Int Environ Agreements (2020) 20:179–195
https://doi.org/10.1007/s10784-019-09466-3

ORIGINAL PAPER

The doctrine of liability fixation of state responsibility in the convention on transboundary pollution damage

Xuyu Hu[1]

Accepted: 19 December 2019 / Published online: 7 January 2020

Abstract
Transboundary pollution is an international problem. There are currently no adequate mechanisms under international law to balance the relationship between state sovereignty and state responsibility for transboundary pollution harm. The doctrine of liability fixation is at the core of state responsibility and plays an important role in transboundary environmental harm. What type of responsility, fault liability or strict liability should be adopted in state responsibility for transboundary pollution harm? Scholars have different viewpoints on this key issue, and states may have fundamentally different positions and differ widely in terms of both policy and substantive issues. There is uncertainty and variability in the drafting of international conventions on transboundary pollution harm. This article focuses on the normal international legal rules regarding the principle of imputation, and it analyses the advantages and disadvantages of adopting the principles of strict liability and fault liability, their value and the relationship between state responsibility and civil subject liability. This article aims to explain why it is necessary to change the direction of the doctrine of liability fixation of state responsibility in the convention on transboundary pollution harm, and it considers a new direction to adapt to the complex interests and demands of various countries. From the perspective of furthering the prevention of pollution and determining compensation for harm and constructing liability regimes for transboundary pollution, this article proposes the doctrine of the liability fixation of state responsibility and analyses the relevant trends and possible available options.

Keywords Transboundary pollution · State responsibility · Fault liability · Civil liability · Strict liability

Abbreviation
ILC International Law Commission

✉ Xuyu Hu
forest2019@vip.126.com

[1] School of Law, Nankai University, 38 Tongyan Road, Jinnan District 300350, Tianjin, China

1 Introduction

Transboundary pollution refers to the external or spillover substances that cross a country's political boundaries. With increasing demand for resources, and technological progress that has caused widespread or even catastrophic threats of transboundary harm, the economic costs of transboundary pollution activities have been externalized. This problem has proven particularly difficult to resolve, and it is one of the most persistent problems in environmental law (Hall 2007, p. 681). A standardized state responsibility rule for the prevention of transboundary pollution has not yet been developed. The principles of liability and compensation in cases of transboundary damage are not well developed (Rao 2004, p. 224). The fact is that the legal machinery enabling compensation for transboundary pollution harm has generally been deliberately neglected (Guruswamy 2010, p. 212). Why does the state responsibility compensation system for transboundary pollution damage remain so underdeveloped in the world? Although the roles of concepts such as fault, strict liability or absolute liability has attracted major attention and controversy in international law, the establishment of the type of state responsibility for transboundary pollution harm is still a vague concept that appears to differ widely in terms of both policy and substantive issues. Scholars have theoretically addressed the issue of liability for negligence as the principle of state responsibility and the constituent element of that principle. This issue has been recognized as being central to international environmental law and as an international priority. The work of the International Law Commission (ILC) will remain superficial if the elements of this relationship are not more broadly defined and more deeply studied, which must include the ascertaining of whether strict liability constitutes the basis of a state's liability for activities involving risk (ILC 2003, p. 46).

Currently, the idea that all transboundary harm should be prohibited and presumed unlawful has generally been rejected. To adapt to the progress of science and technology and the development of the world economy, more comprehensive theories of international law are needed. We should pay attention to the relevant legal developments with regard to due diligence and the prevention of state responsibility in international law. Further, we must realize that the issues involved are complex and that neither fault liability nor strict liability can provide a fully feasible path of resolution; rather, a variety of systems and measures must be integrated.

1.1 The substantial development and progress of state responsibility for transboundary environmental pollution harm

Inherent in industrial development is the fact that, in modern society, damage to the environment cannot be completely avoided. Decades of international efforts have not changed the current trend of transboundary pollution growth. The lack of a common comprehensive interest is one of the most difficult problems obstructing the enactment of effective transboundary pollution law. Given the highly conflicting interests involved in a transboundary pollution dispute, the source state has little incentive to cooperate in forming a legal regime (Merrill 1997, p. 1017). The source state will refuse to consent to any adjudication of harm, as evidenced by the fact that, to date, not a single harmed country has even attempted to bring a claim against a major emitting country in international climate law (Cole 2015, p. 307). In spite of the increasing number of cases of transnational environmental damage, compensation is in fact paid only very rarely (Doeker and Gehring 1990, p. 2). Cases

where compensation is obtained are the exceptions, not the rule, and states are reluctant to develop adjudicatory regimes for implementing state responsibility (Guruswamy 2010, p. 212). A claim for transboundary pollution harm remains a hard battle for claimants because state responsibility is influenced by the treaties involved, the nature of the cases and even the balance of interests among states.

Although the explosion at the Chernobyl nuclear reactor in 1986 caused significant increases in radioactivity levels in more than twenty downwind states, no state sought compensation by bringing suit against the Soviet Union (Merrill 1997, p. 958). Because the former Soviet Union is neither a member state of the Paris Convention nor the Vienna Convention, the above two conventions are not applicable. Japan's Sendai earthquake caused severe damage to the nuclear power plant in Fukushima, and 80% of the leaked radioactive material entered the ocean. The damage to the global ecology, especially marine ecology, was unprecedented (Jin 2016, p. 53). However, most states around the world that use nuclear energy, including China and Japan, have not been involved in the two international treaties concerning compensation for damages caused by nuclear energy production. Therefore, in regard to the nuclear damage accident at Fukushima, these treaties could not provide a direct basis for the confirmation of liability between China and Japan. States' domestic activities can have consequences of negative transboundary harm that usually cannot be compensated without interstate coordination. Therefore, state responsibility arises only if there is a breach of the obligation of a treaty (quasi-contractual arrangement) or customary international law (the international legal principle of 'no harm to another country').

1.2 The role and limitations of international treaties on state responsibility for transboundary pollution

Contractual agreements are the most promising means by which to achieve collective action on transboundary pollution. However, the source state will refuse to participate in a regime of centralized regulation unless some benefit can be linked to its agreement (Merrill 1997, p. 981). Consequently, some existing transboundary pollution treaties are primarily committed to the construction of information-sharing and consultation mechanisms rather than establishing substantive state responsibility regimes. For example, the *Convention on long-range transboundary air pollution in 1979* clearly stipulated the following in a footnote: 'The present Convention does not contain a rule on State liability as to damage' (United Nations 1979, p. 1445). Usually, the adoption of strict or absolute rules of state responsibility in the practice of state treaties is rare. In international law, there is only one convention that directly stipulates state responsibility for transboundary damage and specifically stipulates the form of that liability, namely the 1972 *Convention on international liability for damage caused by space objects* (ILC 2003, p. 44). This is the first example of an international convention imposing this form of such absolute liability on states. 'States seem to accept a fully-fledged international liability only in areas where issues of global and military importance prevail over economic and civil aspects.' (Doeker and Gehring 1990, p. 2). Conventions on civil liability for the international environment are mainly focused on fields such as nuclear pollution and oil contamination; moreover, only a few conventions have been passed. These conventions have established a compensation regime of strict liability for injurious consequences of uses of nuclear energy and oil pollution, and they have involved issues of civil liability as well as restrictions of liability for operators and enterprises. Many states are unwilling to bear specific state responsibility in this area and make the operators accept strict liability, whereas the state

holds only complementary liability; furthermore, it is even possible for the state to evade or lessen its liability.

Liability for transboundary pollution among states sometimes results in 'cooperation agreements'. In 2005, an explosion occurred at the Jilin Petrochemical Co., Ltd., which severely polluted the water of the Songhua River. This accident affected some cities in the Russian Far East and damaged water resources. China and Russia once had communications about their claims for compensation; however, there was no related international convention that could be applied to the transboundary pollution between the two states. After this pollution accident, in 2008, the two states signed a cooperation agreement on the transboundary water area (Xie et al. 2013, p. 86). Since the 1980s, Indonesian plantations have caused periodic forest fires and transboundary toxic haze pollution, which has had a serious impact on Indonesia and Southeast Asia (Mohan 2017, p. 1). The plantations' emphasis on profit at the expense of the environment and society has led to serious and harmful consequences affecting millions of people (Jiang and Li 2017, p. 69). To further control haze pollution, ASEAN formulated the *ASEAN Cross-Border Haze Pollution Agreement* in 2002.

The issue of aerial emissions containing hazardous waste crossing borders will likely become more prominent with increased global industrialization (Callahan 2018, p. 176). The general principle of international law reflects that one country should not allow activities within its borders to interfere with activities within another sovereign state's borders (Sinden 2010, p. 324). However, sovereign immunity potentially exempts the majority state's liability for transboundary pollution from the convention and from customary law. Therefore, the international community should develop a workable law regime framework for the prevention of transboundary pollution and an adequate compensation mechanism for damages.

2 The construction of strict liability in international conventions about transboundary pollution harm

Since 1978, transboundary pollution harm has been on the agenda of the ILC; this issue is within the purview of 'International liability for injurious consequences arising out of acts not prohibited by international law' (ILC 1978, p. 6). The ILC eventually formulated two documents: the *Draft articles on prevention of transboundary harm from hazardous activities*, completed in 2001, and *International liability for injurious consequences arising out of hazardous activities*, completed in 2006. The two drafts have three elements: prevention, cooperation and strict liability for harm compensation; so long as pollution has not reached the level of 'significant' or 'substantial' harm, it is considered tolerable (ILC 1996, p. 108). While the term 'strict liability' was not used by the ILC, a regime that was very close to the rules of strict liability was produced. Regardless of whether strict liability should be introduced into conventions on state responsibility for transboundary pollution, the advantages and disadvantages of adopting the principle of strict liability are an important question in international treaties and deserve extended analysis.

2.1 The proposed concept of the international liability regime of the state and the need for same

The traditional concept of state responsibility arises only when an international 'wrong' is committed by a state. However, some of the activities resulting in transboundary pollution are not recognized as being an international 'wrong' and do not give rise to state

responsibility. The international community generally believes that countries should have reasonable freedom to carry out activities within their territories even though such activities may lead to transboundary harm. Although most of the industrial activities that cause transboundary pollution are not prohibited, a legal system is needed to adjust the risks and consequences of such activities (Birnie and Boyle 2002, p. 100). A greater focus on harm, and indeed risk of harm, is in opposition to the attribution of wrongful conduct (Townley 2018, p. 619). The international community has realized that actual harm has been produced in cases where appropriate preventive measures have not been taken and the state should undertake a certain form of compensation. 'Countries may need to assume corresponding international liability for their lawful acts due to the necessity of reality' (Cassese 2009, p. 324). Otherwise, potentially affected countries and the international community may persist in requiring the country of origin to prevent all harm caused by relevant activities, which may result in the activities themselves being banned (ILC 2002, p. 90). In other words, the state could incur international responsibility where it has failed to prevent transboundary environmental harm originating in its territory that was foreseeable, direct, significant and within its power to prevent had it exercised due care (Banda 2019, p. 1950).

Therefore, due to the limitations and insufficiency of traditional state responsibility in handling transboundary environmental harm, the ILC hopes to compile a set of state responsibility compensation systems that are different from traditional state responsibility, and it has decided to focus on the consequences of activities instead of the legitimacy of the activities themselves. At the beginning of its work on the topic of state responsibility, the ILC agreed that 'it was necessary to adopt a formula which did not prejudge the existence of responsibility for lawful acts' (ILC 1978, p. 149). Consequently, modern international law further includes within the scope of state responsibility activities that are not prohibited by international law but do actual damage to other countries, and it has accordingly established the concept of 'international liability'. The new concept of 'international liability' created by the draft articles is based on lawful acts and establishes states' liability to undertake primary rules (obligations) (ILC 1994, p. 156). Such obligations may be indicated as 'primary' if they derive from the general rules and principles of international law, which imposes specific duties on states. The consensus seems to be that the term 'liability' for the consequences of ultra-hazardous, but lawful acts flows directly from a 'primary' norm (Dumbauld 1987, p. 550). Any specific duty to prevent an event is a primary obligation; if this primary duty is violated, the secondary rules of state responsibility will apply. Specifically, the breach of such primary obligations inevitably leads straight to state responsibility (Horbach 1991, p. 71). Thus, countries that may be influenced can require the source state to abide by the obligation of prevention when facing activities that might cause 'significant' or 'substantial' transboundary harm, even though the activity itself is not prohibited.

The objectives of the ILC in the preparation of 'international responsibility' for the codification of non-wrongful acts are to provide compensation to injured states and to require liable states take adequate measures to minimize the risk of potential harm. The separation of state responsibility and international liability seemingly was the main principle of this purpose such that responsibility was related to wrongfulness, whereas liability should be used only in relation to acts not prohibited by international law, specifically, lawful acts. The ILC sought to articulate a universal principle governing all transboundary pollution; while certain actions are not wrong, a violation of the rules on prevention would give rise to state responsibility. Of course, the failure to comply with the obligation to prevent or to minimize risk does not mean that the activity itself is prohibited. To this extent, the

formulation of state international liability, as well as the corresponding obligations, is of great value for the prevention of transboundary pollution.

However, some scholars have also put forward different opinions on the concept and system of international liability. There is possible confusion between the topics of state responsibility and international liability. There are problems of conceptual complexity and responsibility consistency between the two topics. The draft does not explain how non-unlawful acts could give rise to state responsibility. It is not clear that the conceptual basis on which it is distinguished from state responsibility is either sound or necessary (Boyle 1990, p. 1). It is noted that the scope and the content of the topic remained unclear due to factors such as conceptual and theoretical difficulties, appropriateness of the title and the relationship of the subject to 'state responsibility' (ILC 1997, p. 59). The draft may weaken the general normalization of international law and the regulations that may lead to the establishment of traditional state responsibility. In their draft harm principles, with no satisfactory explanation, the ILC illogically and untenably purports to transplant state responsibility into those draft rules (Guruswamy 2010, p. 226). One commentator has objected to considering international liability at all on the grounds that it is 'fundamentally misconceived' in a manner that 'may induce a general confusion in respect of the principle of state responsibility' (Magraw 1986, p. 316). Therefore, the draft has substantive defects and major conceptual problems. Furthermore, there is no concept of 'international liability' for legitimate activities in state practice and the jurisprudence of the International Tribunal. The coexistence of the two types of state responsibility only increases confusion, and the borderline between the two concepts even seems to have disappeared, or it has become extremely vague. 'There cannot be any real distinction between the topic of state responsibility and international liability, particularly if the focus is on state liability' (Rao 2004, p. 225). 'International liability' and 'state responsibility' still must be clearly defined to diminish the confusion. 'The relationship between international liability and state responsibility is both promising and troubling.' (Magraw 1986, p. 330).

2.2 The strict liability of the state as the subject of international liability

Strict liability can play a larger role in punishment than fault liability, and linked with the result, it transfers the basis of liability from fault to risk. Some of the debate regarding the principle centres on whether strict liability is required for all transboundary pollution harm (Hall 2007, p. 700). One scholar observed that under the strict liability doctrine, there was no opportunity for a state to defend itself on the grounds that its actions were reasonable or that the damage was unforeseeable (Stone 1993, pp. 55–57). The ILC draft is intended to articulate a general principle applicable to all transboundary pollution about state responsibility. The ILC considered the idea of imposing strict liability on the state in whose territory the hazardous activity was situated instead of channelling the same to the private operators in charge of the activity (Rao 2004, p. 226). As the principle of exception is applicable to extremely hazardous activities, strict liability for transboundary environmental harm has also gained support from scholars.

Scholars who take positive viewpoints believe that the status of the strict liability principle in liability for transboundary harm should not only be strengthened but also become a general principle; it should at least remain so in regard to the field of so-called extremely hazardous activities (Gaines 1989, p. 330). Some scholars believe that the concept of international liability should be developed on the basis of establishing a general obligation of strict or absolute liability for environmental damage (Doeker and Gehring 1990, p.3) and

that the principle of fault liability is too simple to be convincing. Scholars also claim that fault is not a condition for constituting international liability (Brownlie 1983, pp. 41–46) and that international treaties, international practice and many important international documents on the development trends of international society have confirmed the strict liability of the state in the field of transboundary pollution (Wang 1995, p. 118; Zhou 2004, p. 237; Zhao 2000, p. 581). Although some states are resistant to the idea of strict liability because they view it as a potential infringement on their sovereignty, it is the standard most likely to serve the purpose of the international liability topic, especially in cases involving transboundary pollution (O'Keefe 1990, p. 207). Because international law lacks the public authority to prohibit activities with the potential for high levels of hazard that might result in severe transboundary harm, to maintain social justice, strict liability must be applicable, at least at the present time (Suzuki and Souji 1988, p. 169). States' adoption of the regime of strict liability to fulfil their compensation liability is a major breakthrough in traditional international law. A form of strict liability should be adopted on the international plane to provide relief for those physically harmed by transboundary pollution (O'Keefe 1990, p. 153). It is unfair to make victims bear unavoidable damage only because the source country of the pollution has fulfilled its obligation of due diligence (Birnie and Boyle 2002, p. 184). In theory, strict liability could better solve transboundary problems with the goal of building a consensus regarding environmental obligations. However, to date, this system has served to protect the interests of the affected state.

Contrary to the minority opinion on considering and attaching importance to the application of strict (non-fault) liability for severe harm in hazardous activities, a negative attitude is taken among many scholars towards the new general compensation liability that has not yet been formulated in the regulations of customary international law, and these scholars have resisted establishing a regime of strict liability (ILC 1992, p. 44). The legal literature is divided over the problem of international responsibility for environmental harm (Mazzeschi 1992, p. 37). The perspective that links the occurrence of harm directly with the obligation of compensation without considering the situation of the source state does not have a legitimate basis in current nation-state practices (Usuki 1989, pp. 1–70). In fact, states do not intend to begin determining the conditions of state responsibility for transboundary environmental harm in the convention. The concepts of strict liability and absolute liability are well known in the domestic law of some countries and in international law involving certain activities; however, a great number of activities covered by one article have not been fully addressed under international law (ILC 1996, p. 128). Some scholars maintain the view that under current substantive law, there are no precise or general rules concerning strict liability, particularly for the transboundary harm caused by activities involving risk of such harm (ILC 1991, p. 109). In customary international law, there is no rule of strict state liability; such a basis for liability can be applied only if a treaty provides for it (Sersic 2008, p. 289). The concept of strict liability has aroused some strong opposition in the Commission and in the Sixth Committee of the General Assembly because it is not based on any norm of general international law (O'Keefe 1990, p. 182). Most international lawyers on this topic have found this argument unpersuasive, specifically, 'States' direct liability, i.e. strict liability, for transnational injuries brought about by such private activities.' (Handl 1980, p. 231). Such scholarly opinions should not be ignored.

The question of whether the attribution of liability is an appropriate form is a core problem of compensation. If the draft articles were intended to be legally binding, at least the core part of that instrument would have to be drafted to reflect lex lata and be acceptable to most states (ILC 1991, p. 112). Without widespread national consent and acceptance, it is very difficult to generalize the principle of strict liability, and it is

impossible for that principle to become the 'best method' or 'preferable method' for international environmental protection. With a relatively small number of state practices under strict liability, the direct introduction of the principle would lead to improper restraint on the state's sovereignty. Even if liability might be imposed (which seems unlikely), it must be accepted or taken up voluntarily (Cole 2015, p. 320). It is still too early to introduce the concept of strict liability into international law, and it is questionable whether such rules are mature enough to be codified by the ILC. It is difficult to compile one type of centralized, universal strict liability of state mechanism to handle all types of transboundary pollution questions. It is not a mature practice for the draft articles to use strict liability to adjust various risks and harms. Only a very few treaties establish strict state liability for the transboundary pollution harm from lawful activities.

Currently, a variety of names have been used for the modern theory that imposes strict liability. Regarding the terminology, the definitions of result liability, risk liability, strict liability, objective liability, absolute liability, adventure liability or cause-and-effect liability are still not clear, and all these concepts are still in use (Phil 1984, p. 35). However, the guidelines identifying the strict liability of the state have yet to be fully developed, and strict liability has not yet been formed as a general rule of customary international law. An undue emphasis on strict liability at the international level appeared inappropriate while states in practice adopted a more pragmatic approach to compensation without relying upon any one consistent concept of liability (Rao 2004, p. 226). Strict liability could be regarded as one of the foundations—but not the only foundation—of the compilation of the draft convention, or it could be more suitable to apply a flexible form of strict liability (Zhou 1988, p. 121). In other words, such a system does not block states adopting the principle of strict liability for compensation in the special convention system. Therefore, fair allocation should be implemented through consultation with relevant countries that carry out hazardous activities and bring about harm.

3 The liability focus: allocation of loss instead of international liability of state

The content of the topic of strict liability remains unclear due to factors such as conceptual and theoretical difficulty, the degree of appropriateness of titles and the relationship between 'international liability' and 'state responsibility' (ILC 2003, p. 43). The working group (ILC) therefore decided that the issues of 'prevention' and 'international liability' should be addressed separately, and it shifted to studying the mode by which the losses of transboundary harm could be allocated. At its 2002 session, the working group of the ILC recommended a new policy framework that stressed the development of guiding principles on the allocation of loss for transboundary damage instead of a strict regime of international liability (Rao 2004, p. 226). The solutions to the problem of transboundary pollution have transformed from the state responsibility model to the civil liability model, and solutions 'concentrate on harm caused for a variety of reasons but not necessarily involving state responsibility' (ILC 2003, p. 44). The draft has deviated from the original intention of the system and has fundamentally shaken the foundation of state responsibility for compensation. They attempted to introduce a new approach that would not have to rely exclusively on any one concept of liability, much less on state liability.

3.1 Strict civil liability regime for transboundary environmental harm

The non-existence of a general rule of the strict liability of states, and their hesitation to adopt a convention containing provisions on such liability, led to the eventual adoption of civil liability schemes. The draft principles adopted on 5 August 2004 are the result of an important change in the orientation of the ILC on the topic of international liability. Its purpose is to emphasize the allocation of loss to be distributed among the different private parties who carry out hazardous activities and not to establish a national system of international liability for compensation. The liability stipulated in the rules of international law has nothing to do with state responsibility in the strict sense (Cassese 2009, p. 324). The codification scheme eventually generates strict liability; however, the liability subjects are mainly civil subjects. Liability for activities falling within the scope of the present draft principles primarily attaches to the operator, and such liability does not require proof of fault (ILC 2006, p. 60). This approach indicates the ILC's new way of thinking about the special subject of responsibility for compensation. This thinking focuses on the question of choosing an appropriate remedy, and it pays attention to promoting the adoption of a fairer, more convenient and more efficient method to compensate innocent victims for transboundary harm.

The system of international treaties, as well as the laws and practices of various countries, has widely adopted the form of imposing the main liability for compensation on operators. Operators who have direct control over activities should assume primary liability in any allocation system of loss. The operator of hazardous activities that cause damage incurs non-fault liability for such harm (Herdegen 2007, p. 100). Civil liability regimes are usually established by treaty, and the norm of strict liability that operates in practice has gained support. Compared with state responsibility, a civil liability claim has considerable advantages and may be become a more effective means of environmental protection. In treaty practice, the strict liability has formed the basis for the construction of liability regimes (ILC 2006, p. 74). Some conventions require operators to have appropriate insurance or other financial guarantees for compensation liability, unless the operator itself is a state. The perspective of the 'internalization of the cost', which fundamentally constitutes the principle of 'the polluter pays', thus promotes an economic function (ILC 2006, p. 61). Furthermore, strict liability is a good approximation of the principle of 'the polluter pays' (Birnie and Boyle 2002, pp. 93–94). Operators are forbidden from seeking refuge to carry out hazardous activities and not paying for the harm they cause, fundamentally encouraging the exercise of the utmost caution and due diligence and thereby preventing damage.

The reasons for the imputation of strict liability lie in neither the culpability for activities nor defects in actors' meanings; rather, they originate from a basic concept of compensation in our legal consciousness. Superficially speaking, strict liability considers only the causal relationship between acts and harm, not the fault of actors. The development trend shifts from the theory of a strict and necessary requirement of predictability ('appropriateness') to a relatively loose causal relationship (Wetterstein 1997, p. 40). Strict liability allows certain force majeure exceptions; therefore, the liability is not absolute, usually with a few exonerating grounds. Defendants can be free from liability only if they are able to prove that the harm was caused by the victims, the third party or force majeure. The principle of strict liability has become a civil liability policy that can be used after the negotiating state's consideration of factors such as the nature of specific risks, the effectiveness of preventive measures and the potential economic sustainability of hazardous activities.

3.2 The advantages and disadvantages of adopting the principle of a strict civil liability regime

New facilities, technologies, substances or materials are the source of unknown and unpredictable risks. This type of convention on the civil liability for transboundary pollution appears centrally in some fields; specifically, in these fields, there are important reasons for the states to advocate conventions formulated on civil liability for transboundary pollution. From the perspective of the proposition of having operators assume liability for compensation, those who cause high risk and seek economic benefits should be liable for controlling any injurious consequences of their activities (Doeker and Gehring 1990, p. 7). Such a system turns compensation for losses into costs and transfers those costs to consumers through the market or allocates them to society by way of liability compensation insurance. As a result of the application of systems such as insurance, funds and liability limitations, many liabilities for environmental harm have been transferred or dispersed. Of course, adopting a strict liability system to internalize external costs reduces the product or service competitiveness of the polluters.

Civil strict compensation liability has the advantages of clear boundaries and convenient application; it serves as a principle of law and is rooted in existing state practice. The special rapporteur noted that international conventions on civil liability with respect to hazardous activities have, in general, imposed strict liability, primarily on the grounds that the victims should be compensated promptly (ILC 1994, p. 156). The emphasis of laws has been shifted from shouldering the blame to compensating for loss (Fuchs 2004, p. 5). The main objective in the future may be to encourage states to conclude agreements on strict civil liability applicable to specific areas involving the risk of transboundary environmental damage. A rule of strict liability has the important advantage of protecting environmental values.

The problem of transboundary pollution must be solved through negotiation and cooperation between countries. We can say that strict liability also exacerbates the conflict inherent in transboundary pollution dispute resolution. Two states may have a fundamentally different position on certain types of transboundary harm. If the source country is to be forced to take expensive control measures, a balance must be struck between the costs and benefits of regulation. Strict liability offers an even more one-sided, pro-environmental rule, that is, a rule likely to be favoured by rich nations and resented by poor nations (Merrill 1997, p. 1017). Some commentators doubt 'whether the 'polluter pays' principle has achieved the status of a generally applicable rule of international law' (Sands 2003, p. 280). In the case of activities that are not dangerous but still carry the risk of causing significant harm, there may be a better case for liability to be linked to fault or negligence (ILC 2006, p. 79). Strict liability makes it easier to compensate for damage than fault liability; however, it weakens the obligation to prevent occurrence by emphasizing compensation for loss. If we draw a general imputation principle regarding the system of civil liability, it might lead us into a more complex field. The principle cannot be treated as a rigid rule of universal application, nor are the same means used to implement such principle in all cases (Birnie and Boyle 2002, pp. 94–95). Although the draft principle of strict civil liability has advantages, it requires a coordination of the national laws, and such a task is fraught with difficulties.

4 The role of state fault liability and civil strict liability in transboundary pollution damage

Transboundary pollution may be divided into two aspects: prevention and liability, and two aspects are addressed in that sequence. The fault liability of the state requires the state to undertake due diligence to prevent transboundary pollution harm from activities within its jurisdiction or control. The request of some degree of foreseeability is reasonable. With the breach of this obligation, or a negligent or fault conduct, state responsibility can be incurred. Strict liability is generally assumed to provide incentives for better management of the risk involved; however, this is an assumption that may not always hold (ILC 2006, p. 79). The concept of prevention has assumed great significance; in any event, prevention as policy is better than a cure (ILC 1998, p. 23). The question is whether the fault liability theory is a more effective legal norm than the norms of strict liability in achieving satisfactory solutions to transboundary pollution disputes; thus, more case-specific research is needed.

4.1 The development of state fault liability in customary international law and the role in preventing pollution

When evaluating due diligence in the context of determining state responsibility under international law, one must consider the standards established by 'soft' norms, which are not in themselves compulsory (Dupuy 1991, p. 434). However, customary law reflects international concern for the impacts of one state's activities on other states, including through the impact of restrictions on state sovereignty. The enforcement provisions of the 1972 *Convention on the prevention of marine pollution by dumping of wastes and other matter* necessitate reliance on customary law for establishing state responsibility. Strict liability in state responsibility for transboundary harm has no position in customary international law, and it has not become a universal norm for state responsibility—even if state practices may not be sufficiently representative to establish customary international law. Such practice as does exist may not be sufficiently widespread and representative to indicate an international customary legal basis for a strict liability of states for transnational pollution damage (Handl 1980, p. 230). The general standard under international law is not strict liability: the harm must be foreseeable, and the state must know, or should know, that a given activity poses a risk of significant harm (Banda 2019, p. 1948). Most speakers specifically agree that neither rules of wrongfulness nor rules of strict liability are in themselves an answer to the problem of avoiding and repairing physical transboundary harm (ILC 1983, p. 85). Although many domestic legal regimes and civil liability conventions accept the strict liability regime in determining existing risks and hazardous activities, the expansion of the principle of state responsibility is attributable to the evolution of international law and interpreted on the basis of practice and conventions. International laws are a gradual development rather than only a compilation of existing laws (Birnie and Boyle 2002, p. 99). In other words, it should be ensured that the substantive rules of international law, specifically, the imputation principle, are not merely compiled but rather develop progressively. These substantive rules exceed the possibility of being compiled into a complete code, and any attempt to generalize them will be rejected as an improper infringement on the freedom of action based on national sovereignty. Therefore, it should be understood that

the ILC work is primarily engaged in codification rather than progressive development; its work is based on the usual examples of state practice, including conventions.

The value and importance of this strict liability principle for the state responsibility legal regime will not be taken for granted in customary international law. The issues of state responsibility in traditional international law refer to fault liability, and actual state practice supports only a general due diligence requirement. It is recognized that the state has duties of prevention under international law, and these entail certain minimum standards of due diligence (Birnie and Boyle 2002, p. 113). There is a customary international rule that obliges states to monitor the activities carried out in space under their jurisdiction and in activities under their control so that such activities do not cause significant environmental damage to the resources of other states' territories. In such cases, state obligations are limited by the due diligence rule, the conclusions of which find confirmation in the case law, diplomatic practice, overall treaty practice and numerous acts adopted by conferences, international organizations and authoritative scientific institutions (Mazzeschi 1992, p. 38).

Cases of transboundary pollution are not rare in history. The most influential law case is the *Trail Smelter Arbitration* (USA vs. Canada, 1938 and 1941), to which can be traced the basic principle that a state should ensure payment of prompt and adequate compensation for hazardous activities (ILC 2006, p. 77). This precedent has been reaffirmed in many international declarations in recent decades and has an important role in the discussion of transboundary pollution principles and practice. In this case, the Tribunal implied that the liability was strict based on the requisite causation and the cause of 'significant' or 'substantial' transboundary harm. However, the case does not articulate a universal rule applicable to all transboundary pollution harm disputes. The case, namely the Trail Smelter, does not authoritatively establish a standard of strict liability for transnational injuries (Handl 1980, p. 229). Whether the Tribunal was correct in its assumption that the 'true' international customary rule takes the form of a universal principle, and whether the content of that principle entails some form of strict liability, has engendered many arguments (Merrill 1997, p. 951). The Trail Smelter arbitration offered an example of a state that remains an exception (Rao 2004, p. 226).

If it is mandatory for states to assume strict liability for compensation for the harm arising out of wrongful acts not prohibited by international law at the present stage, enforcing this requirement will exceed the pace of progress of the international community. This viewpoint denies the existence in customary international law of any new principle relevant to the topic, maintaining that strict liability has always been the product of a particular conventional regime (ILC 1983, p. 83). Therefore, there is no easy way of persuading states to adopt a uniform policy regarding the place of strict liability as a rule of customary international law (ILC 1983, p. 84). Compared with the norm of strict liability, fault liability provides a better basis for dealing with state responsibility for transboundary environmental harm, reducing the possibilities for taking hard bargaining positions to facilitate the achievement of the interstate agreements. The legal regime is more predictable, and it is more likely to lead to an agreement. Even if the active measures adopted by the state obviously cannot absolutely guarantee the desired result, it is logical that international law may only impose on the state the obligation 'to make every effort' to reach such result; that is, only an obligation of diligent conduct (Mazzeschi 1992, p. 41). The rapporteur Quentin-Baxter noted that only when a state violates its primary obligation of liability by not repairing the damage this can be considered a wrongful act for which the state will incur state responsibility (Horbach 1991, p. 71). Of course, the relief method of fault liability is neither comprehensive nor adequate enough, and it may also lead to the unfair results because

those acts are characterized by neither fault nor intention; moreover, it is very difficult to prove that a state entity is at fault.

4.2 The integration of a prevention system of transboundary pollution and a loss compensation mechanism

If the fault liability theory, in dealing with state responsibility for transboundary environmental harm, replaces the strict liability formula, we could establish a legal mechanism system that prevents and resolves transboundary pollution harm disputes, and with relatively fewer threats to state sovereignty. A state will not be held liable for an activity merely because it was carried out within its territory. The state has an obligation to formulate preventive measures and rules and supervise their implementation to prevent the occurrence of transboundary pollution damage, which is based on the principle of fault liability. Such measures and rules must reflect the understanding that the right to territorial sovereignty comes with the responsibility to prevent transboundary environmental harm (Banda 2019, p. 1896).

The relationship between state responsibility and civil liability is a basic issue related to liability and compensation (ILC 1991, p. 115). In the relationship between liability and prevention, we first focused on the prevention objective. Over time, the object of international environmental law thus shifted from managing orderly resource use to environmental stewardship grounded in the duty of prevention and environmental risk management (Banda 2019, p. 1897). It has been proven that in terms of operational costs, taking preventive measures against harm is more favourable than paying for the consequences after causing harm. If, in such a case, transboundary pollution harm occurs, the operator will be strictly liable, and the state will be responsible only for the other consequences of the breach of its due diligence obligation (ILC 1994, p. 156). State responsibility could be invoked to implement not only the obligations of the state itself but also the civil responsibility or duty of the operator (Rosas 1994, p. 161). Thus, while states slowly establish rules of compensation under state responsibility or rules of prevention of transboundary harm, the international community has followed a parallel path with the objective of offering compensation to injured parties based on operator liability.

Transboundary pollution problems can often be addressed more effectively through the domestic civil liability legal system and by compelling compliance with environmental protection objectives, and this approach deserves a central role in proposals to reform the transboundary pollution regime. Despite the fact that using the domestic legal system to address international problems can be tremendously effective in the short term, it creates the risk of undermining the international legal system and the procedural values of predictability and fairness (Hall 2007, p. 737). States become reluctant to undertake heavily increased liability obligations when private regimes function satisfactorily. Hence, private liability regimes in turn reduce the necessity of state responsibility for transnational environmental damage (Doeker and Gehring 1990, p. 16). Effective protection of the environment requires more than a willingness to cooperate; it requires the recognition that controlling pollution is a state's legal obligation (Springer 1983, p. 196). Thus, the state would need to apply the precautionary principle in its activities to avoid or prevent serious or irreversible damage.

In conventions with regard to transboundary pollution harm, despite having defects of complexity, the fault liability of the state is still a necessary and important means, and its functions will be further strengthened. The system of strict civil liability compensation

cannot replace the system of state responsibility. The state responsibility and civil liability legal systems have relied on each other in arriving at the substantive principles that are now widely accepted. State responsibility and international law can assume new significance and vitality when used as interlocking remedies in conjunction with civil liability (Guruswamy 2010, p. 237). A mature system of state responsibility will be conducive to the strengthening of international environmental protection, and states remain the most important players. State responsibility should not be overwhelmed or lessened in developing transboundary environmental damage liability, and private law liability should be facilitated by emphasizing and developing state responsibility. The obligation to exercise due diligence also requires states to engage in actions such as screening and monitoring private activities and carrying out impact assessments (Vordermayer 2018, p. 81). Only by emphasizing state responsibility we can compel international society to attach greater importance to protecting the entire environment to boost the establishment and perfection of international environmental law. Reliance on only state negligence liability or strict civil liability cannot produce a complete effect or perfect solutions; we need the combination of the two, each complementing the other, to achieve the effect of prevention and compensation. Of course, in that relationship of the compensation that is the state's responsibility and the compensation that is a civil liability, there is a need for more thematic study.

5 Conclusions

How can we overcome the structural barriers to the imputation principle of state responsibility for transboundary pollution? There are conflicting opinions about this among scholars of international law. Any regime of liability should consider factors such as the balance of interests, reasonableness, due diligence, and equity, and it must not hinder economic development or scientific progress. It is difficult to determine what type of responsibility principle of state is the most effective and feasible means by which to address transboundary harm. Although the relief method of fault liability is neither comprehensive nor adequate enough and may lead to the unfair results, the strict liability in state responsibility cannot be regarded as sufficient for stipulation in the conventions of transboundary pollution, and it especially cannot be regarded as applicable to all transboundary pollution cases. The establishment of a liability system must take into account the balance of interests between countries. Strict liability more or less ignores the need to balance such numerous and complex interests. Strict liability is not universally accepted, even in conventions, although that it can be viewed as having been accepted in state practice. If the state's strict liability for significant harm was regarded a universal rule, this would most likely produce counterproductive and negative effects. Indeed, this norm may have unintentionally contributed to the general failure to establish a system of collective action. Without widespread national consent, it is very difficult for the principle of strict liability to be generalized, and it exceeds the pace of progress of the international community at the present stage.

Would a legal regime based on fault liability theory solve all transboundary pollution problems? Practice shows that although the fault liability theory faces some difficulty in dealing with state responsibility for transboundary environmental harm, the theory provides a better foundation for building a consensus for meaningful regulation of transboundary pollution and accommodates competing interests. The focus of law should shift away from the strict liability of international law provided by some current international legal theories towards the fault liability theory in dealing with state responsibility for transboundary

environmental harm. One possibility is a return to the source of customary international law, and a more specific list of state acts that fall under the scope of prevention articles should be compiled. More precisely, the concept of state responsibility is predicated on the rule of due diligence. We should focus on an obligation of increased prevention.

Currently, the connection between state responsibility and civil liability in two legal regimes, the interrelationship between prevention and liability, has been undervalued. The interrelated nature of the concepts of 'prevention' and 'liability' requires particular emphasis. Such liability should have been included in a more general analytical model on loss allocation. Any regime for the allocation of loss should be designed to provide incentives for those concerned with transboundary pollution harm and the state to take preventive measures to avoid damage. The attachment of primary liability to the operator does not in any way absolve the state from discharging its own duty of prevention under international law. In the formulation of the transboundary pollution harm liability system, establishing a system of state fault liability for harm and strict civil liability for compensation with a number of limiting factors has a better chance of being widely accepted by the international community. Of course, this choice and approach may also be influenced by different stages of economic development of the countries concerned.

Acknowledgements The authors of this paper would like to thank the editors and three anonymous reviewers for valuable comments on this manuscript.

Compliance with ethical standards

Conflict of interest The author declares that he has no conflict of interest.

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