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No iceberg in sight: on the absence of WTO disputes challenging fossil fuel subsidies

Dirk De Bièvre[1] · **Ilaria Espa**[2] · **Arlo Poletti**[3]

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Abstract The empirical record of dispute settlement cases under World Trade Organization (WTO) rules on energy subsidies consists only of cases against renewable energy (RE) subsidies, whereas WTO members have not challenged others' much larger and environmentally harmful fossil fuel subsidies. Yet, the WTO agreement on subsidies and countervailing measures would at first sight seem to create possibilities to forestall environmentally harmful subsidization. In this article, we assess possible explanations for the skewed distribution of energy subsidies dispute settlement complaints at the WTO. We argue that differences in legally relevant characteristics of fossil fuel subsidies, on the one hand, and RE subsidies, on the other hand, largely explain this observation. In the case of RE subsidies, in particular, the disputes filed to date have targeted a much narrower set of measures than the whole range of RE subsidies currently in place, namely those incorporating a local content requirement component. Although this finding is not new, we have probed into this question more systematically, both by widening the scope of the empirical analysis from actual to potential WTO disputes on energy-related policies the European Union and the USA might have initiated, and by systematically assessing the plausibility of alternative explanations.

Keywords Dispute settlement · European Union · Subsidies · Trade policy · USA · WTO

✉ Dirk De Bièvre
dirk.debievre@uantwerpen.be

Ilaria Espa
ilaria.espa@wti.org

Arlo Poletti
arlo.poletti@unitn.it

[1] Department of Political Science, University of Antwerp, Sint Jacobstraat 2, 2000 Antwerp, Belgium

[2] World Trade Institute, University of Bern, Hallerstrasse 6, 3012 Bern, Switzerland

[3] Department of Sociology and Social Research, University of Trento, Via Giuseppe Verdi 26, 38122 Trento, Italy

Abbreviations

AB	Appellate Body
ASCM	Agreement on subsidies and countervailing measures
DSM	Dispute settlement mechanism
FIT	Feed-in tariff
GATT	General Agreement on Tariffs and Trade
GDP	Gross domestic product
IEA	International Energy Agency
LCR	Local content requirement
MADB	Market access database
OECD	Organisation for Economic Co-operation and Development
R&D	Research and development
RE	Renewable energy
TER	Trade estimate report
UNEP	United Nations Environmental Programme
USTR	United States Trade Representative
WTO	World Trade Organization

1 Introduction

The questions of whether and how the regulatory reach of the World Trade Organization (WTO) should expand to the realm of environmental protection have been intensely debated in the last two decades. While it is widely accepted that the issue areas of trade and environment intersect in many different ways, there is no agreement on the desirability of expanding the WTO's regulatory reach to deal with such linkages. Not only has the WTO been criticized for prioritizing trade over the environment whenever conflicts between the two have arisen in the interpretation of existing multilateral trade rules; it has also allegedly produced significant 'regulatory chill' effects in its interactions with other environmental regulatory venues (Eckersley 2004).

At the same time, because of its centrality in the trade, energy and environment triangle, the WTO could play a key role in fostering more effective environmental protection in the specific area of energy subsidies (Casier et al. 2014; Asmelash 2015). Two features of the WTO suggest that the multilateral trading system could be more effective than other regulatory venues in constraining government support for environmentally harmful energy production and consumption and thus contributing to the production of the global public good of curbing global warming. First, the WTO agreement on subsidies and countervailing measures (ASCM) disciplines the use of government subsidies. Second, WTO rules, including ASCM provisions, have more bite than commitments arising out of international environmental agreements, because they are backed up by enforcement in the form of the WTO dispute settlement mechanism (DSM). Since members know that they might face retaliatory trade measures if they do not comply, non-compliance with WTO rules should, and generally is, far less rampant than in other international venues, where states only incur reputational costs.

Despite this potential, many have noted that the WTO has so far failed to constrain the use of environmentally harmful energy subsidies (Casier et al. 2014; Lewis 2014; Rubini 2014). The argument rests on two important observations. The first is that the poor rate of compliance with the ASCM notification requirements has compromised the ability of WTO

members to challenge others' fossil fuel subsidies among other types of unlawful subsidies,[1] as well as contributed to the delay of fossil fuel subsidies reform (Laan 2010). The second is that WTO members have launched WTO dispute settlement cases against subsidies for renewable energy (RE), but not others' much larger fossil fuel subsidies. This empirical record is particularly unfavorable from a climate change perspective. According to the International Energy Agency (IEA), the US$510 billion spent in 2014 on fossil fuel consumption subsidies by a total of forty countries corresponds to an incentive of US$115/ton of carbon dioxide (CO_2) (IEA 2015). In addition, fossil fuel production subsidies continue to account for approximately US$100 billion per year (Overseas Development Institute and Oil Change International 2016). The IEA came up with a counterfactual estimate that, if the fossil fuel subsidies it estimated were completely phased out by 2020, global primary energy demand would decrease by 5% and CO_2 emissions by 5.8% (IEA 2013).

Against this background, this article makes two contributions. The first is to define the benchmark against which to assess whether the WTO has proved ineffective in deterring the use of fossil fuel subsidies by its members. The observation that WTO members have challenged RE subsidies through WTO litigation while no single WTO dispute against fossil fuel subsidies has been initiated so far does not necessarily prove this proposition. A proper assessment requires widening the scope of the empirical observation to include *potential* disputes, namely the range of policies and measures enacted by WTO members that are in (potential) violation of WTO rules and that could therefore be challenged in WTO litigation. We do so by presenting original empirical evidence on the requests to initiate WTO disputes against (potentially) WTO incompatible energy subsidies brought to the attention of US and EU policymakers by domestic constituencies. Since governmental representatives crucially depend on information provided by private industries wishing to improve their access to foreign markets, we identify such a set of potential cases (Davis 2012; De Bièvre et al. forthcoming).

The second contribution of the article is to investigate why WTO members have launched legal challenges against each other's renewable energy subsidies, but not against each other's fossil fuel subsidies. To do so, we assess the plausibility of a wide range of explanations that might account for this skewed distribution of potential and actual cases on energy subsidies.

The article proceeds as follows. We start by explaining the nature and applicability of WTO rules against environmentally harmful subsidization (i.e., fossil fuel subsidies) and compare it to the regulatory reach of WTO rules when it comes to RE subsidization. In particular, we assess the implications of the trade injury focus espoused under the ASCM, which makes energy subsidies subject to the rules of the agreement to the sole extent that they are trade-distortive, irrespective of any costs they might impose on the environment. In a second step, we offer an overview of both actual and potential disputes that could be brought to the WTO, drawing on trade barrier reports of the United States Trade Representative (USTR) and the European commission market access database (MADB). We then move on to consider a number of possible explanations for why fossil fuel energy subsidies have eluded WTO scrutiny so far.

[1] Many factors help explain such low reporting performance, including the weak sanctioning mechanism for non-compliance with the ASCM notification requirements, the fear of self-incrimination and the absence of a systematic reporting format (Steenblik and Simón 2010). Accordingly, many authors have stressed the importance of strengthened disciplines on transparency under the ASCM (Horlick and Clarke 2016) and suggested new templates for WTO subsidy notifications (Steenblik and Simón 2010).

2 Energy subsidies and the WTO agreement on subsidies and countervailing measures

The ASCM is one of the many treaties that form an integral part of the agreement establishing the WTO. The ASCM disciplines a subset of government interventions in the marketplace (Horlick and Clarke 2016). The types of government support measures that are to be considered 'subsidies' for the purposes of the agreement are listed in Article 1 ASCM. To fall within the scope of application of the ASCM, a 'subsidy' shall constitute a government financial contribution (or income or price support) and provide a benefit to a recipient. A financial contribution by a government can take one of the three forms: (1) direct transfers of funds or liabilities; (2) government revenue forgone (i.e., fiscal incentives); and (3) the provision or purchase of goods or services apart from general infrastructure.[2] A benefit is bestowed if the recipient of the financial contribution is better off than it would otherwise have been, absent that contribution, in the marketplace. In other words, it is considered to be conferred when 'the recipient has received a "financial contribution" on terms more favorable than those available to the recipient in the [relevant] market' (WTO 1999, para. 158).

The agreement distinguishes between prohibited and actionable subsidies and defines the respective regulations for each category. Prohibited subsidies include subsidies that are *de jure* or *de facto* conditioned upon export performance or contingent upon the use of domestic over imported goods (Article 3 ASCM). Prohibited subsidies have to be terminated 'without delay' (Article 4.7 ASCM). Actionable subsidies, by contrast, are as such not prohibited unless (1) they are specific within the meaning of Article 2 ASCM; and (2) they cause adverse effects on trade with other partners as per Article 5 and Article 6 ASCM.[3] A subsidy is considered 'specific' if it is *de jure* or *de facto* limited to certain enterprise(s) or industry/-ies, or enterprises in certain regions except when such differentiation is based on objective eligibility criteria and conditions. A specific subsidy constitutes an actionable subsidy, subject to withdrawal or modification obligations, if it can be shown to cause adverse effects in the form of: (a) injury to the domestic industry of another WTO member; (b) nullification or impairment of benefits accruing directly/indirectly to another WTO member; or (c) serious prejudice to the interests of another member.

In sum, ASCM disciplines apply generically to any specific 'subsidy' that has an impact on other countries (Horlick and Clarke 2016). For this reason, the agreement does not distinguish between fossil fuel subsidies and RE subsidies. Inasmuch as both categories of subsidies consist of subsidies to goods,[4] they may be subject to ASCM disciplines as long as they meet the requirements therein (Asmelash 2015).

Whether subsidies to fossil fuels and renewable energy are captured by ASCM rules will thus depend on their administrative form, their economic incidence and their recipients (Steenblik 2010). On a general level, governmental interventions in the energy field either lower the price paid by energy consumers (consumption subsidies), lower the cost of energy production or raise the price received by energy producers (production subsidies)

[2] See Article 1.1 (a) (1) (i)-(iii) ASCM. The agreement also covers situations where a government entrusts a private body to provide a financial contribution in any of these three forms or provides financial support indirectly (e.g., through a funding mechanism). See Article 1.1(a) (1) (iv) ASCM).

[3] Prohibited subsidies are deemed to be specific and inherently trade-distorting (Horlick and Clarke 2016).

[4] Energy products, including electricity, are classified as goods under the Harmonized System nomenclature and treated accordingly in the WTO legal framework.

(IEA 2011). This definition potentially captures much more than the trade-distorting subsidies targeted under the ASCM (Coppens 2014).

3 The standard argument: the scope of ASCM rules and the different legal characterization of energy subsidies

The standard explanation for the observation that fossil fuel subsidies have so far not been challenged before the WTO DSM emphasizes legal arguments. These arguments explicitly or implicitly assume that the likelihood of success in WTO disputes is the main factor driving governments' choices over whether or not to initiate a WTO dispute against another WTO member. According to this perspective, the legal structure of the ASCM contributes directly to the skewed distribution of energy subsidy disputes in the WTO, because it exposes a wider range of RE subsidies to a much higher chance of being found inconsistent with the rules of the agreement compared to fossil fuel subsidies, which are overall under-captured by current disciplines.

3.1 Fossil fuel subsidies

Despite the repeated calls and pledges for rationalizing and phasing out fossil fuel subsidies (G20 2009; IEA 2013), governments continue to heavily support the production and consumption of fossil fuels (IEA 2015). The bulk of fossil fuel subsidies are concentrated in the largest oil- and gas-exporting countries, which alone bear 40% of the overall economic costs linked to the use of such subsidies (IEA 2015). Although these subsidies encourage over-production and over-consumption of fossil fuels and create barriers to investment in RE sources, generating a negative impact on the environment, governments often allege that this is counterbalanced by their social and economic redistributive benefits (IEA 2013). Yet, the IEA et al. (2009) estimate that fossil fuel consumption subsidies are an inefficient means to alleviate poverty as they are only marginally distributed to the poorest segments of the population while often placing unsustainable burdens on state budgets, especially in the case of high energy prices.

Fossil fuel subsidies given to producers are widely used in both developed and developing countries (IEA 2013). The most common forms of fossil fuel subsidies given on the production side typically fall within the broader categories of 'direct transfer of funds or liabilities' or 'government revenue foregone' as defined under the ASCM (Espa and Rolland 2015). Among the former are direct expenditures (e.g., direct grants linked to capital or to the acquisition of land; research and development (R&D) support to fossil fuel producers to support the acquisition of exploration data or exploration technologies for oil and natural gas) and credit support measures (e.g., concessional government loans and loan guarantees aimed at reducing the cost of coal, oil and gas production; subsidized credit to domestic infrastructure and power plants); among the latter are tax expenditures such as income tax deductions, investment tax credits, reduced royalties or extraction taxes, exemptions from excise taxes or special taxes, and accelerated capital cost allowances (UNEP 2008; Sawyer and Stiebert 2010). Not only do these types of subsidies meet the financial contribution requirement under the ASCM definition of subsidy, they also bestow a 'benefit' within the meaning of the agreement by making recipients better off in the marketplace (Espa and Rolland 2015). They also qualify as 'specific' under ASCM rules, as their benefits usually accrue to a group of industries (e.g., energy-intensive industries

such as iron and steel) or sectors (e.g., electricity generation).[5] Yet, as fossil fuel production subsidies are often meant to maintain regional employment in depressed areas and/or at times of economic crisis or transition (e.g., small local mines), they do not always have a trade impact (OECD 2013). And even when they do, trade impacts may not come to the detriment of consumers in other countries, for example, when large energy producers subsidize production so that the final effect is a depression of world energy prices (Espa and Rolland 2015). The adverse distributive effects would indeed befall on less subsidized producers in the form of lower income. Since such adverse trade-distortive effects are exceedingly difficult to show (Wold et al. 2012), challenging these types of fossil fuel production subsidies as actionable subsidies is likely to prove unsuccessful.

Fossil fuel subsidies given to consumers also generally 'evade' ASCM disciplines. Apart from social safety nets provided in the form of tax expenditures (e.g., reduced value-added taxes or excise taxes on fuel) or direct budgetary transfers (e.g., fuel vouchers or heating energy grants) confined to a set of beneficiaries (namely low-income households), fossil fuel consumption subsidies mostly come in the form of dual pricing policies (price controls or ceilings, sales of energy inputs by state trading enterprises at preferential rates), whereby energy-exporting countries set lower energy prices for domestic consumers, including industrial users, compared to export or world prices (Pogoretskyy 2009). Such practices do not seem to fall squarely under the legal definition of subsidy espoused in the ASCM, although authors still disagree as to whether the financial contribution requirement could be stretched to encompass dual pricing schemes (Pogoretskyy 2011). It has also been argued that fossil fuel consumption subsidies might constitute 'income or price support' measures that would be captured under Article 1.1(a) (2) ASCM (Sawyer and Stiebert 2010). While this definitional element needs to be interpreted 'in the sense of Article XVI of [the General Agreement on Tariffs and Trade, GATT], the language of Note 2 *Ad* Article XVI GATT specifies that it refers to those subsidies that 'operate directly or indirectly to increase exports of any product from [the Contracting Party which grants the subsidy], or to reduce imports of any product into [the Contracting Party which grants the subsidy].' In other words, this provision seems to target measures that induce a price differential that is profitable for domestic *producers* rather than consumers (Pogoretskyy 2011). In any case, and more importantly, these policies are mainly applied horizontally and in a non-discriminatory fashion, falling short of the specificity requirement imposed under Article 2 ASCM (Selivanova 2007; Howse 2010; Pogoretskyy 2011).

3.2 Renewable energy subsidies

In contrast to fossil fuel subsidies, often granted on the consumption side, renewable energy subsidies are mainly granted on the production side (IEA 2011). These include a number of direct expenditures, tax expenditures, R&D grants, and feed-in-tariff (FIT) schemes. Direct financial transfers encompass capital grants, concessional loans, and loan guarantees provided to renewable energy producers for equipment manufacturing. Tax expenditures include tax deferments, deductions or exclusions, and accelerated depreciation to promote investment in renewable energy projects (Ghosh and Gangania 2012). In both cases, subsidies are either meant to expand green electricity generation capacity or to promote manufacture of renewable energy components. R&D grants are also widely used to promote

[5] However, there are also cases where tax concessions are provided equally to all manufacturing sectors to encourage the use of less polluting fuels such as natural gas and liquefied petroleum gas (Espa and Rolland 2015).

fundamental and applied research on RE production, storage, transmission, and distribution (Espa and Rolland 2015). These types of expenditures squarely fall within the ASCM definition of a subsidy. In most cases, moreover, they are likely to be considered specific regardless of whether they target RE sources in general or specific forms of renewable energy (e.g., wind or solar) given that the sector remains a specific portion of the overall electricity generation market (Rubini 2011). What is more, any tax expenditures and direct expenditures including R&D grants would always be prohibited under ASCM rules when conditioned upon the use of domestic goods. Local content requirements (LCRs) have indeed become a widespread component of RE support programs (Espa and Holzer 2017).

Apart from these characteristics, the most common type of RE production support schemes to date are FIT schemes (Wilke 2011; Espa and Rolland 2015), which ensure the government's purchase of electricity produced from RE sources (mainly wind and solar power) at a minimum price over a time span, which normally goes from 20 to 40 years (UNEP 2012). According to the latest Global Status Report of the Renewable Energy Policy Network for the twenty-first century, 110 FIT schemes were in place in 2015 at either state, province or country levels (REN21 2016). In principle considered as RE subsidies of a non-discriminatory nature (Cosbey and Mavroidis 2014), FIT schemes often incorporate local content requirements (Kuntze and Moerenhout 2013; Hufbauer et al. 2013; Stephenson 2013) and have repeatedly been challenged at the WTO on that basis in recent years, accounting for four out of six ASCM disputes on energy filed so far (see Sect. 4). Yet, in the only WTO ruling concerning FIT schemes under the ASCM, *Canada-Renewable Energy*, the WTO Appellate Body (AB) condemned the LCRs attached to the program at issue as a discriminatory component inconsistent with Article III:4 GATT and Article 2.1 of the agreement on trade-related investment measures, but did not condemn the scheme altogether as a prohibited subsidy within the meaning of Article 3 ASCM (WTO 2013). While acknowledging that the FIT program qualified as a government purchase of goods as per Article 1.1(a) (1) (iii) ASCM, the AB said it was unable to complete the benefit analysis required under the second definitional element of subsidy, as it dismissed the market benchmarks proposed by the complainants. In its view, these were wrongly found in the single wholesale electricity market instead of being derived from considering the competing markets for wind and solar electricity that came into existence because of the Ontario government intervention as separate markets (WTO 2013; see also Asmelash 2015). The position of the AB thus seemed to give some consideration to the environmental value of renewable energy in its definition of the benchmark market (Espa and Rolland 2015). Yet, the approach designed by the AB—based on the fundamental distinctions between conventional and renewable electricity markets, on the one hand, and between already established markets and new markets created via government intervention, on the other—has raised much controversy, and it remains to be seen whether the AB will maintain its stance in future rulings (Rubini 2012; Wold et al. 2012; Cosbey and Mavroidis 2014). Even so, however, its detailed reasoning will likely serve as guidance to complainants in suggesting more approximate benchmarks in pending and future WTO disputes concerning RE subsidies, making it harder for the AB to invoke its inability to determine the existence of a benefit (Cosbey and Mavroidis 2014).

3.3 Implications of ASCM rules for the regulation of energy subsidies

The analysis above shows that the ASCM solely targets trade-distorting subsidies, failing to take into account any other market failures or negative externalities (Horlick and Clarke 2016). Originally, the agreement did contain an exception whereby certain categories of subsidies, including environmental subsidies and subsidies for research and development, were deemed non-actionable (Article 8 ASCM). Yet this was negotiated as a provisional

5-year exception and expired on January 1, 2000, after WTO members failed to renew it (Rubini 2012; Weber and Koch 2015).

The drawbacks falling from the trade injury focus of the ASCM are particularly evident in the area of energy subsidies. These measures may carry significant environmental costs (in case of fossil fuel subsidies) or benefits (in the case of RE subsidies), which cannot per se be taken into account as long as the regulatory reach of the ASCM is solely determined on the basis of the existence of trade distortions. Hence, under current rules, fossil fuel subsidies may escape ASCM disciplines even if they harm global commons and yet do not cause trade distortions or are not specific, whereas RE subsidies captured by ASCM provisions are treated like any other trade-distorting subsidies irrespective of any proven environmental benefits (Espa and Roland 2015; see also Meyer, this issue).

When considering the most common forms of fossil fuel subsidies in light of ASCM rules, it seems that the legally relevant characteristics that they exhibit make it questionable whether they would be subject to ASCM disciplines for two reasons. First, the most common forms of fossil fuel subsidies, namely dual pricing schemes provided on the consumption side, are characterized by non-specificity and arguably do not fall under the scope of application of the ASCM. Second, even when fossil fuel subsidies are specific within the meaning of the agreement, the difficulty in proving their adverse effects leaves the question open as to whether they qualify as actionable subsidies under ASCM disciplines. The under-capture of fossil fuels by current ASCM rules can thus account for the absence of WTO disputes targeting such programs to date.[6]

By contrast, all types of existing renewable energy subsidies are susceptible to fall within the legal definition of subsidy espoused in the agreement and to be found specific. When aimed at promoting RE components manufacturing, they seem likely to pass the adverse effects requirement. Whenever they incorporate a LCR component, moreover, specificity and adverse effects would not even need to be proven, as they would qualify as prohibited subsidies within the meaning of Article 3 ASCM. This very important element has arguably informed the choice of challenging RE subsidies before the WTO dispute settlement bodies, since WTO disputes concerning RE subsidies initiated to date have consistently targeted a much narrower set of measures than the whole range of RE subsidies currently in place, namely FIT schemes with a LCR component.

4 The bottom of the iceberg of WTO disputes on energy subsidies: assessing the plausibility of alternative explanations

Ever since the filing of the *Canada-Renewable Energy* case in 2010, energy subsidies gained prominence in WTO litigation. Legal challenges, however, have targeted RE support schemes only, with six cases brought before the WTO Dispute Settlement Body so far, including the widely discussed *India-Solar Cells* case in 2013 (Asmelash 2015).[7]

Existing analyses focus almost exclusively on *actual* WTO disputes. Since identifying potential cases is difficult, logical inferences run the risk of being only based on actual

[6] While some have noted that there is value in discussing controversial fossil fuel subsidies in WTO committees and trade policy review meetings (Wolfe 2013), these discussions do not substitute WTO disputes in deterring environmentally harmful subsidization.

[7] Moreover, WTO disputes against RE subsidies are only a subset of the actions that WTO members have undertaken to challenge measures supporting the production of clean energy, which also include WTO disputes against biofuels or trade remedies imposed against RE subsidies (see Lewis 2014).

disputes, presenting a well-known selection problem in litigation research (Priest and Klein 1984; De Bièvre et al. forthcoming). Broadening the scope of the empirical analysis to potential cases is important because a body of political science-oriented literature shows that the choice whether to initiate a dispute is likely to be politically charged (Sattler and Bernauer 2011; Davis 2012; Poletti and De Bièvre 2014).

Several WTO members indeed keep track of foreign trade barriers encountered by their economic operators. They thus have a stack of potential WTO dispute settlement cases in their drawers that they might decide to table at the WTO. Expanding on the seminal work by Davis (2012), we identified a larger number of potential disputes concerning the energy sector by relying on the USTR National Trade Estimate Reports (TERs) on foreign trade barriers and on the European Commission's Market Access Database.[8] In fact, most trade barriers reported to the USTR and the European Commission involve fossil fuel production and have as yet not resulted in WTO dispute settlement filings (Table 1).

Therefore, before concluding that the regulatory reach of ASCM rules explains the dominance of renewable energy cases over fossil fuel ones on the one hand, and the choice of targeting those RE support schemes incorporating a LCR component on the other hand, alternative explanations deserve attention. A first important question concerns the role of domestic lobbying. Many have noted that political pressures by powerful domestic constituencies are key to determine governments' decision to initiate WTO disputes, even in the absence of strong legal arguments, because such decision can perform the function of signaling the government's resolve to defend domestic interests (Davis 2012; Poletti and De Bièvre 2014). Asmelash (2015) argues that legal arguments were stronger against RE subsidies and suggests that domestic RE industries have been actively engaged in requesting to initiate trade disputes against subsidies granted to other RE firms in foreign countries, while fossil fuel industries have so far been inactive in terms of lobbying their governments to take action against the subsidization of fossil fuel consumption abroad.

Our findings at least partially cast doubt on this assertion. Indeed, the distribution of potential disputes concerning the energy sector displayed in Table 1 shows that the US government was asked by domestic industries to initiate WTO dispute to target measures supporting the fossil fuel sector consistently throughout the period considered. Yet, interestingly, none of these measures are subsidies. While this might give credence to the expectation that the likelihood of a legal victory in challenging fossil fuel subsidies is lower, it may also be a reflection of the different levels of expansion and consolidation of the fossil fuel markets compared to the RE market. In the first case, markets are already well established and with limited prospects for growth due to scarcity of primary energy resources and climate change imperatives, whereas the large and rapidly growing state of the RE market makes it profitable for firms to challenge those subsidies granted to competitor firms in other countries (Horlick and Clarke 2016). On the other hand, the fossil fuel sector is dominated by a small set of large players, which may make it easier for these firms to act individually or collectively than the generally smaller and more numerous firms in the RE sector. At the same time, though, oil and gas multinationals generally possess large stocks of foreign direct investment in other countries, which may sometimes make them potential beneficiaries of local fossil fuel subsidies. It is therefore not clear a priori whether

[8] See http://madb.europa.eu and https://ustr.gov/about-us/policy-offices/press-office/reports-and-publications. The WTO members that dispose of a formalized mechanism of market access investigations allowing to access data on potential disputes are the EU, the USA and Japan. At this stage, we have only collected data on the first two WTO members' potential disputes.

Table 1 List of EU and US potential and actual disputes on policy measures supporting the energy sector

Dyads of (potential) disputants	Type of energy policy	Retaliatory capacity	Gravitation	Power preponderance
USA				
Potential disputes				
USA–India 2011 LCRs, affecting foreign parts suppliers (USTR TER on India 2011, 11)	Renewable energy	11.4	17.9	0.91
USA–Canada 2010 FIT program (USTR TER on Canada 2010, 5)	Renewable energy	74.4	18.8	0.96
USA–EU 2008 Cyprus (EU) qualified as a 'developing and protected' market for natural gas, reducing foreign firms' entry into the market (USTR TER 2008, 230)	Fossil fuel	18.8	18.9	−0.09
USA–Brazil 2007 Investment restrictions on 'old energy' providers (USTR TER on Brazil, 2007, 8)	Fossil fuel	15.9	17.8	1.02
USA–Mexico 2002 Public procurement and barriers due to ownership structures with regard to the state-owned petroleum monopoly (USTR TER on Mexico 2002, 8)	Fossil fuel	85.8	18.3	1.17
USA–India 2001 Government monopoly of imports of petroleum products through 'canalizing agencies' (Indian Oil Corporation) (USTR TER on India for 2001, 4)	Fossil fuel	19	17.1	1.34
USA–Canada 1999 State monopoly on energy distribution (USTR TER on Canada 1999, 7)	Fossil fuel	86.3	18.5	1.15
USA–Japan 2002 Safeguards in the natural gas sector (USTR TER on Japan 2002, 8 and 13)	Fossil fuel	28.8	18.2	0.44
Actual disputes				
USA–China 2010 DS 419, wind power equipment	Renewable energy	17.9	18.1	0.4
USA–India 2013 DS 456, certain measures relating to solar cells and solar modules	Renewable energy	12.5	18	0.94
EU				
Potential disputes				
EU–Korea 2012 Approval procedure of second-generation photovoltaic technologies (MADB, Barrier ID: 135432)	Renewable energy	9	18.2	1.16
EU–Turkey 2011 LCRs on utilization of renewable energy sources for the generation of electricity (MADB, Barrier ID: 145484)	Renewable energy	47.2	18.4	1.35

Table 1 continued

Dyads of (potential) disputants	Type of energy policy	Retaliatory capacity	Gravitation	Power preponderance
EU–Canada 1997 FIT Program (MADB, Barrier ID: 105373)	Renewable energy	5.4	17.4	1.13
EU–USA 1996 Limitations to licenses to hydroelectric and atomic energy production companies to American citizens or companies (MADB, Barrier ID: 960066)	Nuclear and renewable energy	21	18.4	0.06
Actual disputes				
EU–Canada 2011 DS 426, measures relating to the FIT Program	Renewable energy	9	18.1	0.99

Authors' own calculations. Operationalization: gravitation—the log of bilateral trade and the log of economic size of the potential complainants and defendants; power preponderance—the difference between the log gross domestic product (GDP) of the potential complainants, and log GDP of potential defendants; retaliatory capacity—the share of defendant's exports to the complainant's market out to total defendant's exports. Raw data on GDP, imports and exports of potential defendants and complainants are gathered from United Nations Conference on Trade and Development and World Integrated Trade Solutions

domestic lobbying incentives can explain differences in the number of cases filed against fossil fuel and renewable energy subsidies.

Another source of variation may well be situated in the degree of transparency of fossil fuel subsidies compared to RE subsidies. Here again, however, it is difficult to attribute the dominance of renewable energy cases to an alleged lower transparency of fossil fuel subsidization. WTO members have been found to largely understate the magnitude of fossil fuel subsidies subsidization when complying with their ASCM reporting obligations, but poor reporting rates have also characterized RE subsidies (Horlick and Clarke 2016). The only considerable progress has been achieved in the last few years outside the WTO, namely thanks to the efforts of the Organisation for Economic Co-operation and Development (OECD), the IEA and the Global Subsidies Initiative (GSI) of the International Institute for Sustainable Development (IISD) (Steenblik and Simón 2010; Laan 2010) and in the context of the voluntary peer reviews of fossil fuel subsidies undertaken by G20 and APEC members (Steenblik 2016). While low transparency arguably makes it less likely for subsidies to be challenged in the WTO, regardless of their trade-distorting effects, this does not affect fossil fuels subsidies more than RE subsidies.

If domestic lobbying and transparency are unlikely to explain observed patterns of dispute initiation in the energy sector, perhaps more convincing explanations can be found: gravitation, power preponderance and retaliatory capacity (see Table 1). First, patterns of dispute initiation by the EU and the USA could have been driven by the gravitational dynamics of world trade. This line of argument applies gravity models of inter-state conflict to trade disputes and suggests that the probability of WTO dispute initiation increases among large and highly interdependent economies (Horn et al. 1999). Although it would seem obvious that the growing size of the RE market and the high trade volumes would trigger more dispute initiation, evidence combining actual and potential disputes does not seem to support the gravitation hypothesis. In the US case, the two selected opponents, China and India, do not display the highest scores, and the gravitational

dynamics of world trade would have rather led us to expect dispute initiation against WTO partners such as the EU and Canada. Similarly, we could have more plausibly expected the EU to initiate disputes against the US or Turkey, rather than Canada.[9]

Second, the relative power of (potential) disputants might account for WTO dispute initiation. When the potential complainant has a larger market than the potential defendant, it is more likely to obtain the removal of trade barriers through bilateral interactions preceding the initiation of a dispute, as it can threaten to impose greater costs on the target with limited harm to its own economy (Guzman and Simmons 2005). We should thus have expected the EU and USA to prioritize targeting each other. In the case of the USA, however, the decision to target China's wind power equipment in 2010 seems to be quite in line with the power preponderance hypothesis. But again, the variation on this score is limited as in all cases potential opponents have enough market size to be able to resist pressures for out-of-court settlement.

Finally, dispute initiation could also be affected by the complainant's retaliatory power vis-à-vis the defendant. Indeed, given the decentralized nature of the DSM as an enforcement mechanism, the credibility of the threat of retaliation in cases of non-compliance may explain how WTO members select their targets in WTO disputes. In general, WTO members with large markets can more credibly threaten to impose costly retaliation on defendants in the form of market closure in cases of enduring non-compliance than members with small markets (Guzman and Simmons 2005). At the same time, large WTO members' retaliatory capacity is greater with respect to countries that export relatively more. However, retaliatory capacity does not seem to be a good predictor of observed patterns of dispute initiation either. In both the US and the EU cases, this hypothesis would have suggested other WTO members as the likely targets of WTO disputes. In the US case, one could have expected Mexico and Canada as more likely targets, whereas for the EU, Turkey might have been a more likely target, given their overwhelming dependence on US and EU export markets, respectively.

5 Conclusion

In this article, we have examined why renewable energy subsidies are challenged more often than fossil fuel subsidies under the ASCM of the WTO. We found that differences in the form of these subsidies largely explain the skewed distribution of WTO disputes challenging these subsidies. Most fossil fuel subsidies are characterized by non-specificity and are provided on the consumption side, while renewable energy subsidies have often a local content requirement component, which makes them by definition prohibited under existing ASCM rules. Although this general finding is not new, we have probed into this question more deeply by looking at actual WTO disputes on energy subsidies as well as potential ones that two major trading powers, the EU and the USA, might have brought, but have not (yet). This approach allowed us to assess the plausibility of some alternative explanations for dispute (non-)initiation—the impact of domestic lobbying, gravitation, power preponderance and retaliatory capacity—finding that these are hardly more convincing explanations than the standard legal explanation.

[9] However, the *Canada-Renewable Energy* dispute was fundamentally triggered by the competition between Japanese and South Korean (Samsung Group) manufacturers, the latter having benefitted from Ontario's FIT scheme (Weber 2010).

Our findings offer additional support to arguments about the need to reform ASCM rules with a view to expanding the ASCM category of prohibited subsidies to include fossil fuel subsidies (Horlick and Clarke 2016). As we have shown, this is most urgent not only in light of the magnitude of fossil fuel subsidization and its alarming environmentally harmful impacts, but also given that the regulatory reach of the ASCM, and particularly its current trade injury focus, unambiguously has a bearing on explaining the absence of WTO disputes targeting such measures to date. Providing legal certainty as to the unlawfulness of environmentally harmful subsidies arguably has the potential to reverse this trend. This was observed in the case of the WTO disputes targeting RE subsidies, which importantly so far have only challenged public support schemes that incorporated a local content requirement component—and thus precisely those RE subsidies that would qualify as prohibited under the ASCM. Acknowledging that a blanket prohibition approach in the case of fossil fuel subsidies might not be politically viable (especially among large fossil fuel producing developing countries), however, a possible solution could be to espouse a combined approach such as the one followed for the fisheries subsidies negotiation in the WTO (Sumaila 2016). This includes the prohibition of the most egregious resource-depleting subsidies, while other less environmentally harmful subsidies could be left actionable (Hernández-Zermeño 2016). Finally, in order to make this effective, the reform of the category of prohibited subsidies should be accompanied by more stringent transparency and notification requirements (Horlick and Clarke 2016).

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