Antidumping

SUMMARY

A recent phenomenon is the rapid spread of antidumping laws amongst developing countries (i.e. China, India, Mexico). Between 1980 and 2003 the number of countries in the world with an antidumping law in place more than doubled, going from 36 to 97 countries. This paper examines a number of potential explanations for this proliferation of antidumping laws. We look for determinants explaining the timing of trade law adoption using a duration analysis. Results suggest that retaliatory motives are at the heart of the proliferation. This raises serious policy issues since antidumping laws should be about combating unfair trade, not about retaliation which runs contrary to the spirit of the WTO. Results also suggest that past trade liberalization raises the probability of a country to adopt an antidumping law. The proliferation of antidumping laws has important policy implications. In the interest of all users, antidumping rules should be renegotiated at the level of the WTO to make their use less 'easy', in order to avoid an escalation of protection worldwide.

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What explains the proliferation of antidumping laws?

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1. INTRODUCTION

Over the past two decades many countries, especially developing ones, have adopted antidumping (AD) laws. This proliferation mainly took off after 1980. Before, there were only five major users of AD: Australia, Canada, EU, New Zealand and the US. These countries have come to be known as the 'traditional users'. But since 1980 many more countries, the so-called 'new users' (Prusa and Skeath, 2002), have started to adopt and use AD laws, as illustrated in Figure 1. While AD actions are supposedly intended to combat 'unfair trade', by now most economists agree that AD is not so much about stopping unfair trade but has predominantly become a tool of industrial policy used by countries to foster the interests of their national industries (see Box 1 for more information about the way AD laws work).

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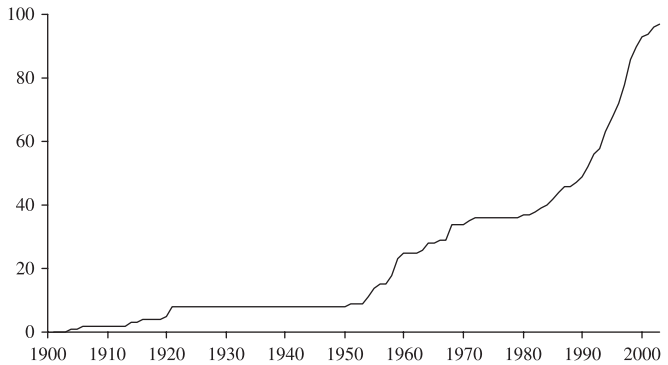

Figure 1. Evolution of the number of countries with antidumping laws

Source: Authors' update of Zanardi (2004a).

Box 1. Antidumping: how it works

While the WTO gives each member the freedom to adopt AD laws (Macrory, 2005; Ognivtsev *et al.*, 2001), it does specify that WTO members can only adopt AD laws consistent with the WTO AD Agreement. In the original GATT agreement, AD was regulated by Article 6. The current WTO AD Agreement defines the rules for implementation of Article 6 of the GATT

Article 6 of the GATT '*recognize[s] that dumping, by which products of one country are introduced into the commerce of another country at less than the normal value of the products, is to be condemned if it causes or threatens material injury to an established industry in the territory of a contracting party or materially retards the establishment of a domestic industry.*' Put differently, Article 6 states that when a firm(s) charges a lower price for its exports than for its domestic sales, it is considered to be *dumping*. When this dumping *injures* the interests of domestic producers of a similar product, unilateral AD duties can be imposed by the importing country. The use of AD is based on the notion that dumping is an unfair business strategy and therefore the 'level-playing field' must be re-established through government intervention.

From an economic point of view several objections can be raised when evaluating the contents of Article 6.

First, GATT rules seem to imply that for the importing country to impose AD protection it suffices to show that it is in the interest of domestic producers to do so.

Second, Article 6 seems to suggest that any form of price discrimination between the market of origin and the export market with a lower price in the export market for the same product is considered 'unfair'. Economists regard

this definition as too broad since price discrimination is not necessarily an unfair practice but could just reflect different demand elasticities between the domestic and foreign market (with the foreign demand function being more elastic). The only type of 'unfair' dumping, according to economists, is the case of 'predatory dumping' where exporters aim to drive domestic rivals out of the market and become monopolists (or oligopolists). Two conditions are required for predation to be successful: high entry-barriers in the domestic industry of the importing country and a high concentration of domestic producers (Viner, 1923). These conditions ensure that foreign firms can charge monopoly prices after having driven domestic rivals out of the market without facing the risk of re-entry by other domestic firms. However, a close look at Article 6 shows that the legal definition of dumping is not well equipped to detect predatory dumping. In fact its scope is too wide and includes forms of dumping economists would regard as 'fair' trade (Veugelers and Vandenbussche, 1999).

Article 6 requires there to be a 'causal' relationship between dumping and injury. This aspect uncovers another weakness of the current rules. Current practice shows that it now often suffices for an AD authority to show that an upward trend in the volume of dumped imports coincides with a downward trend in industry performance indicators (e.g. sales, profits, prices, capacity utilization etc.) to infer causality (Grossman and Wauters, 2007; Sapir and Trachtman, 2007). But it is clear that other factors may account for the adverse evolution of a domestic industry. A change in consumer tastes or bad management and inefficient behavior of domestic firms are alternative reasons resulting in the same negative performance in terms of prices, profits, sales, etc.[1]

In sum, economists feel that the rules on dumping, injury to the domestic industry and causality between the two are now rather loose, making the finding of injurious dumping rather easy and resulting in too many affirmative findings and too much protection.

In practical terms, AD procedures begin when a domestic industry files an AD petition with the relevant authority.[2] If dumping and injury are ascertained, trade protection can be granted. Protection can then take different forms. The simplest one is the imposition of AD duties. Alternatively, foreign firms can voluntary decide to increase their prices by agreeing on a price undertaking that eliminates injury to the domestic firms. Importantly, the duties or the agreed prices are firm-specific and are calculated for each dumping exporter.

[1] The AD Agreement resulted from the Kennedy Round required dumping to be 'demonstrably the principal cause' of material injury. This stricter requirement was dropped in AD Agreements approved during the Tokyo and Uruguay Rounds.

[2] A petition is valid if it is supported by a majority of the industry (measured in terms of production or employment).

Even before reaching the final decision, provisional AD duties can be imposed if preliminary determinations by the importing country have established the existence of dumping and injury and there are reasons to believe that without such measures injury would continue during the investigation period. Overall, the investigation should not take more than a year to reach completion (except in special circumstances). Following the implementation of the Uruguay AD Code, AD duties and price undertakings should be terminated at most five years from their introduction, except if a review determines that dumping and injury would continue otherwise.

The WTO AD Agreement only provides the general framework that regulates the use of AD but it leaves flexibility to each country in the way it decides to implement it. This leads to a variety of practices. For example, in some countries (e.g. Canada, China, US) two different authorities investigate the existence of dumping and of material injury while in other cases just one agency is in charge of both tests (e.g. EU, India, Mexico). Some countries also seem to prefer negotiated agreements to the formal imposition of AD duties much more than others (e.g. EU and South Korea versus Brazil and US). An important aspect is that some AD laws may include a public interest test to judge the merit of AD protection vis-à-vis the welfare of the country as a whole. Noticeably, the EU has such a provision (the so-called 'Community Interest test') implying that in principle AD protection also has to be in the interest of domestic consumers in the EU community. Sadly, this public interest test is not well enforced and is rarely invoked to dismiss an AD case. Therefore, in practice, AD protection is installed when it is deemed in the interest of domestic producers without considering the interests of other users and consumers.

As this short description illustrates, AD is an exception to the GATT/WTO principle of non-discrimination. AD measures only affect imports from alleged dumpers. Hence, not all countries (and firms within each country) receive the same treatment.

While AD measures by the traditional users have gone down, those by the countries that adopted an AD law after 1980 have gone up. To give just one example: India initiated about 321 AD cases between 1995 and 2002 while during that same period the US initiated 289 and the EU 263, as shown in Table 1. When scaled by the size of imports it turns out that the highest number of AD measures per US$ of imports is now attained by some of these new users, as shown by Finger *et al.* (2002).

Moreover, new users predominantly use AD protection against traditional users, notably the US and the EU. In the words of Dan Ikenson (2002) from the Cato Institute (a think tank in Washington DC) '*the likelihood of continued antidumping proliferation poses a significant threat to US export growth (. . .) the US has become the third largest target of antidumping actions around the world*' and a similar argument applies for the EU

Table 1. Top adopters and sectoral breakdown of AD initiations by adopters

Top adopters	AD initiations in 1995–2002	Top sectors	% of AD initiations in 1995–2002
India	321	Industrial chemical	39.08%
Brazil	99	Iron and steel	30.16%
Peru	86	Machinery	5.71%
Mexico	74	Textile and apparel	5.71%
China	62	Food products	4.01%
Egypt	46	Paper and products	3.21%
Turkey	46	Rubber products	3.11%
Indonesia	40	Other sectors	9.01%
Taiwan	32		
Thailand	31		
. . . as a comparison:			
US	289		
EU	263		

Notes: The statistics about top countries and sectors are calculated only including the countries that introduced an AD law from 1980 onward; some of the top adopters introduced an AD law after 1995 (see Table 2 for details).

Source: Moore and Zanardi (2006).

as well. Therefore, American and European firms are now themselves under threat of facing AD actions by developing countries jeopardizing market access to some of the largest growing markets in the world.

All this shows that the recent proliferation of AD laws raises serious policy issues since the welfare effects of widespread AD protection are negative. Gallaway *et al.* (1999) calculated that the total net welfare costs of affirmative AD and countervailing actions for the United States in 1993 were only second to the MultiFibre Agreement.[3] Moreover, a recent paper by Vandenbussche and Zanardi (2007a) estimated the trade depressing effects of AD proliferation for some new users to be in the range of 8.9% of their annual imports. For example, while India saw its imports rise by 11.3% as a result of trade liberalization over the period 1991–2001, its use of AD measures reduced imports by 10.2%. This suggests that adopting and using AD laws can substantially offset gains from trade liberalization and refutes the notion that AD laws are 'a small price to pay'.

The purpose of this paper is to formulate and test a number of possible explanations for the AD law proliferation. These explanations will be grounded in existing theories of political economy of trade policy and other channels suggested in the literature on the use of AD. In addition to the adoption decision, proliferation also holds another interesting question related to the time gap between adoption of an AD law and the first AD initiation. Our data reveal substantial heterogeneity amongst adopters in terms of the time of their first use, which is worth exploring.

[3] Countervailing duties are imposed on imports that receive illegal subsidies in their home country.

Table 2. Countries in the sample (1980–2003)

Countries that did not adopt AD law (1)	WTO membership (2)	Countries that adopted AD law (3)	WTO membership (4)	Date of AD law (5)	Date of first use of AD law (6)
Angola	1994	Albania	2000	1999	n.a.
Bahrain	1993	Armenia	2003	2003	n.a.
Belize	1983	Bangladesh	1972	1995	n.a.
Benin	1963	Belarus	–	1999	n.a.
Botswana	1987	Bolivia	1990	1992	never
Brunei Darussalam	1993	Brazil	1948	1987	1988
Burkina Faso	1963	Bulgaria	1996	1993	2002
Burundi	1965	Cameroon	1963	1998	n.a.
Cambodia	2004	Chile	1949	1986	1994
Chad	1963	China	2001	1997	1997
Congo	1997	Colombia	1981	1990	1991
Côte d'Ivoire	1963	Costa Rica	1990	1996	1996
Djibouti	1977	Croatia	2000	1999	never
Gambia	1965	Cuba	1948	1990	n.a.
Georgia	2000	Czech Republic	1993	1997	1998
Ghana	1957	Dominican Rep.	1950	2001	never
Guinea	1994	Ecuador	1996	1991	1997
Guinea-Bissau	1994	Egypt	1970	1998	1998
Guyana	1966	El Salvador	1991	1995	never
Haiti	1950	Estonia	1999	2002	n.a.
Hong Kong	1986	Fiji	1993	1998	n.a.
Macau	1991	Guatemala	1991	1996	1996
Macedonia, FYR	–	Honduras	1994	1995	never
Madagascar	1963	Hungary	1973	1994	never
Maldives	1983	Iceland	1968	1987	never
Mali	1993	India	1948	1985	1992
Malta	1964	Indonesia	1950	1995	1996
Mauritius	1970	Israel	1962	1991	1993
Mongolia	1997	Jordan	2000	2003	never
Mozambique	1992	Kazakhstan	–	1998	n.a.
Myanmar	1948	Kyrgyz Republic	1998	1998	never
Namibia	1992	Latvia	1999	2000	2001
Nepal	2004	Lithuania	2001	1998	1999
Niger	1963	Mexico	1986	1986	1987
Oman	2000	Moldova	2001	2000	never
Papua New Guinea	1994	Morocco	1987	1997	never
Qatar	1994	Nicaragua	1950	1995	1997
Rwanda	1966	Pakistan	1948	1983	2002
Sierra Leone	1964	Panama	1997	1996	1998
Solomon Islands	1994	Paraguay	1994	1996	1999
Sri Lanka	1948	Peru	1951	1991	1992
Suriname	1978	Philippines	1979	1994	1994
Swaziland	1993	Poland	1967	1997	1997
Switzerland	1966	Romania	1971	1992	never
Tanzania	1961	Russian Federation	–	1998	2000
Togo	1964	Saudi Arabia	2005	2000	n.a.
United Arab Emirates	1994	Senegal	1963	1994	never
		Singapore	1973	1985	1994
		Slovak Republic	1993	1997	never
		Slovenia	1994	1993	1999

Table 2. *Continued*

Countries that did not adopt AD law (1)	WTO membership (2)	Countries that adopted AD law (3)	WTO membership (4)	Date of AD law (5)	Date of first use of AD law (6)
		Spain	1963	1982	1984
		Taiwan	2002	1984	1984
		Thailand	1982	1994	1994
		Trinidad & Tobago	1962	1992	1996
		Tunisia	1990	1994	never
		Turkey	1951	1989	1989
		Ukraine	–	1999	1999
		Uruguay	1953	1980	1998
		Uzbekistan	–	1997	never
		Venezuela	1990	1992	1992
		Vietnam	2006	1998	n.a.

Notes: 'Never' means that the country had not used its AD law by the end of 2003. 'n.a.' means that no information is known about the usage of AD law for this country. '–' means that the country has not yet joined the WTO.

As for the decision to adopt, our empirical analysis is based on a set of 108 countries that did not have an AD law in 1980, which is the starting point of our sample period. Of those 108 countries, 61 adopted an AD law at some point between 1980 and 2003, which is the final year of our sample. The countries that adopted an AD law are listed in Table 2. To analyze the decision of first use we have far fewer observations at our disposal since only 61 countries adopted an AD law.[4] In view of the time dimension in adoption and first use decision, the use of duration (survival) analysis seems warranted. In particular we will use a parametric Weibull model and a semi-parametric Cox model.

An important aspect to note is that while the decision to adopt an AD law is made by a country, the decision to use AD proceedings instead is decided by firms that feel adversely affected by the dumping practices of foreign competitors. This means that AD policy works differently than competition policy where governments can at their own initiative decide to pursue a cartel or investigate an anti-competitive practice when they see fit. In the case of AD laws, governments in principle only administer the laws once they have adopted them, that is they will investigate the complaint made by an import-competing industry[5] and decide whether to grant that industry protection or not but they do not themselves initiate AD cases. Despite the fact that governments in principle only apply the existing rules, it has been shown that AD application is not just a 'technical track' process but leaves room for political influence (see, among others, Finger *et al.*, 1982; Moore, 1992; Tharakan and Waelbroeck,

[4] The set of countries that can be used is further reduced because of lack of data.

[5] A petition is valid if supported by a number of firms that is deemed representative (in terms of output or employees) of the allegedly injured industry.

1994). In view of this we will analyze to what extent political reasons also enter the adoption decision.

Although Table 2 makes clear that most countries with an AD law are members of the GATT/WTO, the adoption seems to have moved quite independently from WTO membership. Moreover, it is important to note that there is no formal obligation to adopt an AD law to join the GATT/WTO (Macrory, 2005; Ognivtsev *et al.*, 2001). However, a member country that wishes to introduce an AD law must do it in conformity with the WTO AD Agreement. A casual look at Table 2 already shows a large heterogeneity in the timing of AD law adoption and GATT/WTO membership. But in what follows we will more rigorously verify to what extent GATT/WTO membership is a determining factor in the proliferation of AD laws.

For all the reasons outlined above it is clear that from a policy perspective, it is important to investigate the determinants that lead countries to adopt AD laws. Our main findings can be summarized as follows.

One of our results is that AD law proliferation seems to be driven by 'retaliation motives'. The cumulated number of AD measures a country has received in the past strongly affects the probability of adopting an AD law. This result is in line with modern political economy theories arguing that strategic interaction between governments is important in explaining the emergence of trade protection laws (Bagwell and Staiger, 1999, 2002). However, the adoption of AD laws for strategic purposes suggests an abuse of AD laws, since retaliation is not what these rules are designed to combat (see Box 1) and thus is a violation of WTO rules.

Another robust finding of this paper is that AD law adoption is driven by a 'substitution effect' where more permanent tariffs are traded in for 'ad hoc' AD protection. Empirically we find that substantial trade liberalization in the past raises the probability of a country adopting an AD law. Hence countries seem to substitute tariffs by more contingent type of protection instruments like AD laws.

Traditional political economy models based on the 'conflict of domestic interests' would predict that the proportion of skilled versus unskilled workers is also likely to affect a country's decision to adopt an AD law. Trade policy in these models emerges as the outcome of a democratic majority voting process between winners and losers of protection (Mayer, 1984). However, we do not to find any evidence of that. Several reasons may account for this. Either direct democracy does not work well since workers do not use their right to vote because voting is costly. Or, alternatively, direct democracy is not a good assumption for trade policy issues since individuals do not directly vote on trade protection laws. Even when we look at the extent to which labor power is organized, as measured by union density of a country, we do not find an effect of workers on the decision of a country to adopt an AD law.

The assumption of direct democracy may not be an appropriate one to explain the formation of trade policy. More realistic political economy models instead assume indirect democracy i.e. that trade policy decisions are the result of a two-step political process where first individuals elect policymakers and second policymakers take

decisions. 'Protection for sale models' argue that special interest groups affect trade policy by lobbying in the second stage (Grossman and Helpman, 1994). Special interest groups and potential lobbyists in favour of the adoption of AD laws are import-competing industries that intend to use AD protection extensively. Moreover it has been shown that the stronger the financial clout and the more concentrated these industries are, the more likely their lobbying is bound to be successful (Olson, 1965). Our analysis indeed confirms that the size of the two most important beneficiary sectors of AD protection, notably the chemicals and the steel sector (as shown in Table 1) indeed positively affects the likelihood of AD law adoption. In contrast, the size of the textiles sector does not seem to have a determining role in the adoption decision. This is suggestive that financial clout is a more determining factor in trade policy outcomes than voting power. In most countries the textiles sector accounts for a larger share of employment but consists of many small firms which may face coordination problems. Instead, the steel and chemicals sectors are typically dominated by a few large players with substantial market power which makes coordination of lobby efforts and rent-seeking in these sectors easier and puts these industries in a better position to approach policymakers with financial contributions.[6]

We also find that the amount of net inflow of foreign direct investment (FDI) in a country significantly lowers the probability of AD law adoption. This is consistent with lobbying activities from multinational firms against AD laws since they usually source a larger share of their intermediate inputs from abroad.

Short-run macro economic fluctuations like GDP growth and exchange rate volatility do not seem to affect the decision to adopt an AD law. But a more long-run indicator of economic development like the size of the agricultural sector is negatively correlated with the decision to adopt an AD law. This largely explains why most African countries are absent amongst the new adopters and other countries like China, Brazil, India and Mexico to name a few, feature prominently amongst the new adopters. The latter countries have clearly moved away from agriculture into manufacturing. And since AD laws are mainly used to protect intermediate inputs in manufacturing (chemicals, steel, machinery, etc.) and far less to protect agricultural products, we would indeed expect to find that the size of the industrial sector is positively correlated with the decision to adopt an AD law.

As mentioned already, the decision of first use is more difficult to characterize due to a much smaller number of observations. Still, our findings suggest that short-run retaliatory motives and the level of development of a country matter most in explaining the cross-country variation of the first AD initiation.

The policy implications arising from our results are multiple and will be discussed in detail in a separate section. Predominantly they call out for the urgent need to

[6] For example, in India the textile sector employs about 35 million people and represents 14% of industrial production, while steel only accounts for 2.1% and chemicals about 7% of industrial production. The numbers are similar for the three other largest 'new users' of AD policy: China employs about 26% of workers in textiles, 4% in chemicals and 3% in steel sector.; Mexico employs about 23% in textiles, 0.3% in chemicals and 5.8% in steel.

renegotiate the AD procedure at the multilateral level, not in the least because the main targets of AD measures by the new adopters are the traditional AD users such as the US and the EU that have thus far blocked any substantial change to the AD rules in the absence of an incentive to do so. With evidence around suggesting that these new adopters are mainly using their AD law against the traditional users (Vandenbussche and Zanardi, 2007a) this is likely to result in a Prisoner's dilemma situation lowering welfare for all.[7] Therefore it is the role of an organization like the WTO to make AD rules less easy to apply to prevent countries from abusing AD laws to improve their terms of trade conditions at the expense of trade partners. Also, the WTO should curb rent-reeking activities by tightening the application of the rules such that special interest groups can less easily affect AD decision-making. Failure to do so is likely to result in substantial trade losses as recently argued by Vandenbussche and Zanardi (2007a).

The structure of the paper is as follows. In the next section we discuss existing political economy models as well as other hypotheses that may explain the proliferation of AD laws. This will provide the guidelines for the variables to be used in the empirical models on the determinants of adoption and first use of AD laws. Section 3 presents a description of the data while Section 4 discusses the methodology we use. The results are presented and discussed in Section 5. Section 6 concludes by discussing the policy implications of our empirical results.

2. WHY DO COUNTRIES ADOPT AN ANTIDUMPING LAW?

Arguably AD laws should only be there to protect a country in the event of unfair (i.e. dumped) imports. According to most economists the only type of unfair dumping that would justify protection is predatory dumping. The extent of predatory dumping is however hard to measure empirically, moreover the legal AD rules are not well equipped to distinguish predation from other types of dumping (see Box 1 for more details).[8]

In this paper we therefore take an indirect approach by arguing that if we find that country level variables that have nothing to do with the fairness of trade seem to affect the decision to adopt an AD law, this casts doubt on the correct motives for adoption and subsequent use of AD. If we find evidence of strategic or political economy motives underlying the adoption decision there is clearly room at the level of the WTO to change the AD rules to bring them more in line with the objective they are supposed to serve.

[7] A small literature is emerging arguing that in a dynamic context retaliatory tools like AD laws may prove necessary to uphold a free trade equilibrium (see Martin and Vergote, 2004). This suggests that abolishing AD laws would not be appropriate. Still, the policy conclusions would go in the same direction as argued in this paper (i.e. making the use of AD stricter with less possibility for lobby groups to affect the decision making).

[8] Shin (1998) shows that less than 10% of US AD cases are potentially about predatory dumping, which is the only instance where AD measures are economically justified.

We are unaware of any theoretical or empirical literature that has looked at the underlying motives for AD adoption. Previous literature has mainly focused on explaining the use of AD and its effects (see Box 2 for a short literature review on the use of AD laws). For the purpose of analyzing the proliferation of AD, which is the main research question in this paper, we therefore turn to the political economy literature on the emergence of trade laws and the earlier AD literature on the overall use of AD protection.

Box 2. Short literature review of the effects of antidumping

The economic literature on AD is very long both in its theoretical and empirical dimensions. Here, we will highlight only some of the results that are relevant for the current study and that are not already discussed in the main text of the paper.[9]

At first, a clarification is necessary. Although AD is a response to dumping, the discussion on AD is now independent from the one about dumping, as a result of an increasingly long literature that points out that the occurrence of dumping is not anymore the defining aspect in the application of AD duties and in the industries' motivations in filing such petitions.[10] Indeed, when investigating the determinants of worldwide AD filings, Prusa and Skeath (2005) 'reject the notion that the rise in AD activity is solely explained by an increase in unfair trading' since they find clear evidence that AD actions are motivated by strategic reasons. In a recent survey on AD, Blonigen and Prusa (2003) go as far as to argue that 'all but AD's staunchest supporters agree that AD has nothing to do with keeping trade "fair"'. The only economic rationale to use AD is if the dumping exporters are trying to eliminate the domestic industry in order to become monopolists (i.e. predatory dumping). However, such cases seem to be very rare (e.g. Shin, 1998). Then, it is no surprise that various studies conclude that the use of AD results in net welfare losses for a country. Gallaway *et al.* (1999) use a computable general equilibrium model to estimate that the annual welfare loss of affirmative AD and countervailing actions for the US were in the range of 4 billion US$ a year in 1993, second only to the costs resulting from the Multifibre Agreement.[11] The US International Trade Commission (1995), DeVault (1996) and Anderson (1993) reach the same qualitative conclusions when analyzing specific US AD cases. Although the existing literature focuses on the US, similar qualitative conclusions should hold for other AD users. These estimates, however, consider only the distortions due to the trade flows directly subject to AD measures. Therefore,

[9] See Blonigen and Prusa (2003) and Nelson (2006) for longer surveys of AD.

[10] The legal definition of dumping provided by the WTO AD Agreement is also far from the economic definition.

[11] Countervailing duties are imposed on imports that receive illegal subsidies in their home country.

they should be taken as lower bounds of the actual effects since many strategic effects are at play when firms internalize the existence of AD laws.

Among the strategic effects, it is known that AD procedures can help domestic and international collusion. Theoretically, AD laws can act as price floors (Prusa, 1994), which facilitate collusive outcomes. Moreover, faced with the prospect of AD duties, domestic and foreign firms have an incentive to strike a deal and share the rents that would otherwise be collected by the importing country as tariff revenue (Prusa, 1992; Veugelers and Vandenbussche, 1999; Zanardi, 2004b). Even more alarming, the need for domestic firms to cooperate during the various phases of the investigation can lead to the creation of sustainable cartels (Messerlin, 1990). In the US, this possibility is reinforced by the Noerr-Pennington legal doctrine which provides some antitrust exemption for US firms that cooperate during AD proceedings.

When collusion is achieved or trade protection (e.g. AD duties or price undertakings) is granted, the trade flows of goods under scrutiny obviously decrease. However, Staiger and Wolak (1994) provide econometric evidence that imports are also (negatively) affected by preliminary affirmative decisions. Therefore, firms may actually file AD petitions because of these investigation effects (i.e. harassment) although they do not expect final duties to be imposed.

As for the trade effects resulting from AD duties, it is important to remember that such duties are applied discriminatory to some (exporters within) countries, giving rise to the possibility of trade diversion. This implies that AD protection leads to a shift in the origin of imports, with an increase of imports from countries not named in the AD investigation. Although trade diversion can offset the reduction of trade from named countries (thus reducing the benefit for domestic producers), it involves sourcing from inefficient exporters. Prusa (1997) finds clear evidence of (less than fully offsetting) trade diversion for a sample of US cases. Instead, Konings *et al.* (2001) and Niels (2003) conclude that for European and Mexican AD duties trade diversion is much lower, suggesting that AD is more effective in keeping imports out.

Because of the various effects that the existence and use of AD laws can generate, it is inherently difficult to quantity the total effects stemming from the overall AD system. Still, Vandenbussche and Zanardi (2007a) use the recent proliferation of AD laws as a unique opportunity in time to evaluate the effect of the adoption and use of AD laws on bilateral trade flows using a gravity equation approach. Their conclusion is that AD can have serious trade depressing effects on imports. In particular, those countries that recently adopted AD laws and intensively use them experience annual trade losses of about 8.9%. Their results illustrate the chilling effects that AD policy can have since for countries like India and Taiwan the dampening effects of AD laws on trade flows are found to largely offset the earlier gains from trade liberalization.

Mainly two complementary theories are currently around to explain the existence of trade policy laws. The first one focuses on the social concerns of voters and public officials (i.e. policymakers take 'optimal decision' from a social welfare point of view). However, in the real world there are ample examples where actual policies seem to be quite different from 'optimal policies'. This brings us to the theory of the self-interested individual and the conflicts of interest where policy decisions are considered to be the outcome of a democratic process where voters vote according to how trade policy affects their interests (Baldwin, 1989; Drazen, 2000; Mayer, 1984).

In the case of indirect democracy the decision to adopt a trade policy can also be affected by financial contributions to policymakers and through lobbying by those that stand to lose or gain a lot from trade policy (Grossman and Helpman, 1994).

Modern versions of political economy models of trade policy also point out that the interests of individuals are not just affected by the policies of the country in which they reside but also and increasingly by the policies and actions of other countries and by decision making at a supra-national level like that of the WTO (Bagwell and Staiger, 1999, 2002).

Drawing from the political economy literature, as well as from other channels suggested in the literature on the use of AD,[12] below we discuss a number of different hypotheses that may explain the decision of a country to adopt (and start using) an AD law.

- **Retaliation hypothesis** (Blonigen and Bown, 2003; Bagwell and Staiger, 1999, 2002; Feinberg and Reynolds, 2006; Prusa and Skeath, 2002)
  Countries may adopt and use AD laws because of a retaliation motive. In particular, some of the new users (e.g. Brazil, China, India, Mexico) of AD today have been heavily targeted by AD measures in the 1980s and 1990s by traditional users like the EU and the US. Therefore the recent proliferation of AD laws could be part of a 'tit-for-tat' strategy where their adoption of AD laws is driven by the fact that they felt 'victimized' by the use of AD by others against their exporters. The new adopters of AD may have understood the flexibility of AD actions as trade policy instruments and decided to arm themselves with the same 'weapons'.
  Such a channel is also consistent with modern political economy models of trade that emphasize that trade policies are the outcome of the actions and policies adopted by *other* governments (Bagwell and Staiger, 1999, 2002). In order to investigate this hypothesis, the numbers of past AD investigations and/or measures a country has received are natural explanatory variables for our empirical models.

- **Substitution effect**

  Many developing countries have embarked on trade liberalization reforms during the recent decade. In many cases, these trade liberalization efforts resulted in

[12] However, we are not aware of any other theoretical and empirical study that analyses the determinants of the proliferation of AD laws.

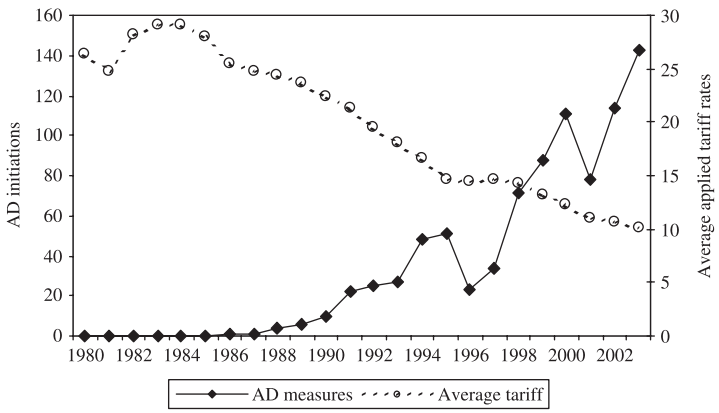

Figure 2. A substitution effect between tariffs and AD

Notes: Annual caseload of AD initiations by countries that adopted an AD law after 1980; average applied tariff rates of countries that do not have an AD law or adopted one after 1980.

many important structural changes in their economies. At the same time, the various GATT rounds of trade negotiations have limited the possibilities for countries to use 'standard' trade policy instruments (e.g. tariffs, quotas). The adoption of an AD law may therefore entail a substitution effect i.e. when countries agree to permanently reduce tariffs, they may want to keep their options open and replace permanent tariffs with another form of trade protection that they can use when the need arises to do so. In that sense an AD law can be regarded as some kind of 'insurance policy'. This possibility is apparent in Figure 2 where the number of AD measures by adopters and their average tariff rates are negatively correlated. The 'substitution hypothesis' can be tested by including measures of past trade liberalization as explanatory regressors. It needs to be pointed out that we may potentially be introducing an endogenous variable since it may be the case that the anticipation of future AD protection may also result in more trade liberalization. To exclude the possibility that our result on the substitution effect is driven by reverse causality, we will use an appropriate instrument for a country's openness that is less endogenous.

- **Institutional reasons**

  Even a casual look at the data suggests that there is a large heterogeneity across WTO members in terms of AD laws which most likely can be explained by the observation that the adoption of an AD law is not compulsory under WTO membership (Macrory, 2005; Ognivtsev *et al.*, 2001). Taiwan adopted an AD law 18 years *before* becoming a member of the WTO while Thailand adopted an AD law 12 years *after* joining the GATT. Adoption of AD laws occurs for countries

outside the WTO as well as inside the WTO.[13] This can be seen from Table 1 where for each country we list the year of WTO membership and the year of AD law adoption. It also shows that in 2003, 46 WTO members still did not have an AD law. Variables related to the time of WTO membership should be able to show if WTO membership is an institutional factor that can explain a country's decision to set up an AD regime.

- **Contagion effects**
  As the number of countries with an AD law increases over time, it may become more attractive for a country without an AD law to implement one. Prusa referred to it as the 'club effect' in his 2001 speech at the CATO Policy Forum. Countries observe other countries using AD and learn by seeing. The more countries that have AD laws, the more other countries learn about them, which leads them to join the club and use AD to their own advantage. Such a club may have a geographical dimension. The number of countries with an AD law (world-wide or in a particular geographical area) are natural choices as variables to include in the empirical analysis to test this hypothesis.

- **Political economy hypothesis** (Baldwin, 1989; Drazen, 2000; Gawande and Krishna, 2003; Grossman and Helpman, 1994; Hillman, 1982; Mayer, 1984)
  The standard neo-classical trade theory of Heckscher–Ohlin predicts that protection affects skilled workers differently than unskilled workers. Therefore the proportion of skilled versus unskilled workers at the country level can be a proxy for the number of advocates versus opponents of protection. Hence, if neo-classical trade models are the correct ones to think about then under a majority voting rule, we would expect the proportion of skilled to unskilled workers at the country level to be related to the adoption of an AD law. In addition we also want to verify to what extent the probability of AD law adoption is affected by the presence of strong unions defending the interest of mainly unskilled workers.[14] Labor power may matter in two ways: 1) Unions dislike competition since it threatens their power and are more likely to support laws allowing trade protection; 2) Unions are a source of cost-push shocks which can undermine domestic firms' competitiveness, hence resulting in a call for the protective use of AD laws (Vandenbussche *et al.*, 2001). For these reasons our analysis should include a measure of union power at the country level.
  The 'protection for sale' models (Grossman and Helpman, 1994) assume trade policy to be a two step process: first voters elect political representatives and second policymakers decide on trade policy. Hence trade policy laws are the

[13] Countries that are not members of the WTO are free to restrict trade as they like. Still, even in these countries the use of AD from an industry perspective is much easier than having to ask a government to approve special measures.

[14] We thank both referees for pointing out the potential role of unions in an earlier draft of this paper.

result of a process of indirect democracy where lobbying and rent-seeking affect the second stage decision making. Based on this we would expect industries with a reputation as intensive users of AD protection to lobby for adopting AD laws. Table 1 lists the sectors that in the recent past applied most for AD protection. The top users include the chemical sector with 39% of all AD initiations, the steel and metals sector with 30%, and the machinery and the textile sectors as distant third and fourth with just less than 6% each. Clearly, an indication of the size of the domestic steel and chemicals sectors could capture the strength of the lobbying power and the rent-seeking behavior of these industries in terms of favoring the adoption of an AD law.

The extent to which an economy hosts foreign firms may also affect its decision to implement AD laws that subsequently allow domestic industries to trigger protection. Multinational firms (MNEs) usually source more intermediate inputs from abroad than domestic firms. Since it is usually intermediate products and raw materials that are mostly subject to AD protection, MNEs will have a clear incentive to lobby against the introduction of AD laws.[15] In order to verify the relevance of this argument, our empirical specifications will include a measure of FDI flows. *A priori*, we would expect the higher the net inflow of FDI, the lower the probability of AD law adoption.

- **Macro-effects** (Knetter and Prusa, 2003; Leidy, 1997)

  Earlier work has shown that a country's GDP growth and real exchange rate fluctuations have a significant effect on its total AD filings. Smaller and more open economies with flexible exchange rates are more subject to volatile business cycles and may want to use AD laws to smooth out business cycle effects.

  But arguably, the adoption of an AD law is more of a long-run decision where the influence of short-run macro economic conditions may matter less. Thus, it seems desirable to also control for more long-run measures of the level of development of a country. An often heard argument is that while in principle all countries can adopt an AD law, in practice it is only the countries that have the capacity to manage these laws that adopt in the first place. This may explain why very low-income African countries are largely absent in the list of adopters while Latin American countries belonging to more medium level income countries list prominently amongst the new adopters.

  Also, since AD is mostly about the protection of manufacturing products, we would expect countries with a large agricultural sector to be less interested in adopting an AD law, while those countries moving out of agriculture and into manufacturing would be expected to be most keen on having AD laws on the books.

[15] The Congressional Budget Office of the United States reports (CBO, 1998) that 80.9% of US AD measures active on December 31, 1995 were against intermediate goods and raw materials. Similarly, 77.7% of Mexican AD initiations targeted intermediate and capital goods in the period 1987–2002 (Reyes de la Torre and González, 2005).

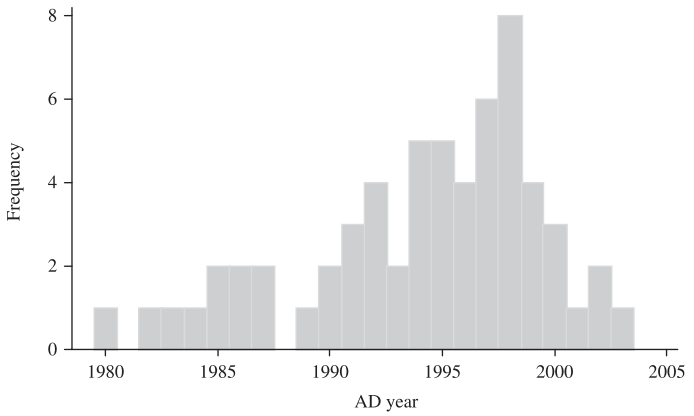

Figure 3. When did countries adopt antidumping laws?

Source: Authors' update of Zanardi (2004a).

The heterogeneity across countries in adoption and first use of AD will allow us to identify which of these channels is better able to explain the time patterns that are observable in the data. We suspect that the decision to adopt is driven more by long-run motives than the decision to start using AD laws. For example it is unlikely that short run macro shocks in the recent past would explain the decision to adopt an AD law. Instead it seems more likely that short run shocks determine when an industry engages in the first use of a newly adopted AD law since once a law is in place a complaint can be filed relatively quickly. However, only the empirical results will provide an answer to these questions.

3. DESCRIPTION OF THE DATA

The sample period for the empirical analysis goes from 1980 until 2003. The starting point of our analysis is mainly motivated by Figure 1 showing that from the 1980s onwards the worldwide proliferation of AD laws really took off. The endpoint of our data is the result of data availability. Between 1980 and 2003, 61 countries introduced an AD law with most adoptions occurring in the second half of the 1990s, as shown in Figure 3. This is the set of 'adopters' for the empirical analysis. In addition, our sample also consists of countries that did not have an AD law by 1980, had not adopted one by the end of 2003 and that had sufficient data availability.[16] In this sense, our sample includes 108 countries in total (although data limitations on some regressors reduce the sample). Table 2 lists all the countries in the dataset together

[16] Our control group consists of all countries in the world that satisfy these two criteria.

with the year when they joined the WTO (if they did) and the year when they adopted and first used an AD law (if they did).

A comparison between the year of adoption and the year of *first use* of AD laws uncovers substantial heterogeneity. In fact, almost half (i.e. 27 countries) of all the countries that adopted an AD law during our sample did not begin using AD by the end of 2003 and the time profile of the remaining 34 countries present substantial heterogeneity.[17] For example, Chinese firms initiated their first AD investigation the same year the law was adopted, while their Indian counterparts waited for 7 years. On average there is a three and half year lag between countries' adoption and first use of AD laws. While some countries adopt an AD law but their firms never initiate a demand for AD protection, others countries use it right away. The heterogeneity of first use is an equally interesting dimension of the worldwide proliferation of AD although the available data are far fewer since only 34 countries that adopted also started using AD before 2003.

The variables that we use to test the various hypotheses will be discussed in more detail along with the results while their description and sources are reported in Table A1 in the Appendix.

4. METHODOLOGY

The aim of our empirical model is to investigate the determinants of a country's decision to adopt and subsequently first use AD laws. Therefore, we intend to address two separate, though obviously related, issues: the likelihood that a country adopts an AD law at time t, given that it did not have one in 1980; and the time it takes for import-competing industries to start using such a law after it has been adopted. It is important to emphasize that we do not intend to explain the overall use of AD, as there are already several contributions in the literature on this aspect.

These two policy questions can be considered as 'events'. The time up to an event provides information on what triggered the event (i.e. which explanatory variables are responsible for triggering the event). The appropriate methodology to analyze these decisions is called *survival analysis* (or event analysis or duration analysis).[18] Survival analysis techniques have many applications and are especially well known among labor economists that employ them to study issues such as the duration of unemployment.

There are several types of models that can be used in survival analysis. The most important and well-known models are the proportional hazard models. In these versions, the variable that needs to be explained is the 'hazard rate' $h_i(t)$, which is the probability of an event occurring at a particular moment in time for a particular country i given that it did not occur earlier. The variables that can potentially explain

[17] We do not have any information about the use of AD laws in ten countries that adopted after 1980.

[18] Survival analysis deals with the possibility of right censoring (i.e. a subject under investigation does not experience the event by the end of the sample) and the non-normality in the distribution of errors.

the occurrence of an event are represented by a set of (time varying) regressors x_{it} that correspond to the variables that we indicated in order to capture the channels discussed in Section 2. Formally, a hazard model can be presented as follows

$$h_i(t) = h_0(t)\exp(x_{it}\beta) \quad (1)$$

where i stands for the country, t for the year, x_{it} is the matrix of regressors and β is the vector of coefficients to be estimated. $h_0(t)$ in (1) is called the 'baseline hazard rate'. The formulation in (1) clarifies why these models are 'proportional': any change in the explanatory variables results in a new hazard rate, $h_i(t)$ that is proportional to the baseline hazard rate independent of the time variable.

Hazard models differ from each other in terms of the assumptions made about the way the baseline hazard rate is specified. In the case of semi-parametric models (i.e. the Cox model), the baseline hazard rate is left unestimated so that no assumption for the functional form of $h_0(t)$ is required. This flexibility comes at the cost of a loss of efficiency with respect to the case where a baseline hazard rate is appropriately modeled. Parametric models do impose a functional form on the baseline hazard rate. Among the many options, the Weibull model is often used because of its generality since it allows the baseline either to be constant, increasing or decreasing over time. In this sense, it nests three alternatives by assuming the following specification:

$$h_0(t) = pt^{p-1}\exp(\beta_0) \quad (2)$$

where $p > 0$ is an ancillary parameter, t is time and β_0 is the constant. The baseline hazard rate is constant if p is equal to 1 while it is increasing (decreasing) for p above (below) 1.

We will use a Weibull model for the empirical analysis. It remains an empirical issue to see whether calendar time has an effect (i.e. if the parameter p is statistically significant). If it is, it represents a measure of our ignorance in the sense that the regressors do not fully explain the adoption or first use decision. As a sensitivity check we will also present the results for the Cox model, which should not systematically differ if the final parameterization of the baseline hazard rate is correct.

The estimates for the coefficients β in (1) can be interpreted as the contribution of each regressor to the likelihood of the occurrence of adoption and first use. To facilitate the interpretation of the estimates, we will report our results as hazard ratios (i.e. the exponential of individual coefficients β) since they represent the effect of a one-unit change in the independent variable on the likelihood of adopting or first using AD laws.[19] What has to be kept in mind, however, is that in this case what matters is whether the hazard ratios are statistically different from one. A hazard ratio that is statistically higher (lower) than one implies a positive (negative) and significant effect on the likelihood of AD law adoption or first use. For example, a hazard ratio of 1.20 for a dummy variable means that the probability of AD law adoption is 20%

[19] Therefore, the scale used in the measurement of each regressor is important. When discussing the economic impact of the variables, we will report the effect of a one standard deviation change on the likelihood to adopt AD laws (Section 5.3).

higher when the dummy is equal to one while a hazard ratio of 0.80 would imply a 20% lower probability. To further simplify comparisons we will also present a table with the effects of a one-standard deviation change in each regressor.

It is important to point out that in a survival analysis framework each country is part of the sample up to the year when the decision (to adopt or first use AD) is taken and it disappears afterwards. When analyzing the decision to adopt, all countries start in 1980[20] and they are included until the year when they adopt, or until 2003 if they have not adopted by the end of the sample (i.e. these countries are censored since we do not observe the event[21]).[22] Obviously, the decision to use an AD law is conditional on having first adopted such a law. Therefore, for the second question of interest countries that adopted at some point during our sample period are included from the year of adoption until the year when an industry first initiated an AD petition, or until the end of the sample if no use of their AD law had been made by the end of 2003.[23]

However, on top of the regressors that we include in the analysis, there may still be unobserved country level heterogeneity. Suppose there are some unobserved factors that are not included in our analysis but that influence the decision to adopt/use AD law, this will bias the estimates of the coefficients. Duration models allow to control for this possibility by including country specific random effects. In this case, the estimated specification becomes

$$h_i(t) = \alpha_i h_0(t)\exp(x_{it}\beta) \tag{3}$$

where the effects α_i are drawn from a distribution with positive support. These kinds of models are called 'frailty models' and they will allow us to verify that our results are robust to all country level heterogeneity not explicitly captured by the regressors. However, it is important to note that the random effects are assumed not to be correlated with the included explanatory variables. They are there to account for the sample selection induced by the sorting of countries over time, which is known to bias the coefficients of the retained explanatory variables to zero (Lancaster, 1990).

5. RESULTS

In this section, we discuss the results for the two questions that form the objective of the paper. To facilitate the analysis, the results of the empirical models are discussed in two separate sub-sections.[24]

[20] Our data are left-censored. This is not too much of a problem if we are willing to assume that, conditional on the covariates, countries faced the same risk of adopting an AD law in 1980. In the robustness check, we will also show that the results are unchanged if 1990 is used as the beginning of the analysis.

[21] Right-censoring is not a problem since it is uncorrelated with the covariates.

[22] Countries may enter later if they were born after 1980 (e.g. countries born from the break-up of the Soviet Union).

[23] We have no information about the use or no use of the AD law in ten countries. Therefore, we would be able to use at most 51 countries for a total of 280 observations. As a sensitivity check, we will assume that these ten countries did not use AD.

[24] The results for all the specifications not explicitly reported in the paper are either available in the working paper version (Vandenbussche and Zanardi, 2007b) or from the authors upon request.

5.1. Adoption decision

We start by analyzing the factors that may influence the adoption of an AD law. For this purpose we have 108 countries in our sample of which 61 adopted an AD law at some point during the period of analysis (1980–2003).[25] All the countries are listed in Table 2 and we note that most of those that adopted are developing countries with low to medium-income levels.

The results of various specifications are shown in Table 3. Our empirical models contain variables on the various hypotheses formulated above: retaliation, substitution effect, institutional channel, contagion, industrial composition, level of development, sectoral lobbies, inward FDI and labor power. Our preferred specification is shown in column (1) which is the one with the largest number of observations since all the variables included are available for the majority of countries in our sample. Additional variables are added in subsequent columns but often reduce the number of observations substantially. The subsequent specification in columns (2) to (6) mainly serve the purpose of demonstrating the robustness of the results. Correlations between any two explanatory variables are low as can be verified from the correlation matrix in Table A.2 in the appendix. The last two columns show the results of a frailty model and a Cox model using our main specification in column (1) to verify the robustness of our results when using alternative estimation methods.

Retaliation hypothesis For the purpose of investigating whether a country's adoption of an AD law is inspired by earlier actions of other trade partners we experimented with *total AD initiations/measures received* in the current year as well as with *total cumulative AD initiations/measures received* in the past (from 1980 onwards). *Initiations* refer to the number of complaints filed by foreign industries while *measures* indicate the number of such complaints that resulted in the imposition of AD duties. Initiations and measures received (cumulated or not) are highly correlated and they all perform relatively well with better results for cumulated measures. When including cumulated AD measures of the past we always find a positive and significant sign suggesting that a country is more likely to adopt an AD law the more it has been targeted in the past by AD measures. This can be seen from all specifications included in Table 3.

In view of the high demand for AD protection in the steel and chemicals industry, it is worth verifying to what extent past AD measures in steel and chemicals received by the countries in the sample may have had an effect on the decision to adopt an AD law. For this purpose, we test for the existence of differential retaliation effects driven by steel and chemical cases by constructing a *cumulative number of past steel measures* and the *cumulative number of past chemical measures*. We find that both of them are significant although past steel measures has a larger and a more significant coefficient. Retaliation driven by sectoral rent-seeking is likely to have negative welfare implications

[25] Fewer countries may be included in the various specifications due to data limitations.

Table 3. The adoption of antidumping laws

	Preferred specification (1)	Reverse causality (2)	Sectoral lobbies (3)	Steel imports (4)	Inward FDI (5)	Union density (6)	Frailty model (7)	Cox model (8)
Cumulated AD measures received in the past	1.011***	1.011***	1.007***	1.007***	1.015***	1.008**	1.018**	1.012***
	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.008)	(0.003)
%Δ Openness index	1.050***		1.035**	1.044***	1.046**	1.042**	1.051***	1.047***
	(0.017)		(0.017)	(0.017)	(0.018)	(0.017)	(0.019)	(0.018)
%Δ Continental openness index		1.112***						
		(0.039)						
WTO entry in past 5 years	1.824*	1.522	1.658	1.689	2.028**	1.837*	2.387**	2.150**
	(0.583)	(1.218)	(0.636)	(0.587)	(0.597)	(0.597)	(0.904)	(0.690)
Number of AD laws in same continent	1.209***	1.218***	1.288***	1.213***	1.270***	1.225***	1.323***	1.377***
	(0.052)	(0.050)	(0.067)	(0.053)	(0.053)	(0.055)	(0.098)	(0.084)
Industry VA (% GDP)	1.036**	1.037**		1.039**	1.038***	1.054**	1.046**	1.047***
	(0.015)	(0.016)		(0.016)	(0.015)	(0.023)	(0.021)	(0.016)
Services VA (% GDP)	1.029[a]	1.030*		1.021	1.032**	1.020	1.044**	1.044**
	(0.018)	(0.018)		(0.018)	(0.016)	(0.020)	(0.023)	(0.018)
Chemicals (% VA of manufacturing)			1.075***					
			(0.027)					
Textiles & clothing (% VA of manufacturing)			0.993					
			(0.017)					
Ore and metal imports (% of total imports)				1.218[b]				
				(0.147)				
Net inward FDI (% GDP)					0.806***			
					(0.037)			
Medium union density						0.714		
						(0.263)		
High union density						0.976		
						(0.394)		
Medium income	1.806	1.502	1.215	0.874	1.959	0.554	1.351	0.972
	(0.954)	(0.839)	(0.561)	(0.450)	(1.068)	(0.267)	(0.888)	(0.511)

Table 3. *Continued*

	Preferred specification (1)	Reverse causality (2)	Sectoral lobbies (3)	Steel imports (4)	Inward FDI (5)	Union density (6)	Frailty model (7)	Cox model (8)
High income non-OECD	0.791	0.685	0.372	0.256	21.394***	0.491	0.530	0.446
	(0.843)	(0.726)	(0.491)	(0.316)	(19.842)	(0.544)	(0.663)	(0.454)
High income OECD	0.788	0.693	13.368***	0.231	0.769	0.297	0.789	0.413
	(1.115)	(0.997)	(9.706)	(0.379)	(1.098)	(0.424)	(1.632)	(0.545)
p	1.151	1.09	1.447	1.256	1.337	1.238	1.053	–
	(0.249)	(0.228)	(0.348)	(0.289)	(0.344)	(0.289)	(0.248)	
Observations	1113	1113	628	786	1010	748	1113	1113
Countries included	80	80	60	78	75	60	80	80
Countries adopting AD law	49	49	37	46	49	46	49	49
Log likelihood	37.762	37.853	22.754	24.589	27.887	29.879	36.576	152.51

Notes: The table reports hazard ratios with robust standard errors of the underlying point estimates in brackets. A coefficient above (below) 1 implies that the variable has a positive (negative) effect on the likelihood of adoption. *p* is the ancillary parameter of the Weibull model, which is estimated as *ln(p)* with the reported robust standard errors referring to this point estimate. * denotes significance at the 10% level, ** 5% level, and *** 1% level; (a) this coefficient is marginally significant at 10% with a p-value of 0.101; (b) this coefficient is marginally significant at 10% with a p-value of 0.103. Column (7) shows the results of a frailty model comparable to country level random effects. Column (8) shows the results of a Cox model.

for the AD adopting country. This clearly calls for a tightening of the AD rules at the level of the WTO to reduce the possibilities for rent-seekers. For brevity however we do not report the sectoral split of cumulated AD measures in Table 3.

Substitution effect Next, we want to verify to what extent the adoption of an AD law is a substitute for more permanent tariffs. Put differently, we want to analyze whether a country is more inclined to adopt an AD law when it has recently liberalized. For this purpose we experiment with different measures of trade openness. In column (1) of Table 3 we capture trade liberalization by including the percentage change (over two years) of an *openness index*. We use the 'Freedom to Trade Internationally' index of the Simon Fraser Institute in Canada. This index is a measure of tariffs and non-tariff barriers as well as other regulatory factors all capturing the general openness of a country.[26] This index has the advantage of being available for a relatively large set of countries and for a long time period.

Including past trade liberalization yields a highly significant hazard ratio larger than one on the trade *openness index*. This is consistent with the substitution effect hypothesis: the more a country has opened up to trade in the past the higher the probability of adoption. However, we may face a problem of endogeneity if reverse causality is at work where past trade liberalization was inspired by the prospect of an AD law. Therefore in column (2) of Table 3 we replace the openness of a country by the *openness index of the continent* to which the country belongs. This should appropriately account for the potential endogeneity of the openness index at the country level. The change in openness at the continental level is highly correlated (i.e. 0.44) with the change at the country level, making it a good 'instrument'.[27] And it is clear that openness at the continental level is more exogenous since it is very unlikely that adoption of an AD law by country *i* could influence the average openness of the continent the country belongs to. The results are reported in column (2) of Table 3. They show that even when including a measure of openness at the continental level we still find a positive and significant sign in the duration model suggesting that more openness has a positive effect on the probability of a country to adopt an AD law.[28]

As a robustness check we also verify our results using an alternative measure for openness where we considered the percentage change (over two years) in the average *applied tariffs* as obtained from the World Bank.[29] The results are qualitatively the same (i.e. a larger reduction in applied tariffs in the past increases the probability of AD

[26] The index ranges from zero (closed economy) to ten (open economy) and gives values up to two decimals.

[27] The use of an instrumental variable approach in duration models is not feasible. Therefore we just used 'openness of the continent' as a proxy for 'openness at the country level'.

[28] The results are also unchanged if we use the lag of the change in the openness index.

[29] The percentage change in applied tariff rates better captures the true extent of trade liberalization than if we were to use bound tariff rates (i.e. the maximum tariffs that a country can impose as a result of its WTO commitments). In fact, most developing countries have large 'overhangs' (i.e. the bound tariff rates are much higher than applied tariffs) so that a change in bound tariff rates may not result in any change in applied protection. Moreover, countries do not disclose their bound tariff rates in a systematic way (i.e. on a sectoral and time dimension).

adoption) but will not be shown to save on space.[30] Since our *openness index* is available for a substantially larger set of countries we use it as our preferred measure. The result on openness is very robust across all specifications shown in Table 3 irrespective of whether we use openness at the country level or openness at the continental level.

Our result on openness at the continental level refutes the possibility of reverse causality. It casts some doubt on the relevance of the 'safety valve argument' which argues that trade liberalization is facilitated by the anticipation of future use of AD. While the safety valve hypothesis has received some attention in previous literature (Finger and Nogués, 2005; Niels and ten Kate, 2006; Feinberg and Reynolds, 2007) the existing empirical evidence in support of it is considered to be weak. In fact, Moore and Zanardi (2006) find that past use of AD is actually hindering further trade liberalization in a sample of developing countries. The results reported in this paper are indicative that the safety valve argument for the decision of a country to adopt an AD law does not receive empirical support.

Institutional hypothesis In order to verify that the adoption of AD laws is not solely driven by WTO membership, we want to include an additional control for whether or not an AD adopting country is a member of the WTO. Also, if our result on openness still holds up after including a control for WTO membership, we know that AD adoption is truly triggered by past trade liberalization efforts rather than by WTO membership. Since WTO membership usually requires countries to engage in trade liberalization, we need to verify to what extent WTO membership is correlated with our measure of trade openness. The correlation between our measures of trade liberalization and the WTO membership dummy is only 0.07. The correlation with the dummy variable included in Table 3 of whether or not a country entered the WTO in the past five years is even lower (i.e. −0.04). Still, this dummy variable yields a positive and significant effect on the probability of AD adoption.[31] However, controlling for WTO membership does not change the significance on the openness index, demonstrating the robustness of substitution effect. The significance of the WTO dummy however depends on the specification used, confirming that the link between AD adoption and WTO membership is weak.

Contagion hypothesis In order to verify the relevance of contagion effects, we include the *cumulative number of countries that have an AD law in the same continent*. Table 3 shows that the correlation with AD adoption is always positive and highly significant.[32] Interestingly,

[30] Applied tariffs are available for a considerably smaller set of countries.

[31] We chose a 5 year dummy on the basis of the fact that for those countries that adopted after WTO entry, the average number of years between becoming a WTO member and AD adoption is 13 years while the median value which is less sensitive to outliers is only 5 years.

[32] We note that this variable clearly displays an increasing trend which may interfere with the estimation of the ancillary parameter p. Indeed, this parameter is significant (and greater than one) if such a regressor is excluded. However, a likelihood ratio test clearly favours the model that includes the 'Number of AD laws in the same continent', suggesting that this variable provides more explaining power than a simple trend.

a similar variable calculated at a world level is always insignificant, thus clearly pointing to the relevance of regional effects. Several explanations are possible for this result. Either it suggests that there is some kind of geographical herd behavior taking place, which may not be necessarily based on rational grounds. Or, there is some learning behavior when countries observe neighbors using these measures successfully against developed countries. While the significance of this contagion effect merits further research, it falls outside the direct scope of this paper but it does seem an important control variable to explain adoption.

Political economy motives In order to verify the political economy motives discussed before, ideally we require detailed information on variables like the industrial, sectoral and skill composition of the economy, union density, total and sectoral import structure, inflow of FDI, etc. However, since most of the countries in our sample are developing countries, data availability on some of these variables is low.

What is most readily available for most countries is the industrial composition over time (i.e. the relative size of the agricultural, industrial and service sectors). Therefore we start by including their *value added as a percentage of GDP*. A good reason to control for industrial composition is that a close look at the list of countries in Table 2 suggests that while most African countries did not adopt an AD law by the end of 2003, many Asian and Latin American countries did. An important difference between these adopters and non-adopters is the size of the agricultural sector. Most African countries display a low change in the size of that sector over time, while adopters like Brazil, China, India, and Mexico all embarked on an 'industrial or service revolution' with shrinking economic activity in agriculture in favor of industry (e.g. China) and services (e.g. India). Table 3 shows that when we include the time varying industrial composition of the economy, the results confirm our prior: the larger the share of value added in industry vis-à-vis the agricultural sector (i.e. the excluded category), the more likely a country is to adopt AD law. For services the result is less strong but mostly significant across specifications.[33] One of the most likely explanations underlying this result is that AD laws after adoption are subsequently most often used to protect intermediate inputs in the manufacturing process. Therefore these laws are of less use to a country with a large agricultural sector.

The availability of the other political economy variables listed above is much more limited. We will discuss and introduce them one by one but mainly for the purpose of verifying the robustness of the variables in our preferred specification in column (1).

Once we look at the role of specific sectors within the industrial sector by including the *value added of the chemical sector* and the *value added of the textiles and clothing sector*, the number of observations drops by about one third. This can be seen from column (3) compared to column (1). The reason for including the size of the chemicals and

[33] In column (1) services VA is marginally significant at the 10% level with a p-value of 0.101.

textile sectors is that while the textiles sector is usually a very large sector in terms of employment it only represents about 6% of AD initiations, while the chemical sector is much smaller in terms of employment but accounts for most of the AD initiations (i.e. 39% as shown in Table 1). Ideally we would also like to include the steel industry, the second largest demander of protection but unfortunately data limitations do not permit us to do so.[34] From column (3) we see that indeed the presence of a larger *chemical sector* significantly explains the adoption of AD laws. Instead, the *textiles and clothing sector* is not significant in explaining the adoption of AD law. Several reasons may account for that. First, textile products were already protected by the MultiFibre Agreement during our sample period thus reducing the need for other forms of protection. Secondly, it could be that since the textiles sector is typically less concentrated, it has less financial means to weigh on trade policy than the chemicals sector. In textiles, firms and profit margins are typically smaller although the number of employees is usually much larger. This last interpretation suggests that indirectly our results are more supportive of 'protection for sale' models than of median-voter models.

As a proxy for the clout of the domestic steel sector in column (4) of Table 3 we include the *imports of ores and metals* as an indirect measure of the importance of the domestic steel sector. The inclusion of ores and metal imports forces us to drop many observations and the regressor is only marginally significant at the 10% level (with a p-value of 0.103) implying that a larger import share of ores and metals seems to be positively correlated with a country's adoption of an AD law.

When we add the amount of *net inward FDI* (two year average as a percentage of GDP) in column (5) of Table 3 this results in a drop of about a hundred observations compared to the specification in column (1). We find that net inward FDI is always negatively correlated with the probability of AD adoption and perhaps more importantly its inclusion does not alter the other results.[35] As argued before, multinational firms are more likely to import intermediates and raw materials from abroad which can explain their aversion to trade protection on intermediate inputs (i.e. the typical target of AD actions) and their willingness to lobby against trade protection laws.

As a test for the traditional political economy models, we tried including the country level ratio of *skilled over unskilled workers* instead of the value added variables. Such a variable should control for winners and losers from trade protection as predicted by the neo-classical trade theories. The data used are from the Barro-Lee dataset where skilled people are defined as the number of people above 15 years of age with a secondary school education and above. The problem is that availability of

[34] The WDI dataset does not include an indicator of the size of the steel sector. Another database from the World Bank (i.e. the Trade and Production database) does include some sectoral measures but the coverage is really poor resulting in too few observations left for the estimation.

[35] Because of possible endogeneity concerns, we experimented with a continental level of FDI (i.e. similar to our treatment of the openness index). The correlation between the country specific and the continental variable is 0.40 and all the results go through when using this aggregate variable.

these data for our set of countries is low. Including this variable does not yield a significant coefficient and will therefore not be shown.

As an alternative, we also experimented with a measure of labor power. *Union density* data, measured as the percentage of the working population that is unionized, were obtained from various sources (see Appendix for details). The problem with these data is that trade unions play very different roles and have very different bargaining powers in different countries. Also the data are characterized by a lot of missing observations. In view of this shortcoming, we constructed time invariant union density dummies indicating the strength of unions at the country level. Various cut-off points can be chosen but the results are not sensitive to the choice. Column (6) of Table 3 reports the results of a specification with three union dummies: one for density up to 20% (i.e. the excluded category), one for union density between 21 and 40%, and one above 40%. In the estimates reported as well as in other unreported specifications, we fail to find a significant effect of cross-country differences in union density on the decision to adopt an AD law.

Macro effects The last channel that we discussed in Section 2 relates to macro effects. We can control for macro effects in various ways. We tried including short-run macro controls that substantially vary over time such as *GDP growth* and the change in *the real exchange* rate vis-à-vis the US$ (both over a two year period). These short-run macro controls do not appear relevant in explaining adoption. Also a measure of *GDP variability* as a control for the chances that a recession emerges did not seem to be relevant for the adoption decision. Replacing the change in the real exchange rate by a similar measure of *exchange rate variability* which may capture a country's change in competitiveness did not seem to have a significant effect on the adoption decision either.[36] One reason why short run macro evolutions may matter less for the adoption of an AD law is that this is more of a long run decision that is likely to be driven by long-run factors rather than short-run macroeconomic evolutions.

We also tried including dummy variables (as reported in Table 3) capturing the *income level* of a country: medium income, high income non-OECD, and high-income OECD countries (as defined by the World Bank) with low-income countries as the excluded dummy. The definition of these dummies does not change very much over time. By including these dummies we control for cross-sectional income level differences across countries. Note that the correlation with the industrial composition variables is low (see Table A2 in the Appendix) since income dummies are not time varying. Although including these *income dummies* as macro controls does not change the qualitative results (although some estimates have a lower level of significance), the dummies themselves are not significant in the adoption decision.

[36] For this purpose we calculated the ratio of standard deviation of GDP (or real exchange rate) to its mean value over the past five years.

Before concluding, we note that the ancillary parameter p of the Weibull model is not significant in any of the models shown in Table 3. As we discussed in the section on methodology, we should expect this coefficient not to be significant if the regressors are able to explain the decision to adopt. We can conclude that the baseline hazard is constant so that the Weibull model that we have been using is equivalent to an exponential model. In other words, the probability of adopting is not affected by the simple passing of time.

5.1.1. Robustness While not shown here for brevity, we also checked the sensitivity of our results to the inclusion of some other regressors. We give a brief account of the results of some of these experiments. We tried adding geographical controls in the form of *dummies for continents*. None of the *continental dummies* were significant and, importantly, none of our results change. We also split the sample into two subperiods since a close look at the adoption dates shows that most of the countries in our sample adopted an AD law in the course of the nineties. The results are unchanged when only considering the 1990s; when only using the 1980s the significance on the change in the openness index and the industry value added is lost. As a final check, we also dropped the low-income countries from our sample. It can be argued that low-income countries have different (political and economic) priorities which are not captured by our list of regressors and may bias the results. Even if this is the case, the results illustrate that the low-income countries do not bias or drive our results since all the conclusions reached before go through.

What we do show in the last two columns of Table 3 is the results of alternative methodologies to check the robustness of our results. In column (7) we estimate a Weibull model with frailty and in column (8) we use a Cox model. A frailty model is comparable to an analysis with random effects in a panel data setting.[37] The results show that when applying a frailty model to our specification in column (1) the conclusions on our two main variables of interest (i.e. retaliation and substitution effect) as well as the other channels are unchanged by the inclusion of random effects. And finally in the last column of Table 3 we use a Cox semi-parametric model instead of the Weibull parametric model. The Cox model is semi-parametric in the sense that it does not estimate the baseline hazard rate and hence no value for the ancillary parameter p is shown at the bottom of column (3). Using the same regressors as in column (1) we obtain exactly the same qualitative results. This reassures us that the variables we include do a good job in explaining the adoption decision independently of the type of hazard model we use.

[37] The frailty can be modelled differently depending on the distribution from which the α_i in (3) are drawn. The specification in column (7) was estimated assuming an inverse Gaussian distribution. The gamma distribution is another popular choice. Although there is no clear rule to choose among distributions, we note that the effects of covariates differences completely vanish in gamma frailty models as time goes by while they do not when using an inverse Gaussian distribution (Cleves *et al.*, 2004). Independently of the chosen distribution, frailty models assume that the unobserved heterogeneity is uncorrelated with the other explanatory variables.

5.2. First use decision

The decision to use an AD law is conceptually distinct from the decision to adopt an AD law. In particular, a country decides to adopt an AD law but it is an import competing industry that files a petition to request AD protection.[38] There is substantial heterogeneity across countries as for the time gap between adoption and first use of AD laws. This observation seems worth exploring since it is a research question that can also be addressed with the same type of methodology we have been using to explain AD adoption, although AD adoption is a country's responsibility while its use is an industry decision.

While other papers have already tried to explain the overall AD use by new users (i.e. Prusa and Skeath, 2002; Bown, 2006), we use a hazard model to explain the time of the first AD initiation given that a country has adopted an AD law during our sample period (1980–2003). We should point out that the number of observations at our disposal to explain the time from adoption to first use is substantially lower than in the adoption case since we now only include the 34 countries that adopted an AD law whereas previously we had adopters and non-adopters in the sample. Partly due to this low number of observations (i.e. between 240 and 280) the results are less robust than in the analysis of the adoption decision and conclusions are more fragile.

As argued above, the same reasons that explain the decision to adopt could affect an industry's first use of AD. We experimented with various specifications of the full model. Here we will only briefly give an account of the results that came out of these experiments.[39] The results that arose for the first use decision are somewhat different than for the adoption decision. The main robust finding is that the first time that AD is used in a country seems strongly correlated with short-run retaliation motives. Including the lagged value of *AD measures received* by all trade partners positively and significantly affects the first use decision. While *cumulative measures* in some specifications also holds up, last year's *AD measures received* always performed stronger independently of the specification. Note that in the adoption model, it was the other way round. There, *cumulated AD measures* seemed more important than last year's AD measures received. This can be understood in view of the fact that the adoption of an AD law is more of a long-run decision which may depend less on short-run fluctuations in terms of measures received, whereas the first use of AD is likely to be triggered by more recent events like the AD measures domestic exporting firms faced abroad in the past year.

This retaliatory use of AD is worrisome since it suggests again that strategic considerations play a role in the use of the AD instrument, which arguably are in contrast with the non-discriminatory spirit of the WTO.

[38] A petition is valid if supported by a number of firms that is deemed representiative (in terms of output or employees) of the allegedly injured industry.

[39] Results available in the working paper version (Vandenbussche and Zanardi, 2007b).

The only other significant effect is that amongst the countries that adopt AD laws, industries in the richer ones begin using it sooner. In terms of the macro-economic variables, we find that *medium* and *high income non-OECD countries* within the group of adopters have a higher probability of first use than low income countries. This could be consistent with the argument that *medium* and *high income countries* have more capacity to manage and implement the AD laws than low income countries that may often lack the expertise to apply all the AD rules into practice.

None of the other variables of the adoption model proved to be significant in explaining the first use decision.

5.3. Economic significance

Ideally we would like to know how each channel affects the probability of adoption. Up to this point in the analysis this was not really possible since the hazard ratios reported in the various tables while showing the direction in which an individual regressor affects adoption of AD, can not be easily compared across regressors. The reason is that hazard ratios represent the effect of a one-unit change of the variable of interest and they are sensitive to the measurement unit.

To overcome this problem and to facilitate the comparison of which channel is more economically relevant, in Table 4 we calculate the effects of a one-standard deviation change of each regressor on the probability of adoption of an AD law.

Table 4. Economic significance (decision to adopt an AD law)

	% Impact on hazard	Mean (st. dev.)
Cumulated AD measures received in the past	14.42***	2.19
	(3.67)	(11.80)
%Δ Openness index	49.60**	2.78
	(2.45)	(8.26)
WTO entry in past 5 years	*82.43*	*0.09*
	(1.88)	*(0.29)*
Number of AD laws in the same continent	73.32***	2.23
	(3.39)	(2.90)
Industry VA (% GDP)	53.89*	28.83
	(1.96)	(12.11)
Services VA (% GDP)	39.76	48.30
	(1.39)	(11.65)
Average hazard rate (1,113 observations)		0.04
		(0.090)
Average hazard rate for the countries adopting an AD law		0.19
in the year when they adopt the AD law (49 observations)		(0.247)

Notes: The table reports the percentage impact of a one-standard deviation change in each regressor on the hazard rate, except for dummy variables (in italics in the table) where the effect of the dummy switching from 0 to 1 is reported. The other column reports the mean and standard deviation of each regressor. The last two rows report average hazard rates. Robust z-statistics in brackets. * denotes significance at the 10% level, ** 5% level, and *** 1% level.

Whenever the regressor is a dummy variable, the percentage change reflects the effect of the dummy switching from 0 to 1. These computations are performed on our preferred specification (i.e. column (1) of Table 3). This exercise does not completely solve the problem because some variables exhibit much more volatility around their means than others, as can be seen in Table 4 where the last column reports means and standard deviations of each regressor.

In terms of retaliation, we can say that 12 additional AD measures received in the past (i.e. one standard deviation) raise the probability of AD law adoption in the current year by 14.4%. Similarly we can say that an increase in past trade openness by 8 points raises the probability of AD law adoption by almost 50%. However, it is difficult to say how likely it is that such a one-standard deviation change will materialize. The institutional WTO variable always enters with a large coefficient but its significance varies a great deal across specifications. One reason is that this variable is very sensitive to the set of countries included in the sample, since there is a large heterogeneity across countries and the number of countries included in the analysis varies between specifications. Based on our results in column (1) we can say that if a country became a WTO member in the past five years, the probability of adopting AD laws is increased by 82.4%. Finally, an increase of the value added of the industrial sector as a percentage of GDP of 12% raises the probability of adopting AD laws by more than 50%.

In order to provide an overall assessment of the model, in the last two rows of Table 4 average hazard rates are reported. The first one is based on all observations included in the regression while the second one is calculated for the year and the countries when an AD law was included. The second hazard rate is almost fivefold larger, confirming the ability of the model to explain the determinants of AD law adoption.

6. POLICY RELEVANCE

The fact that many countries have adopted AD laws in recent years provides us with a unique opportunity in time to study the reasons for this AD proliferation. The new adopters of AD laws appear to be mainly developing countries. The main purpose of AD laws within the WTO context is supposedly to combat 'unfair imports'. However, economists by now agree that the current WTO AD Agreement is not well equipped to detect true cases of unfair trade (Shin, 1998). This suggests that other considerations may underlie a country's decision to engage in AD policy. These considerations are likely to be more 'political' in nature and may have little to do with combating unfair trade.

One of the important conclusions arising from this paper is that retaliation motives are at the heart of the proliferation of AD laws and the decision to start using them. This raises serious policy issues since retaliation motives run clearly contrary to the general anti-discriminatory principle that guides the WTO and is suggestive that countries 'abuse' their AD laws. Interestingly, new adopters direct their AD measures

mainly against the traditional users of AD that targeted them with AD measures in the past, notably the US and the EU (Vandenbussche and Zanardi, 2007a). With these retaliation motives at work, there is a serious risk of Prisoner's dilemma outcomes where countries engage in too many unwarranted AD cases. On this ground, it seems that there is an urgent need for a substantial tightening of the dumping and injury criteria that the AD authorities are required to use in determining whether to impose AD duties.

Paradoxically, the proliferation of AD laws and the capacity of developing countries to retaliate may also open up opportunities for change. Until now the political will to change AD laws was largely absent among the developed countries. For many years developing countries have been insisting on a change of the AD rules which they felt were inadequate and were in many cases unjustly hurting the interests of their exporters. However, the traditional users, notably the US and the EU, have always opposed major changes of the AD law. The recent proliferation of AD may change the attitude of the US and EU and make them more willing to agree on changes in order to avoid a building up/running up of AD protection from developing countries which now adversely hurts the traditional exporters. It seems that there are some signs in this direction. The EU Trade Commissioner, Peter Mandelson, has recently released the Green Paper on the EU trade defense instruments where the EU displays its willingness to change. One prominent reason for this has been the recent 2005 'leather shoe' case against China and Vietnam. This case revealed that AD duties were hurting instead of benefiting a large share of the EU producers.[40] This resulted in large opinion differences between member states in terms of whether or not to impose AD duties. A compromise was reached by substantially shortening the period for which AD duties apply.

Hopefully, it will become clear that it is in the interest of all AD users to renegotiate the AD rules to make their use less 'easy'. For a start, AD rules should be guided more by economics principles than purely legal definitions which would tighten its application and reduce the number of type I errors (classify dumping as unfair where it is not). Along this line, changes in the AD law may benefit from the longer experience of competition laws and practices. In fact, economists have long been arguing that AD laws, if not scrapped, should resemble competition laws more (see, among others, Hoekman and Mavroidis, 1996; Messerlin, 1994). In that case we would observe fewer AD cases passing the hurdle and resulting in trade protection.[41]

The fact that we find that past trade liberalization positively affects a country's adoption of an AD law suggests that AD laws are used as a substitution tool when

[40] The largest and most efficient EU shoe producers had for some time been outsourcing the more labor intensive parts of the shoe production process to China and Vietnam. By introducing AD duties on the imports of shoes in the EU, these firms were adversely affected while AD protection mainly benefited the smaller and more inefficient producers.

[41] One option would be to eliminate AD laws and install a world competition law (and authority) to 'level the playing field' and make sure that all firms play by the same rules. Given the current problem of finding an agreement among the WTO members, it seems unrealistic that such an option would be seriously taken into consideration in the near future.

an economy becomes more open to trade. This seems to confirm earlier allegations that an AD law is a substitute for more permanent tariffs but of a more ad-hoc and selective type. The danger of this phenomenon is that gains from trade liberalization could be in part offset by welfare losses resulting from the adoption of AD laws. Recently, Vandenbussche and Zanardi (2007a) have shown that for the new users of AD, the trade losses resulting from the systematic implementation of an AD policy substantially offset the increase in trade that was obtained under past trade liberalization efforts. However, it is also important to point out that the WTO provides instruments (i.e. safeguards) other than AD to accommodate industries that are substantially and negatively affected by trade liberalization without the need to show unfair imports. The reason why AD actions are more popular measures and far more frequently used than safeguards is that it is more difficult for a country to impose protection under the current safeguard rules due to stricter rules. If safeguards are too difficult to be used, the rules governing their use should be changed instead of using AD as a second best instrument to wield protection to specific sectors (or firms) in distress.

Our analysis also showed that political economy motives underlie AD decisions. We find some evidence that countries with a substantial chemicals and steel sector adopt AD more often and start using it faster than others. This seems to suggest that the chemicals and steel sectors are relatively more successful in lobbying for the protection of their domestic interests. A possible remedy at the level of the WTO would be to tighten the AD rules to make them less subject to rent-seeking from particular sectoral interest groups. One way to accomplish this may be to introduce a *Public Interest Clause* into the WTO AD Agreement and make it compulsory in any AD law. At present, the WTO AD agreement does not require a public interest test for imposing AD duties. However, an effective public interest clause ensures that AD protection can only be imposed when it is in the interest of *all* domestic parties, including (intermediate and final) consumers. At present only a few countries, including the EU, have such a clause while the large majority of countries do not even pay lip service to consumers' interests.[42] And even in those countries that officially have a public interest clause (e.g. Argentina, Australia, Canada and EU), its enforcement is, at best, sporadic so that consumers' interests are often equated to domestic producers' interests. A reform at the level of the WTO agreement on AD entailing a clear operational definition of Public Interest would ensure two things. First that all countries include such a test in their national AD law and second that countries clearly have to demonstrate the elements involved in the Public interest test (Sapir, 2006).

Despite the fact that they do not seem to have much explanatory power for the proliferation of AD laws, short-run macro shocks appear to be important in explaining the overall use of AD measures as convincingly argued by Knetter and Prusa (2003)

[42] Interestingly, consumers are mentioned only once in the WTO AD Agreement and only to allow representative consumer organizations to provide relevant information.

and Leidy (1997). This is suggestive that AD is used to shelter domestic firms from negative shocks instead of countering dumping practices. This would imply that the causality investigation in AD procedures needs to be tightened. The causality clause requires the protecting country to demonstrate a causal link between dumped foreign imports and injury to the domestic industry. This causality is now checked rather loosely. It suffices to show that a downward trend of domestic sales coincides with an increasing trend of imports. Ideally, causality should be established by turning to more sophisticated methodological approaches. A multivariate regression analysis that related injury to dumping and controls for the macroeconomic environment would establish more precisely which elements significantly contributed to the domestic injury and which did not. As an alternative, a simulation approach could be used although this would demand more data with regard to the assumptions on various demand and supply elasticity parameters (Grossman and Wauters, 2007; Sapir and Trachtman, 2007). Also in this case, modification could be made to the WTO AD Agreement in order to force AD authorities to conduct more sound economic analyses.

Adoption and first use are crucial aspects of the proliferation of AD laws. An understanding of countries' decisions on these matters is essential in view of the multilateral trade negotiations taking place at the level of the WTO. Both the EU and the US should welcome the opportunity in the Doha Round, or beyond, to renegotiate the rules of AD in order to prevent further proliferation and worldwide trade depression of which they seem to become the main target. This is even more relevant since the results presented in this paper show that retaliation motives play a crucial role both in explaining adoption and in triggering the first use of AD. Today it seems that the US is only prepared to discuss the technical aspects of AD (see Moore, 2007) which is regrettable since adoption and use of AD laws by new users is resulting in global trade chilling effects as shown recently by Vandenbussche and Zanardi (2007a). We should not let AD erode the trade gains that have been achieved through painful trade reforms. Now that we understand better the phenomenon behind the proliferation of AD, efforts can be made to limit it before more welfare gains from past trade liberalization are lost.

Discussion

Luigi Guiso

Ente Luigi Einaudi

This paper documents an impressive worldwide upward trend in the adoption and use of antidumping laws (AD) after the mid-1980s and tries to identify factors that may explain why countries adopt AD laws and why they use them. The bottom line is that the adoption of AD laws is correlated with proxies of institutional

variables and retaliation motives as well as with measures of the desire to build a safety net when countries liberalize trade. The explanation of the timing of the first use of AD measures, not surprisingly, is more difficult to predict, but a response to antidumping measures received by other countries has a strong explanatory power.

I found the issue raised interesting points and is certainly of policy relevance for the current debate within the WTO about what to do with AD laws. As far as I understand, the difficulty arises because although antidumping can (as the authors recognize) be considered a good pressure valve for countries undergoing rapid trade liberalization, they can also create political and economic tension. Political tension stems from debate over the recent rise in antidumping suits, sparking concerns that while negotiations dismantle transparent and stable tariff barriers, members are substituting discriminatory, unpredictable antidumping suits. Thus providing evidence about the motives for adopting AD laws and for using them bears directly on this relevant controversy that often sees developing and developed countries on opposite sides. Developing countries object to the proliferation of antidumping laws and safeguards because they are particularly vulnerable to unpredictable shifts in market access. While industrialized countries insist that conditional domestic protection is key to gradually liberalizing international trade.

The paper does a good job at putting together a number of indicators of potential motives for adopting/using AD laws and then running a horse race to see which ones are relevant. It also attaches interpretations to the correlations obtained, often stressing causality as running from the left hand variables to the right hand variables.

One interesting finding is that WTO participation is correlated with AD adoption; this suggests that countries adopt AD laws in view of WTO membership. But why? The favored interpretation is that this reflects a country protective reaction to exposure to international competition and simultaneous removal of trade barriers that participation in the WTO entails. An alternative interpretation, in my view, is that participation in WTO and adoption of AD laws are both driven by a third, unobserved factor that leads a process of trade liberalization – a change in 'philosophy' or policy style, in favor of more market-friendly policies and economic freedom. A similar argument applies to the results on the safety net hypothesis where measures of trade liberalizations (index of openness) are found to be positively correlated with the adoption of AD laws, while changes in tariffs are correlated negatively with AD laws. The point that I am making is that many of the variables that are chosen as potential drivers of AD adoption – including trade liberalizations and participation is WTO – are endogenous and can be seen as part of an underling process that leads a country to change its attitude towards international trade. To address this difficult issue of causality properly one should find an instrument for trade liberalization–exogenous forces that move a country towards trade liberalization, a difficult task.

Another instance where the same problem shows up is the main specification when total trade is used to test the substitution effect hypothesis (AD replaces tariffs). Here the problem is reverse causality: the substitution hypothesis implies that more openness causes more demand for AD laws; on the other hand, more AD laws, *ceteris paribus*, may cause less openness. In this case the problem is addressed by replacing a country openness with a measure of openness in the area. How good an instrument this is, however is not clear.

In my view the most robust evidence in support of the idea that AD laws are used (abused) to protect national industries in the wake of a process of trade liberalization is the effect that past initiations/measures received have on AD laws (the retaliation hypothesis). It is hard to imagine in this case causality running the other way round. Thus, while a reading of the various effects one by one may be consistent with different interpretations, a joint reading of the correlations presented in the paper looks supportive of the author's argument.

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This paper addresses an important policy question. Antidumping laws are the subject of a lively policy debate among economists, lawyers and politicians all over the world. A particular concern in this debate is the proliferation of antidumping measures and the possibility of curbing misuse by amending the WTO system. Before policy measures are taken it is important to understand how the present system works. Vandenbussche and Zanardi have written an interesting paper, which analyzes why countries adopt antidumping (AD) laws and what causes them to start using the law actively. While AD laws may be beneficial, as they perhaps make it easier for countries to open up and liberalize trade more generally, they can be misused and hinder prosperous trade. A central message from the paper is that the determinants the paper identifies for adoption and first use of AD, point to misuse as an important phenomenon.

The paper sets up various possible hypotheses for why antidumping laws are adopted. There is no firm theory behind the hypotheses, rather they reflect common sense. The hypotheses are: retaliation, a substitution effect hypothesis (trade liberalization reduces the option to use traditional trade policy tools, and an AD law may to some extent substitute for this), institutional reasons (WTO membership, time passed since WTO membership), contagion effects (neighboring countries have adopted an AD law), political economy factors (strong industries) and macro effects. Through a survival analysis the authors try to estimate the influence of these factors in determining a country's decision to adopt an antidumping law and subsequently make use of it.

A section on methodology carefully explains the empirical strategy. For the reader, who is uninitiated in the mysteries of survival analysis, this is a welcome service.

The results are broadly that cumulated AD measures received in the past (long-term retaliation), recent membership of WTO, number of AD laws on the same continent (a measure of contagion), an openness index, and industry's share of GDP all make the adoption of an antidumping law more likely. Measures relating to macroeconomic factors like GDP growth, real exchange rate movements, or the income level of the country do not matter.

As for the first use of AD measures, the number of AD measures received in the past year is highly significant, indicating that retaliation is important. Similarly, the income level of the country influences the adoption positively. There are weaker effects from the number of active AD laws in same continent and ore and metal's share of total imports. The latter effect is interpreted as relating to political economy effects, since it is well-known that the steel and chemical industries are often protected by AD measures.

The paper is intriguing, but as noted above there is no firm theory behind the hypotheses, they rather reflect the common wisdom, partly stemming from the relevant literature, and a good portion of common sense. While the authors' common sense is much like mine, a disadvantage stemming from this strategy is that some of the hypotheses seem to be interrelated. For example, the distinction between the substitution hypothesis and the so-called institutional reasons seems blurred. Similarly, under the political economy hypothesis it seems that there are elements of the substitution effect as well as the retaliation hypothesis. Furthermore the relation between the hypothesis and the variable supposed to reflect the influence of this particular channel may sometimes be questioned.

An open question which remains is whether there are common determinants of some of the variables employed. For instance, the decision to become a WTO member is not an exogenous variable. This decision may be driven by a number of factors, which could easily also affect the decision to adopt an AD law and use an AD law. This raises the question of what the significance of the 'WTO entry in last 5 years' on the right hand side means? If there are common factors determining WTO membership and adoption of an AD law, the two variables will be related in the regression even though there is no causal relation between the two. More generally, one may worry whether the causality is always from the right hand side to the left hand side in the regressions. Similarly, the contagion hypothesis is a bit controversial in that there are no economic theories behind it. One wonders whether the significance of the variable 'number of AD laws in same continent' just picks up some other correlated effects. In all fairness, the authors are aware of the problems, but I think they still deserve to be mentioned.

It is my judgement that the authors have come a good way in uncovering determinants for adoption and first use of AD laws. However, I would find it very interesting to go further and try to relate the adoption of AD laws and their first use to more fundamental variables. In line with the recent progress in the theory of competition policy and political economy, one has a strong feeling that it

would pay to dig deeper and try to relate to more fundamental and structural variables.

From the political economy perspective, it seems obvious to see whether the political structures of the countries affect the issues at hand. Are democracies more prone to adopt and use AD laws than dictatorships? Are right or left wing governments more prone to introduce and use AD? Is there a difference between parliamentary and presidential systems? A large literature in political economy has studied the effects and determinants of corruption. A natural question to ask is whether more corrupt countries are more prone to adopt and use AD? Similarly, it is a natural question whether the legal system of a country has an impact on AD. Is there a difference according to whether a country has common law or not? While the size of industry and the size of industries that are well known to receive AD-protection, steel and chemicals, enter the regressions, Olson's analysis would suggest that industries would more easily overcome the collective action problem if they were more concentrated. This leads to the hypothesis that more concentrated industries lobby harder for protection and thus to more AD. The list could be made much longer; my point here is just that it seems a natural next candidate to try to uncover such more fundamental determinants.

A potential problem, which the paper does not address, and which may also be important in further research on these issues, is that a government typically has several protective measures at hand. Technical trade barriers come to mind. Economic and political economy theories typically aim at predicting when protective trade measures are taken, not at predicting when the particular measure is AD. It appears that a more detailed analysis is called for in order to address this issue.

The paper has a nice section explaining the WTO AD system, according to which the use of AD is sometimes justified. The methods employed in the paper do not allow a distinction between justified and non-justified use of AD, the presumption being, I guess, that most use is non-justified anyway. In this perspective, the retaliation result is very interesting; it seems hard to believe that retaliatory use of AD can be justified according to the WTO rules.

Panel discussion

Fontagné thought that the relation between WTO accession, tariffs and AD law was not fully clear in the paper as entry in the WTO necessarily implied partial phasing out of tariffs and that possible introduction of antidumping regulation was conditional on WTO entry. Seabright suggested that the presence of AD laws can be partly explained by political economy issues as they represent a failure of domestic competition laws. The authors replied that AD laws represent a second best measure when competition laws do not operate well.

O'Rourke thought that the choice to use AD laws rather than other policies certainly depended on industrial structure: some industries may be more vulnerable to the kind of temporary shocks AD can be useful against. This also implies that the growth process of various countries may explain the proliferation of AD laws. Drazen believed that this type of research required more theoretical structure on the political economy mechanisms at work. It is certainly important to better understand who the gainers/losers in each country are to analyze the determinants of AD laws and draw some policy implications.

DATA APPENDIX

Table A1. Description and sources of variables

Variables	Description	Sources
Adoption AD law	Year of adoption of AD law. Number of countries with AD laws.	Zanardi (2004a) and authors' updates.
AD variables	Variables related to the number of initiations and measures targeted to each country (in a given year or cumulated) at a sectoral level.	Zanardi (2004a) and Moore and Zanardi (2006).
Openness index	Index of 'Freedom to trade internationally' (interpolated).	Economic Freedom Index published by the Fraser Institute.
Applied tariffs	Average (unweighted) applied tariff rates (interpolated).	World Bank: http://siteresources.worldbank.org/INTRES/Resources/tar2005.xls
Union density	Dummy variables based on trade union density.	AIAS, Blanchflower (2006), ILO (1998), Ishikawa and Lawrence (2005), Kuruvilla *et al.* (2002), OECD – Labour Market Statistics, Roberts and Wibbels (1999), US Department of Labor, Visser (2003).
Skilled/unskilled population	Ratio of skilled to unskilled people aged 15 or older (interpolated).	Barro–Lee dataset.
Macro-economic variables	Variables related to a country economic structure and performance (e.g. GDP, exchange rate, FDI).	World Development Indicators. CHELEM for Taiwan.
WTO membership	Membership of the GATT/WTO and year of accession.	WTO website.

Table A2. Correlation matrix

Variables	Cumulated AD	Openness	WTO entry	Number of AD laws	Industry VA	Services VA	Medium income	High income non-OECD	High income OECD
Cumulated AD	1								
Openness	0.051	1							
WTO entry	–0.038	–0.042	1						
Number of AD laws	0.107	0.054	0.078	1					
Industry VA	0.179	–0.088	0.124	0.014	1				
Services VA	–0.050	–0.085	0.028	0.116	–0.137	1			
Medium income	0.137	0.003	0.136	0.127	0.358	0.238	1		
High income non-OECD	0.017	–0.101	0.046	–0.047	0.278	0.226	–0.290	1	
High income OECD	–0.002	–0.021	–0.048	0.185	0.044	0.172	–0.150	–0.043	1
Openness continent	0.072	0.440	0.084	0.123	–0.087	0.020	0.028	–0.105	–0.052
Chemicals	0.062	–0.049	0.032	–0.086	0.102	–0.101	0.245	–0.329	–0.099
Textiles and clothing	–0.024	–0.035	0.015	0.013	–0.199	0.162	–0.164	0.279	–0.078
FDI	0.114	–0.028	0.068	0.341	0.081	0.116	0.068	0.303	0.009
Medium union	–0.074	0.048	–0.044	0.174	0.080	–0.031	0.180	–0.089	0.054
High union	0.275	0.067	–0.125	0.018	0.167	–0.077	–0.130	0.094	0.086

Notes: The upper part of the table reports correlations for 1113 observations. The rows for the regressors used in columns (2) to (6) of Table 3 report correlations for each of these variables with the variables in each column for the observations included in each respective specification.

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