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Lähtenmäki-Uutela, A., Yliskylä-Peuralahti, J., Repka, S. et al (2019). What explains SECA compliance: rational calculation or moral judgment?. *WMU Journal of Maritime Affairs*, 18(1): 61-78. <http://dx.doi.org/10.1007/s13437-019-00163-1>

N.B. When citing this work, cite the original published paper.



What explains SECA compliance: rational calculation or moral judgment?

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Received: 26 July 2018 / Accepted: 14 January 2019 / Published online: 7 February 2019

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Abstract

We explain the Sulphur Emission Control Area (SECA) compliance through analyzing both rational and moral factors for compliance motivation. According to preliminary analysis based on samples and measurements, the compliance rate for SECA is rather good and air quality has improved significantly. As costs of compliance are rather high and penalties for non-compliance rather low for regulation targets, moral motivation factors must be relevant for compliance. Maintaining good relationships with control authorities and peers requires shipowners to comply with the rules for practical and moral legitimacy. Our interviews with Danish, Finnish and Estonian shipowners confirmed that most of them follow the law simply because it is the law, this applying both to current Baltic Sea SECA rules and the future global sulphur emission rules. Obeying environmental law thus has a taken-for-granted status among shipping companies. Almost half of the companies specifically mentioned they follow the SECA rules because they want to take care of the environment, thus having internalized the regulatory content. Some companies see global compliance to depend on efficient controls.

Keywords Environmental regulation · Compliance · Motivation · Legitimacy · Sulphur · Baltic Sea

1 Introduction

To measure the impact of an environmental regulation, it is necessary to know whether and how well it is complied with. Compliance rate usually refers to the percentage of regulation targets behaving in compliance with the rules at a specific time in a specific

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place. The behaviour of the largest polluters is more important for the societal outcome than the behaviour of the smaller ones. If control authorities understand the capabilities and motivations of regulation targets along with the external pressures they confront, it allows them to employ more efficient enforcement strategies (Gunningham 2011).

The goal of the Baltic Sea SECA (Sulphur Emission Control Area) rules is to reduce sulphur emissions from ships operating in the Baltic Sea. The SECA rules were negotiated in the Marine Environment Protection Committee (MEPC) of the International Maritime Organization (IMO 2008), which is a part of United Nations. The rules are in the MARPOL Annex VI. There are SECAs also in North America and the Caribbean, and they fall under their respective MoUs. Since 2015, the sulphur limit of 0.1% for marine fuel in the SECAs applies. In sea areas outside the SECAs, the limit is 3.5%. In the European Union, the international sulphur rules have been implemented by the Directive (EU) 2016/802 (European Parliament and Council 2016). For passenger ships that regularly operate to or from any EU port, the limit for fuel sulphur content outside the SECAs is 1.5%.

Either ship fuel must contain maximum 0.1% sulphur or exhaust gases must be cleaned. SECA entered into force in 2015, and we discuss its compliance in different parts of the Baltic Sea 3 years later. We aim at understanding the rational calculation and moral motivation factors that explain Baltic Sea SECA compliance and that will determine the compliance for the global 2020 sulphur emission rules (max 0.5% sulphur in ship fuel). We want to know whether the shipping companies operating in the Baltic Sea region see non-compliance with the sulphur rules as unthinkable, and we also aim to analyze why.

The findings will be relevant also for understanding the compliance motivations of other environmental regulation with a long and varying history (Peterson and Diss-Torrance 2012).

2 Explanations for regulatory compliance

The reasons for why companies comply with law in general and environmental law in particular are studied at least in law and economics, legal sociology, criminology, legislative studies, and management.

Effective regulation depends on the ability and motivation of the regulation targets to comply. *Ability* requires *awareness* of the rules and *capacity* to obey them (Nollkaemper 1993, 238.) Regulation on marine pollution is and should not be based on what currently is technologically and economically feasible. Regulation must still assume that cleaner options at least have potential to become widely available within a reasonable time. As a result of new regulation, a part of regulation targets, also in the case of SECA, may end up in a position where compliance is not a viable option. Regulation must assume that such companies will exit the business instead of non-compliance (Nollkaemper 1993, 238).

From the classical law and economics perspective, compliance is based on rational calculation, where the costs of compliance are weighed against the likelihood of detection multiplied with the severity of punishment (Becker 1968). If the anticipated punishment of non-compliance exceeds the costs of compliance, rational regulation targets will comply (Cooter and Ulen 2013). The calculation is based on how regulation targets perceive the probability of sanctions. Evidence shows that punishment calculations do have a role in real life: a fine for a water

pollution violation for one actor changed the behaviour of all actors resulting in a two thirds reduction in the statewide violation rate in the year following the fine (Shimshack and Ward 2005). The rational calculation perspective is inadequate in fully explaining compliance as it ignores human moral emotions and willingness to comply with the rules of society. Compliance to environmental regulations is typically higher than predicted by standard economic theory. This has been labelled as the “Harrington paradox” (Harrington 1988; Nyborg and Telle 2007). The paradox can be summarized in the following three statements (Harrington 1988):

- (i) For most sources of pollution, the frequency of surveillance is quite low.
- (ii) Even when violations are discovered, fines or other penalties are rarely used in most states.
- (iii) Sources are, nonetheless, thought to be in compliance a large part of the time.

Humans decide to follow certain rules but not others. Kagan et al. (2011, 37) list three main motivational factors as explaining why businesses are motivated to comply with laws: the fear of punishment, concern over reputation and a sense of duty. Similarly, Nielsen and Parker (2012) identify three main strands of compliance motivations: (1) economic, (2) social and (3) normative. Winter and May (2001) list calculated motivations, social motivations and normative motivations. May (2004) separates between negative and affirmative motivations for compliance, where negative emotions arise from fear of punishment, affirmative motivations from good intention and a sense of obligation. Tyler (2011, 79) says compliance is based on either external or external motivations, where the command-and-control model is based on the former and the self-regulatory model on the latter. This resonates with the findings of Van Vugt and Tybur (2015) on how human hierarchies are based either on dominance or prestige. For Nielsen and Parker (2012, 431), social motivations refer to earning the approval and respect of others and normative motivations to doing the right thing. With social motivation, the values need not be (yet) internalized and compliance behaviour is rather based on social pressure from other regulated firms, trade associations, advocacy groups, the media, family and friends and inspectors (Winter and May 2001, 678). Normative motivation is a combined sense of moral duty and agreement with the importance of a given regulation (Winter and May 2001, 677.) The sense of right and wrong has been internalized: an offence is unthinkable, off the deliberative agenda. The sense of right and wrong is constituted by shaming and social disapproval vs. pride and praise in relationships based on trust and respect (Nielsen and Parker 2012, 434.)

Summarizing the compliance motivation literature, the differences between rational/economic/calculated motivations, social/reputational motivations and morality/conscience seem clear. We believe it is the most realistic to acknowledge that humans have plural motives all at once, and that they may be inconsistent (see Nielsen and Parker 2012, 429). An actor does not merely apply its economic/material thinking, its social/reputational concerns or its sense of duty, but instead all of them. The actions of regulators and other stakeholders can influence which motive comes to the fore at any particular time (Nielsen and Parker 2012, 434). Trust in the impartiality of the authorities issuing the regulation (Black 2008) and the appropriateness of the regulation both

increase compliance (Börzel et al. 2012). Makkai and Braithwaite (1991) found that if company management perceives to have some control over the law enforcement process, it increases organizational compliance. If the authority listens to the regulation targets, its ruling feels more legitimate to them. The authorities need to recognize possible business subcultures that resist regulation: participation in such subcultures may negatively impact compliance (Ayres and Braithwaite 1992, 94).

We believe the *legitimacy* theory brings together the motivational theories and the social environment. An organization needs to gain and maintain legitimacy within a societal system, and therefore is motivated to comply with its prevailing norms. Suchman (1995, 574) defines legitimacy as “a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions”. Suchman (1995) distinguishes three types of legitimacy: pragmatic, moral and cognitive. Often they co-exist and reinforce one another. Pragmatic legitimacy means that an organization meets stakeholder expectations or audience interests. Moral legitimacy is achieved, if societal evaluators such as environmental public interest groups or the general public refer to actions of the organization as the right thing to do. Cognitive legitimacy is created when the organization has a taken-for-granted status in society: society accepts it necessary or inevitable. According to Mobus (2005), gaining legitimacy requires substantial effort but maintaining legitimacy is a low-effort process. Repairing lost legitimacy again requires substantial effort.

Protecting the (marine) environment is a complex ecological and social question. Pieraccini et al. (2017) reviewed the literature on marine protected areas and found that planning, governance, enforcement, socio-economic incentives, community involvement and conflicts between stakeholder groups create the social framework that explains (non-)compliance. According to Agardy et al. (2011), non-compliance with marine protected areas commonly occurs when people do not understand (or have not been told) the reasons for restrictions. Many people very willingly abide by the rules when they recognize it is in their own self-interest to do so. One of the great shortcomings of government agencies and NGOs alike has been failing to communicate how marine protected areas can meet multiple objectives and steer things towards sustainability. Enforcement may be more readily accepted, especially in cases like open access waters where the “anything goes” rules precede management, when people understand why regulations are needed and for whose benefit.

Raakjaer Nielsen and Mathiesen (2003) studied regulatory compliance in Danish fisheries and found that both economic/rational and socio/moral motivational factors had a major impact. Rational factors include the economic gains to be obtained and the threat of sanctions. Compatibility between regulations and fishing practices and the norms and morals of the individual fishers were important for compliance. There were indications that if fishers participated the regulatory process, it stimulated rule compliance (Raakjaer Nielsen and Mathiesen 2003).

In shipping, compliance of regulations has previously been found to vary geographically and by shipping segments. Vessels operating in European and North American waters are more compliant in global comparison, mainly due to strong enforcement of port state control. As regards segments, tankers and container vessels follow regulations better than, e.g. bulk ships, because there are segment-specific norms and codes of

conduct in place in tankers and in container transport. In shipping, the compliance rate is generally higher with environmental regulations compared to health and safety regulations (Bloor et al. 2013).

3 SECA compliance and what explains it

3.1 Data on SECA compliance

According to OECD 2016, the reported compliance rate in the European ECAs after 2015 was above 95%. This figure is based on data from port state controls, monitoring of smokestacks of ships and air quality monitoring in or outside port cities (OECD 2016). As the OECD (2016) states, this data either illustrates high compliance or the difficulty to detect non-compliance. The records of the THETIS-EU system show the results of fuel samples taken by the control authorities of the EU Member States (Thetis derives from the Greek goddess of the sea). THETIS-EU is the platform to record and exchange information on the results of SECA compliance verifications performed by the EU Member States. During the first 22 months (January 2015 to end of October 2016), the percentage of non-compliant samples was 3.53% in the Baltic Sea, 5.41 in the North Sea and 3.38% outside the SECAs (Alda 2016). The most common breach so far found in the EU sulphur inspections is the inadequacy of logs: the ships cannot show transparent information on how the fuel switch happens when crossing SECA borders (Trafikanalys 2017, 27).

Airborne measurements tell the same story: the emissions have been reduced significantly. The Belgian Sniffer Campaign implemented at the North Sea in 2016 showed a 8% non-compliance (Van Roy and Scheldeman 2016). According to preliminary results from Mellqvist (Mellqvist et al. 2017a, b, c), the SECA compliance rate is above 90% in Danish waters and close to Gothenburg; however, the individual companies breaking the rules are always the same. Vessels that only rarely come into the Baltic Sea waters break the rules more frequently. Compliance is higher at Great Belt Bridge than in Baltic proper. The Great Belt Bridge is known to be monitored, whereas the Baltic proper is probably seen as less monitored. It seems the fear of getting caught does have a role in compliance. In addition to the variable risk of getting caught, also the sanctions of getting caught vary according to port state and may not be a strong enough deterrent in all cases. It is more common that vessels emit excessive sulphur as they are leaving the SECA rather than on the way in, because on the way in, they risk an on-board inspection. Some ships that have installed scrubbers have still been observed to have high levels of emissions on multiple occasions. (Mellqvist et al. 2017a, b, c). The trend seems to be towards stronger compliance (Mellqvist et al. 2017a).

Overall air quality has also improved significantly. Close to port cities, there are also other sources of SO_x such as the industry and cars; therefore, ship regulation alone cannot reduce the sulphur concentrations to zero. However, the shipping regulations have significantly impacted the situation: in three different locations in Denmark, SO₂ concentration in the air was 47 to 60% lower in 2015 than in the previous years (Ellerman 2015), and in Hamburg, SO₂ concentrations have reduced by 50% (Kattner et al. 2015).

3.2 Explaining SECA compliance as rational calculation

The SECA regulation targets are the shipowners. The main compliance options are fuel change and the use of an exhaust gas scrubber (Kalli et al. 2014; Lähteenmäki-Uutela et al. 2017). Both come with a cost (Nikopolou 2017). These costs can be substantial and influence the competition of trade markets (Gritsenko and Yliskylä-Peuralahti 2013; Bergqvist et al. 2015).

The share of fuel cost in total vessel operating costs is high, about 25 to 45% for ro-ro vessels in Notteboom's (2011) example. The EMSA (2010) estimated the costs of fuel switch to be 0.1–0.2 € per ton traded by sea in the SECA area or that complying with the rules raises the transport costs by 10–20% (EMSA 2010). According to Jiang et al. (2014), marine gas oil (MGO) was a more cost-effective compliance option than a scrubber when the price difference between heavy fuel oil (HFO) and MGO was less than 231 euros per tonne. The investment payback time for a scrubber depends on the price difference between dirtier and cleaner fuel. The prices of marine fuel oils, in turn, are based on oil price along and the demand/supply balance (Notteboom 2011, 66). Altogether for all the European SECAs (the Baltic Sea, the North Sea, and the English Channel), Kalli et al. (2013) predicted the costs of fuel switch to be between 3.3 and 4.6 billion USD per year. Out of all the ships sailing the Baltic Sea in 2015, Antturi et al. (2016) estimated that 4719 ships had switched to low-sulphur fuel (MGO), and 136 ships had installed a scrubber. The yearly costs of added fuel price and scrubbers for these ships were estimated to be altogether 465 million euros in 2015 prices. This would make the average added yearly cost for one ship sailing the Baltic Sea around 100,000 euros in 2015. For one big ship, an added cost of 100,000 euros may occur for one round trip between the UK and Sankt Petersburg.

All the rational compliance calculations depend heavily on the marine fuel prices, and the prices have varied considerably both before and after 2015. In September 2014, the price of 0.1% MGO BW was at its highest at \$22.49/mmBTU. At this time, intermediate fuel oil (IFO 380) cost \$15.5/mmBTU. After this, the prices of all fuels went down. At its lowest in February 2016, MGO cost \$8.03/mmBTU and IFO cost \$4.43/mmBTU. The lowering fuel prices softened the impact of the SECA for shipowners and their customers and may have impacted compliance motivation also. Still, MGO has constantly been around at least 50% more expensive than IFO with the price curves of these fuels having a steady distance. After 2016, the prices have been on the rise. In October 2018, the price for MGO was again high at \$18.53/mmBTU and the price of IFO was \$13.02/mmBTU (Det Norske Veritas at <https://www.dnvgl.com/maritime/lng/current-price-development-oil-and-gas.html>).

The rise in MGO price presumably makes companies shift to other fuels or scrubbers and/or lowers their compliance motivation. Trafikanalys (2017) for example presumes that rising fuel prices will make non-compliance attractive. As alternatives to MGO and scrubbers, also “hybrid fuels” (or emission control area fuels, ECA fuels, or ultra-low sulphur fuel oils, ULSFO) have been introduced to the market. Hybrid fuels are a trade name for fuels that suit large marine diesel engines and fulfill the sulphur requirements. They are more similar to residual fuels than to distillates (MGO or MDO) as regards viscosity and lubricity. A part of ships also uses LNG (liquefied natural gas) or methanol as fuel. The total amount of marine fuel used in the Baltic Sea is quite

difficult to assess, as bunkering occurs in many different ports and at sea, within and outside the SECA (Trafikanalys 2016, 16).

The amount of fines, particularly in relation to the compliance costs, is the other critical element in any rational calculations about the cost-efficiency of compliance vs. non-compliance. A penalty that barely matches the gains from violation is not a true deterrent (Fung 2016). Compliance monitoring is performed by the IMO member states based on national legislation and varies between the IMO member states. The control authorities are the flag states and the port states. The Baltic Sea and North Sea control authorities are members of the Paris memorandum of understanding on port state control, where the mission is to eliminate the operation of sub-standard ships through a harmonized system of port State control (ParisMoU 2018). The European Directive has no provisions for a mandatory system for reporting inspections and sharing the inspection results, but the European Maritime Safety Agency (EMSA), an information system that Member States use on a voluntary basis since 2015. The THETIS-EU system aims to support the port state control inspection regime and facilitate the assessment of compliance. It has operated since 2015. The goal is to enable risk-based inspection targeting based on alerts from remote sensing and fuel calculator inspection tools (EMSA 2018).

Each country independently decides on the administrative and criminal sanctions. The criminal sanctions include fines to the shipping company and/or its crew and even imprisonment of crew. A typical administrative sanction is vessel detention. According to Fung (2016), the maximum financial penalties in the Baltic Sea region for the violation of the SECA regulations range from 2900 euros in Latvia to about a million euros in Sweden, Finland and Poland, where Denmark has no specific maximum penalty. Nordic countries use criminal penalties, whereas administrative penalties are used in Baltic countries, Germany and Poland. We cannot conclude that low penalties would make total non-compliance the rational option. The amount of fines multiplied with the probability of getting caught is no doubt significant in parts of the Baltic Sea. Outside the Baltic Sea, Norway targets to have fines that are higher than the difference in fuel cost. Probably the rational option for many shipowners would be to use legal fuel or scrubber where fines are large and compliance monitoring is strong and to use illegal fuel or switch off the scrubber in other places.

A cheating strategy with the fuel switch will produce some psychological stress. Future systems where fuel use is monitored real time will reduce the incentives for illegal fuel switch.

The severity and probability of sanctions are the other main issues in any rational calculations on whether to comply. As regards monitoring and sanctions, a main issue is the international nature of both the shipping business and of the regulatory institutions. Outside territorial waters in the open sea, there is no normative authority to monitor compliance. The United Nations Convention on the Law of the Sea (UNCLOS) employs the so-called Freedom of the seas concept. Innocent passage should always be allowed (United Nations 2018). This concept may be partly the reason why shipping is lacking behind in environmental regulation compared for instance to industrial operations and other modes of transport. Lately, however, the international community and the IMO have been active in developing environmental regulation for shipping, challenging the freedom of the seas concept as an idea of shipping freely utilizing the sea. Maritime spatial planning (MSP) and blue growth

strategies focus on taking into account the environmental boundaries and balancing the interests of all blue business sectors.

OECD (2016) identifies a legal gap, a detection gap and a sanction gap that are relevant for the compliance of SO_x emission regulations. The legal gap is related to shipping regulation being implemented by flag states and port states. Shipowners can register their ships wherever they want (choose a flag state), and registries vary in how they enforce the sulphur emission rules. Registers are chosen based on “favourable conditions, such as limited costs and flexibility with regards to regulations and their implementation”. The second control mechanism is the port state control: in *territorial waters* of a state, the state can control that international shipping regulations are complied with, irrespective of the flag of the ship. Port state control is limited to what they can detect: a ship may have a scrubber and/or carry low-sulphur fuel, but the port state does not know whether they have been used. And even if a port authority would detect that a ship has been non-compliant throughout its entire voyage, it can only apply sanctions for what has happened in its territorial waters. Port states can and do coordinate their enforcement efforts (OECD 2016, 40). The 2020 global sulphur emission cap will pose even bigger legal problems than the current SECA areas, as a large part of seas and oceans *belong to no state*. The OECD (2016, 41) suspects the likelihood of compliance outside territorial waters will be reduced. Greater enforceability could be achieved by reversing who carries the burden of proof so that a shipping company would need to show that it has obeyed the rules.

Another gap is the detection gap. Even if an authority has legal competence to control the emissions, it may not detect non-compliance. Port states take oil samples and verify bunker delivery notes. It is difficult to determine whether a fuel switch has been done when entering the SECA, and bunker delivery notes are “notoriously subject to irregularities and fraud” (OECD 2016, 41). The use of a mass flowmeter allows the inspectors to know the exact amount of fuel that has been bunkered. These flowmeters are mandatory in Singapore since 2017. In the future, the carriage of heavy fuel oil for propulsion purposes may be prohibited altogether (Ibid., 42).

The SECA compliance monitoring is now largely based on port states taking fuel samples, but ship emissions can also be monitored airborne, possibly also from satellites (CompMon 2018) if decided so in the IMO. Air pollution monitoring is performed via planes, drones, and sniffers. It is not possible to fly over all shipping routes in the world, and some flag states may not want to fear shipowners with sniffers. The OECD report lists big data solutions, on-board monitoring equipment and satellites as future monitoring measures (OECD 2016, 41). It may be possible to add sniffers in all ships and have them send the results of compliance as part of Automatic Identification System (AIS) messages that are mandatory for ships.

The third gap is the sanction gap. Even if an authority has competence and detects non-compliance, there may be no penalty or only a small penalty. Usually sanctions for breaking the SECA rules are fines; however, port state control can also detain a vessel if it is not seaworthy (CompMon 2018). According to OECD (2016, 42), penalties for non-compliance have typically been smaller than the cost savings of using a non-compliant fuel. In the USA, there is effective enforcement of sulphur regulation with high penalties (EPA 2015), but in the EU, there is no harmonization among Member States on the matter (EMSA 2018). The Directive (EU) 2016/802 does state that “penalties ... shall be effective, proportionate and dissuasive” and that the fines should

“at least deprive those responsible of the economic benefits derived from the infringement” (European Parliament and Council 2016.)

In conclusion, due to the legal, detection and sanction gaps, both the risk of getting caught and the economic consequences of getting caught can be small at least in some places, and these factors vary significantly between the coastal countries of the Baltic Sea SECA. Simultaneously, economic incentives to use non-compliant fuel are large.

3.3 Explaining SECA compliance from the social pressure and moral obligation perspectives

Shipping companies may consider that complying with environmental regulations is inevitable, e.g. due to regular checks. Keeping up a good performance before the eyes of the control authorities may be highly relevant for day-to-day legitimacy. Pragmatic legitimacy may be achieved through facing regular control procedures without any problems. As already discussed above, compliance with SECA regulations is verified by port-state-control. Simultaneously, many other issues regarding compliance with safety and environmental regulations are checked. Due to these regular checks and the reputational risk and related market consequences (e.g. fear of losing freight contracts and/or clients, increased insurance costs) caused by non-compliance in port-state-control, shipmasters and vessel crew rather want to comply than take the risk of being non-compliant (Black 2008; Bloor et al. 2013). The perceived risk of detection may be more important than the punishment (Burby and Paterson 1993; Gray and Scholtz 1991).

Pragmatic legitimacy may also require the shipping companies to follow rules due to social pressure from their peers. According to Bloor et al. (2013), free-riding is considered objectionable in the shipping industry and there is strong plea for “level playing field” for everyone. The industry has established the Trident Alliance specifically for the purpose of sulphur regulation enforcement (Trident Alliance 2019). Social pressure and, e.g. public “naming and shaming” campaigns determine also to what extent non-compliant companies risk their reputation if non-compliance is detected. In a strong culture of compliance, shipping companies may assume that their market competitors are compliant.

If the shipowners have internalized the SECA rules, they accept the reasons and goals of the regulators and their justifications why SECA regulations are needed. They also consider that restricting the amount of emissions is morally right and contributes to important environmental and societal benefits. They may gain moral legitimacy through compliance (Mobus 2005).

Table 1 summarizes the determinants of regulatory compliance

3.4 Interviews with shipping companies

The literature reviewed together with the most recent results of Mellqvist et al. (Mellqvist et al. 2017a, b, c) shows that the compliance rate of the Baltic Sea SECA rules is good. As described above, factors beyond rational calculation potentially motivate compliance. We interviewed shipping companies from the Baltic Sea Region in April 2018 about their motivations to comply with the SECA regulations. We chose 110 companies from Finland (30), Estonia (44) and Denmark (36) and posed five questions to them. Target companies were selected to cover different

Table 1 Determinants of regulatory compliance

	Ability to comply	Compliance
Awareness of the rules		
Capability to comply: availability and affordability of options		
Compliance costs: fuels vs. scrubbers	Economic motivation to comply: cost–benefit calculation	
Penalties for non-compliance: severity and likelihood		
Social pressure, expectations of stakeholders	Moral motivation to comply: internalization of the rule	
Company values: what is right and wrong		

shipping segments and also to show differences between companies originating from different countries. Danish shipping companies have more international operations, and Estonia has a short history as a market economy. Finland needs maritime traffic to serve its own trade more than other Baltic countries due to its “island”-like position. Because of moral bias towards oneself and one’s own company, we specifically asked about whether the shipping companies believe other shipping companies (the competitors of the respondent) to comply with the rules and why. We believe this question reveals the state of shared moral principles and justifications. The following questions were asked:

- Do you comply with the current Baltic Sea SECA rules? *Why?*
- What do you believe is the *compliance rate* of the Baltic Sea SECA rules?
- *Why* do other companies comply with the current Baltic Sea SECA rules? + *Why not?*
- Are you preparing for the 2020 global sulphur rules? *Why?*
- Do you believe other companies will comply with the 2020 global sulphur rules? *Why / why not?*

We interviewed the CEOs of the shipping companies. The CEOs are responsible for management and leadership of all shipping companies’ activities, so they should represent companies’ ideas. Interviews were conducted over phone during 6 March–20 May 2018. Altogether, 29 answers were received and thus the general response rate was 27%. This chapter analyzes the responses of the 26 companies who saw themselves as the regulation targets.¹ Most companies are able to comply with the rules. Only one company based on Estonia said they were unable to comply with the SECA regulations, stating that this is because they have no money.

When we asked the companies about their own motivation to comply with the SECA rules, most companies said they follow the law simply because it is the law and law needs to be followed. The high compliance rate is based on strong normative justifications and cognitive legitimacy (Suchman 1995; Nielsen and Parker 2012): following the rules is the “right thing to do”, and non-compliance is not an option if a company wants to continue in the shipping business. Obeying the law and maritime regulations thus has a taken-for-granted status

¹ The SECA rules are irrelevant to some companies contacted because their ships are small or because they only have sailboats.

among shipping companies. This normative obligation includes all types of regulations, and the purpose of the regulation is not questioned.

Almost half of the companies also specifically mentioned they follow the SECA regulations because they want to take care of the environment. For these companies, taking care of the environment is a part of their internalized affirmative norms (May 2004). These companies do not see themselves as following the rules just to get the approval of others:

- “Because we are honest people and a stock listed company”
- “In order to think about future and the betterment of environment”
- “Primarily because of the law but also because we believe in regulations for better causes”
- “It’s good that we have these regulations, better for environment, a step in the right direction. Level playing field or equal competition if everyone complies”

When asked about the reasons for other companies for compliance vs. non-compliance, responses varied much more. While companies themselves often state to follow the SECA rules by normative motivations, for others, they more often refer to the practical and economic reasons. Economic reasons are the obvious explanation to why some companies would try to escape the rules (see Tables 2 and 3 below): related cost savings and the lack of severe punishments. Complying with the rules requires costly investments. We see and describe ourselves as exhibiting our pro-social and moral character, while we recognize and carefully watch for the tendencies of cheating and hypocrisy in others:

- “others comply because they are afraid to get caught and harm the reputation and the market they don’t want to be in the first page in the newspapers ... so it’s the reputation issue mainly”
- “... port system control where all vessels are monitored where they arrive from all over the world ... and I don’t think it’s worthwhile not to follow these rules”
- “More or less they do comply but some try to find loop holes.”

Economic, social and moral motivations are necessarily intertwined in decision-making on whether to comply with societal norms. Harm to reputation and failure to meet customer and other stakeholder expectations does have economic consequences at least in the longer run, since shipping companies are likely to

Table 2 The main justifications motivating SECA compliance

Economic motivations	Social motivations	Normative motivations
Cost of losing reputation and thus customers	Harm to reputation, naming and shaming Everyone else follows the regulations as well Meeting customer expectations	Following the regulations is taken for granted Strong sense of moral duty: “we need to think of the environment”

Table 3 The main justifications discouraging SECA compliance

Economic motivations	Social motivations	Normative motivations
Non-compliance saves money Small fines of non-compliance	Consequences of non-compliance are very small	

lose customers if their reputation is questionable and if they have many violations in port-state control (Akamangwa 2017). Although the fines for SECA non-compliance are negligible, shipping companies seem to think that these other indirect economic consequences are more serious and costly. Thus, fear of negative economic and social consequences due to non-compliance—not official punishments as such—seem to motivate most companies to comply with SECA regulations.

Shipping companies were also asked what they think is the overall compliance rate with SOx regulation among shipping companies operating in the Baltic Sea. Estimations for compliance rate varied between less than 50% and 100%. Not all companies dared to guess the compliance rate: it is not easy to be confident about what competitors are doing.

“Absolutely no idea but 95% or more”
“90 something”.

When asked about the impacts of the 2020 sulphur emission regulation, what matters most is whether the company in question has operations only inside the present SECA area or whether it also operates elsewhere. The reasons to comply with the forthcoming sulphur emission regulation are the same as with present regulations. Most Finnish companies saw they are not impacted by these rules as most of them mainly operate within the SECA and therefore already need to comply with much stricter rules. Some saw the 2020 as levelling the playing field.

Some Danish companies saw the future rules as causing extra cost and causing uncertainty for their operations, as majority of them operate outside the present SECA. Many of the Danish shipping companies are still considering their compliance options. As an immediate consequence, many companies expect fuel prices to rise.

“So far we are waiting and talking about scrubber or MGO, the prices will rise but we are generally waiting to see how things go”

“If they want to ship, owners should soon take action. I think some of the companies are like us waiting at the moment to hear about the prices of the scrubbers, waiting for the first person to buy them and in general just waiting.”

“We as a company are fully aware that something should be done, this is the first step to help the earth with the problem we foresee. It will cost for sure but something is to be done.”

When asked about the compliance behaviour of other companies after 2020, interviewees were rather pessimistic. Some shipowners do believe that most of the world will follow the rules, while others do not have much faith:

“A willingness is there for sure but if they actually do that’s a different thing.”
“Majority will comply but I don’t think everyone will.”
“Some will be tempted not to comply but major and serious companies will comply for sure.”

Many respondents were in the opinion that compliance with the forthcoming regulations is likely to vary a great deal, because ensuring compliance is based on monitoring conducted by individual flag and coastal states and no global monitoring and/or enforcement mechanisms exist especially for the high seas. The respondents pointed out that some flag and coastal states are either reluctant or unable to enforce the regulations, e.g. due to lack of resources:

“I don’t believe [in full compliance], because the same compliance control we have here is not in place everywhere.”
“Regulations are followed only in the Baltic Sea, elsewhere controlling (of the rules) is much harder.”
“Mediterranean, Far East and Africa will not follow the rules because the situation in the countries in these regions is very different (compared to us).”

The responses confirm the results of many earlier studies on the problems of present maritime governance architecture and regulation of industries with global operations. Since shipping mainly takes place outside national jurisdictions, it is regulated through a combination of national authorities, the EU and the International Maritime Organization (IMO). In addition, shipowners can choose where to register their ships in order to deliberately avoid national regulations (DeSombre 2006; Bloor et al. 2013; Roe 2013; Valentine et al. 2013; Lister et al. 2015; Yliskylä-Peuralahti and Gritsenko 2014; Yliskylä-Peuralahti 2017).

Above, we stated that the rational option for shipowners would probably be to switch between compliance and non-compliance depending on the place. The shipowners interviewed do not admit doing this, however. This may be because many of the companies we interviewed only sail the SECAs. For ships traveling in and out of SECAs, it is legal and normal to switch fuels and to have separate tanks for different fuels. There is an incentive to switch to cheaper fuel early when leaving a SECA, late when entering the SECA and when out of reach of SECA control. In 2020, there will be a carriage ban for fuels that are non-compliant of the global sulphur rules.

4 Conclusions: what explains SECA compliance

The necessary determinants for regulatory compliance seem to have been reached with the Baltic Sea SECA: it is an example of an international environmental norm with a fairly good compliance rate, close to 90% (OECD 2016; CompMon 2018). Regulation targets are very well aware of the rules, as they have been discussed extensively in IMO, EU and national level before the implementation of the regulation. The regulation targets have been active in participating in the regulatory process. The shipping industry has not been against the SECA regulation as such, but it has demanded fair regulation globally and is not in favour of regional regulation, such as forming of SECAs, as it distorts competition (Yliskylä-Peuralahti 2017). Suppliers to the shipping industry have been active in developing clean technology and alternative fuels and promoting their products for SECA

compliance with a focus on sustainability and responsibility. Awareness and capability together create an ability to comply with regulations. In addition to ability, compliance motivation (willingness to comply with regulation) is a necessary determinant for compliance. The regulation targets seem to have good relationships with authorities and are able to participate the enforcement process for instance by taking part in the European Sustainable Shipping Forum (ESSF) and national working groups. It is generally agreed upon that the societal benefits of the regulation exceed the costs (EMSA 2018), although there are also critical views (see Antturi et al. 2016).

It seems the SECA regulation is fairly well internalized by regulation targets: they do not consider the option of non-compliance. Regulation targets comply in order to uphold their legitimacy (Suchman 1995), have affirmative motives for compliance (May 2004) and have internalized the goals of the regulation (Winter and May 2001). Such a situation can only be created if the regulatory goals are acknowledged as worthy by society at large and by the important stakeholders of the shipping companies. Good air quality in large Northern European port cities and human health seem to be such a goal. The stricter environmental regulation can give the Baltic Sea and the North Sea a forerunner position in clean shipping when the global SO_x emission regulations come in force in 2020.

We have interviewed companies from three countries around the Baltic Sea. We focused our study to why companies comply with the current Baltic Sea SECA rules, and we also investigated the views of Baltic Sea companies on the global 2020 rules. It would also be interesting to study the SECA compliance motivations of shipowners from other countries around the North Sea as well as from the coastal regions of the USA. The technical options for emission reduction including along with their costs are the same regardless of where shipping is carried out, but there may be some differences in the actor factors impacting compliance. In comparison to other sea areas, monitoring compliance in the Baltic Sea is relatively easy; as the sea area is small, maritime authorities in the port and coastal states have resources to conduct port-state-control effectively, and there is a strong “compliance culture” among shipping companies in the region. This is not the case in other regions in the world, and not even inside Europe. However, even within the Baltic Sea, not everybody complies. More credible controls and sanctions would enhance the compliance rate in Europe even further, and harmonization of the enforcement among EU countries would be important. Now the fuel sampling on ships is based on risk analysis (see Sampson et al. 2016). The airborne sampling can give good back-up for port state control. Another option is to have a sniffer in all the ships. With global rules on green house gas emissions, more devices on ships to sample the exhaust gases is one option for monitoring the compliance of several environmental regulations.

The forthcoming global sulphur emission regulation is based on the same IMO-based regulatory framework as the SECA rules. The only difference between SECA and the forthcoming global rules is the allowed sulphur content of the fuel used in ships. Therefore, when the global 2020 sulphur emission regulation is in place, shipping companies and maritime authorities in other coastal regions are likely to face same questions as their Baltic counterparts regarding how to comply with the (global) rules and how to ensure efficient compliance monitoring and sanctions for non-compliance. Shipping companies interviewed were rather pessimistic regarding the compliance of global emission regulations. Pessimism is mainly due to significant differences in enforcement resources in coastal states outside Europe, marked differences in companies’ attitudes towards environmental protection and respect of regulations in general, and technical difficulties in monitoring ships sailing in the

High Seas. With the global sulphur emission rules, the legal authority at High Seas will need to be solved. Operators need to know that the international community governs the High Seas with credible and impartial authority. The carriage ban on non-compliant fuel set by the IMO enters into force on 1 March 2020. This will facilitate the successful enforcement of the global rules (Trident Alliance).

Parvainen et al. (2018) believe that through multi-stakeholder alliances, it is possible Media discourse is a part of building the compliance culture: regulators and other stakeholders express their opinions and state their values in the media. Through their statements, companies impact each other's compliance motivations. In March 2018, one representative of British Petroleum expected about 9% of the industry to be non-compliant as the rule takes effect in 2020 (Kumar 2018). Such a starting result would be deemed fairly good, and the goal of greatly improved air quality and human health would be achieved.

For oil companies, the compliance rate and the choice between compliance options by shipping companies are decisive factors shaping their demand. For keeping oil-based fuels competitive, they need to be cheaper than other compliance options. A major shift towards distillate oils and hybrid fuels is happening due to the environmental demands, regulations benefiting modern and flexible refineries (Xu 2018). In addition to the environmental benefits, the more expensive distillate oil has benefits in higher thermal value, lowered fuel consumption and less sludge (Notteboom 2011, 67). Oil companies may in the future bring these benefits more to the fore in their marketing. In the future, hydrogen energy may challenge oil-based fuels (de Troya).

Acknowledgements Open access funding provided by University of Turku (UTU) including Turku University Central Hospital.

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