and effectiveness in reducing targeted imports. In line with the literature, we show that AD duties, on average, reduce targeted export values (quantities) of non-Chinese exporters by 40% (44%). Chinese exports react more strongly, with targeted export values (quantities) falling by 55% (60%) following the imposition of AD duties. Marginal effects are, however, stronger for non-Chinese exporters, which react more sensitively to a one percentage point increase in duties than Chinese exporters.

The differential effect of AD duties on export quantities is driven by the fact that China is treated as an NMES country by several importers. We show that being granted MES strongly affects the trade destructing effect of AD duties. Specifically, the MES methodology is more efficient, meaning that a one percentage point increase in AD duties imposed against MES has a stronger trade dampening

effect (1.9% reduction in export quantity) than if imposed against an NMES exporter (0.06% reduction in export quantity). Overall, the NMES methodology is, however, more effective. Export quantities, on average, fall by 65% following the imposition of AD duties against NMES exporters. For MES exporters, the average fall in exports amounts to 55%. Nevertheless, countries that have officially granted China MES by signing a memorandum of understanding still seem to treat the country with NMES when it comes to their AD legislation.

The marginal price increase in response to AD is stronger for MES exporters than for China and other NMES exporters. In contrast to expectations, the overall positive price effect is, however, stronger for exports from China. This result is driven by a specific type of AD duties (conditional duties imposed if export prices fall below a certain level) that is frequently implemented against China and that impacts export prices very differently compared to traditional ad-valorem or specific duties.

A major conclusion from our analysis is that AD duties remain effective in reducing imports independent of MES. This finding is good news for those WTO members that are struggling to change China's NMES treatment in national AD regulations. On the other hand, the case of countries that signed a memorandum of understanding with China reveals that simply giving lip service to China's status as a market economy is not enough on its own. It is how the rules are applied by the individual member states that determines the efficiency and effectiveness of AD duties.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available on the following webpages: Trade data: http://www.cepii.fr/CEPII/en/bdd_modele/bdd.asp. Antidumping data: <https://datacatalog.worldbank.org/dataset/temporary-trade-barriers-database-including-global-antidumping-database/resource/dc7b361e>.

ORCID

Alexander Sandkamp  <https://orcid.org/0000-0002-1679-8032>

Erdal Yalcin  <https://orcid.org/0000-0001-9459-1718>

ENDNOTES

- ¹ Rose (2004) concludes that a WTO membership has no significant impact on increasing global trade. However, a growing literature suggests that the GATT/WTO has had a strong trade-promoting effect across all member countries, although the derived effects turn out to be significantly different across member states. See also Felbermayr and Kohler (2010), Chang and Lee (2011), Dutt et al. (2013) and Felbermayr et al. (2020).
- ² Under WTO legislation, member states can impose antidumping duties (temporary tariffs) on particular imports that are sold at less than the "normal value," which is usually the product's price in an exporter's domestic market (Van Bael & Bellis, 2011). Other trade defence instruments include anti-subsidy as well as safeguard measures.
- ³ These principles are defined in the Antidumping Agreement, also known as the Agreement on Implementation of Article VI of the GATT 1994 (WTO, 1994).
- ⁴ The basis for NMES treatment is provided by Article VI of the GATT (1994). It recognizes that member states may have difficulties in determining price comparability for the purpose of AD procedures for imports originating from countries characterized by "distorted domestic markets" due to strong government control. Examples for this are a large number of state-owned companies or monopoly industry structures.

- ⁵ In addition, the MES methodology also implies that—*ceteris paribus*—firms charging a lower price in the destination country receive higher AD duties, increasing the likelihood of them exiting the market. This mechanism would drive up average prices further.
- ⁶ The European Union abandoned NMES for WTO members in December 2017 in response to the expiry of the relevant paragraph in China's Accession Protocol to the WTO according to Regulation (EU) 2017/2321 (European Parliament, 2017). The legal basis for this varying legislation can be found in Paragraph 15 (a)(ii) of China's Accession Protocol to the WTO in 2001. Accordingly, member states may independently define whether China has market economy status or not, and respectively, which methodology is to be used to determine the normal value of imports. The case of China has received a lot of attention in recent years because paragraph (d) of Article 15 in China's Accession Protocol defines an expiration clause stating that the provision of sub-paragraph 15(a)(ii) shall expire 15 years after China's WTO accession, i.e., in December 2016. There has been much discussion among WTO members, trade lawyers, and the scientific community about the exact consequences of this expiration. Some argue that the expiration *de jure*, or at least *de facto*, ended the possibility of treating China with NMES in AD investigations; others disagree and continue to regard the accession protocol as a sound legal basis for special treatment of China (Felbermayr et al., 2016). A detailed list of WTO members that have officially granted China MES is provided in Table A.1 in the Appendix.
- ⁷ For an overview, consider Nelson (2006) or Blonigen and Prusa (2003, 2016).
- ⁸ Unit values are inferred by dividing value by quantity.
- ⁹ Many countries also impose a preliminary duty which is temporarily imposed, typically for a few months. With trade at the annual level, there is no meaningful way of incorporating them. Nevertheless, preliminary duties and even the initiation of a case may have significant trade dampening effects (Besedeš & Prusa, 2017; Lu et al., 2013; Staiger & Wolak, 1994).
- ¹⁰ This strategy may result in measurement error. However, it is the only way to obtain information on the applied duty for many cases. The estimation of the overall effectiveness of AD duties using dummies remains unaffected by this practice. For specific duties, the reported dumping margin is taken as the AD duty.
- ¹¹ To the best of our knowledge, this list did not change in the course of the sample period (Felbermayr et al., 2016). It excludes Russia, which was granted MES by the EU in 2002.
- ¹² Russia did not receive any AD duties in the sample period prior to being assigned MES.
- ¹³ Puccio (2015) identifies further countries that granted China MES. However, these countries did not impose AD duties in the sample period and are therefore ignored in this analysis.
- ¹⁴ Most of the countries which granted China MES did so in 2004 or 2005. When China joined the WTO in December 2001, the possibility to treat the country as non-market economy in AD cases was enshrined in its accession protocol (WTO, 2001). The NMES methodology typically leads to higher AD duties and China was already a major target of AD when it joined the WTO (232 AD cases in force against China in 2001). It is therefore not surprising that the country sought to obtain MES as soon as possible from 2002 onwards (Puccio, 2015). Hu Jintao became President in 2003. It is perhaps not unreasonable to assume that he pushed the matter further, leading to several countries granting China MES soon after he got into office.
- ¹⁵ These countries are Argentina, Australia, Brazil, South Korea, Peru and South Africa. Chile and Costa Rica also signed a memorandum but did not impose any AD duties against China in the sample period.
- ¹⁶ To give an example, Urdínez and Masiero (2015) write that Chile granted China MES already in 2002. However, Puccio (2015) notes that Chile only signed a memorandum of understanding in 2004. The case of Chile is not relevant for us since the country does not impose any AD duties against China in the sample period. However, it illustrates the blur surrounding the issue of MES.
- ¹⁷ This concerns Columbia, India, Israel, Japan, Mexico and Turkey.
- ¹⁸ The MES count includes countries which signed a memorandum of understanding with China.
- ¹⁹ Table B1 in the Appendix summarizes main differences in applied AD methodologies across the European Union, the United States, and Canada. Appendix B summarizes the main features of the US and Canadian AD methodologies. A detailed overview of the EU methodology can also be found in Felbermayr et al. (2016).
- ²⁰ For a detailed overview of recent contributions to the structural gravity approach, consider Anderson (2011), Costinot and Rodríguez-clare (2014), and Yotov et al. (2016) for surveys of the theoretical gravity literature, and Baldwin

- and Taglioni (2006), Head and Mayer (2014), and Piermartini and Yotov (2016) for surveys of the empirical gravity literature.
- ²¹ Nesting by exporter is chosen over running separate regressions for China and other exporters as this allows us to control for a greater number of fixed effects and also enables a direct comparison of the estimated coefficients.
- ²² Since $value = price \times quantity \rightarrow \ln value = \ln price + \ln quantity$.
- ²³ The overall effect is calculated using the formula $100(e^{\beta} - 1)$.
- ²⁴ The effect of MES and NMES is estimated using the equation $\ln Y_{ijht} = \beta_{MES}AD_{ijht}^{MES} + \beta_{NMES}AD_{ijht}^{NMES} + \beta_{other}AD_{ijht}^{other} + v_{ijh} + v_{iht} + v_{jht} + v_{ijt} + \epsilon_{ijht}$, where the treatment variable is interacted with a dummy indicating whether the exporter is assigned MES or NMES by the importer, or if MES/NMES is not specified (status unclear).
- ²⁵ The semi-elasticities reported in Column (5) of Table 3 are estimated predominantly using variation in AVDs and SDs. It is therefore not surprising to see the strong positive price coefficient only for the dummy regression.
- ²⁶ Averages are simple means across observations. This means that average duties are weighted according to the number of times a trade flow of an affected importer-exporter-product combination is observed (before and after the duty was implemented).
- ²⁷ This section is based on Felbermayr et al. (2017).

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APPENDIX A

ADDITIONAL TABLES

TABLE A1 China's market economy status by importer

Country	MES/NMES year
Argentina	MES 2004 (memo)
Australia	MES 2005 (memo)
Brazil	MES 2004 (memo)
Canada	NMES
(Chile)	MES 2002 (memo)
(China)	
Columbia	
(Costa Rica)	MES 2008 (memo)
EU	NMES
India	
Indonesia	MES 2004
Israel	
Jamaica	MES 2005
Japan	
Korea	MES 2005 (memo)
Malaysia	MES 2004
Mexico	
New Zealand	MES 2004
Pakistan	MES 2004
(Paraguay)	
Peru	MES 2004 (memo)
South Africa	MES 2004 (memo)
Thailand	MES 2004
Trinidad & Tobago	MES 2005
Turkey	
Uruguay	MES 2009
USA	NMES
(Venezuela)	MES 2004

Note: Listed are all 28 countries that imposed AD duties in the sample period. Countries in parenthesis did not impose AD against China in the sample period. (memo) indicates countries that signed a memorandum of understanding with China. The Philippines granted China MES in 2004 but did not impose any AD duties against any country in the period of investigation.

Source: Data from Puccio (2015), Urdinez and Masiero (2015), WTO (2015) and Kennedy and Cheng (2012).

TABLE A2 Countries assigned NMES by the EU, the US and Canada

EU	US	Canada
(Albania)		
Armenia	(Armenia)	
(Azerbaijan)	(Azerbaijan)	
Belarus	Belarus	
China	China	China
(Georgia)	(Georgia)	
Kazakhstan		
(Kyrgyzstan)	(Kyrgyzstan)	
(Moldova)	Moldova	
(Mongolia)		
(North Korea)		
Russia (MES 2002)	Russia (MES 2002)	
(Tajikistan)	(Tajikistan)	(Tajikistan)
(Turkmenistan)	(Turkmenistan)	
	Ukraine (MES 2006)	
(Uzbekistan)	(Uzbekistan)	
Vietnam	Vietnam	Vietnam

Note: No AD duties were imposed against countries in parenthesis in the sample period. Russia only received AD duties from the US under MES.

Source: Data for the EU from Detlof and Fridh (2007) and Felbermayr et al. (2016), for the US from Morrison (2019) and for Canada from Nedumpara and Zhou (2018).

APPENDIX B

BRIEF SUMMARY OF AD LEGISLATION IN THE EU, THE US AND CANADA²⁷

Main aspects of the AD legislation in the United States

AD investigations in the United States are initiated by two different authorities. The Department of Commerce (DOC) investigates the existence and extent of dumping and the International Trade Commission (ITC) determines the injury sustained (Bowman et al., 2010). The US AD legislation is set out in the Tariff Act of 1930 (USCODE, 1673, 1677).

The US DOC determines normal value depending on whether the exporter's country of origin is an MES country or an NMES country. Unlike, for example, the EU AD legislation, however, US AD law contains an explicit definition of a non-market economy. Accordingly, any foreign country that does not operate on market principles of cost or pricing structures, and, as a consequence, sales or trade in such a country do not reflect a fair value of the traded good, is considered a non-market economy. In its decision on NMES, the DOC examines six factors, also referred to as the NMES test:

TABLE A3 Trade effects of AD duties by MES; EU and US only and excluding China

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. var.	ln value	ln value	ln quantity	ln quantity	ln price	ln price
AD var.	Duty	Dummy	Duty	Dummy	Duty	Dummy
AD duty MES	-0.0172*** (0.0024)	-0.7415*** (0.0815)	-0.0209*** (0.0029)	-0.8398*** (0.0970)	0.0037*** (0.0011)	0.0983*** (0.0356)
AD duty NMES	-0.0153*** (0.0057)	-1.3721*** (0.2873)	-0.0163** (0.0064)	-1.4397*** (0.3087)	0.0010 (0.0012)	0.0676 (0.0734)
AD duty other	-0.0015*** (0.0002)	-0.6129*** (0.0279)	-0.0018*** (0.0002)	-0.7073*** (0.0317)	0.0003*** (0.0001)	0.0944*** (0.0110)
Observations	46,045,247	46,047,736	46,045,247	46,047,736	46,045,247	46,047,736
R ²	0.8634	0.8634	0.8801	0.8801	0.8765	0.8765
Clusters	6,421,907	6,421,936	6,421,907	6,421,936	6,421,907	6,421,936

Note: AD duties by the EU and the US against China as well as AD duties imposed by other countries are captured by the variable "AD Duty other". Standard errors clustered by exporter-importer-product in parentheses, *** $p < .01$, ** $p < .05$, * $p < .01$. All regressions include exporter-importer-product, exporter-product-time, importer-product-time and exporter-importer-time fixed effects. "ln" stands for the natural logarithm.

- the extent to which the foreign country's currency is convertible into the currency of other countries;
- the extent to which wage rates in the foreign country are determined by free bargaining between labor and management;
- the extent to which joint ventures or other investments by firms of other foreign countries are permitted in the foreign country;
- the extent of government ownership or control of the means of production;
- the extent of government control over the allocation of resources and over the price and output decisions of enterprises; and
- such other factors as the administering authority considers appropriate.

Generally, a country is classified as having MES unless the DOC decides otherwise. The designation of a country as either a MES or NMES country is thus easily amendable because it is determined by administrative act, not a law. For example, if WTO law mandates a change in China's NMES, the same could be effected rapidly in the United States due to not having to go through a legislative amendment procedure (Bungenberg, 2016). A request for status review can be made by any interested party during as well as outside an investigation. To initiate a status review, the applicant must present evidence of the alleged MES or NME status to the DOC.

Main aspects of the AD legislation in Canada

In Canada, like in the United States, AD legislation is administered by two authorities: the Canadian Border Services Agency (CBSA), which determines whether dumping has occurred, that is, the preliminary injury, and the Canadian International Trade Tribunal (CITT), which determines the final injury.

Trade defence is mainly regulated by the Special Import Measures Act (SIMA, R.S.C., 1985, 2018) as well as by the Special Import Measures Regulation (SOR/84-927, 2018), which cover AD law. Canada has a comparatively detailed list of criteria for determining the degree of government influence. Criteria for direct government influence include, but are not limited to:

TABLE B1 Different AD methodologies by countries assigning China NMES

	Existing methodology (regulation (EU) 2016/1036)	US methodology	Canadian Methodology
MES/NME treatment	Countries treated differently according to MES, China treated as NME by default (analogue prices used to calculate dumping margin)	Countries treated differently according to MES; China treated as NME by default	All WTO members treated as MES countries by default
Burden of proof	The government of China must prove that China is a market economy according to the EU criteria to be granted MES; Chinese firms need to prove that they act in a market economy environment to receive MET	Chinese firms need to prove that they act in a market economy environment to receive MET	Burden of proof for NME conditions rests on Canadian producers
Basis of decisionmaking	No formal reports but decision of NME status or MES taken at country level; decision on MET taken individually	No formal reports but decision of MES or NME status taken at country level. Sectoral MES possible in principle	Decision made on case-by-case basis, based on detailed list of criteria
Normal value construction	Constructed normal value based on market economy third country ("analogue country")	Exporter's factors of production valued using surrogate country prices and costs (third country chosen based on similar level of economic development)	Domestic sales prices or costs in a third country
Mixed normal value	In case of NMEs, constructed normal value based entirely on prices and costs in third country	Mixed normal value possible if exporter uses factors imported from a MES country	No mixed normal value determination

Note: "MET" means market economy treatment and refers to individual exporters within NMES countries being treated as if they were situated in MES countries. Table taken from Felbermayr et al. (2017); Sources: National AD legislation of the European Union, Canada, and the United States.

- the government sets minimum and/or maximum (floor or ceiling) price levels for certain goods that permits prices to be established no lower or no higher than the minimum or maximum price levels;
- the government sets absolute pricing levels for certain goods;
- the government sets recommended or guidance pricing to which sellers are expected to adhere within a certain range above and/or below that value;
- there are government or regulatory bodies responsible for establishing the price levels and for regulating and enforcing these price levels;
- there are government owned or controlled enterprises that set the price of their goods in consultation with the government or as a result of government-mandated pricing policies and, because of their market share or dominance, become price leaders in the domestic market.