COMPENSATION FOR VESSEL-SOURCE OIL POLLUTION DAMAGE IN CHINA

DONG BINGYING

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The Hong Kong Polytechnic University

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The Hong Kong Polytechnic University

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DONG BINGYING

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CERTIFICATE OF ORIGINALITY

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_____ (Signed)

DONG Bingying (Name of Student)

To My Dear Parents and Husband

ABSTRACT

This is not the end, it is not even the beginning of the end, but it is perhaps the end of the beginning.

— *Winston S. Churchill*

We live in an energy-dependent world where oil is the main source of energy. The carriage of oil by sea goes hand in hand with the potential risk of oil spill incidents. China is potentially exposed to an increasing risk of vessel-source oil pollution incidents as a result of rapid development of its marine petroleum industry and marine transportation. However, the complete framework of a compensation regime for vessel-source oil pollution damage was not established until after a number of laws and regulations came into effect by the close of 2012. However, up to now there has not been any relevant research dedicated to this new regime of compensation for vessel-source oil pollution damage in China. In addition, this research is motivated by China's reluctance to fully accept the well-established international compensation regime for vessel-source oil pollution damage. Few attempts have been made to explain the different attitudes of countries toward the international compensation regime, or to analyze the rationality of China's incomplete acceptance of such international regime.

Taking the above background into consideration, this research contributes to the existing literature in three respects. Firstly, this research comprehensively investigates the new regime of compensation for vessel-source oil pollution damage in China, and illustrates how China is enhancing its compensation capacity and moving closer toward the international standards that have been established by the relevant international conventions. Secondly, this research applies a social science method—fuzzy-set Qualitative Comparative Analysis—into legal research and, for the first time, into the oil pollution compensation area. It is used to demonstrate how three factors combined together have led to the

high acceptance level of the international regime, these factors being (a) economic development, (b) risk of exposure to tanker oil spills, and (c) the financial burden associated with adherence to the relevant international conventions relating to oil pollution compensation. Three patterns of countries that have joined the International Oil Pollution Compensation (IOPC) Fund are identified and interpreted. Finally, based on a comprehensive examination of the compensation regime for vessel-source oil pollution damage in China, together with the results of the fuzzy-set Qualitative Comparative Analysis, this research provides a useful insight into the necessity and feasibility of China's participation in the IOPC Fund, which would further increase the compensation limits and give greater protection to the victims of any future oil pollution incidents in China.

PUBLICATIONS ARISING FROM THE THESIS

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3. Zhu, Ling, Dong, Bingying, Li, Kevin X., "China's 2012 Regime for Compensation for Vessel Source Oil Pollution: A Comparative Study", *Ocean Development and International Law*, 3:44 (2013): 270-286.

4. Dong, Bingying, Zhu, Ling, Luo, Meifeng, "Combating Marine Pollution from Vessels: China's New Legislation", *The International Journal of Marine and Coastal Law,* 29 (2014) 158-172.

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ABBREVIATIONS

CLC	Civil Liability Convention
CLCs	The 1969 CLC and 1992 CLC
CMC	China Maritime Code
COPE Fund	Compensation for Oil Pollution in European Waters Fund (EU)
csQCA	Crisp-set Qualitative Comparative Analysis
CVOPCF	China Vessel-Source Oil Pollution Compensation Fund
EU	European Union
fsQCA	Fuzzy-set Qualitative Comparative Analysis
GIS	Geographic Information System
GNI	Gross National Income
IEA	International Energy Agency
IMCO	Intergovernmental Maritime Consultative Organization
IOPC Fund	International Oil Pollution Compensation Fund
ITOPF	International Tanker Owner Pollution Federation
LLMC	Convention on Limitation of Liability for Maritime Claims
LLR	The Regulation of Limitation of Liability for Maritime Claims Relating to Ships with a Gross Tonnage not Exceeding 300 Gross Tons and Those Engaging in Transport Services Between Ports of China, as well as Those for Other Coastal Operations (PRC)
MARPOL	International Convention for the Prevention of Pollution from Ships
MEPL	Marine Environmental Protection Law (PRC)
MOF	Ministry of Finance (PRC)
MOT	Ministry of Transport (PRC)
MSA	Maritime Safety Administration (PRC)
OBOs	Oil/bulk/ore ships
OPA	Oil Pollution Act
OSLTF	Oil Spill Liability Trust Fund (The United States)

P&I	Protection and Indemnity
PRC	The People's Republic of China
QCA	Qualitative Comparative Analysis
SDR	Special Drawing Right
SOA	State Oceanic Administration (PRC)
SOPF	Ship-source Oil Pollution Fund (Canada)
STOPIA	Small Tanker Oil Pollution Indemnification Agreement
TOPIA	Tanker Oil Pollution Indemnification Agreement
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environment Programme

CHAPTER 1

INTRODUCTION

Background of the Research

As a commodity of key strategic importance, ever since the Second World War[1] oil has been the main source of energy in the world. In 2010, oil accounted for over 34 per cent of the world's primary energy consumption.[2] Oil demand is closely related to the seaborne shipments of crude oil, because around half of the global crude oil production is transported by sea.[3] Crude oil transported by sea in 2010 amounted to about 1.8 billion tons.[4] Transporting such a huge amount of oil by sea involves the risk that oil spills may lead to pollution of the marine environment. Also, along with the growth in size of bulk carrier and container ships, numerous spills at sea have been of heavy fuel oil from non-tanker vessels.[5] To prevent vessel-source oil pollution damage, the International Maritime Organization (IMO) has, in this regard, adopted a number of international conventions. One of the most important international instruments is the International Convention for the Prevention of Pollution from Ships, 1973 and its 1978 Protocol (MARPOL 73/78). Annex I of MARPOL 73/78 specifically deals with prevention of pollution by oil. According to a recent study conducted by the International Tanker Owner Pollution Federation (ITOPF), there was a significant reduction in both the volume and frequency of oil spills during the period from 1992 to 2012, and this trend is likely to be partly

[1] Colin de la Rue, Charles B. Anderson, *Shipping and the Environment*, 2nd ed. (London, Hong Kong: Informa, 2009), 10.

[2] Review of Maritime Transport, 2011, United Nations Conference on Trade and Development, available at: http://unctad.org/en/Docs/rmt2011_en.pdf. (accessed 20 March 2013)

[3] UNCTAD Report of Liability and Compensation for Ship-Source Oil Pollution: An Overview of the International Legal Framework for Oil Pollution Damage from Tankers, Studies in Transport Law and Policy, 2012 No.1, at p 19.

[4] Supra note 2.

[5] Ling Zhu, "Compensation Issues under the Bunkers Convention", *WMU Journal of Maritime Affairs* 7(2008): 303-316.

attributable to the implementation and enforcement of conventions and regulations specifically aimed at the prevention of vessel-source oil pollution.[6]

Although prevention has proved to be the most effective method of combating oil pollution, compensation is equally important because oil spill incidents are inevitable.[7] The international compensation regime for vessel-source oil pollution damage has been established since the 1960s by several international conventions and their amendments, including (1) the 1969 International Convention on Civil Liability for Oil Pollution Damage, together with its 1976/1992 protocol and 2000 Amendments (hereinafter referred to as "the 1969/1992 CLC"), (2) the 1971 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, together with its 1976/1992 protocol and 2000 Amendments (hereinafter referred to as "the 1976/1992 Fund Convention"), (3) the Protocol of 2003 to the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1992 (hereinafter referred to as "the 2003 Supplementary Fund Convention") and (4) the International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001 (hereinafter referred to as "the Bunkers Convention"). Under this international regime, there are two independent sub-regimes. One is the three-tier compensation regime applying to oil tankers, the other is the single-tier compensation regime applying to bunker spill from other types of ships. The basic framework of the international compensation regime for tanker oil pollution has been built by the 1969/1992 CLC and the 1976/1992 Fund Convention. Strict liability is imposed on the owner of a tanker causing oil pollution, while a limited number of exonerations are offered. This liability is limited to an amount depending on the tonnage of the ship. In addition, the owner is required to maintain compulsory insurance or other financial guarantee to

[6] Susannah Musk, Trends in Oil Spills from Tankers and ITOPF Non-tanker Attended Incidents, paper presented at the 2010 Arctic and Marine Oil Spill Program (AMOP) Technical Seminar, Vancouver, 5-7 June 2012, available at: http://www.itopf.com/information-services/publications/papers/documents/amop12.pdf. (accessed 13 May 2012).

[7] Chao Wu, *Pollution from the Carriage of Oil by Sea: Liability and Compensation* (London: Kluwer Law International, 1996), 2.

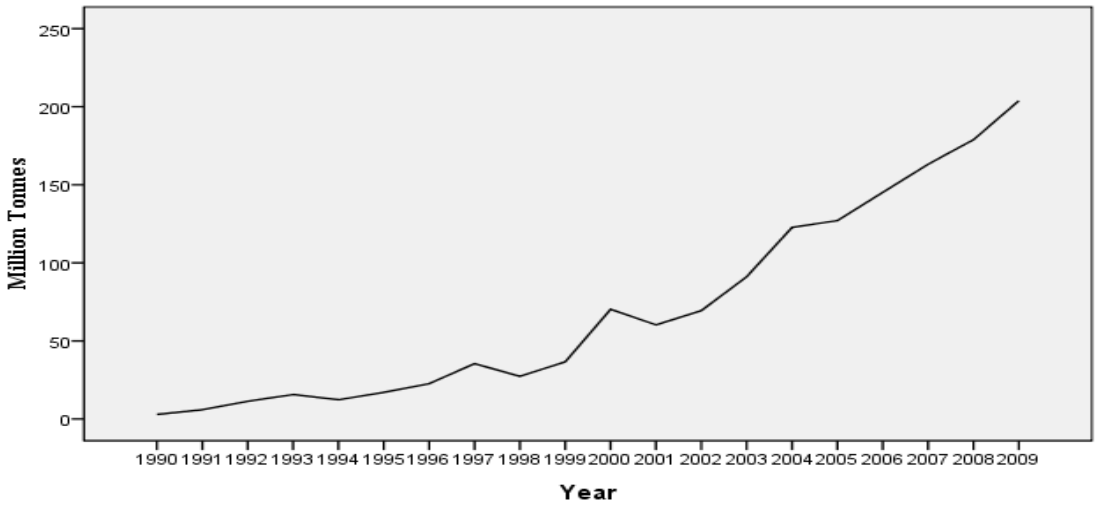
cover his liability of oil pollution damage. At the same time, the International Oil Pollution Compensation Fund (hereinafter referred to as "the IOPC Fund") is financed by levies imposed on oil receivers. It provides supplementary compensation up to overall 203 million SDR where the amounts recoverable from the shipowner are insufficient to cover the oil pollution claims. Meanwhile, some of the IOPC Fund Member States have acceded to the 2003 Supplementary Fund Convention, which provides a third tier of compensation up to an overall 750 million SDR. This three-tier compensation regime aims to provide adequate and prompt compensation for claimants of tanker oil pollution damage, and to share the financial burden between shipowner and oil receivers. However, this regime does not apply to ships other than oil tankers. It was the purpose of the the Bunkers Convention to fill in this gap. Like the 1969/1992 CLC, the Bunkers Convention establishes strict liability, limitation of liability and compulsory insurance for the shipowner. However, there is no supplementary compensation source for bunker oil pollution under this single-tier regime. The international compensation regime for vessel-source oil pollution damage is considered to be robust and well-developed, as shown by its wide ratification and the large number of oil spill cases that it has handled.

Going contrary to the reduction of oil pollution incidents on a global scale, the number and volume of oil pollution incidents in Chinese sea areas are not showing a downward trend.[8] Throughout the past two decades, imports of crude oil have been increasing dramatically as a result of China's economic development. In 1990, the import of crude oil was 5.97 million tons, whereas in 2009 the import of crude oil, for the first time, surged above 200 million tons, and in fact reached 203.79 million tons (see Figure 1-1). The risk of oil pollution from ships has therefore increased exponentially along with China's growing need for crude oil.[9]

[8] The statistics analysis of oil pollution incidents in Chinese sea areas can be found in Chapter 4.

[9] Lisa Woolgar, "Assessing the Increasing Risk of Marine Oil Pollution Spills in China", paper presented at Twentieth International Oil Spill Conference, Savannah, GA, 4-8 May 2008, available at: http://www.itopf.com/information-services/publications/papers/documents/IOSC08LW.pdf. (accessed 13 May 2012).

Figure 1-1: China's Crude Oil Imports, 1990-2009



Source: China Energy Statistical Yearbook, China Customs Statistical Yearbook, International Petroleum Economics

In an effort to deter oil pollution from ships, China has acceded to a number of international conventions, and has also enacted a series of domestic laws and regulations for the prevention of and compensation for any oil pollution damage from ships. With respect to compensation, China has acceded to both the 1992 CLC and the Bunkers Convention, but has not adopted the 1992 Fund Convention and the 2003 Supplementary Fund Convention. In addition, a number of domestic laws and regulations have been adopted since 2010. These new laws and regulations have initiated significant development of the compensation regime for vessel-source oil pollution damage in China. On 1 March 2010 the amended Regulations of the PRC on the Prevention and Control of Marine Pollution from Ships (hereinafter referred to as **"**the Amended Regulations**"**) took effect. Shortly afterwards, the Measures for Implementation of Insurance for Civil Liability of Oil Pollution from Ships (hereinafter referred to as "the Oil Pollution Insurance Regulation") took effect as of 1 October 2010, this constituting the first tier of the compensation regime for vessel-source oil pollution damage. In addition, the Provisions of the Supreme People's Court on Several Issues Concerning the Trial of Cases of Disputes over Compensation for Vessel-induced Oil Pollution (hereinafter referred to as "the Judicial Interpretation") came into effect on 1 July 2011, and this clarified a number of uncertain issues with regard to liability and compensation for oil pollution

damage from ships. Furthermore, a final draft of the Administrative Measures for Use and Collection of the Compensation Fund for Oil Pollution Damage from Ships (hereinafter referred to as "the Compensation Fund Regulation") took effect as of 1 July 2012. The China Vessel-source Oil Pollution Compensation Fund (hereinafter referred to as the "CVOPCF") is in place to provide an additional amount of compensation up to RMB 30 million to oil pollution victims. The operation of the CVOPCF not only starts the mechanism of sharing the financial burden between shipowners and oil receivers, but also signifies the establishment of a two-tier compensation regime for vessel-source oil pollution damage in China. Admittedly, this demonstrates the significant progress that China has so far made to protect the interests of pollution victims, as well as to protect the marine environment. However, it should be noted that the maximum compensation amount provided by this two-tier compensation regime, particularly with regard to tanker oil pollution, is still much lower than the international standard that has been established by the above mentioned international conventions.

Objective and Structure of the Research

On an international level, many researchers have conducted comprehensive studies on the international compensation regime for vessel-source oil pollution damage (David W. Abecassis, 1978[10]; Chao Wu, 1996[11]; Ling Zhu, 2007[12]; Colin de la Rue and Charles B. Anderson, 2009[13]). On the Chinese domestic level, there are also a number of literatures regarding the civil liability and compensation for vessel-source oil pollution. Hong Liu[14] (2002) proposed that it

[10] David W. Abecassis, *The Law and Practice Relating to Oil Pollution from Ships* (London: Butterworths, 1978).

[11] Chao Wu, *Pollution from the Carriage of Oil by Sea: Liability and Compensation* (London; Boston: Kluwer Law International, 1996).

[12] Ling Zhu, *Compulsory Insurance and Compensation for Bunker Oil Pollution Damage* (Berlin; New York: Springer, 2007).

[13] Colin de la Rue and Charles B. Anderson, Shipping and the Environment, 2nd ed. (London: Informa law, 2009).

[14] Hong Liu, "Establishing and Implementing the Chinese Regime of Compensation for Oil Pollution Damage from Ships", *Environmental Protection in Transportation,* 6 (2002): 6-10.

was necessary to establish a compensation regime for vessel-source oil pollution damage in China. She suggested that compulsory insurance should be implemented in accordance with the level of economic development in China, and that a domestic compensation fund for vessel-source oil pollution damage should be established to provide a supplementary compensation source. However, she suggested that a low limitation of liability, a low contribution amount to the domestic compensation fund, and a low compensation amount for victims should be adopted at the initial stage of establishing the compensation regime. Lixin Han[15] (2007) scrutinized the legal aspect of liability and compensation for vessel-source oil pollution damage in China. She particularly evaluated and criticized the draft of the Compensation Fund Regulation. She suggested that a specific oil pollution compensation regulation should be enacted, and also proposed a draft Law of Compensation for Pollution Damage Caused by Ships. In this regard, Hongjun Shan[16] (2007) compared the Chinese law concerning civil liability and compensation for marine oil pollution damage with both the relevant international conventions and the United States law. He came to the conclusion that the existing oil pollution compensation law in China should be improved so as to create more incentives for potential responsible parties to take greater precautionary measures in preventing oil pollution incidents and to ensure adequate compensation for oil pollution victims. Hui Wang[17] (2011) conducted a comparative study of the International, United States and Chinese regimes concerning marine oil pollution damage from a law and economics perspective, and held that optimal incentives for prevention can be generated through a compensation mechanism that matches contributions to the fund proportionate to those who contribute to the risks. However, when these studies were carried out, the above mentioned new laws and regulations concerning compensation for vessel-source oil pollution damage had not been implemented, and the two-tier compensation regime had not been established. Up to now there has not been any

[15] Lixin Han, *Research on legal regime of liability and compensation for oil pollution from ships* (Beijing: Law Press China, 2007).

[16] Hongjun Shan, *Comparative Study of China, American and International Civil Liability Regime on Oil Pollution* (Beijing, Law Press China, 2009).

[17] Hui Wang, *Civil Liability for Marine Oil Pollution Damage: A Comparative and Economic Study of the International, US and Chinese Compensation Regime* (The Netherlands: Kluwer Law International, 2011).

relevant research dedicated to a comprehensive study of this newly established compensation regime in China. This research attempts to fill the gap in existing literatures.

Therefore, the primary goal of this research is to comprehensively examine the two-tier compensation regime for vessel-source oil pollution damage in China. Two prime questions are as follows: (1) How does China improve its compensation regime for vessel-source oil pollution damage and move closer to the international standard? (2) Is it still necessary and sensible for China to accept the 1992 Fund Convention, which offers a higher level of compensation to victims? In order to answer these questions, prior to investigating the newly established regime in China the international compensation regime for vessel-source oil pollution damage needs to be examined. Moreover, factors or combinations of factors, which may influence countries to accept the international compensation regime for tanker oil pollution in varying degrees, are to be identified by the fuzzy-set Qualitative Comparative Analysis. The aim is to unveil the general patterns of those countries that have acceded to the 1992 Fund Convention, and to further explain the reasons behind these patterns. If China represents one of these patterns, the interpretations of these patterns will be helpful in analyzing the rationality of China's concerns regarding the 1992 Fund Convention. This will provide inspiration for policy makers when considering the necessity of now accepting the 1992 Fund Convention.

Therefore, this thesis is structured into two main parts, with five individual chapters in each part. Part I concerns the international compensation regime for vessel-source oil pollution damage, and Part II focuses on the compensation regime for vessel-source oil pollution damage in China. In Part I, Chapter 2 begins with an examination of the international compensation regime for vessel-source oil pollution damage. A number of key issues in several international conventions in this respect are analyzed. Chapter 3 further explains the diverse acceptance level of this well-established international regime. Factors are identified that may influence a country's acceptance level of the international

regime. Furthermore, how these factors combine together to lead to a high acceptance level of the international compensation regime for tanker oil pollution, namely, adoption of the 1992 Fund Convention or the 2003 Supplementary Fund Convention, is figured out and explained. As a result, the patterns of countries accepting the 1992 Fund Convention and the interpretation of these patterns are revealed. In Part II, Chapter 4 illustrates the current situation with regard to oil spills from ships in Chinese sea areas, by a statistical analysis and review of the legal framework of the compensation regime for vessel-source oil pollution in China. Since there is no specific oil pollution law in China, stipulations of the civil liability and compensation for vessel-source oil pollution damage can be traced through several national legislations and international conventions to which China has acceded. This chapter also performs a deep analysis of the application of these laws. Chapters 5 and 6 are devoted to a detailed investigation of the compensation regime in China from two particular aspects: (1) Compensation provided by shipowners; and (2) compensation provided by oil receivers. In Chapter 5, the main features of the first-tier compensation provided by shipowners is explored, including the issues of strict liability and liable parties, admissible claims, limitation of liability and compulsory insurance. Furthermore, two practical issues regarding the limitation of liability and compulsory insurance are discussed. There then follows Chapter 6, which provides an in-depth investigation into the second-tier compensation provided by the domestic compensation fund that is financed by oil receivers. Its legal basis, operation and compensation by the domestic compensation fund are scrutinized. Besides this, Chapter 6 also seeks to further investigate the reasons why China has been reluctant to accede to the 1992 Fund Convention, and to analyze the rationality of these concerns, based on the results obtained in Chapter 3. Furthermore, suggestions are given as to whether a purely domestic scheme is an appropriate solution for supplementary compensation in China, or whether it is time to consider acceding to the 1992 Fund Convention. Finally, Chapter 7 summarizes the whole of the research, and points out areas for further research.

Methods Used for the Research

First of all, to comprehensively analyze the legal regime of compensation for vessel-source oil pollution damage in China, a legal multidisciplinary approach[18] is to be employed. Various legal disciplines will be investigated, including maritime law, environmental law, tort law and insurance law. Maritime law, which regulates the relationships arising out of marine transportation and those pertaining to ships, is the basic research discipline, because ships causing oil pollution at sea are the sole object of research in this study. Besides this, certain specific issues in civil law, such as the application of the international conventions, are to be analyzed, because civil law provides general rules dealing with property relationships, as well as personal relationships between civil subjects with equal status. In addition, vessel-source oil pollution is by nature a kind of environmental tort. Accordingly, the basic principles and functions of environmental law and tort law need to be examined as well. Apart from the above, as a special feature of the liability and compensation system for vessel-source oil pollution damage, compulsory insurance needs to be studied, to obtain a general understanding of insurance law.

Secondly, the analysis of the international conventions regarding compensation for vessel-source oil pollution damage will not be limited to the texts of the Conventions. The intentions of legislators concerning some important issues, such as strict liability, limitation of liability and compulsory insurance, are to be illustrated.

Thirdly, although this study is not a traditional comparative legal study, the legal comparison method is adopted in analyzing the compensation regime for vessel-source oil pollution in China. Comparisons between the well-established international regime and the Chinese regime are involved in almost all the main

[18] Michael G. Faure and James Hu (eds.), *Prevention and Compensation of Marine Pollution Damage: Recent Developments in Europe, China and the US* (Alphen aan den Rijn: Kluwer Law International, 2006), iv.

legal issues, such as strict liability, admissible claims, limitation of liability, compulsory insurance and the compensation fund. Through identifying similarities and differences between the international regime and the Chinese regime, the legal comparison method helps to gain an in-depth understanding of both of these regimes, as well as to observe any gaps, which are difficult to detect if looking only at the Chinese regime.

Lastly, fuzzy-set Qualitative Comparative Analysis will be used to empirically explain how certain factors, which may influence the acceptance level of the international regime for vessel-source oil pollution damage, are combined together to lead to the high acceptance level of the international regime. The fuzzy-set Qualitative Comparative Analysis that was developed by Charles Ragin in 1987 is a social science method of ascertaining empirical patterns displayed by cases under examination, and thereafter interpreting these patterns, based on the researcher's substantive knowledge. It has been well established and widely used in social science research. Social phenomena are complex and difficult to unravel, because different causally relevant factors usually combine in a variety of ways to produce a given outcome.[19] The fuzzy-set Qualitative Comparative Analysis is better suited to analyzing causal complexity than is conventional quantitative analysis. This is because it focuses on the multiple combinations of different factors producing a specific outcome, rather than the "net effect" of each factor on this outcome. Although this method has proven to be a useful tool in conducting social science research, it has rarely been applied to legal research. This research is also seeking to demonstrate the potential this method has for solving legal problems. Furthermore, the compensation regime for marine oil pollution has, as such, never been the subject of analysis using fuzzy-set Qualitative Comparative Analysis. This research is for the first time applying this method in the area of oil pollution compensation, and attempts to innovate the research in this area by combining a legal multidisciplinary approach with a social science method.

[19] Charles C. Ragin, *The Comparative Method—Moving Beyond Qualitative and Quantitative Methods* (Berkeley, Los Angeles, London: University of California Press, 1987), 26.

PART I:

INTERNATIONAL COMPENSATION REGIME FOR VESSEL-SOURCE OIL POLLUTION DAMAGE

CHAPTER 2

LEGAL FRAMEWORK OF THE INTERNATIONAL COMPENSATION REGIME FOR VESSEL-SOURCE OIL POLLUTION DAMAGE

2.1 Introduction

In the wake of the historic disaster of the *Torrey Canyon* oil spill incident in March 1967[1], an international regime of liability and compensation for vessel-source oil pollution damage was created by two international conventions adopted under the auspices of the Intergovernmental Maritime Consultative Organization (IMCO), which was the predecessor of the International Maritime Organization (IMO), including: (1) The 1969 International Convention on Civil Liability for Oil Pollution Damage (hereinafter referred to as "the 1969 CLC"); and (2) the 1971 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (hereinafter referred to as "the 1971 Fund Convention"). At first, the 1969 CLC was criticized for being insufficient to cover oil pollution caused by a major oil pollution incident, and it was said to be unfair to put the entire burden on the shipping industry, since the damage was ultimately caused by the nature of the oil cargo.[2] In actual fact, the origin of the 1971 Fund Convention was thus a "compromise which was finally agreed to solve the deadlock delegations"[3] reached at the 1969 CLC. Without the 1971 Fund Convention, which imposed the obligation of compensation on oil receivers, the 1969 CLC would never have been accepted.

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[1] The Torrey Canyon ran aground while entering the English Channel, and spilled her entire cargo of 120,000 tons of crude oil into the sea in March 1967.

[2] Lawson A. W. Hunter, "The Proposed International Compensation Fund for Oil Pollution Damage", *Journal of Maritime Law and Commerce*, 4 (1972) 4: 117-139.

[3] Official record of the Conference on the Establishment of An International Compensation Fund for Oil Pollution Damage, 1971 Fund Convention (London: Inter-Governmental Maritime Consultative Organization, 1978), 198.

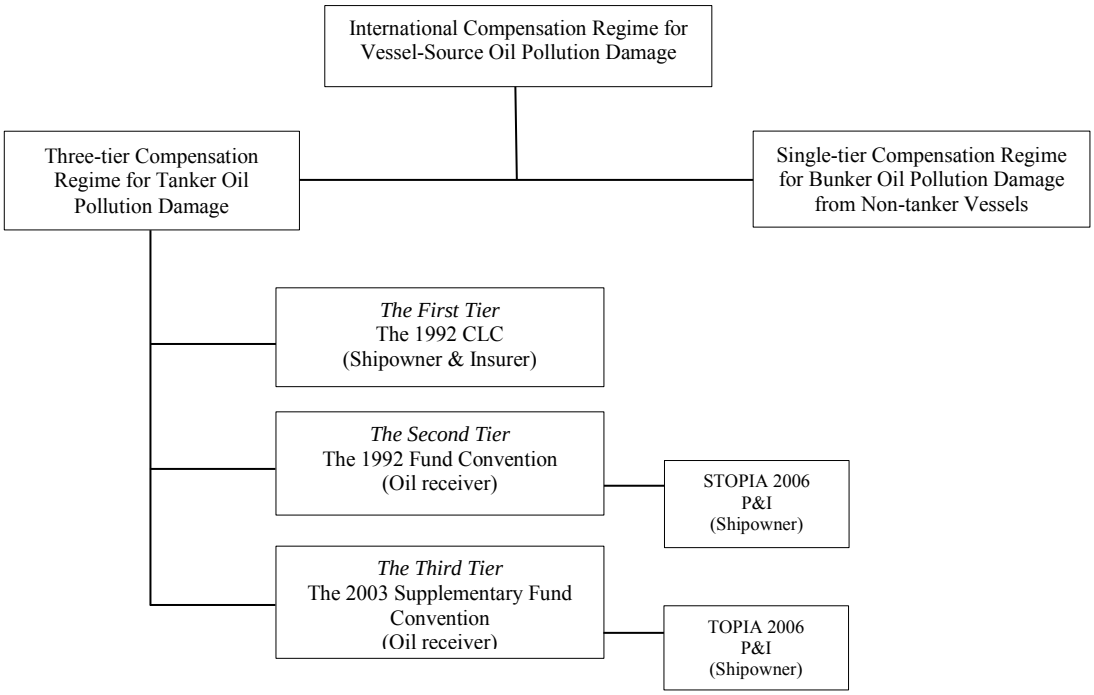
These two conventions were amended by two protocols in 1992, which are referred to as the 1992 CLC and the 1992 Fund Convention. Like their predecessors, the 1992 CLC imposes strict liability on the shipowner, with a limited number of exonerations, and establishes a system of compulsory liability insurance. As the second tier of the compensation regime, the 1992 International Oil Pollution Compensation Fund (hereinafter referred to as "the 1992 IOPC Fund"), which was created by the 1992 Fund Convention, provides supplementary compensation for oil pollution victims where compensation under the 1992 CLC is either unavailable or inadequate. In 2003, the Protocol of 2003 to the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1992 (hereinafter referred to as "the 2003 Supplementary Fund Convention") was created to provide higher levels of compensation to some contracting states of the 1992 Fund Convention and this constitutes a third tier of the compensation regime. Moreover, two voluntary agreements, including (1) the Tanker Oil Pollution Indemnification Agreement, 2006 (hereinafter referred to as "TOPIA 2006") and (2) the Small Tanker Oil Pollution Indemnification Agreement, 2006 (hereinafter referred to as "STOPIA 2006"), were approved to ensure the cost of oil pollution claims under the 1992 CLC, the 1992 Fund Convention and the 2003 Supplementary Fund Convention are shared equally between shipowners and oil receivers. The history of the international regime of compensation for tanker oil pollution damage is also the history of achieving a balance between the conflicting interests of all parties involved.[4] This regime is designed not only to provide adequate and prompt compensation to oil pollution victims, but also to balance the financial burden between the shipping industry and the oil industry.

On the other hand, opposite to the three-tier compensation regime for tanker oil pollution damage, a single-tier compensation regime for bunker oil pollution damage from non-tanker vessels was created by the International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001 (hereinafter referred to as "the Bunkers Convention"). In this chapter, the main features of the

[4] Chao Wu, *Pollution from the Carriage of Oil by Sea: Liability and Compensation* (London: Kluwer Law International, 1996), 3.

abovementioned international conventions, as well as the voluntary agreement, are examined.

Figure 2-1 International Compensation Regime for Vessel-Source Oil Pollution Damage



2.2 The 1969/1992 CLC

Despite several improvements in the 1992 CLC, the general framework and basic features of the 1969 CLC and the 1992 CLC are the same, and some of the provisions are identical. Both of them impose a strict liability on shipowner, with limited exceptions where they are entitled to limit their liabilities. Besides this, compulsory insurance and direct action are also important features of these two conventions. The main differences between the 1969 CLC and the 1992 CLC are the limits of compensation. Limits under the 1992 CLC are significantly higher than the limits under the 1969 CLC. Although the 1992 CLC is widely accepted, there are a number of states that only ratified the 1969 CLC, for instance, Brazil and Costa Rica.

2.2.1 Geographic Scope

The 1969 CLC applies to pollution damage caused on the territory, including the territorial sea, of a Contracting State, and to preventive measures taken to prevent or minimize such damage.[5] The 1992 CLC extends the geographic application to the exclusive economic zone of a Contracting State established in accordance with international law, and to the area beyond and adjacent to the territorial sea extending not more than 200 nautical miles from the baseline from which the breadth of its territorial sea is measured if a Contracting State has not already established such zone.[6] Moreover, it explicitly provides that any preventive measures to prevent or minimize such damage, wherever taken, are covered by the 1992 CLC.[7]

2.2.2 Pollution Damage

Pollution damage defined by the 1969 CLC means "… loss or damage caused outside the ship carrying oil by contamination resulting from the escape or discharge of oil from ships, wherever such escape or discharge may occur, and the costs of preventive measures and the further loss or damage caused by preventive measures."[8] The preventive measures mean "…any reasonable measures taken by any person after an incident has occurred to prevent or minimize pollution damage."[9] Damage is limited to that caused outside the ship, so that damage caused by pollution on board is not covered. Besides this, the damage must be caused by contamination resulting from the escape or discharge of oil from the ship. Personal injury resulting from an explosion or fire caused by oil is excluded.[10] The 1992 CLC clarified the compensation scope for environmental loss. It is provided that compensation for impairment of the environment other than loss of profit from such impairment shall be limited to

[5] The 1969 CLC, Article II.

[6] The 1992 CLC, Article II (a).

[7] Ibid, Article II (b).

[8] The 1969 CLC, Article I (6).

[9] Ibid, Article I (7).

[10] Chao Wu, supra note 4 at 48.

the costs of reasonable measures of reinstatement actually undertaken or to be undertaken.[11] In addition, the 1992 CLC extends the compensation to include preventive measures after an incident creating a grave and imminent threat of causing such damage.[12]

2.2.3 Ship

The 1969 CLC restricted its application to sea-going vessels and seaborne craft of any type whatsoever actually carrying oil in bulk as cargo.[13] Thus, tankers in ballast were excluded. However, the 1992 CLC applies to sea-going vessels and seaborne craft of any type whatsoever constructed or adapted for the carriage of oil in bulk as cargo.[14] Accordingly, the 1992 CLC extends its application to include oil spills caused by tankers that do not actually have oil carried in bulk as cargo at the time of an incident. In addition, the 1992 CLC also extends the scope of coverage to oil spills from oil/bulk/ore ships (OBOs),[15] provided that they are actually carrying oil in bulk as cargo, and during any voyage following such carriage, unless it is proved that it has no residues of such carriage of oil in bulk aboard. For both conventions, warships or other ships owned or operated by a State and used for non-commercial government service are excluded from application.[16]

2.2.4 Oil

Oil is defined in the 1969 CLC as any persistent oil, no matter whether carried on board a ship as cargo or in the bunkers, such as crude oil, fuel oil, heavy diesel

[11] The 1992 CLC, Article I (6).

[12] Ibid, Article I (8).

[13] The 1969 CLC, Article I (1).

[14] The 1992 CLC, Article I (1).

[15] Tsimplis M.N., "Marine Pollution from Shipping Activities", *Journal of International Maritime Law*, 14 (2008):101-152.

[16] The 1969 CLC, Article XI and the 1992 CLC Article XI.

oil, lubricating oil and whale oil.[17] The 1992 CLC deletes the whale oil and restricts the application to persistent hydrocarbon mineral oil.[18]

2.2.5 Strict Liability of Shipowner

Strict liability is imposed on a shipowner, but at the same time, under the CLCs, a limited number of exonerations are available to them.[19] Claimants only need to prove that the damage was caused by the spill incident. The burden of proof that a pollution incident is caused by exonerations provided by the CLCs[20] is on shipowners. Thus, shipowners bear the risk of pollution claims resulting from incidents occurring that are not their fault, and this is important because often all the relevant evidence is outside the control of claimants.[21]

"Owner" means the registered owner or the person or persons owning the ship when the registered owner is in absence.[22] Channeling the liability to owners[23] is one of the important features of the CLCs. On the one hand, the CLCs channel oil pollution claims to the owner of the ship by excluding claims against him that are outside the scope of the CLC. On the other hand, claims against various parties other than the shipowner are excluded. Under the 1969 CLC, no claim

[17] The 1969 CLC, Article I (5).

[18] The 1992 CLC, Article I (5).

[19] The 1969 CLC, Article III (1) and the 1992 CLC, Article (1).

[20] The 1969 CLC, Article III (2) & (3) and the 1992 CLC, Article (2) & (3) provides that:

"2. No liability for pollution damage shall attach to the owner if he proves that the damage: a) resulted from an act of war, hostilities, civil war, insurrection or a natural phenomenon of an exceptional, inevitable and irresistible character, or b) was wholly caused by an act or omission done with intent to cause damage by a third party, or c) was wholly caused by the negligence or other wrongful act of any Government or other authority responsible for the maintenance of lights or other navigational aids in the exercise of that function.

3. If the owner proves that the pollution damage resulted wholly or partially either from an act or omission done with intent to cause damage by the person who suffered the damage or from the negligence of that person, the owner may be exonerated wholly or partially from his liability to such person."

[21] Colin de la Rue, Charles B. Anderson, *Shipping and the Environment*, 2nd ed. (London, Hong Kong: Informa, 2009), 98.

[22] The 1969 CLC, Article I (1) and the 1992 CLC, Article I (1).

[23] The 1969 CLC, Article I (3) and the 1992 CLC, Article I (3).

can be made against the servants or agents of the owner.[24] The 1992 CLC goes further than the 1969 CLC in this regard. This is because the 1992 CLC further provides that no claims can be made against: (a) the servants or agents of the owner or a member of the crew; (b) the pilot or any other person who, without being a member of the crew, performs services for the ship; (c) any charterer, manager or operator of the ship; (d) any person performing salvage operations with the consent of the owner or on the instructions of a competent public authority; (e) any person taking preventive measures and (f) all servants or agents of any person mentioned in (c), (d) and (e).[25] However, this provision does not prejudice the right of recourse of the owner against any party for pollution claims.[26] The channeling provision is designed to simplify the compensation system for pollution victims by clarifying the compensation route to the greatest extent, thus speeding up the settlement of claims.[27]

If oil is discharged or escapes from two or more vessels, the owners of all the ships concerned shall be jointly and severally liable for all such damage that is not reasonably separable.[28] Where oil is discharged or escapes after a collision between two or more vessels, then if oil is spilled from only one vessel, under the CLCs, and without prejudice to the right of recourse, the owner of the spilling vessel shall be strictly liable for the oil pollution damage, unless he can discharge himself from liability due to any stipulated exonerations in the CLCs. It should be noted that, although the CLCs do not provide a basis for claims against non-spilling vessels involved in a collision that results in oil pollution, claims being brought against colliding vessels on some other basis for liability are not prevented.[29]

[24] The 1969 CLC, Article III (4).

[25] The 1992 CLC, Article III (4).

[26] The 1969 CLC, Article III (5) and the 1992 CLC, Article III (5).

[27] Mans Jacobsson, "Bunker Convention in Force", *Journal of International Maritime Law* 15 (2009): 21 – 36.

[28] The 1969 CLC, Article IV and the 1992 CLC, Article IV.

[29] Colin de la Rue and Charles B. Anderson, supra note 21, at 669-670.

2.2.6 Limitation of Liability

As one of the traditions in maritime law, the right of shipowners to limit their liability under the CLCs may be considered as a *quid pro quo* for the stringent basis of liability.[30] As far as strict liability is concerned, unless such liability is limited, industry would not carry out hazardous activities that are essential to society, because the risk generated from the activities would be greater than the profit.[31] Under the 1969 CLC, owners are entitled to limit their liability in respect of any one incident to an aggregate amount of 2,000 francs for each ton of ship's tonnage, and the maximum compensation amount shall not in any event exceed 210 million francs. Under the 1976 protocol, Special Drawing Rights (hereinafter referred to as "SDR"), as defined by the International Monetary Fund, are used as the applicable unit of account replacing the gold franc.[32] A new limit of 133 SDR for each ton, and a financial cap of 14 million SDR, are provided.[33] There is no minimum limitation of liability under the 1969 CLC, which resulted in the IOPC Fund being involved in a number of minor incidents and bearing a large proportion of compensation.[34] As a consequence, in the 1992 CLC, a minimum limit of 3 million SDR for a ship not exceeding 5,000 tons is set. For ships above 5,000 tons, the limit is 3 million in addition to 420 SDR for each ton above 5,000 tons. The maximum compensation amount is 59.7 million SDR. Following the *Erika* incident, limits were again increased by the 2003 Amendments.[35] A minimum limit of 4.51 million SDR is set for a ship not exceeding 5,000 tons; for ships above 5,000 tons, the limit is increased to 4.51 million SDR in addition to 631 SDR for each ton above 5,000 tons; and the overall financial cap is reached at 89.77 million SDR.[36]

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[30] Colin de la Rue and Charles B. Anderson, supra note 21, at 113.

[31] Chao Wu, supra note 4, at 62.

[32] The 1976 Protocol to the International Convention on Civil Liability for Oil Pollution Damage, 1969, agreed on 19 November 1976.

[33] The 1976 Protocol, Article II (1).

[34] Colin de la Rue and Charles B. Anderson, supra note 21, at 14.

[35] IMO Resolution LEG. 1(82), Amendment, adopted on 18 October 2000, to the Limitation Amounts in the Protocol of 1992 to Amend the International Convention on Civil Liability for Oil Pollution Damage, 1969.

[36] The 2003 Amendment, Article 2.

Under the CLCs, certain conduct by shipowners can lead to the loss of limitation. Under the 1969 CLC, the owners are not entitled to limit their liability if the incident occurred as a result of actual fault or privity of the owner.[37] Under the 1992 CLC, the test of conduct barring the right of limitation is stricter, so it is harder to break the limits, which could be seen as a compromise to increase the limitation amounts. A shipowner is denied the right of limitation if it is proved that the pollution damage resulted from his personal act or omission, was committed with the intent to cause such damage, or recklessly and with knowledge that such damage would probably result.[38] The burden of proving the shipowner's conduct is on the claimant.[39]

The owner shall establish a fund with the Court or other competent authority, for the total sum representing the limit of his liability as described in the CLCs.[40] Establishment of a limitation fund is a prerequisite to the right of limitation.[41] Where the owner has established a fund and is entitled to limit his liability, no person having a claim for pollution damage arising out of the incident shall be entitled to exercise any right against any other assets of the owner in respect of such claim. Meanwhile, the Court, or any other competent authority, shall order the release of any ship or other property belonging to the owner, which ship or property may have been arrested in respect of a claim for pollution damage arising out of the incident, and shall similarly release any bail furnished to avoid such arrest.[42] With regard to the distribution of the limitation fund, the pro-rata rule is introduced so that the fund shall be distributed among the claimants in proportion to the amount of their established claims.[43]

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[37] The 1969 CLC, Article V (2).

[38] The 1992 CLC, Article V (2).

[39] *The Bowbelle* [1990] 1 Lloyd's Rep. 532 and MSC Mediterranean Shipping Co SA v Delumar BVBA *(The Rosa M)* [2002] 2 Lloyd's Rep. 399.

[40] The 1969 CLC, Article V (3) and the 1992 CLC, Article V (3).

[41] Ibid.

[42] The 1969 CLC, Article VI (1) and the 1992 CLC, Article VI (3).

[43] The 1969 CLC, Article V (4) and the 1992 CLC, Article V (4).

2.2.7 Compulsory Insurance and Direct Action

Owners of a ship carrying more than 2,000 tons of oil in bulk as cargo is required to maintain compulsory insurance or other financial security in the sum fixed by applying the limits of liability prescribed in the 1969 CLC or the 1992 CLC.[44] Smaller ships of less than 2,000 tons are not required to maintain compulsory insurance, so as to alleviate the administrative burden on the compulsory insurance regime.[45] Claimants are entitled to claim for compensation directly against the liability insurers or other person providing financial security.[46] However, as a compromise, the insurer may avail himself of the limits of liability, even though the owner is not entitled to limit his right. Furthermore, it is the right of the insurer to avail himself of any defenses which the owner himself would have been entitled to invoke. The insurer can be discharged of his liability if the pollution damage resulted from any willful misconduct of the owner himself. However, in no case can the insurer reject a claim for a defense which he might have been entitled to invoke in a proceeding brought against him by the owner.[47] Compulsory insurance and direct action solve any difficulties in enforcing claims caused by the insolvency of one-ship companies, and ensure adequate and prompt compensation for claimants.[48]

Contracting States shall ensure, under the domestic legislations, that the adequate insurance or other financial guarantee is in force for a ship carrying more than 2,000 tons of oil in bulk as cargo, wherever registered, which calls at their ports or offshore terminals.[49] With respect to a ship registered in a Contracting State, a certificate attesting that insurance or other financial guarantee is in force shall be issued by the appropriate authority of the State of the ship's registry.[50] At the

[44] The 1969 CLC, Article V (1) and the 1992 CLC, Article V (2).

[45] O.R. LEG/CONF/4, at p 469.

[46] The 1969 CLC, Article V (8) and the 1992 CLC, Article V (8).

[47] The 1969 CLC, Article V (8) and the 1992 CLC, Article V (8).

[48] David W. Abecassis, *The Law and Practice Relating to Oil Pollution from Ships* (London: Butterworths, 1978), 205.

[49] The 1969 CLC, Article V(8) and the 1992 CLC, Article VII (11).

[50] The 1969 CLC, Article VII (2) and the 1992 CLC, Article VII (2).

same time, with respect to a ship not registered in a Contracting State, the certificate shall be issued by the appropriate authority of any Contracting States of the CLCs. The issuing authorities have the discretion to determine the conditions of issue and validity of the certificate.[51] However, no specific provision in CLCs requires the issuing authorities to investigate the financial standing of the insurer before issuing the certificate. The certificate shall be carried on board the ship, and a copy shall be deposited with the authorities who maintain a record of the ship's registry[52], or with the authorities of the State issuing and certifying the certificate if the ship is not registered in a Contracting State.[53] Contracting States agree to recognize the certificates issued by each other under the Conventions. If there are some concerns that the insurer is financially incapable of meeting his obligation in full, the authorities of any Contracting States of CLCs may request consultation with the issuing authorities at any time.[54]

2.2.8 Time Bar

The right to compensation shall be extinguished unless an action is brought within three years from the date when the damage occurs. However, in no case shall an action be brought after six years from the date of the incident that caused the damage. Where this incident consists of a series of occurrences, the six year period shall run from the date of the first such occurrence.[55]

2.3 The 1992 Fund Convention

As the second tier of compensation under the international regime, the IOPC Fund provides supplementary compensation for vessel-source oil pollution damage. Due to the denunciation mechanism in the Protocol of 1992 to amend

[51] The 1969 CLC, Article VII (6) and the 1992 CLC, Article VII (6).

[52] The 1969 CLC, Article VII (4).

[53] The 1992 CLC, Article VII (4).

[54] The 1969 CLC, Article VII (7) and the 1992 CLC, Article VII (7).

[55] The 1969 CLC, Article VII and the 1992 CLC, Article VII.

the 1971 Fund Convention,[56] Members of the 1992 Fund Convention ceased to be Members of the 1971 Fund Convention from 16 May 1998. The departure of the Members of the 1971 Fund resulted in a proportional financial burden falling on the contributors to the 1971 Fund.[57] The 2002 Protocol amended Article 43 of the 1971 Fund Convention, providing that the 1971 Fund Convention ceases to exist when the number of Contracting States falls below twenty-five.[58] The IMO also adopted a Resolution on the winding-up of the 1971 IOPC Fund, urging Contracting States to denounce the 1971 Fund Convention and become Members of the 1992 IOPC Fund.[59] The 1971 Convention ceased to be in force on 24 May 2002 and does not apply to any incident occurring after that date.[60] Therefore, in this section, only the 1992 Fund Convention and the 1992 IOPC Fund are examined.

2.3.1 Organization of the 1992 IOPC Fund

The 1992 IOPC Fund has an Assembly that is composed of representatives of all Member States of the 1992 Fund Convention.[61] The Assembly is the supreme organ governing the 1992 IOPC Fund, and must hold one regular session each year.[62] The Assembly elected 15 Member States as members of the Executive Committee, which is mainly responsible for approving settlements of claims.[63] The 1992 IOPC Fund, the Supplementary IOPC Fund and the 1971 IOPC Fund have a joint Secretariat, based in London. The Director is the chief administrative

[56] The 1992 Protocol to amend the 1971 Fund Convention, 18 December 1971, Article 34.

[57] IMO, (2000), Conference Agrees to Early Winding Up of 1971 Oil Pollution Compensation Fund, London, UK, IMO News.

[58] Protocol of 2000 to the 1971 Fund Convention, Article 2.

[59] Resolution on the Termination of the 1971 Fund Convention and Accession to the 1992 Protocols: IMO documents LEG/CONF 11/9, 17 September 2000.

[60] IOPC Fund Annual Report, 2011, available at: http://www.iopcfund.org/npdf/AR2011_e.pdf. (accessed 10 November 2013).

[61] The 1992 Fund Convention, Article 17.

[62] Ibid, Article 19(1).

[63] IOPC Fund Annual Report, 2011, available at: http://www.iopcfund.org/npdf/AR2011_e.pdf. (accessed 10 November 2013).

officer of the Fund and is responsible for the management of the Fund. The joint Secretariat currently has 30 staff members.[64]

2.3.2 Financing of the 1992 IOPC Fund

The 1992 IOPC Fund is financed by contributions levied on any person in a Contracting State who has received more than 150,000 tons of crude oil and heavy fuel oil in one calendar year.[65] The theoretical basis is that those who benefit from an activity should bear the risks generated by such an activity.[66] Based on this principle, as the main beneficiary of the carriage of oil by sea, the oil industry should, alongside the shipping industry, share the financial burden of compensation for vessel-source oil pollution.

A minimum quantity of oil received is set at 150,000 tons in order to exclude small oil receivers, since the administrative costs for the Fund would be greater than the amount contributed by them.[67] Oil receivers should pay the due contribution if their receipts of contributing oil exceed 150,000 tons when aggregated with the quantity of contributing oil received in the same Contracting State in the same year by any associated person or persons. Besides which, according to Article 10 of the 1992 Fund Convention[68], the oil receipt is not

[64] Explanatory Note of IOPC Fund: The International Regime for Compensation for Oil Pollution Damage, Feb 2013, available at: http://www.iopcfunds.org/fileadmin/IOPC_Upload/Downloads/English/explanatorynote_e.pdf. (accessed 10 November 2013).

[65] The 1992 Fund Convention, Article 10(2).

[66] Chao Wu, supra note 4, at 4.

[67] O.R., 1971, LEG/CONF.2/C.1/1, at p 87.

[68] The 1992 Fund Convention, Article 10(1):

"Annual contribution to the Fund shall be made in respect of each Contracting State by any person who, in the calendar year referred to in Article 12, paragraph 2(a) or (b), has received in total quantities exceeding 150,000 tons: (a) in the ports or terminal installations in the territory of that State contributing oil carried by sea to such ports or terminal installations; and (b) in any installations situated in the territory of that Contracting State contributing oil which has been carried by sea and discharged in a port or terminal installation of a non-Contracting State, provided that contributing oil shall only be taken into account by

limited to imports by international transportation but includes domestic oil transportation, although the carriage of oil by sea within only one State seldom occurs.[69] Therefore, it is possible that the same contributing oil could be counted more than once if it is imported from abroad and received in a port of a Contracting State and subsequently transshipped to other ports of the same State.

Contracting States are not responsible for the payment of contributions levied on contributors, but they shall ensure that any obligation to contribute to the 1992 IOPC Fund is fulfilled.[70] Contracting States must inform the Director of the name and address of any person who is liable to pay the contribution, as well as provide data on the relevant quantities of contributing oil received by any such person during the preceding calendar year.[71] This information is to be communicated in oil reports submitted to the Director, and is maintained on a list.[72] This list shall be the *prima facie* evidence[73] when determining the amount of contribution from the receivers.

2.3.3 Compensation Provided by the 1992 IOPC Fund

The 1992 IOPC Fund is available where (1) the shipowner is exempted from liability under the 1992 CLC; (2) the shipowner is financially incapable of meeting his obligations in full and any financial guarantee does not cover or is insufficient to compensate for the damage; or (3) the damage exceeds the limits of liability under the 1992 CLC.[74] At the same time, the 1992 IOPC Fund incurs no obligation of compensation if (a) it is proved that the pollution damage resulted from an act of war, hostilities, civil war or insurrection, or was caused

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virtue of this sub-paragraph on first receipt in a Contracting State after its discharge in that non- Contracting State. ”

[69] Chao Wu, supra note 4, at 96.

[70] The 1992 Fund Convention, Article 13(2).

[71] Ibid, Article 15(2).

[72] Colin de la Rue and Charles B. Anderson, supra note 21, at 142.

[73] The 1992 Fund Convention, Article 15(3).

[74] Ibid, Article 4(1).

by oil which has escaped or been discharged from a warship or other ship owned or operated by a State and was used on Government non-commercial service at the time of incident; and (b) the claimant cannot prove that the damage resulted from an incident involving one or more ships.[75] Additionally, the 1992 IOPC Fund is exonerated wholly or partially from its obligation to pay compensation if it is proved that the pollution damage resulted wholly or partially either from an act or omission done with the intent to cause damage by the person who suffered the damage or from the negligence of that person.[76] However, exoneration due to contributory negligence of the claimant does not apply to preventive measures.[77] The maximum compensation amount provided by the 1992 IOPC Fund was originally set at 135 million SDR in respect of any one incident,[78] but this was increased to 203 million SDR from 1 November 2003.[79] This amount includes the actual amount paid by the shipowner under the 1992 CLC.[80]

2.3.4 Right of Subrogation

The 1992 Fund Convention preserves the right of recourse or subrogation of the 1992 IOPC Fund against the shipowner, his guarantor and the third parties.[81] On the other hand, the Contracting States or agency which has paid compensation for pollution damage to any person shall also acquire by subrogation the right which that person enjoyed under the 1992 Fund Convention.[82]

2.3.5 Time Bar

[75] Ibid, Article 4(2).

[76] Ibid, Article 4(3).

[77] Ibid, Article 4(3).

[78] The 1992 Fund Convention, Article 3(4).

[79] Amendments of the Limits of Compensation in the Protocol of 1992 to Amend the International Convention on the Establishment of An International Fund For Compensation for Oil Pollution Damage, 1971, was approved by IMO Resolution LEG1(82) on 18 October 2002.

[80] IOPC Fund Annual Report, 2011, available at: http://www.iopcfund.org/npdf/AR2011_e.pdf (accessed 15 November 2012).

[81] The 1992 Fund Convention, Articles 9(1) & 9(2).

[82] Ibid, Article 9(3).

The right to compensation shall be extinguished unless an action is brought, or notification of action sought under the CLC against the shipowner, has been made within three years from the date when the damage occurred. However, in no case shall an action be brought after six years from the date of the incident causing the damage.[83] Such notification must be made in accordance with the formalities required by the law of the court seized and in such time and in such a manner that the Fund has in fact been in a position effectively to intervene as a party to the proceedings.[84]

2.4 The 2003 Supplementary Fund Convention

Following the *Erika*[85] and *Prestige*[86] incidents, compensation provided by the 1992 CLC and the 1992 Fund Convention was proved to be inadequate.[87] The Supplementary IOPC Fund was created by the 2003 Supplementary Fund Convention. It provides a third tier of compensation in cases where the total damage exceeds, or there is a risk that it will exceed, the applicable limit of compensation provided by the 1992 IOPC Fund.[88] Only the Contracting States of the 1992 Fund Convention are entitled to participate in the 2003 Supplementary Fund Convention, and only those established claims which have been recognized by the 1992 IOPC Fund can be covered by the Supplementary IOPC Fund.[89] The maximum compensation available under the Supplementary IOPC Fund for any one incident is up to 750 million SDR, which includes the amount payable under the 1992 CLC and the 1992 Fund Convention.[90]

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[83] Ibid, Article 6.

[84] Ibid, Article 7(6).

[85] *Erika* incident took place in France in 1999.

[86] *Prestige* incident took place in Spain in 2002.

[87] Tsimplis, M.N., supra note 15, at 101-152.

[88] IOPC Fund Annual Report, 2011, available at: http://www.iopcfund.org/npdf/AR2011_e.pdf (accessed 25 July 2012).

[89] The 2003 Supplementary Fund Convention, Article 1(8).

[90] The 2003 Supplementary Fund Convention, Article 4(2).

The Supplementary IOPC Fund is financed by contributions levied on any person in a Contracting State who has received more than 150,000 tons of crude oil and heavy fuel oil in one calendar year. In addition, there is the requirement of a "*membership fee*" provided by Article 14 of the 2003 Supplementary Fund Convention. According to this article, there shall be deemed to be a minimum receipt of 1 million tons of contributing oil in each Contracting State.[91] If the aggregate quantity of contributing oil received in a Contracting State is less than 1 million tons, the Contracting State shall assume the obligation to pay the contribution, based on the deemed 1 million tons receipt or on the difference between the 1 million tons deemed receipt and the actual receipts within the state that fall within the 2003 Supplementary Fund Convention.[92] The inclusion of the deemed receipt of 1 million tons contributing oil ensures at least a minimum contribution to the very considerable compensation offered by the Supplementary IOPC Fund, and also effectively enforces the proper reporting of oil receipts.[93]

Contracting States shall communicate to the Director of the Supplementary IOPC Fund information on oil receipts in accordance with Article 15 of the 1992 Fund Convention.[94] If a Contracting State does not fulfill the obligation to submit the communication, and this results in a financial loss for the Supplementary IOPC Fund, that Contracting State shall be liable to compensate such loss.[95] Furthermore, compensation provided by the Supplementary IOPC Fund will be temporarily denied if a Contracting State does not fulfill the communication obligations imposed by Article 13(1) and Article 15(1).[96] Where the compensation has been temporarily denied, the compensation will be denied permanently if the communication obligations have not been complied with

[91] Ibid, Article 14(1).

[92] Ibid, Article 14(2).

[93] Elizabeth Blackburn QC, "The 2003 Protocol to the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage 1992: One Bridge Over Some Particularly Troubled Water", *Journal of Maritime Law and Commerce* 9(2003): 530-544.

[94] The 2003 Supplementary Fund Convention, Article 13(1).

[95] Ibid, Article 13(2).

[96] Ibid, Article 15(2).

within one year after the Director of the Supplementary IOPC Fund has notified the Contracting State of its failure to report.[97]

2.5 Two Voluntary Agreements: STOPIA 2006 and TOPIA 2006

The 2003 Supplementary Fund Convention highly increases the compensation amount available for oil pollution victims. However, it breaks the balance reached by the 1992 CLC and the 1992 Fund Convention, since the financial burden of compensation carried by oil receivers becomes disproportionate. The imbalance has been adjusted by two voluntary agreements, STOPIA 2006 and TOPIA 2006.[98] STOPIA 2006 and TOPIA 2006 are established by legal binding agreements between shipowners who are insured against oil pollution risks by P&I Clubs which are members of the International Group of P&I Clubs.[99] Under the scheme of STOPIA 2006, relevant owners of tankers of 29,548 gross tonnage or less agree to indemnify the 1992 Fund Convention for the difference between the vessel's limit of liability under the 1992 CLC and 20 million SDR.[100] In other words, the minimum limit of liability for small tankers, which is 4.5 million SDR under the 1992 CLC, is increased to 20 million SDR. STOPIA applies to oil pollution incidents in countries that are members of the 1992 IOPC Fund. STOPIA provides that the tanker will be considered as a "Relevant Ship" if following three conditions are met: (1) it is of 29,845 tons or less; (2) it is insured by P&I Clubs which are members of the International Group of P&I Clubs; and (3) it is reinsured through the pooling arrangements of the International Group of P&I Clubs.[101] The Clubs in the International Group have amended their rules so that all the "Relevant Ships" are automatically entered in STOPA. [102] At the same

[97] Ibid, Article 15(3).

[98] STOPIA 2006 and TOPIA 2006 took effect on 20 February 2006.

[99] Explanatory notes of STOPIA 2006 and TOPIA 2006, Document 92FUND/A.ES.10/13.

International Group of P&I Clubs is constituted by 13 world leading P&I Clubs and is the association which protects its members against large marine insurance claims which, individually, would be difficult to survive. The 13 principal member Clubs provide liability cover for approximately 90% of the world's ocean-going tonnage.

[100] STOPIA 2006, Article IV.

[101] Ibid, Article III (B).

[102] Any other business- STOPIA, Document 92 FUND/ EXC.37/8.

time, TOPIA 2006 covers oil pollution damage in countries that are members of the Supplementary IOPC Fund. Under TOPIA 2006, relevant tanker owners undertake to indemnify the 2003 Supplementary Fund in respect of 50% of the amount of any claim falling on the 2003 Supplementary Fund. All the tanker that are entered in one of the P&I Clubs which are members of the International Group of P&I Clubs and reinsured through the pooling arrangements of the International Group of P&I Clubs are automatically entered in TOPIA.[103] Both STOPIA 2006 and TOPIA 2006 strive to ensure that the overall costs of claims falling within the international system are shared approximately equally between shipowners and oil receivers[104] (see Figure 2-2). The adjustment mechanisms offered by STOPIA 2006 and TOPIA 2006 provide a means for progressively correcting any significant imbalance, especially where very large oil spill incidents take place.[105]

Table 2-1 Maximum Compensation Amount for Any One Incident under International Compensation Regime for Tanker Oil Pollution Damage

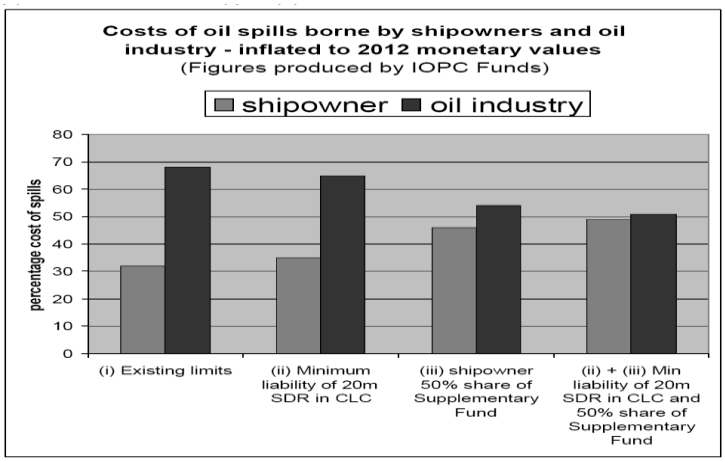
Convention/Protocol	Maximum Compensation Available
The 1992 CLC *(The First Tier)*	- 4.5 million SDR for a ship not exceeding 5000 units of tonnage; - 630 SDR for each additional unit of tonnage for a ship with a tonnage in excess of 5000 units of tonnage; - aggregate amount shall not in any event exceed 89.77 million SDR.
The 1992 Fund Convention *(The Second Tier)*	203 million SDR
The 2003 Supplementary Fund Convention *(The Third Tier)*	750 million SDR
STOPIA 2006 *(Voluntary Agreement)*	20 million SDR for tankers of 29,548 gross tonnage or less
TOPIA 2006 *(Voluntary Agreement)*	50% of the amount paid by the 2003 Supplementary Fund

[103] STOPIA and TOPIA- Note by the Director, Document 92FUND/A.ES.10/13.

[104] Supra note 96.

[105] Notice to Member No. 13 2005/2006, West of England.

Figure 2-2 Costs Borne by Shipowners and Oil Industry – Inflated to 2012 Monetary Values[106]



2.6 The Bunkers Convention

According to Article 1(1)[107] of the CLC 1969 and its 1992 Protocol, the CLCs do not apply to ships other than oil tankers. It was the purpose of the Bunkers Convention to fill in this gap and to develop an international system of liability and compensation for bunker oil pollution damage from non-tanker vessels.[108]

[106] The source is derived from IOPC Fund Assembly 10th session Agenda item 8 in October 2005. The statistical review was carried out by the Oil Companies International Marine Forum (OCIMF) on the basis of the study by IOPC Funds' Secretariat in 2004. When the costs of past oil spills during 1978 to 2003 were compared with the financial limits under the 1992 CLC, Fund Convention and the 2003 Supplementary Fund, it showed that the shipping industry would contribute 32% and the oil industry 68% respectively. The disparity was shown in the bar chart under "(i) Existing limits". The bar chart under (ii) showed the apportionment if STOPA 2006 is applied; the bar chart under (iii) showed the apportionment if TOPIA 2006 is applied; and the bar chart under (ii) + (iii) showed the apportionment if both STOPIA 2006 and TOPIA 2006 are applied. The bar chart showed that if the claims figures for the period from 1978 to 2003 are adjusted as if the limitation provided by the 1992 CLC, the Fund Convention and the 2003 Supplementary Fund Convention together with STOPIA 2006 and TOPIA 2006 were applied, then shipowners would have paid 51% and oil cargo owners 49% respectively.

[107] The 1992 CLC, Article 1(1) states: "'Ship' means any sea-going vessel and seaborne craft of any type whatsoever constructed or adapted for the carriage of oil in bulk as cargo, provided that a ship capable of carrying oil and other cargos shall be regarded as a ship only when it is actually carrying oil in bulk as cargo and during any voyage following such carriage, unless it is proved that it has no residues of such carriage of oil in bulk aboard."

[108] Ling Zhu, "Can the Bunkers Convention Ensure Adequate Compensation for Pollution Victims?", *Journal of Maritime Law and Commerce* 40 (2009) 40: 203-219.

The Bunkers Convention was created to ensure adequate and prompt compensation to victims of oil pollution damage when oil is carried as fuel in a ship's bunker.[109] The main features of the Bunkers Convention are similar to that of the 1992 CLC, such as the strict liability[110], limitation of liability[111] and compulsory insurance[112]. However, there is no supplementary compensating source for bunker oil pollution under the international system. This is because of the practical problem that it is impossible to identify contributors among the cargo interests.[113] Despite the fact that the Bunkers Convention is largely modeled on the 1992 CLC, and that some of the provisions are identical, the Bunkers Convention differs from the 1992 CLC in many aspects, as follows.

2.6.1 Definition of "Ship" & "Oil"

"Ship" is defined as any seagoing vessel and seaborne craft of any type whatsoever.[114] This definition covers a wider class of vessels than does the 1992 CLC, which only covers tanker vessels. According to Article 4 (1) of the Bunkers Convention, it does not apply to pollution damage as defined in the 1992 CLC. "Bunker oil" refers to any hydrocarbon mineral oil, including lubricating oil, used or intended to be used for the operation or propulsion of the ship, as well as the residue from the use of such oil.[115] Distinguishing between bunker oil and cargo oil relies on the demonstration of its intended use. It seems that, unlike the definition under the 1992 CLC, the definition of oil in the Bunkers Convention is not limited to persistent hydrocarbon mineral oil, but also covers non-persistent hydrocarbon mineral oil. Therefore, one may conclude that the 1992 CLC applies to the pollution damage caused by the spillage of persistent hydrocarbon mineral

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[109] Ling Zhu, *Compulsory Insurance and Compensation for Bunker Oil Pollution Damage*, (Berlin: Springer, 2007), 7.

[110] The Bunkers Convention, Article 3.

[111] Ibid, Article 6.

[112] Ibid, Article 7.

[113] Ling Zhu, "Compensation Issues under the Bunker Convention", *WMU Journal of Maritime Affairs* 7 (2008): 303-316.

[114] The Bunkers Convention, Article 1(1).

[115] Ibid, Article 1(5).

oil from tanker vessels, whether the oil is carried as cargo in bulk or in the ship's bunkers, whereas the Bunkers Convention applies to pollution damage caused by bunker spills from non-tanker vessels, whether the oil is persistent or non-persistent, as well as pollution damage caused by spillage of non-persistent bunker oil from tanker vessels.

2.6.2 Wider Scope of Liable Parties and No Channeling Provisions

"Shipowner" in the Bunkers Convention is defined as the registered owner, bareboat charterer, manager or operator of the ship. Where more than one liable party is liable for the pollution damage, their liabilities should be joint and several. In contrast to this, the definition of "shipowner" under the 1992 CLC only refers to the registered owner. This wider definition in the Bunkers Convention provides a greater likelihood of compensation, but also creates difficulties in settling claims and thus delays the compensation payment.

In common with the 1992 CLC, the Bunkers Convention excludes all claims against the shipowner outside the scope of the Convention.[116] However, there are no channeling provisions to exclude claims against certain parties other than the shipowner. Under the Bunkers Convention, the claimants can file their claims against a wider range of potential defendants other than the shipowner, such as the servants or agents of the shipowner, pilots and salvors. It is considered that, in the absence of any second-tier compensation, as many avenues for recovery as possible should be preserved.[117] However, the Bunkers Convention does not prevent Contracting States from introducing channeling provisions in their national legislation in order to protect persons taking measures to prevent or minimize the pollution damage.[118] In a Resolution adopted by the 2001 Diplomatic Conference on the Bunkers Convention, the Conference urges States

[116] Ibid, Article 3(5).

[117] Colin de la Rue, "Liability for Pollution from Ships' Bunkers", in *Pollution at Sea: Law and Liability*, eds. Baris Soyer and Andrew Tettenborn (London: Informa, 2012), 11-22.

[118] Mans Jacobsson, supra note 27, 21-36.

to consider the need to introduce a legal provision for the protection of persons taking measures to prevent or minimize the effect of bunker oil pollution and also recommends that such persons be exempt from liability unless the liability in question resulted from their personal act or omission, was committed with the intent to cause damage, or recklessly and with knowledge that such damage would probably result.[119]

2.6.3 No Stand-alone Limitation Regime

The Bunkers Convention does not set new liability limits. Instead, the limits shall be subject to the applicable international regime or national laws of the Contracting States. One of the main reasons is that when the Convention on Limitation of Liability for Maritime Claims, 1976 (hereinafter referred to as "the LLMC 1976") was revised by a Protocol in 1996[120] (hereinafter referred to as "the 1996 LLMC Protocol"), no allowance was made for a future bunker pollution convention with its own separate limits.[121] Linking the Bunkers Convention to either the applicable international regime, or to national laws, results in inconsistencies between the limits in different Contracting States. Many States are parties to the 1976 LLMC, whereas many other States ratified the 1996 LLMC Protocol that provides higher limits than the 1976 LLMC. At the same time, the 1924 Convention[122] and the 1957 Convention[123] are still in force, and some States remain parties to both of these Conventions that have considerably lower limits. Moreover, some Contracting States to the Bunkers Convention have not ratified any international conventions regarding limitations of liability, so that, in those States, the limits are subject to their national

[119] IMO LEG/CONF. 12/18, Resolution on Protection for Persons Taking Measures to Prevent or Minimize the Effects of Oil Pollution, 27 March 2001.

[120] Protocol of 1996 to amend the Convention on Limitation of Liability for Maritime Claims of 19 November 1976, adopted on 2 May 1996, London.

[121] Nicholas Gaskell, "The Bunker Pollution Convention 2001 and Limitation of Liability", *Journal of International Maritime Law* 15 (2009): 477-494.

[122] The 1924 International Convention for the Unification of Certain Rules Relating to the Limitation of the Liability of Owners of Seagoing Vessels, adopted on 25 August 1924, Brussels.

[123] The 1957 International Convention Relating to the Limitation of the Liability of Owners of Seagoing Ships, adopted on 10 October 1957 in Brussels.

legislation. If there are no such provisions regarding the limitation of liability in the national legislation in a Contracting State to the Bunkers Convention, the liable parties in that particular State will be exposed to the risk of unlimited liability.

2.6.4. Compulsory Insurance and Certification

According to Article 7 of the Bunkers Convention, the registered owner of a ship having a gross tonnage greater than 1,000 tons registered in a Contracting State is required to maintain insurance or other financial security.[124] A threshold of 1,000 gross tons is set to alleviate any administrative burden in the insurance regime. It should be noted that only the registered owner of a ship is required to purchase compulsory insurance or other financial security. Any other liable parties, such as bareboat charterer, operator and manager of a ship, are not obliged to maintain compulsory insurance or other financial security. The compulsory insurance or other financial security should cover the liability of the registered owner for pollution damage in an amount equal to the limits of liability under the applicable national or international limitation regime, but in all cases not exceeding an amount calculated under the 1976 LLMC, as amended.[125] In common with the 1992 CLC, claimants are entitled to claim the compensation directly against the insurer or other person providing financial security.[126]

In practice, the P& I Clubs issue a certificate called a "Blue Card" to confirm that the necessary cover is in force, and this is treated as evidence of insurance in accordance with the Bunkers Convention.[127] A certificate of insurance will be issued against the provision of a Blue Card by the appropriate authority of the State of the ship's registry in a form prescribed in the Bunkers Convention.[128]

[124] The Bunkers Convention, Article 7(1).

[125] Ibid, Article 7(1).

[126] Ibid, Article 7(10).

[127] West of England, No.5 2008/2009 - Entry into Force of the Bunkers Convention – Update on State Certification and Issuance of Blue Cards, July 2008.

[128] The Bunkers Convention, Article 7(2).

For ships registered in a State that is not a party to the Bunkers Convention, the insurance certificate may be issued by the appropriate authority of any Contracting State to the Convention.[129]

2.6.5 Time Bar

The right to compensation shall be extinguished unless an action is brought within three years from the date when the damage occurred. However, in no case shall an action be brought more than six years from the date of the incident causing the damage.[130] Where the incident consists of a series of occurrences, the six-year period runs from the date of the first such occurrence.

2.7 Conclusion

The international compensation regime for vessel-source oil pollution damage has been considered to be successful in achieving the goal of compensating victims of oil pollution incidents, and has served as model for other liability and compensation instruments,[131] such as the International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (hereinafter referred to as "the HNS Convention"). It not only strives to provide adequate compensation for victims of oil pollution incidents in the Contracting States, but also balances the financial burden between shipowners and oil receivers. Its success can be clearly seen from its wide worldwide ratification.[132]

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[129] Ibid, Article 7(2).

[130] Ibid, Article 8.

[131] Alfred Popp, QC, "The Civil Liability and Fund Conventions Model Compensation Schemes", *The IOPC Funds' 25 Years of Compensating Victims of Oil Pollution Incidents,* available at: http://www.iopcfund.org/npdf/jub_en.pdf (accessed 27 August 2012).

[132] As of November 2012, the 1992 CLC has 130 Contracting States; the Fund Convention has 111 Contracting States; the 2003 Supplementary Fund Convention has 28 Contracting States and the Bunkers Convention has 66 Contracting States.

Having said this, with regard to compensation for tanker oil pollution, countries have differed in the extent to which they accepted the international compensation regime. Based on the ratification of the 1969 CLC, the 1992 CLC, the 1992 Fund Convention and the 2003 Supplementary Fund Convention, countries can be divided into five groups[133] that, to some degree, reflect the level of protection afforded to victims of tanker oil pollution incidents,[134] as follows (see Table 2-2): (1) Countries that have not ratified or acceded to any of the relevant international conventions[135]; (2) countries that have only acceded to the 1969 CLC; (3) countries that have acceded to the 1992 CLC but not acceded to the 1992 Fund Convention; (4) countries that have acceded to the 1992 CLC and the 1992 Fund Convention; and (5) countries that have acceded to the 1992 CLC and the 1992 Fund Convention and, additionally, to the 2003 Supplementary Fund Convention. What factors account for such divergent attitudes toward the international regime for tanker oil pollution? What are the patterns of countries choosing a high acceptance level (i.e. accession to the 1992 Fund Convention or the 2003 Supplementary Fund Convention)? In the next Chapter, these questions will be explored by carrying out fuzzy-set Qualitative Comparative Analysis.

Table 2-2 State Parties to International Conventions Regarding Compensation for Tanker Oil Pollution Damage (as at 1 March 2013)

State Parties to only the 1969 CLC			
Benin	Equatorial Guinea	Jordan	Senegal
Brazil	Guatemala	Kazakhstan	
Costa Rica	Guyana	Libyan Arab Jamahiriya	
Côte d'Ivoire	Honduras	Nicaragua	
State Parties to the 1992 CLC but not to the 1992 Fund Convention			

[133] UNCTAD Report of Liability and Compensation for Ship-Source Oil Pollution: An Overview of the International Legal Framework for Oil Pollution Damage from Tankers, Studies in Transport Law and Policy, 2012 No.1, 23-27.

[134] It should be noted that there are just a few countries that have not acceded to any of the international conventions regarding compensation for tanker oil pollution, but provide substantial protection to victims under applicable national law. For instance, the United States has established a purely national regime, but an extremely high limit is set to ensure the availability of adequate compensation for oil pollution victims. The compensation regime in the United States will be analyzed in the following chapter 3.

[135] There are still 193 states that are members of the United Nations but have not acceded to any of the international conventions regarding compensation for tanker oil pollution damage.

Azerbaijan	Indonesia	Peru	Turkmenistan
Chile	Kuwait	Republic of Moldova	Ukraine
China	Lebanon	Romania	Vietnam
Egypt	Mongolia	Saudi Arabia	Yemen
El Salvador	Pakistan	Solomon Islands	(Togo[136])

State Parties to the 1992 CLC and the 1992 Fund Convention

Albania	Ecuador	Malaysia	Samoa
Algeria	Estonia	Maldives	Senegal
Angola	Fiji	Malta	Serbia
Antigua and Barbuda	Finland	Marshall Islands	Seychelles
Argentina	France	Mauritius	Sierra Leone
Australia	Gabon	Mexico	Singapore
Bahamas	Georgia	Monaco	Slovenia
Bahrain	Germany	Montenegro	South Africa
Barbados	Ghana	Morocco	Spain
Belgium	Greece	Mozambique	Sri Lanka
Belize	Grenada	Namibia	Sweden
Benin	Guinea	Netherlands	Switzerland
Brunei Darussalam	Hungary	New Zealand	Syrian Arab Republic
Bulgaria	Iceland	Nigeria	Tonga
Cambodia	India	Norway	Trinidad and Tobago
Cameroon	Ireland	Oman	Tunisia
Canada	Islamic Republic of	Palau	Turkey
Cape Verde	Iran	Panama	Tuvalu
China (Hong Kong)	Israel	Papua New Guinea	United Arab Emirates
Colombia	Italy	Philippines	United Kingdom
Comoros	Jamaica	Poland	United Republic of
Congo	Japan	Portugal	Tanzania
Cook Islands	Kenya	Qatar	Uruguay
Croatia	Kiribati	Republic of Korea	Vanuatu
Cyprus	Latvia	Russian Federation	Venezuela
Denmark	Liberia	Saint Kitts and	
Djibouti	Lithuania	Nevis	(Mauritania[137])
Dominica	Luxembourg	Saint Lucia	(Niue[138])
Dominican Republic	Madagascar	Saint Vincent and the Grenadines	

State Parties to the 1992 CLC and the 1992 Fund Convention and the 2003 Supplementary Fund Convention

Australia	Finland	Japan	Poland
Barbados	France	Latvia	Portugal
Belgium	Germany	Lithuania	Republic of Korea
Canada	Greece	Morocco	Slovenia
Croatia	Hungary	Montenegro	Spain
Denmark	Ireland	Netherlands	Sweden
Estonia	Italy	Norway	United Kingdom

[136] The 1992 CLC will enter into force on 23 April 2013 in Togo.

[137] The 1992 Fund Convention will enter into force on 4 May 2013 in Mauritania.

[138] The 1992 Fund Convention will enter into force on 27 June 2013 in Niue.

Sources are from Explanatory Note of the IOPC Fund, March 2013

CHAPTER 3

EXPLAINING DIVERSE ACCEPTANCE LEVELS OF INTERNATIONAL COMPENSATION REGIME FOR TANKER OIL POLLUTION

3.1 Introduction

As demonstrated in Chapter 2, the three-tier international compensation regime for tanker oil pollution damage has been considered to be one of the most successful schemes to provide compensation for the victims of oil pollution incidents in the Contracting States. However, attitudes toward this international regime vary among different countries, as shown by the diverse acceptance levels. Generally speaking, a high level of acceptance reflects the high level of protection offered to both pollution victims and the marine environment. Questions may arise, though, as to exactly which factors actually motivate states when deciding on the acceptance levels, and what types of countries tend to choose a high level of acceptance (i.e. accession to the 1992 Fund Convention or the 2003 Supplementary Fund Convention). This chapter aims to explain the factors that may influence the acceptance level of the international compensation regime for tanker oil pollution, and to identify multiple "paths", which means the combinations of factors leading to a high level of acceptance of the international regime, using fuzzy-set Qualitative Comparative Analysis (hereinafter referred to as "fsQCA"). fsQCA has been well established and widely used in social science research. However, it is a method that is rarely applied to legal research. This chapter also seeks to demonstrate the potential of this method for solving legal problems.

3.2 Theoretical Argument

The factors that may influence the acceptance level of the international compensation regime for tanker oil pollution have not hitherto been systematically discussed. However, in a recent report published by the United Nations Conference on Trade and Development (hereinafter referred to as "UNCTAD"), some considerations that may be relevant to national policymakers in assessing the relevant merits of acceding to the 1992 CLC, the 1992 Fund Convention or the 2003 Supplementary Fund Convention are proposed.[1] These considerations can be summarized as follows.

- *The relative benefits of adherence to the relevant international conventions and the substantive merits of provisions of such relevant international conventions;*
- *The risk of exposure to tanker oil pollution;*
- *The financial burden associated with adherence to the relevant international legal conventions.*

3.2.1 Benefits and Current Protection Level

The first consideration above will now be examined. The principal benefit of adherence to the relevant international conventions regarding compensation for tanker oil pollution damage is that the Contracting States are "better placed to deal with the financial consequences of a tanker oil spill".[2] In other words, victims in the Contracting States of these international conventions can benefit from the compensation provided by the shipowners and oil cargo receivers. Based on equitable functioning of the international compensation regime,

[1] UNCTAD Report of Liability and Compensation for Ship-Source Oil Pollution: An Overview of the International Legal Framework for Oil Pollution Damage from Tankers, Studies in Transport Law and Policy, 2012 No.1, at p 19.

[2] Supra note 1, at 20.

claimants in all Member States should be treated equally.[3] Therefore, with respect to the benefit of providing compensation for oil pollution victims, there should be no differences among the Contracting States that have acceded to the same international conventions (i.e. the 1969 CLC or the 1992 CLC or the 1992 Fund Convention or the 2003 Supplementary Fund Convention). However, the maximum compensation amounts available to victims are different under the different international conventions. The maximum compensation amount available for pollution victims under the 1969 CLC is approximately 53 times less than the maximum compensation amount available for pollution victims under the 2003 Supplementary Fund Convention. Different acceptance levels of the international compensation regime for tanker oil pollution could reflect the different levels of protection afforded to the victims of oil pollution incidents.[4] In this chapter, the factors contributing to the different acceptance levels of the international compensation regime for tanker oil pollution are to be explained. In other words, the abovementioned consideration is the outcome of this research.

3.2.2 Risk of Exposure to Tanker Oil Spills

The second consideration mentioned in the UNCTAD report concerns a country's risk exposure to tanker oil pollution. The risk of oil spills is defined as the probability (or likelihood) of spills multiplied by the consequences of those incidents.[5]

$$Risk = Consequence * Probability$$

[3] Fifth Report of the Third Intercessional Working Group, Document 92FUND/WGR.3/15, para.10.1.

[4] The United States is an exceptional case.

[5] Manual on Oil Spill Risk Evaluation and Assessment of Response Preparedness, 2010 Edition, issued by IMO Publishing.

The probability relates to factors such as vessel traffic density, weather and sea conditions, navigational hazards, visibility, water depth and nature of the sea bed.[6] The consequence of an oil spill refers to the socio-economic or environmental costs or damage which may result from an incident.[7] It is a function of a number of factors, such as volume and type of cargo carried by a vessel at the time of an incident, effectiveness of the incident response, and proximity to environmentally and economically sensitive areas.[8] Countries located in highly exposed areas not only have a high probability of oil spills occurring, but may also face a catastrophic loss if a major oil spill incident occurs. Adoption of the 1992 CLC can ensure that oil pollution victims are able to benefit from much more substantive financial compensation rules than under the 1969 CLC.[9] Furthermore, where a country is one of the Member States of the IOPC Fund, his risk of a major oil pollution incident and the financial losses incurred could be spread out over the large number of oil receivers who contribute to the IOPC Fund.[10] Therefore, it is likely that those countries having a greater risk of oil spills have a greater incentive to accede to the 1992 Fund Convention or the 2003 Supplementary Fund Convention.

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[6] Irina Enache, Sabina Zagan, "Risk Assessment of Oil Marine Pollution", in *Exposure and Risk Assessment of Chemical Pollution – Contemporary Methodology*, eds. L.I. Simeonov and M.A. Hassanien (Springer, 2009), 325-334.

[7] Ibid.

[8] Colleen O'Hagan, "Use of GIS for Assessing the Changing risk of Oil Spill from Tankers", paper presented at 3rd Annual Arctic Shipping Conference, St Petersburg, Russia, 17-20 April 2007, available at: http://www.itopf.com/information-services/publications/papers/documents/arctic_shipping.pdf (accessed 12 December 2012).

[9] Supra note 1, at 27.

[10] André Schmitt and Sandrine Spaeter, "Hedging Strategies and Financing of the 1992 International Oil Pollution Compensation Fund", Working Papers of BETA from Bureau d'Economie Théorique et Appliquée, UDS, Strasbourg, available at: http://www.beta-umr7522.fr/productions/publications/2005/2005-12.pdf (accessed 29 July 2012).

3.2.3 Financial Burden

The final consideration proposed in the UNCTAD report is the financial burden associated with adherence to the relevant international conventions. This is because any person in the Member States of the IOPC Fund who has received total quantities of contributing oil exceeding 150,000 tons, which oil has been carried by sea to the ports or terminal installations in the territory of that State, should pay an annual contribution to the IOPC Fund.[11] By and large, the contribution is proportional to the imports of crude and fuel oil.[12] Accession to the 1992 Fund Convention or the 2003 Supplementary Fund Convention could be of particular benefit to those countries reporting low annual receipts of crude or fuel oil but who are potentially vulnerable to the effects of a major tanker oil spill.[13] This is because accession to the 1992 Fund Convention or the 2003 Supplementary Fund Convention ensures substantial compensation, but without incurring a heavy financial burden. Thus, it is logical that countries receiving limited shipments of crude and fuel oil, especially those who, at the same time, face potentially high risks, might be willing to adopt the 1992 Fund Convention or the 2003 Supplementary Fund Convention.

3.2.4 Level of Economic Development

In addition to the abovementioned considerations addressed in the UNCTAD report, the level of economic development could also be considered as a factor that may influence the acceptance level of the international compensation regime for tanker oil pollution damage. Firstly, since the economic structure of society is

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[11] The 1992 CLC, Article 10(1) (a) and the 2003 Supplementary Fund Convention, Article 10(1) (a).

[12] Under the 2003 Supplementary Fund Convention, a minimum contribution requirement is set. According to Article 14 (1) of the 2003 Supplementary Fund Convention, there is deemed to be a minimum annual receipt of 1 million tons of contributing oil in the state. Where the aggregate amount of contributing oil received is less than 1 million tones, the Contracting State is required to assume the obligations to pay the difference between the 1 million tones and the actual contributions by oil receivers.

[13] Supra note 1, at 25.

the foundation of our legal and political superstructure[14] and "legal guaranties are directly at the service of economic interests to a very large extent"[15], the level of economic development may play a significant role in the decision over adopting the relevant international conventions. Secondly, the international compensation regime for vessel-source oil pollution damage aims to provide adequate and prompt compensation for victims of oil pollution incidents in Contracting States. Some scholars argue that pollution claims in poor countries could invariably be smaller and less costly than those in rich countries,[16] so making them reluctant to ratify the relevant international conventions with their relatively high financial caps. Thirdly, the international compensation regime for vessel-source oil pollution has also been thought to be relevant to environmental concerns and environmental protection strategies. This is because the international compensation regime could provide incentives on the part of interested parties to control and carry out measures to minimize pollution, and this in turn could produce better marine environmental protection. [17] Moreover, adequate compensation for cleanup costs can encourage prompt cleanup operations, which in itself could be beneficial for the marine environment. Wealthier countries can better afford more environmental protection activities than can poorer ones.[18] In addition, a recent study indicates that, on average, populations in richer countries tend to have a higher level of environmental concern than do inhabitants of poorer nations. [19] This finding is in accordance with the idea of an "environmental Kuznets Curve", which holds that environmental concerns, and thereby environmental quality, increase after a point as a society becomes more

[14] Marx, K. and Engels, F., "A Contribution to the Critique of Political Economy" in *Collected Work* Vol.29, (London: Lawrence & Wishart, 1975), 263-264.

[15] Weber, M, *Economy and Society: An Outline of Interpretive Sociology* (University of California Press: 1978), 334.

[16] Alan Khee-Jin Tan, *Vessel-Source Marine Pollution: The Law and Politics of International Regulation* (London: Cambridge University Press, 2006), 330.

[17] Gotthard M. Gauci, "Protection of the Marine Environment through the International Ship-Source Oil Pollution Compensation Regimes", *Review of European Community & International Environmental Law* 8 (1999): 29-36.

[18] Mark Sagoff, *The Economy of the Earth: Philosophy, Law, and the Environment*, 2nd ed. (New York: Cambridge University Press, 2008), 4.

[19] Axel Franzen and Reto Meyer, "Environmental Attitudes in Cross-National Perspective: A Multilevel Analysis of the ISSP 1993 and 2000", *European Sociological Review* 26 (2010): 219-234.

affluent.[20] Accordingly, countries with strong economies are considered to enable more environmental treaty ratifications.[21] Lastly, and with reference to the relationship between environmental protection and economic growth, although there is a lack of data showing the overall impact of environmental protection policy on economic growth, researchers and policy makers increasingly suggest that environmental protection and economic growth are not mutually exclusive.[22] Moreover, according to the Porter Hypothesis, strict environmental regulations do not inevitably hinder competitive advantages. On the contrary, properly designed regulations may enhance the competitiveness.[23] This could explain, to some extent, the reason why some rich countries are willing to adopt stringent national environmental regulations and international environmental treaties to protect their environment, regardless of the high costs. Consequently, it is likely that countries with a high level of economic development, especially those facing potentially high risks from oil spills, could be in favor of a high acceptance level of the international compensation regime for tanker oil pollution — in order to give stronger protection and support to oil pollution victims and to the marine environment.

3.2.5. Expert Opinion Survey

In addition to the abovementioned analysis, five experts with specialist knowledge and extensive experience in the area of marine oil pollution were carefully selected to conduct an expert opinion survey and affirm the selection of relevant factors. The participants in the expert opinion survey include a scholar in maritime studies (specializing in maritime oil pollution issues) from the World Maritime University, a government official from the Oil Spill Response Technical Center of the Yantai Maritime Safety Administration, the claims

[20] Mark Sagoff, supra note 18, at 4.

[21] David John Frank, "The Social Bases of Environmental Treaty Ratification, 1900-1990", *Sociological Inquiry* 69 (1999): 523-550.

[22] Michael D. Kaplowitz, Frank Luoi, Felix K. Yeboah and Laurie G. Thorp, "Exploring the Middle Ground between Environmental and Economic Growth", *Public Understanding of Science*, Online First Version of Record, Dec 13, 2011, at p1.

[23] Porter, M, and van der Linde, C., "Toward a New Conception of Environment-Competitiveness Relationship", *Journal of Economic Perspective* 9 (1995): 97-118.

director of a leading P & I Club (IG Group) in the United Kingdom, the deputy general manager of an independent maritime survey and consultancy company in China (specializing in oil pollution incidents) and an experienced maritime lawyer from a leading maritime law firm in China. The expert opinion survey questionnaires were sent by email to these experts to obtain their informed opinions and comments. Four weeks later, all five completed expert opinion survey questionnaires were received back, and the results affirmed the selection of factors (see Appendix II).

To summarize, it is assumed that three factors may influence the acceptance level of the international compensation regime for tanker oil pollution, as follows: (1) the risk of exposure to oil spills; (2) the financial burden associated with adherence to the relevant international conventions; and (3) the level of economic development. Based on the abovementioned analysis, it can be assumed that rich countries with a high risk of exposure to oil spills, but without the heavy financial burden associated with adherence to the relevant international conventions, may have great incentives to accept a high level of the international compensation regime. Is this hypothesis empirically true? Does the high financial burden affect the acceptance level of such rich countries facing a high risk of exposure to oil spill incidents? Are there any other types of countries, other than countries with high risks and a high level of economic development, who favor a high acceptance level? In the following sections of this chapter, the method of fsQCA is employed to answer these questions and to identify how the abovementioned three factors are actually operative with respect to acceptance levels of the international compensation regime for tanker oil pollution. It should be noted that social phenomena are complex and difficult to unravel, because different causally relevant factors usually combine in a variety of ways to produce a given outcome.[24] Accordingly, by using fsQCA, this research is seeking to identify multiple combinations of the abovementioned factors that produce the outcome of a high acceptance level of the international compensation regime, rather than the "net effect" of each factor on this outcome.

[24] Charles C. Ragin, *The Comparative Method—Moving Beyond Qualitative and Quantitative Methods* (Berkeley, Los Angeles, London: University of California Press, 1987), 26.

In the following section, the basic concepts and principles of fsQCA will firstly be introduced.

3.3 Overview of fsQCA

3.3.1 Basic Principle of Qualitative Comparative Analysis (QCA)

Qualitative Comparative Analysis (hereinafter referred to as "QCA") was developed by Charles Ragin[25] in 1987 as a social science method for a systematic comparison of cases. It is conceived as a middle path that bridges the cases-based qualitative approach and variable-based quantitative approach.[26] It supports researchers who wish to find out the empirical patterns displayed by cases under examination[27] and thereby helps them interpret the patterns based on researchers' substantive knowledge. To put it in a nutshell, QCA is a set-theoretic method[28], which uses formal logic and Boolean algebra[29] in the analysis of truth tables, aiming to unravel patterns of sufficient and/or necessary conditions of a specific outcome.[30]

[25] Charles C. Ragin, supra note 24, at 26.

[26] Manuel Fischer, "Social Network Analysis and Qualitative Comparative Analysis: Their Mutual Benefit for Explanation of Policy Network Structures", *Methodological Innovations Online* 6 (2011): 27-51.

[27] Claudius Wagemann and Carsten Q. Schneider, "Standards of Good Practice in Qualitative Comparative Analysis (QCA) and Fuzzy-Sets", *Comparative Sociology* 9 (2010): 376-396.

[28] The set-theoretic method is an approach to analyzing social reality through the notion of sets and their relations. It considers almost all social science theory is verbal and is formulated in terms of sets and set relations. For example, when a theory states that "countries located along busy transit routes face high exposure to oil spill incidents", the claim is set-theoretic and a set-relation can be explained as: Countries located along busy transit routes constitute a rough sub-set of countries with a high risk of oil spills.

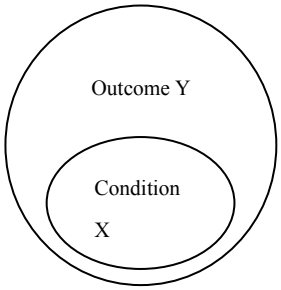
[29] Basic operators in Boolean algebra and Boolean minimization, which are applied to QCA, are introduced in Appendix I.

[30] Carsten Q. Schneider and Claudius Wagemann, *Set-Theoretic Methods for the Social Sciences – A Guide to Qualitative Comparative Analysis* (New York: Cambridge University Press, 2012), 331.

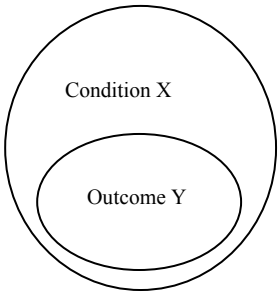
As defined by Rihoux & Ragin,[31] a condition is sufficient for an outcome if the outcome always occurs when the condition is present, but the outcome can also result from other conditions; whereas a condition is necessary for an outcome if it is always present when the outcome occurs. That is to say, the outcome cannot occur in the absence of the condition. From a set-theoretic perspective, a condition can be interpreted as sufficient if it constitutes a sub-set of the outcome. At the same time, a condition can be interpreted as necessary if it constitutes a super-set of the outcome (see Figure 3-1).

Figure 3-1 Set-Relation of Sufficient Condition and Necessary Condition

A. Sufficient Condition： X ⟶ Y



B. Necessary Condition： X ⟵ Y



Social science researchers tend to understand social phenomena or incidents in a holistic way. Attention should be paid to the combination of relevant causal

[31] Benoit Rihoux and Charles C. Ragin, *Configurational Comparative Methods – Qualitative Comparative Analysis (QCA) and Related Techniques* (Los Angeles: Sage Publication, 2009): xix.

conditions. It is usually not the separate or independent effect of a condition but the intersection of a set of causal conditions in time and space that produces a specific outcome.[32] Different causal conditions combining with each other in different ways may produce the same result. This conjunctural or combinatorial nature is the key feature of causal complexity, and what social science researchers unravel is how different conditions fit together and how many different combinations produce a given outcome.[33] QCA is better suited to analyze causal complexity than is conventional quantitative analysis, for the following three reasons:

(1) QCA aims to capture the ***conjunctural or combinatorial*** effect of causations rather than the "net effect" of one single variable. It assumes that causal conditions need to combine to reveal the causal pattern. In contrast, a conventional quantitative approach, such as regression, usually treats each causal condition as an independent cause of outcome, and aims at assessing which causal conditions are the most important ones. Estimates of the net effect of each independent variable assume that the impact of a given independent variable is the same, not only across all the values of other independent variables, but also across all their different combinations.[34]

(2) fsQCA is attuned to view the causal conditions as ***equifinality***, which means that multiple combinations of causal conditions could generate the same outcome. This is in contrast to the unifinal perspective of many statistical techniques, such as the additive and linear regression models.

[32] Charles C. Ragin, *Fuzzy-Set Social Science* (Chicago, London: The University of Chicago Press, 2000), 40.

[33] Charles C. Ragin, supra note 24, at 26.

[34] Charles C. Ragin, *Redesigning Social Inquiry – Fuzzy Sets and Beyond* (Chicago, London: University of Chicago Press, 2008), 40.

A regression equation indicates that only one way exists to produce the outcome, and the independent variable in a regression formula is not an alternative to each other.[35]

(3) Many social science phenomena are the results of asymmetric causal processes and conditions, which means that the explanation of the presence of a phenomenon does not imply that this explanation automatically explains the absence of the same phenomenon.[36] The primary purpose of QCA is to explore set-relations in terms of sufficient condition and necessary condition, and set-relations are fundamentally ***asymmetric*.** This is different from the correlations that assume fully symmetric relations between correlated variables. For example, if X is a sufficient condition of outcome Y, Y is always present when X is present. However, the absence of X does not necessarily imply the absence of Y because Y might occur due to other causal conditions. As a result, it can be illustrated that a set-relation could be strong despite a relatively weak correlation.

3.3.2 Fuzzy-Set Qualitative Comparative Analysis (fsQCA)

The fuzzy-set theory was developed by Lotfi Zadeh[37] in 1965 and first introduced to social science research by Michael Smithson[38] in 1987. Fuzzy-set Qualitative Comparative Analysis (hereinafter referred to as "fsQCA"), which has been developed by Ragin since 2000[39], is a method that integrates the fuzzy-set theory and qualitative comparative analysis. fsQCA allows researchers to calibrate partial membership in sets using values in the interval between 0 (full

[35] Carsten Q. Schneider and Claudius Wagemann, supra note 30, at 87.

[36] Claudius Wagemann and Carsten Q. Schneider, supra note 27, at 376-396.

[37] Zadeh, Lofit A. "Fuzzy Sets", *Information and Control* 8 (1965): 338-353.

[38] Michael Smithson, *Fuzzy Set Analysis for Behavioral and Social Sciences* (Berlin: Springer, 1987).

[39] Charles C. Ragin, *Fuzzy-Set Social Science* (Chicago, London: The University of Chicago Press, 2000).

non-membership) and 1 (full membership).[40] Unlike traditional crisp-set QCA (hereinafter referred to as "csQCA") that can only adopt dichotomous variables (i.e. 1 for presence and 0 for absence), fsQCA also allows interval variables by converting them into fuzzy-sets. The shortcomings of the loss of empirical information of dichotomous variables can be overcome by fsQCA. Additionally, fsQCA is well suited to the so-called "Large-N" analysis under which the comprehension of each case matters much less.[41] Software FSQCA[42] has been developed to perform fsQCA and to identify combinations of conditions that produce a specific outcome.

A. Calibration

To apply fsQCA, the raw data needs to be converted to fuzzy-set membership scores. The process of assigning membership to cases to determine to what degree they display a condition or an outcome is called 'calibration'. Ragin proposed two types of calibration partially relying on a statistical model[43], including (1) direct calibration and (2) indirect calibration. Under direct calibration, a logistic function is used to fit the raw data in between the three qualitative anchors at 1 (the threshold for full membership), 0.5 (the threshold for crossover[44]) and 0 (the threshold for full non-membership). These three qualitative anchors are determined using external criteria based on researchers' theoretical knowledge or empirical evidence, and are subsequently used to transform the original interval scale data into fuzzy-set membership. In contrast,

[40] Benoit Rihoux and Charles C. Ragin, supra note 31, at 88.

[41] Benoit Rihoux, "Qualitative Comparative Analysis (QCA) and Related Systematic Comparative Methods: Recent Advances and Remaining Challenges for Social Science Research", *International Sociology*, 21 (2006): 679-707.

[42] FSQCA is free software and it is available on the following website: http://www.u.arizona.edu/~cragin/fsQCA/software.shtml.

[43] Charles C. Ragin, supra note 34, at 85.

[44] The crossover point is the value of the interval scale variable where the maximum ambiguity as to whether a case is more in or more out of a set (see Ragin, 2000, at p90).

under indirect calibration, researchers need to roughly group cases into six-category set membership scores (i.e. 0, 0.2, 0.4, 0.6, 0.8 and 1) and then use a fractional logit model to regress this preliminary set membership score on the raw data.[45] The external standard used is the researcher's qualitative assessment of the degree to which a case with a given score on an interval scale is a member of the target set.[46] No matter which calibration method is used, the external criteria based on the researchers' theoretical knowledge are required. This feature distinguishes the fuzzy-set membership scores from the ordinal scales that show the ranking of categories without reference to the external criteria.

B. Fuzzy-Set Operations

There are three crucial fuzzy-set operations, including: (1) *logical* and; (2) *logical* or; and (3) *negation.*

***Logical* and**[47]

Compound sets are formed when two or more sets are combined, an operation commonly known as a set intersection. For each intersection, the lowest membership score among all combined sets is taken as the set membership score of the whole intersection. For example, there are two conditions A and B combining together to produce the outcome Y. The set membership scores of A and B are 0.7 and 0.9 respectively. Then, the set membership score of the intersection is 0.7 (also see Table 3-1).

***Logical* or**

Two or more sets can also be joined through *logical* or – the union of sets. For each union, the maximum membership score in the component sets is the membership score of the union. For example, there are two conditions A and B.

[45] Carsten Q. Schneider and Claudius Wagemann, supra note 30, at 35.

[46] Charles C. Ragin, supra note 34, at 85.

[47] Explanation of Logical and/or can be found in the introduction of Boolean algebra in Appendix 1.

Occurrence of either A or B could lead to the outcome Y. The set membership scores of A and B are 0.7 and 0.9 respectively. Then, the set membership score of the union of these two conditions is 0.9.

Negation

Negation, sometimes referred to as 'complement', is a set that contains all those cases that are not members of the original set. To calculate the set membership score of negation, the set membership score of the original set needs to be subtracted from 1. So, in the abovementioned case, the negation of A (i.e. ~A) has a set membership score of 0.3 and the negation of B (i.e. ~B) has a set membership score of 0.1.

Table 3-1 Illustration of Fuzzy-Set Operations

Condition/Fuzzy-Set Operation	Set Membership Score
Condition A	0.7
Condition B	0.9
Logical and/ Intersection of A and B A * B	0.7
Logical or/ Union of A and B A + B	0.9
Negation ~A	0.3
~B	0.1

3.3.3 Using fsQCA to Identify Set-Relations

A. Sufficient Conditions Analysis

As mentioned in the above section 3.2.1, a condition is interpreted as sufficient if it constitutes the subset of the outcome. With fuzzy-set, fuzzy algebra is used to assess a subset relation. Specifically, a subset relation is indicated when

membership scores in one set (e.g. a condition or combinations of conditions) are consistently less than or equal to membership scores in another set (e.g. outcome).[48]

Analysis of Subset Relations Using Crisp-Set Truth Table

The truth table is an important tool to assess the subset relations between the set of conditions or combination of conditions and the set of a given outcome. The truth table lists the logically possible combinations of causal conditions and the empirical outcome associated with each of the configurations.[49] There are 2^k logically possible combinations that are also called "truth table rows", with k number of conditions. For example, 3 conditions can yield 2^3 different types of logically possible combinations, and each truth table row represents a type of logically possible combination (see also Table 3-2). However, the truth table can only allow crisp-set data (i.e. 1 for presence and 0 for absence), so fuzzy-set, that allows any set-membership score, needs to be converted into a truth table for analysis of the subset relation. As Ragin demonstrated, there are three pillars that bridge the fuzzy-set and truth table, as follows:

(1) In the first place, vector space corners, which represent logically possible combinations, should be written down in accordance with the truth table rows (see Table 3-2). With fuzzy-set, each case has varying degrees of membership in different vector space corners.[50]

Table 3-2 Correspondence between Truth Table Row and Vector Space Corner

Condition A	Condition B	Condition C	Vector Space Corners
1	1	1	A * B * C
1	1	0	A * B * ~C

[48] Benoit Rihoux and Charles C. Ragin, supra note 31, at 102.

[49] Charles C. Ragin, supra note 34, at 23.

[50] Benoit Rihoux and Charles C. Ragin, supra note 31, at 104.

1	0	0	A * ~B * ~C
0	1	1	~A * B * C
0	1	0	~A * B * ~C
0	0	1	~A * ~B * C
1	0	1	A * ~B * C
0	0	0	~A * ~B * ~ C

(2) The second pillar is to assess the cases among all the logically possible combinations, and specify a number-of-cases threshold. Although each case has varying set-membership scores in different vector space corners, there is only one corner's set membership score exceeding 0.5.[51] This is the golden rule for fuzzy sets: no matter how many fuzzy sets are combined, any given case has a membership of higher than 0.5 in one and only one of the 2^k logically possible combinations.[52] The set membership score higher than 0.5 indicates that a case is more in than out of the relevant causal combination. Researchers should establish a number-of-cases threshold, which implies how many cases there must be with a score higher than 0.5, to assess the empirical relevance of the combinations of conditions. If the number of cases is above the threshold, the combination of conditions in question can be considered as relevant. Otherwise, it has to be regarded as a logical remainder, which means that the combination of conditions is without enough empirical evidence at hand. The number-of-cases threshold should be decided based on the nature of evidence and the character of the research.[53] Generally speaking, when the number of cases is large, a higher number-of-cases threshold, for instance at least 10 cases, should be adopted.

[51] It should be noted that there is only one exception; that whenever a case holds a membership of exactly 0.5 in one or more constitutive conditions, then its membership will not exceed 0.5 in any of the vector space corners. This is the reason why great caution must be exercised when assigning 0.5 to conditions.

[52] Carsten Q. Schneider and Claudius Wagemann, supra note 30, at 100.

[53] Charles C. Ragin, supra note 34, at 133.

(3) After assessment of the empirical relevance, consistency of the empirical evidence for each combination of conditions, with argument that degree of membership in combination is a subset of degree of membership in the outcome, should be assessed. A formula for measuring the consistency of subset relations has been developed by Ragin,[54] as follows:

$$Consistency\ (X_i \leq Y_i) = \sum[min(X_i, Y_i)]/\sum(X_i)$$

According to this formula, when a combination's set membership scores are in all cases consistently less than or equal to the set membership score of the outcome, the consistency score is 1.00. Since perfectly consistent set relations are rare in social science research, researchers should establish a consistency threshold to be used as a cutoff value for determining which causal combinations pass the fuzzy-set consistency and which do not. Combinations of conditions above the cutoff value are considered to be the subset of outcome, thus to be coded 1; while combinations of conditions below the cutoff value are not considered to be a subset and are subsequently coded 0. Consistency thresholds should be determined based on the strengths of theoretical expectation or quality of the data, and the cutoff value should preferably be higher than 0.75.[55]

Three Types of Solutions

Following construction of the truth table, long Boolean expressions are to be minimized to short expressions unveiling the patterns of subset relations. Using the FSQCA software, three types of solutions can be illustrated, depending on

[54] Charles C. Ragin, supra note 34, at 134.

[55] Carsten Q. Schneider and Claudius Wagemann, supra note 30, at 129.

the allowance of logical remainders, including (1) complex solution, (2) intermediate solution and (3) parsimonious solution.

Due to the limited diversity of social phenomena, there could be some causal combinations that lack enough empirical evidence. In fsQCA, the plausibility of these logical remainders, which are also referred to as "counterfactuals", is usually evaluated to simplify the long Boolean expressions. If a counterfactual is in line with both the empirical evidence at hand and with existing theoretical knowledge on the effect of the single conditions that compose the logical remainders, it will be classified as an "easy counterfactual", with these theory-guided hunches about conditions being called "directional expectations". [56] Complex solution excludes all counterfactuals, and refrains from making assumptions about any logical remainder, whereas parsimonious solution allows all logical remainders (or counterfactuals) to simplify the expression. Intermediate solution allows only easy counterfactuals, by removing individual causal conditions that are inconsistent with substantive knowledge. Selection of the solution depends on the requirements of the research. However, the intermediate solution is usually regarded as the preferable one. This is because the complex solution often tends to be too complex to be interpreted in a theoretically meaningful or plausible manner; at the same time, the parsimonious solution risks resting on assumptions about logical remainders that contradict theoretical expectations, common sense or both.[57]

B. Necessary Conditions Analysis

Necessary condition is a condition that must be present for a given outcome. In fuzzy-set, a condition or a combination of conditions is necessary if it is a superset of the outcome. In other words, necessary condition can be

[56] Carsten Q. Schneider and Claudius Wagemann, supra note 30, at 158.

[57] Carsten Q. Schneider and Claudius Wagemann, supra note 30, at 168.

demonstrated where the outcome constitutes a subset of the conditions or combination of conditions. Just as with assessment of sufficient conditions, the consistency level is also crucial for assessment of necessary conditions. The formula of consistency for necessary conditions is as follows:

$$Consistency\ (Y_i \leq X_i) = \sum[min(X_i, Y_i)]/\sum(Y_i)$$

For necessary conditions, a high consistency threshold of at least 0.9 is usually required to ensure there are no incoherent assumptions about logical remainders.[58] In practice, the necessary conditions analysis is often conducted separately prior to the sufficient conditions analysis.

To sum up, fsQCA is a theoretic method using Boolean algebra with the aid of a truth table to unveil the general patterns of set relations or combinations of causal conditions that produce a specific outcome. In above section 3.2, it has been demonstrated that three factors may influence the acceptance level of the international compensation regime for tanker oil pollution, including the level of economic development, the risk of exposure to oil spills and the financial burden associated with adherence to the relevant international conventions. In the following sections, fsQCA will be used to unveil the patterns of combinations of these factors that lead to a high acceptance level of the international compensation regime.

3.4 Collection and Calibration of Data

3.4.1 Data Collection

A. Level of Economic Development

[58] Carsten Q. Schneider and Claudius Wagemann, supra note 30, at 232.

The level of economic development is measured by Gross National Income per capita (hereinafter referred to as "GNI per capita")[59]. The GNI per capita of 125 countries in 2010 are collected from the "World Development Indicator, 2012" published by the World Bank in 2012.[60]

B. Risk of Exposure to Tanker Oil Spills

Most studies regarding assessing the risk of tanker oil spill incidents are conducted at a regional level. There are few existing studies classifying the risk categories of different countries on a global scale. This might be partly due to the complexity of such risk assessment. As stated in section 3.2.2, the risk of an oil spill is determined by both the probability of an incident occurring and the consequences resulting from the incident. Many factors affect the risk of an oil spill, such as vessel traffic density, weather and sea conditions, navigational hazards, visibility, water depth, nature of the sea bed, volume and type of cargo carried by a vessel at the time of an incident, effectiveness of the incident response and proximity to environmental and economically sensitive areas. Most of these factors are unpredictable, and vary both spatially and temporally, which makes them difficult to model.[61]

[59] GNI per capita (formerly GNP per capita) is the gross national income, converted to U.S. dollars, using the World Bank Atlas method, divided by the midyear population.

[60] World Development Indicators, 2012, available at: http://data.worldbank.org/sites/default/files/wdi-2012-ebook.pdf. (accessed 12 December 2012). In this report, a total of 125 countries' GNI per capita with specific figures are reported.

[61] Colleen O'Hagan, "Use of GIS for Assessing the Changing Risk of Oil Spill from Tankers", (2007), paper presented at 3rd Annual Arctic Shipping Conference, St Petersburg, Russia, 17-20 April 2007, available at: http://www.itopf.com/information-services/publications/papers/documents/arctic_shipping.pdf. (accessed 12 December 2012).

To evaluate the risk perception in relation to the degree of preparedness, research[62] was carried out by a group of ITOPF researchers to provide a general overview of the risk of tanker oil spill in 14 Regional Seas[63] and 5 Partner Seas as defined by the United Nations Environment Programme (hereinafter referred to as "UNEP"). The relevant risk of oil spill from tankers in different locations was deduced by comparing the historical occurrence of spills with the amount of oil transported. Data on historical tanker spills of over 100 tons during the period from 1974 to 2002 was collected from the International Tanker Owners Pollution Federation (hereinafter referred to as "ITOFP") database. Data of oil tanker shipments on specific routes for the year 2001 has been obtained from Lloyds Marine Intelligence Unit. The Geographic Information System (hereinafter referred to as "GIS") was used to graphically display the historical spills and tanker routes by region. The result, as illustrated in Table 3-3, shows different levels of the risk of oil spill from tankers (i.e. High, Medium or Low) in different regions.

Table 3-3 Assessment of Risk Levels for 19 Regional Sea Areas

Regional Sea/Partner Sea	Risk Category
North-east Pacific	Low 1
South-east Pacific	Low 1
Upper South-west Atlantic	Medium 2
Wider Caribbean	Medium 2
West & Central Africa	Medium 2
Eastern Africa	Medium 2

[62] T.H. Moller, F.C. Molloy and H.M. Thomas, "Oil Spill Risks and the State of Preparedness in Regional Seas", (2003), a paper presented at the International Oil Spill Conference 2003, Vancouver, Canada, 6-11 April 2003, available at: http://www.itopf.com/_assets/documents/iosc03.pdf (accessed 12 December 2012)

[63] The Regional Seas Programme, launched in 1974 in the wake of the 1972 United Nations Conference on Human Environment held in Stockholm, is a program of UNEP aiming to address the accelerating degradation of the world's oceans and coastal areas through the sustainable management and use of the marine and coastal environment by engaging neighboring countries in comprehensive and specific actions to protect their shared marine environment.

Red Sea & Gulf of Aden	Medium 2
Gulf Area	Medium 2
Mediterranean	High 3
Black Sea	High 3
Caspian	Medium 2
Baltic	Medium 2
North-east Atlantic	High 3
South Asian Seas	Medium 2
East Asian Seas	High 3
South Pacific	Low 1
North-west Pacific	High 3
Arctic	Low 1
Antarctic	Low 1

Most of the world's coastal countries have participated in the Regional Seas Programme.[64] In our research, a country's risk of oil spills is assessed based on the risk category of their coastal regional seas.[65] Data of the risk categories of 153 countries were collected.

[64] Some landlocked countries are also parties of the Regional Seas Programme, such as Luxembourg and Switzerland.

It should be noted that no regional sea programme was developed for the North American Region, though the United States is a party to the Wider Caribbean Regional Sea Programme, which includes the Gulf of Mexico and the Southeast U.S. continental shelf. Canada only participates in the Regional Sea Programme of the Arctic. Thus, Canada is not included in this research, due to the lack of precise data of the risk category of its coastal areas. However, the legal regime of compensation for ship-source oil pollution in Canada will be examined in the later sections.

[65] T.H. Moller, F.C. Molloy and H.M. Thomas pointed out in the same paper (see footnote 62) that Wider Caribbean and Eastern Africa contains individual areas of high risk, although the remainders of these regions are relatively low risk. According to the Regional Profiles of ITOPF (Regional Profiles: A Summary of the Risk of Oil Spill & State of Preparedness in UNEP Sea Regionals, 2003, ITOPF, available at: www.itopf.com/regional _profiles), some sea areas of the United States, Mexico, Cuba and South Africa are at high risk of oil spill. Therefore, the risk categories of the United States, Mexico, Cuba and South Africa are shown as “high” in this research, although other countries’ risk categories in Wider Caribbean and Eastern Africa remain as “medium”.

C. Financial Burden

The IOPC Fund is financed by contributions from oil receivers in the Member States. Any person who, in the Member States of the IOPC Fund, has received total quantities of contributing oil exceeding 150,000 tons, which oil has been carried by sea to the ports or terminal installations in the territory of that State, should pay annual contributions to the IOPC Fund.[66] Contributing oil refers to crude and fuel oil.[67] The annual contributions are calculated on the basis of a fixed sum per ton of oil, and vary from year to year depending on the number and size of claims expected.[68] In 2010, contributions of £0.0026043 per ton were levied.[69] Generally speaking, the annual contribution is proportional to the crude and fuel oil received in a year.[70] In this research, financial burden refers to the financial burden of countries that are Member States of the 1992 IOPC Fund and the potential financial burden of countries that are not the Member States of the 1992 IOPC Fund. Since there are no actual contributions paid to the 1992 IOPC Fund by countries that are not currently Member States of the 1992 IOPC Fund, their financial burden is measured by the imports of contributing oil, including crude oil and fuel oil. This can provide a crude snapshot[71] of the financial burden

[66] The 1992 CLC, Article 10(1) (a) and the 2003 Supplementary Fund Convention, Article 10(1) (a).

[67] The 1992 CLC, Article 1(3) (a) and (b) and the 2003 Supplementary Fund Convention, Article (1) (7).

[68] UNCTAD Report of Liability and Compensation for Ship-Source Oil Pollution: An Overview of the International Legal Framework for Oil Pollution Damage from Tankers, Studies in Transport Law and Policy, 2012 No.1, at p22.

[69] Annual Report of the International Oil Pollution Compensation Fund, 2010, available at: http://www.iopcfunds.org/uploads/tx_iopcpublications/2010_ENGLISH_ANNUAL_REPORT.pdf. (accessed 7 June 2011).

[70] André Schmitt and Sandrine Spaeter, "Hedging Strategies and Financing of the 1992 International Oil Pollution Compensation Fund", Working Papers of BETA from Bureau d'Economie Théorique et Appliquée, UDS, Strasbourg, available at: http://www.beta-umr7522.fr/productions/publications/2005/2005-12.pdf (accessed 29 July 2012).

[71] It should be noted that there are two limitations to using the imports of crude and fuel oil to measure the financial burden. The first limitation is that, according to Article 10(1) of the 1992 CLC, the contributing oil may include both oil that has been carried from abroad and oil that has been carried from another port in the same country. The second limitation is that the annual contributions to the Supplementary Fund are not considered because of the requirement of minimum contributions.

that would be placed on them, or may be potentially placed on the oil receivers in a country. The imports of crude and fuel oil in 2010 of 116 countries were collected from the International Energy Agency (hereinafter referred to as "IEA") database.[72]

Therefore, a total of 104 countries that are included in all the abovementioned three databases were selected to carry out fsQCA. Data concerning the ratifications of the 1969 CLC, the 1992 CLC, the 1992 Fund Convention and the 2003 Supplementary Fund Convention of these countries are taken from the IMO documentations.

3.4.2 Calibration of Raw Data

To calibrate raw data into fuzzy-sets, target sets must be designated as a particular generic variable. For instance, a target set of "level of economic development" is specified as "rich countries", representing the set of countries with high GNI per capita. In this research, the three abovementioned factors are calibrated into four fuzzy-set conditions, including: (1) rich countries; (2) countries with high risk of exposure to tanker oil spill; (3) countries with medium risk of exposure to tanker oil spill; and (4) countries with low financial burden or potential financial burden (see Table 3-4).

A. Rich Countries

According to the World Development Indicator, 2012 published by the World Bank, countries are classified by their level of development as measured by GNI per capita. Based on the GNI per capita in 2010, countries with less than $1005

[72] Energy Statistics of OECD Countries (2012 edition) and Energy Statistics of Non-OECD Countries (2012 editions), IEA Statistics.

are classified as low-income countries; those with between $1,006 and $3,975 as lower middle income countries, those with between $3,976 and $12,275 as upper middle income countries, and those with incomes of more than $12,276 as high-income countries. These thresholds are applied in calibrating the variable "level of economic development" into the various sets of countries. In the set of rich countries, the full membership anchor is set at $12,276 GNI per capita. The full non-membership anchor is set at $1,006 GNI per capita. The crossover point is set at $3,976 GNI per capita. The direct method is used to calibrate this condition.

B. Countries with High Risk of Exposure to Tanker Oil Spill and Countries with Medium Risk of Exposure to Tanker Oil Spill

The factor of risk of exposure to tanker oil spill is coded into crisp-sets.[73] To avoid any loss of information, two crisp-sets are used, as follows: (1) countries with high risk of exposure to tanker oil spill and (2) countries with medium risk of exposure to tanker oil spill. If a country does not belong to either of these two groups, then this indicates that this country has a low risk of exposure. In raw data, the risks of exposure to tanker oil spill are classified into three different categories, these being high risk, medium risk and low risk. High risk and medium risk are selected because they represent the majority of cases. Thus, in the set of countries with a high risk, a country is coded as 1 if its risk category is high, while a country will be coded as 0 if the risk category is not high. Similarly, in the set of countries with a medium risk, a country will be coded as 1 if its risk category is medium; otherwise, it will be coded as 0. If a country's score is coded as 0 in both sets, then it can be deduced that the risk category of this country is defined as low (see Table 3-4).

[73] The reason why the factor of risk is calibrated into crisp-set conditions rather than fuzzy-set conditions is that the countries with a medium risk will be calibrated into 0.5 using fuzzy-sets, and this should be avoided in the application of fsQCA. This is because the membership of a case will not exceed 0.5 in any of the vector space corners if it holds a membership of exactly 0.5 in one of the conditions.

Table 3-4 Illustration of Crisp-Sets of High Risk and Medium Risk

High Risk	Medium Risk	Implication
1	0	High Risk
0	1	Medium Risk
0	0	Low Risk
1	1	Implausible

C. Countries with Low Financial Burden

As to the financial burden associated with becoming a Member State of the IOPC Fund, there are no specific criteria to tell whether the financial burden is high or not. Based on the oil imports of those countries that ranked in the top fifteen in the world,[74] the qualitative anchor of full non-membership of the set of countries with a low financial burden is placed at 30 million tons imports of crude and fuel oil. It should be noted that any person who, in the Member States of the IOPC Fund, has received total quantities of contributing oil exceeding 150,000 tons, is required to pay annual contributions to the IOPC Fund.[75] By and large, the oil receivers do not need to pay any annual contributions if the aggregated oil imports in a country are below 150,000 tons. Thus, the qualitative anchor of full membership of this set is placed at 150,000 tons. The crossover point is set at 5 million tons.[76]

[74] CIA, The World Fact Book, Country Comparison: Oil Imports, available at: https://www.cia.gov/library/publications/the-world-factbook/rankorder/2175rank.html. (Accessed 20 December 2012).
According to the CIA oil imports ranking, Belgium, with imports of 38.871 million tons, is ranked as the fifteenth largest oil importing country and Australia, with imports of 22.991 million tons, is ranked as the sixteenth largest oil importing country.

[75] The 1992 CLC, Article 10(1) (a) and the 2003 Supplementary Fund Convention, Article 10(1) (a).

[76] The crossover point is selected according to the imports of the country that ranked in the middle position (Denmark, with imports of 5.284 million tons).

D. Level of Acceptance of International Compensation Regime for Tanker Oil Pollution

A purely qualitative approach is carried out to calibrate the result, that is, the acceptance level of the international compensation regime for tanker oil pollution. Based on the ratification status in 2010, countries that have not ratified or acceded to any of the relevant international conventions have a membership score of 0. Countries that have only acceded to the 1969 CLC have a membership score of 0.25. Countries that have acceded to the 1992 CLC but not acceded to the 1992 Fund Convention get a membership score of 0.5. Countries that have acceded to the 1992 CLC and the 1992 Fund Convention have a membership score of 0.75. Countries that have acceded to the 1992 CLC and the 1992 Fund Convention and, additionally, the 2003 Supplementary Fund Convention, get a membership score of 1.

Table 3-5 Lists of Fuzzy-Sets

Condition	Code	What It Measures (Generic Variable)	Set Degrees	Method of Calibration
Rich countries	RIC	Level of economic development	Continuous	Direct Method
Countries with high risk of exposure to tanker oil spill	HR	Risk of exposure to tanker oil spill	Crisp	Qualitative
Countries with medium risk of exposure to tanker oil spill	MR	Risk of exposure to tanker oil spill	Crisp	Qualitative
Countries with low financial burden	LOFB	Financial burden associated with adherence to relevant international conventions	Continuous	Direct Method
Outcome				
High Level of Acceptance	A	Acceptance level of the international compensation regime	Five-value	Qualitative

Table 3-6 Fuzzy-Set Membership Scores of Causal Conditions and Outcome

Country Name	Rich Countries	Countries with Low Financial Burden	Countries with High Risk	Countries with Medium Risk	High Level of Acceptance
Bangladesh	0.04	0.9	0	1	0
Bosnia/Herzegovina	0.57	0.91	1	0	0
Cuba	0.64	0.48	1	0	0
Haiti	0.03	0.95	0	1	0
Iraq	0.16	0.95	0	1	0
Sudan	0.06	0.95	0	1	0
Tanzania	0.03	0.95	0	1	0
Thailand	0.52	0.03	1	0	0
Togo	0.03	0.95	0	1	0
United States	1	0	1	0	0
Brazil	0.88	0.25	0	1	0.25
Benin	0.04	0.95	0	1	0.25
Costa Rica	0.74	0.94	0	1	0.25
Cote d'Ivoire	0.05	0.82	0	1	0.25
Guatemala	0.22	0.94	0	1	0.25
Honduras	0.11	0.92	0	1	0.25
Jordan	0.53	0.68	0	1	0.25
Kazakhstan	0.79	0.48	0	1	0.25
Libya	0.95	0.95	1	0	0.25
Nicaragua	0.05	0.92	0	1	0.25
Senegal	0.05	0.91	0	1	0.25
Azerbaijan	0.62	0.95	0	1	0.5
Chile	0.9	0.41	0	0	0.5
China	0.53	0	1	0	0.5
Egypt	0.17	0.83	1	0	0.5
El Salvador	0.35	0.92	0	0	0.5
Indonesia	0.18	0.3	1	0	0.5
Kuwait	0.95	0.95	0	1	0.5
Lebanon	0.85	0.9	0	1	0.5
Pakistan	0.05	0.32	0	1	0.5
Peru	0.57	0.53	0	1	0.5
Romania	0.8	0.48	1	0	0.5
Saudi Arabia	0.99	0.95	0	1	0.5
Turkmenistan	0.45	0.95	0	1	0.5
Ukraine	0.27	0.43	1	0	0.5
Vietnam	0.05	0.88	1	0	0.5
Yemen	0.06	0.91	0	1	0.5
Albania	0.5	0.95	1	0	0.75

Algeria	0.54	0.94	1	0	0.75
Angola	0.49	0.95	0	1	0.75
Argentina	0.84	0.93	0	1	0.75
Bahrain	1	0.61	0	1	0.75
Bulgaria	0.7	0.49	1	0	0.75
Cambodia	0.04	0.94	1	0	0.75
Cameroon	0.06	0.88	0	1	0.75
Colombia	0.64	0.95	0	1	0.75
Congo	0.14	0.95	0	1	0.75
Cyprus	1	0.9	0	1	0.75
Dominican Republic	0.59	0.81	0	1	0.75
Ecuador	0.47	0.95	0	0	0.75
Gabon	0.8	0.95	0	1	0.75
Georgia	0.21	0.95	1	0	0.75
Ghana	0.06	0.89	0	1	0.75
India	0.06	0	0	1	0.75
Iran	0.55	0.93	0	1	0.75
Israel	1	0.37	1	0	0.75
Jamaica	0.57	0.87	0	1	0.75
Kenya	0.04	0.88	0	1	0.75
Malaysia	0.8	0.42	1	0	0.75
Mexico	0.86	0.93	1	0	0.75
Mozambique	0.03	0.95	0	1	0.75
Namibia	0.55	0.95	0	1	0.75
New Zealand	1	0.51	0	0	0.75
Nigeria	0.06	0.95	0	1	0.75
Oman	0.99	0.95	0	1	0.75
Panama	0.75	0.76	0	1	0.75
Philippines	0.13	0.39	1	0	0.75
Qatar	0.95	0.95	0	1	0.75
Russian Federation	0.89	0.92	1	0	0.75
Singapore	1	0	1	0	0.75
South Africa	0.68	0.18	1	0	0.75
Sri Lanka	0.15	0.85	0	1	0.75
Switzerland	1	0.57	1	0	0.75
Syrian Arab	0.22	0.89	1	0	0.75
Trinidad and Tobago	0.98	0.71	0	1	0.75
Tunisia	0.52	0.88	1	0	0.75
Turkey	0.89	0.25	1	0	0.75
United Arab Emirates	1	0.32	0	1	0.75
Uruguay	0.91	0.85	0	1	0.75
Venezuela	0.94	0.95	0	1	0.75
Australia	1	0.17	1	0	1

Belgium	1	0.05	1	0	1
Croatia	0.97	0.7	1	0	1
Denmark	1	0.49	1	0	1
Estonia	0.98	0.95	0	1	1
Finland	1	0.36	1	0	1
France	1	0	1	0	1
Germany	1	0	1	0	1
Greece	1	0.19	1	0	1
Ireland	1	0.73	1	0	1
Italy	1	0	1	0	1
Japan	1	0	1	0	1
Latvia	0.94	0.95	0	1	1
Lithuania	0.94	0.41	0	1	1
Morocco	0.24	0.47	1	0	1
Netherlands	1	0	1	0	1
Norway	1	0.76	1	0	1
Poland	0.96	0.17	0	1	1
Portugal	1	0.36	1	0	1
Republic of Korea	1	0	1	0	1
Slovenia	1	0.95	1	0	1
Spain	1	0.01	1	0	1
Sweden	1	0.2	1	0	1
United Kingdom	1	0.02	1	0	1

3.5 Analysis of the Results

3.5.1 Necessary Conditions for High Acceptance level

First of all, whether any of the causal conditions can be considered as a necessary condition for the outcome (i.e. the high acceptance level of international compensation regime for tanker oil pollution) is tested. Table 3-7 shows the result of necessary conditions analysis.

Table 3-7 Analysis of Necessary Conditions for Outcome of High Acceptance Level

Condition	Consistency	Coverage
RIC	0.786	0.824
LOFB	0.671	0.674
HR	0.526	0.750

MR	0.429	0.553
LOFB + RIC	0.965	0.703
LOFB + HR	0.950	0.685

As mentioned in section 3.3.3, it is recommended that a high consistency score should be adopted to assess the necessary conditions. As a consequence, a high threshold of consistency score of 0.9 is used in this research. As Table 3-7 illustrated, no condition exceeds the threshold score of 0.9. Thus, none of these four conditions alone is necessary for the high acceptance level of international compensation regime for tanker oil pollution. However, it can be found that the consistency scores of two combinations of conditions that are joined by a logic "or" are above 0.9. This indicates that these two combinations, which are expressed as (LOFB + RIC) and (LOFB + HR), could be necessary for a high acceptance level.

Furthermore, to assure the empirical relevance of the necessary conditions, the coverage of necessary condition should be taken into consideration. Coverage of the necessary condition is a measurement of the importance or relevance of a condition as the necessary condition for the outcome, and the formula is as follows:[77]

$$Coverage\ (Y_i \leq X_i) = \sum[min(X_i, Y_i)]/\sum(X_i)$$

From Table 3-7, it can be seen that the coverage of expression (LOFB + RIC) is 0.703 and the coverage of expression (LOFB + HR) is 0.685. This indicates that both of these two combinations are non-trivial and empirically relevant for the outcome of high acceptance level. Since both (LOFB + RIC) and (LOFB + HR) are necessary conditions and LOFB alone is not necessary for the high

[77] Charles C. Ragin, supra note 34, at 61.

acceptance level, it is likely that the combination of (LOFB + HR*RIC) is necessary for the outcome.[78] As shown in Table 3-8, the consistency score of this expression is 0.930 and the coverage score is 0.716. This indicates that a high acceptance level of the international compensation regime for tanker oil pollution can only be expected in countries characterized by low financial burden, or in rich countries with high risk of exposure to oil spill, or both. This is also consistent with the theoretical analysis in the above section 3.2.

Table 3-8 Necessary Condition Analysis of (LOFB + HR*RIC)

Conditions	Consistency	Coverage
LOFB + HR*RIC	0.930	0.716

3.5.2 Sufficient Conditions for High Acceptance Level

A. Truth Table and Thresholds

A truth table is built to analyze the sufficient conditions for the outcome (see Table 3-9). Due to the large number of cases in this research, the number-of-cases threshold is set at 10. Thus, four combinations of conditions, each of which has 10 or more empirical cases with a greater than 0.5 membership score, are above the number-of-cases threshold. At the same time, the consistency threshold

[78] The logical analysis of the deduction is as follows. The necessity of expression (LOFB + RIC) means that the outcome does not occur in the absence of LOFB or RIC. Similarly, the necessity of expression (LOFB + HR) means that the outcome does not occur in the absence of LOFB or HR. In addition, LOFB alone is not a necessary condition for the outcome. As a result, there must be some cases showing a high acceptance level in the absence of LOFB. In total, there could be four logically possible combinations without LOFB, namely: (1) ~LOFB * HR * ~RIC; (2) ~LOFB * ~HR *RIC; (3) ~LOFB * ~HR * ~RIC and (4) ~LOFB * HR * RIC. The first logically possible combination is contradictory to the result that (LOFB + RIC) is a necessary condition for outcome, because both LOFB and RIC are absent. The second logically possible combination is contradictory to the result that (LOFB + HR) is a necessary condition, since both LOFB and HR are absent. The third logically possible combination is contradictory to both (LOFB +RIC) and (LOFB + HR). Therefore, only the fourth logically possible combination can be true, and (HR * RIC) is likely to be necessary for the outcome.

is set at 0.80. Combinations of conditions exceeding this cut-off value are categorized as sufficient conditions, and subsequently are assigned a value of 1 in the truth table. Conversely, combinations of conditions below this cut-off value cannot be considered sufficient, and thereby are assigned a value of 0 in the truth table. As indicated in Table 3-9, three of the four combinations of conditions are above the consistency threshold of 0.8.

Table 3-9 Truth Table for Analysis of Sufficient Conditions for the Outcome "High level of acceptance"

RIC	LOFB	HR	MR	number	Raw consist.	PRI consist.[79]
1	0	1	0	26	0.896331	0.873832
1	1	0	1	23	0.830431	0.714286
0	1	0	1	22	0.544172	0.303549
1	1	1	0	11	0.860959	0.795363
0	1	1	0	5	0.809372	0.616702
1	0	0	1	5	0.853424	0.665625
0	0	1	0	4	0.796954	0.464285
0	0	0	1	2	0.856624	0.458904
0	1	0	0	2	0.912281	0.651163
1	1	0	0	2	0.986784	0.941177
1	0	0	0	1	0.946428	0.727272

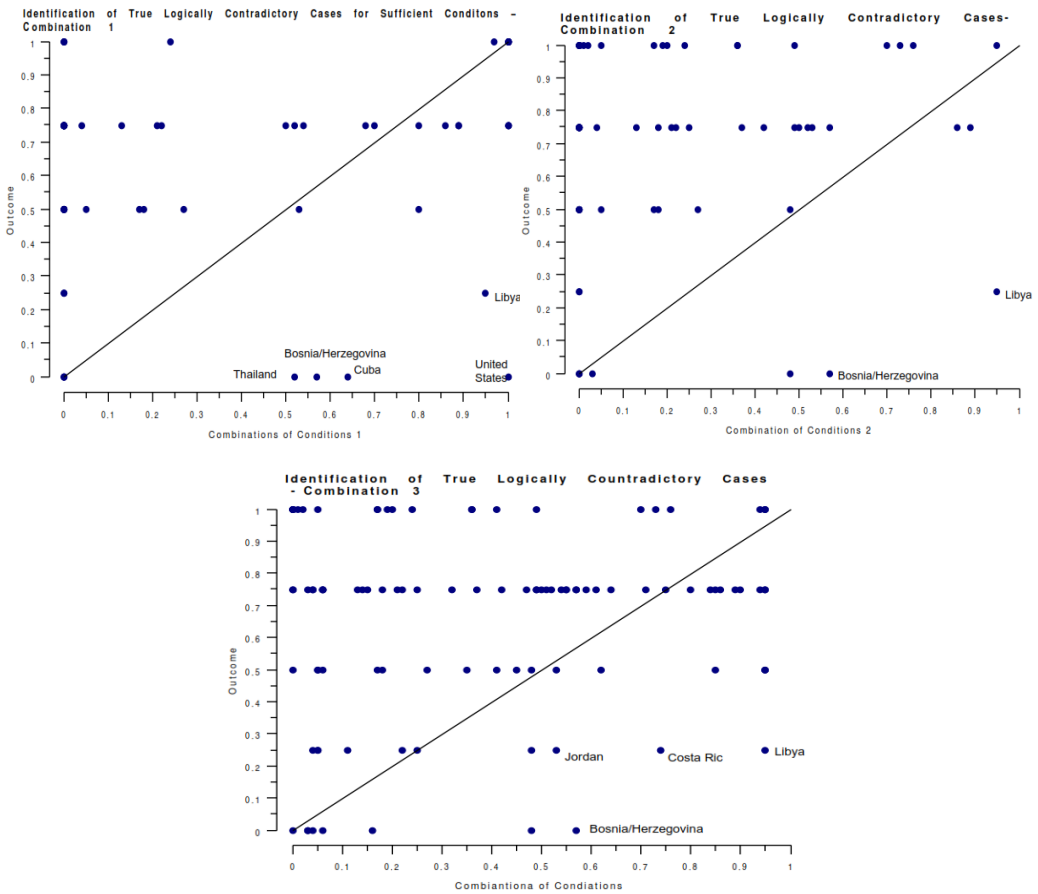
However, before declaration of sufficiency, it is also necessary to check the presence of true logically contradictory cases. They are more in than out of the hypothesized sufficient condition (membership score of combinations >0.5), but more out of than in the outcome (membership score of outcome < 0.5).[80] There could, therefore, be reluctance to declare a combination of condition as a sufficient condition if there are too many true logically contradictory cases. XY Plot is used to identify the true logically contradictory cases, and cases appearing in the lower right area are found to be true logically contradictory cases (see

[79] PRI measure provides a numerical measure of whether a given condition or combination of conditions is a subset of appearance of the outcome but not the absence of the outcome. High PRI consistency indicates that there is a non-simultaneous subset relation and thereby the sufficiency can be declared.

[80] Carsten Q. Schneider and Claudius Wagemann, supra note 30, at 185.

Figure 3-2). As shown in Figure 3-2, 5 out of 26 cases are true logically contradictory in the first combination; 2 out of 23 cases are true logically contradictory in the second combination; and 4 out of 22 cases are true logically contradictory in the third combination. All the numbers of true logically contradictory cases in these three combinations of conditions are acceptable. Therefore, these three combinations can be declared as sufficient conditions and assigned the value of 1. The one other combination of conditions, which is below the consistency threshold, cannot be satisfied as a sufficient condition and is therefore assigned the value of 0.

Figure 3-2 Identification of True Logically Contradictory Cases in Three Combinations of Conditions



B. Results

Three types of solution terms are obtained by using the software FSQCA (see Table 3-10).

Table 3-10 Solution Terms of Sufficient Conditions for the Outcome "High Level of Acceptance"

Solution Term	Expression
Complex solution term	RIC * LOFB * ~HR * MR + RIC * HR * ~MR
Intermediate solution term[81]	RIC * LOFB * LOFB + RIC * HR * ~MR
Parsimonious solution term	RIC

The parsimonious solution term is not reliable, because it allows all counterfactuals, including both easy and difficult counterfactuals. On the other hand, as explained in the above section 3.4.1 (B), the expression of (HR * ~MR) in both the complex and intermediate solution terms is equivalent to HR, and the expression of (~HR*MR) in the complex solution term is equivalent to MR. Thus, both the complex solution term and intermediate solution term can be minimized to an identical expression, as follows:

$$MR * LOFB * RIC + HR * RIC \longrightarrow A$$

This result reveals that all causal paths consist of combinations of conditions, and that no single condition alone can produce the outcome of a high acceptance level. Besides, as the necessary condition identified in the previous necessary condition analysis, (LOFB + HR*RIC) can also be found in two paths of sufficient conditions. One path is MR * LOFB * RIC and the other path is HR *

[81] Assumptions that are used to determine easy counterfactuals for the intermediate solutions include:
(1) A high level of economic development is accountable for a high acceptance level; (2) low financial burden is accountable for a high acceptance level; and (3) high risk is accountable for a high acceptance level. The justification for these assumptions can be found in section 3. 2.

RIC. The presence of either of them can lead to the outcome of a high acceptance level. As indicated in Table 3-11 below, the consistency of the solution term is 0.847. This high consistency score assures the declaration of the sufficiency of the solution term.

Furthermore, the coverage of sufficiency expresses how much of the outcome is covered or explained by a single path or the solution terms.[82] The formula for the coverage of sufficient conditions is as follows:[83]

$$Coverage\ (X_i \leq Y_i) = \sum[min(X_i, Y_i)]/\sum(Y_i)$$

Coverage of sufficient conditions measures the empirical importance of the paths or the solution term. As indicated in Table 3-11 below, the coverage of the entire solution term is 0.717, revealing that the majority of countries in this research can be covered or explained by the two paths mentioned above. Apart from the solution coverage, the coverage of each single path should also be examined, and there are two types of coverage, namely raw coverage and unique coverage. Raw coverage expresses how much of the membership in the outcome is explained by the membership of a single path, while unique coverage indicates how much a single path covers uniquely.[84] It can be observed in Table 3-11 that the raw coverage score is identical to the unique coverage score for both paths. This indicates that there is no overlap between these two paths. That is to say, there are no countries that can be explained by both paths. The unique coverage of Path 1 (RIC * LOFB *MR) is 0.270 while the unique coverage of Path 2 (RIC * HR) is 0.447. Thus, Path 2 has more empirical importance than path 1.

[82] Carsten Q. Schneider and Claudius Wagemann, supra note 30, at 139.

[83] Charles C. Ragin, supra note 34, at 157.

[84] Carsten Q. Schneider and Claudius Wagemann, supra note 30, at 139.

Path 1 indicates that the combination of rich country, low financial burden and medium risk produces the outcome of a high acceptance level of the international compensation regime for tanker oil pollution. Consistency of this path is 0.83. The countries that are exclusively explained by this path and thus have a high acceptance level with regard to the international compensation regime include Argentina, Bahrain, Colombia, Cyprus, Dominican Republic, Gabon, Iran, Jamaica, Namibia, Oman, Panama, Qatar, Trinidad and Tobago, Uruguay, Venezuela, Estonia and Latvia. At the same time, two true logically contradictory cases of this path can be found, including Costa Rica and Jordan. It should also be noted that there are some cases explained by this path but without a high level of acceptance — except for the true logically contradictory cases. They are not identified as true logically contradictory cases, because the membership score of the outcome is exactly equal to 0.5. This group is comprised of four countries, that is, Kuwait, Lebanon, Saudi Arabia and Azerbaijan (see Figure 3-3).

Path 2, representing more empirical relevance, indicates that most of the countries characterized as rich countries with a high risk of oil spill have a high acceptance level with regard to the international compensation regime for tanker oil pollution. Consistency of this path is 0.858. Cases that are exclusively explained by this path, and thus have a high acceptance level with regard to the international compensation regime include Algeria, Bulgaria, Israel, Malaysia, Mexico, Russia, South Africa, Singapore, Switzerland, Turkey, Tunisia, Australia, Belgium, Croatia, Denmark, Finland, Germany, Greece, Italy, Ireland, Japan, Netherland, Norway, Portugal, Korea, Slovenia, Spain, Sweden and the United Kingdom. At the same time, Bosnia/Herzegovina, Cuba, Thailand and the United States are the true logically contradictory cases. In addition, Libya, Romania and China are cases explained by this path but without a high acceptance level, due to the membership of 0.5 in the outcome.

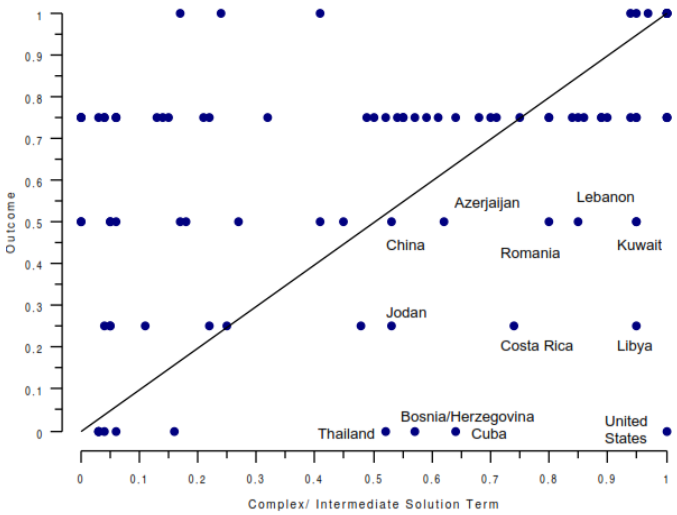
Table 3-11 Complex/ Intermediate Solution Term of Outcome of High Acceptance Level

	Path 1 RIC * LOFB * MR	+	Path 2 RIC * HR	→	High Acceptance Level
Consistency	0.83		0.858		
Raw Coverage	0.27		0.447		
Unique Coverage	0.27		0.447		
Uniquely Covered Cases**	Costa Rica, Jordan Azerbaijan, Kuwait, Lebanon, Saudi Arabia, Argentina, Bahrain, Colombia, Cyprus, Dominican Republic, Gabon, Iran, Jamaica, Namibia, Oman, Panama, Qatar, Trinidad and Tobago, Uruguay, Venezuela, Estonia, Latvia		Bosnia/Herzegovina, Cuba, Thailand, the United States, Libya, China, Romania, Algeria, Bulgaria, Israel, Malaysia, Mexico, Russia, South Africa, Singapore, Switzerland, Turkey, Tunisia, Australia, Belgium, Croatia, Denmark, Finland Germany, Greece, Italy, Ireland, Japan, Netherland, Norway, Portugal, Korea, Slovenia, Spain, Sweden, UK		
Typical Cases***	Argentina, Bahrain, Colombia, Cyprus, Dominican Republic, Gabon, Iran, Jamaica, Namibia, Oman, Panama, Qatar, Trinidad and Tobago, Uruguay, Venezuela, Estonia, Latvia		Algeria, Bulgaria, Israel, Malaysia, Mexico, Russia, South Africa, Singapore, Switzerland, Turkey, Tunisia, Australia, Belgium, Croatia, Denmark, Finland Germany, Greece, Italy, Ireland, Japan, Netherland, Norway, Portugal, Korea, Slovenia, Spain, Sweden, UK		
True Logical Contradictory Cases****	Costa Rica, Jordan (Kuwait, Lebanon, Saudi Arabia, Azerbaijan are the cases with outcome membership of 0.5)		Bosnia/Herzegovina, Cuba, Thailand, the United States (China Romania, Libya are the cases with outcome membership of 0.5)		
Solution Consistency	0.847				
Solution Coverage	0.717				
Uncovered Cases*****	Angola, Cambodia, Cameroon, Congo, Ecuador, Georgia, Ghana, India, Kenya, Mozambique, New Zealand, Nigeria, Philippines, Sri Lanka, Syrian Arab, United Arab Emirates, Lithuania, Morocco, Poland				

* Cases with membership in path > 0.5; **Cases with membership in only one path > 0.5; *** Cases with membership in outcome >0.5, membership in path >0.5;

****Cases with membership in path >0.5 and outcome ≤0.5; Cases with membership in path < 0.5 and outcome> 0.5

Figure 3-3 XY Plot of the Complex/Intermediate Solution Term



3.6 Discussion

In the abovementioned two paths, the presence of condition RIC indicates that cases are more in than out of this set and thereby represents countries with an upper middle income or high income. Similarly, the presence of the outcome of a high acceptance level of the international compensation regime for tanker oil pollution means that a country has acceded to the 1992 Fund Convention or the 2003 Supplementary Fund Convention.

It is observed that RIC is present in both paths. However, it should be noted that there are some lower middle or low income countries that have acceded to the 1992 Fund Convention, such as India and the Philippines. At the same time, there are still a number of lower middle or low income countries that are reluctant to participate in the abovementioned conventions, regardless of the potentially high risk or the low financial burden. This inconsistency produces the result that POC is absent in the solution term. As explained in section 3.2.4, the interpretation of this result could be that those countries with strong economies enable more environmental treaty ratifications to protect victims and the marine

environment, whereas countries with weak economies would not "consider the protection of ecology as something with which they should be concerned".[85]

Path 2 (RIC * HR) indicates that the majority of the upper middle or high income countries facing potentially high risk of oil spill have acceded to the 1992 Fund Convention, and some of them have also acceded to the 2003 Supplementary Fund Convention, giving a relatively high level of protection to victims even though such accession could place a heavy financial burden on their domestic oil receivers. In other words, for most upper middle and high income countries with high risk, countries receiving limited shipments of crude and fuel oil and countries receiving a vast amount of shipments of crude and fuel oil have both acceded to at least the 1992 Fund Convention.[86] On the other hand, it can be seen from Path 1 (RIC * MR * LOFB) that upper middle or high income countries with a medium risk of oil spill only consider becoming Member States of IOPC Funds when the financial burden associated with adherence to the relevant international conventions is low.

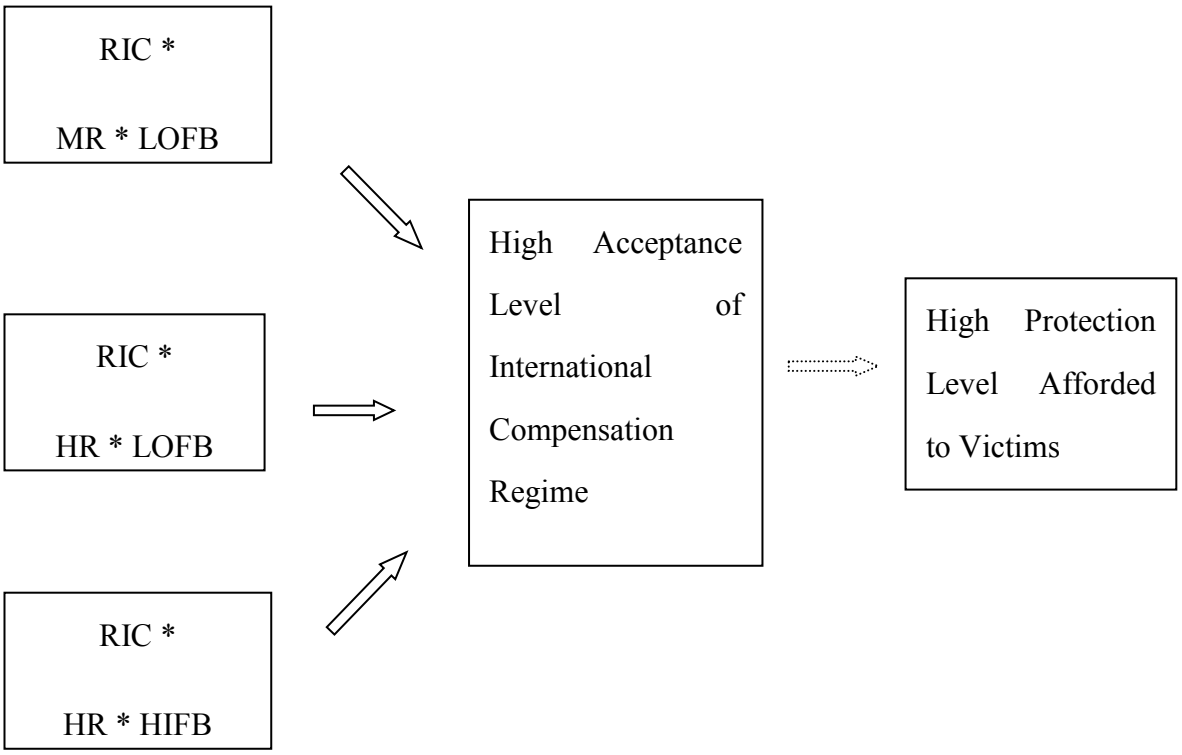
According to the above analysis, Path 2 can be further divided into two sub-paths. One is a path representing the combination of RIC, HR and LOFB. Another is a path representing the combination of RIC, HR and HIFB. Therefore, there are in total three kinds of combinations of conditions leading to accession of the 1992 Fund Convention or the 2003 Supplementary Fund Convention, which accession indicates the high level of protection afforded to victims, as follows: (1) RIC * MR * LOFB; (2) RIC * HR * LOFB and (3) RIC * HR * HIFB (see also Figure 3-4). To further investigate the justification of these three paths, a representative

[85] Chao Wu, *Pollution from the Carriage of Oil by Sea: Liability and Compensation* (London: Kluwer Law International, 1996), 3.

[86] The United States is a special case and more detailed analysis can be found in latter Section 3.6.3.

case for each path will be introduced in the following sections. In addition, the United States will also be examined as an exceptional case, because it is noted that this super rich country, which is surrounded by one of the regional seas with the highest risk, has not acceded to any of the international conventions.

Figure 3-4 Three Combinations of Conditions Leading to a High Acceptance Level of the International Compensation Regime for Tanker Oil Pollution



3.6.1 RIC * MR * LOFB

Low financial burden is associated with accession to the 1992 Fund Convention for countries receiving limited shipments of crude or fuel oil. However, these countries may also face a potential risk of tanker oil spill because of exporting oil, although it is revealed by statistics that net importing countries experience

approximately 80 per cent more spills than net exporting countries.[87] Besides this, countries located along relevant transit routes are also potentially exposed to oil pollution from ships.[88] Even though the risk of oil spill is comparatively low for those countries receiving limited shipments of crude and fuel oil, adoption of the 1992 Fund Convention is a sensible and cost-effective approach to counter the unforeseeable risk. This is because accession to the 1992 Fund Convention can assure prompt and relatively adequate compensation for oil pollution victims without imposing a heavy financial burden.

A Representative Case: Argentina

Although the overall risk in the upper South West Atlantic is relatively limited, the risk of oil spill in Argentina, especially in Rio de la Plata, has been increasing due to the greater volume of shipments of oil and petroleum products.[89] Argentina's adoption of the 1992 CLC and the 1992 Fund Convention was triggered by a large oil spill incident in Rio de la Plata. On 15 January 1999, the Estrella Pampeana, a Liberian-flagged oil tanker owned by Royal Dutch/Shell (hereinafter referred to as the "Shell"), collided with a German cargo ship named Sea Parana at the mouth of the Rio de la Plata, and approximately 30,000 tons of crude oil leaked out from the Estrella Pampeana.[90] The coastline of Magdalena was seriously polluted. Previously, the shores of Magdalena were declared by the

[87] Susannah Musk, "Trends in Oil Spill from Tankers and ITOPF Non-tanker Attended Incidents", paper presented at the 2010 Arctic and Marine Oil Spill Program (AMOP) Technical Seminar, Vancouver, 5-7 June 2012, available at: http://www.itopf.com/information-services/publications/papers/documents/amop12.pdf (accessed 22 December 2012).

[88] Supra note 1, at 19.

[89] Regional Profiles: A Summary of the Risk of Oil Spill & State of Preparedness in UNEP Sea Regionals, 2003, ITOPF, available at: http://www.itopf.com/information-services/country-profiles/documents/uppersouthwestatlantic.pdf (accessed 22 December 2012)

[90] Michael Shea, "Environmental and Legal Implications of the Rio de la Plata Oil Spill", C*olorado Journal of International Environmental Law and Policy* (1999): 183- 190.

United Nations Educational, Scientific and Cultural Organization to be a World Biosphere Reserve, and tourism was the main source of income for this small town. Argentina had not acceded to the 1992 CLC or the 1992 Fund Convention at the time of the incident. In 2002, an Argentine court ruled that Shell was responsible for the spill, and had failed to clean up the coast immediately after the spill incident, so that it must pay 10 million USD to clean up the polluted coastline, based on fault liability.[91] Shell denied its responsibility for the collision. It was not until 2009 that the Magdalena Municipality and Shell reached an agreement to settle the pollution claims for an amount of 9.5 million USD.[92] If Argentina was a Contracting State of the 1992 CLC and the 1992 Fund Convention at the time of the incident, the victims could have received compensation more adequately and promptly. As Michael Shea[93] stated:

"The Rio de la Plata spill demonstrated that the approach taken through the 1992 CLC and 1992 Fund CLC is the more sensible way to deal with oil spills. Under these regimes, victims of oil spills are guaranteed compensation without having to resort, at least in most cases, to litigation. Furthermore, because ship owners are strictly liable, they have a strong incentive to take immediate action to contain spills and, one would hope, be more careful in the first place."

It was the result of this incident that prompted Argentina to ratify the 1992 CLC and the 1992 Fund Convention on 13 October 2000.[94]

3.6.2 RIC * HR * LOFB

[91] The source of news is from BNAMERICAS published on 22 November, 2002, available at: http://www.bnamericas.com/news/oilandgas/Court_rules_Shell_must_spend_US*35mn_on_Magdalena_clean-up. (accessed 22 December 2012).

[92] The source of news is from the website of Petroleo en Magdelena, available at: http://www.petroleomagdalena.com/2009-07-10/current-status-of-the-case/ (accessed 22 December 2012)

[93] Michael Shea, "Environmental and Legal Implications of the Rio de la Plata Oil Spill", *Colorado Journal of International Environmental Law and Policy* (1999): 183-190.

[94] The 1992 CLC and the 1992 Fund Convention took effect on 13 October 2001 in Argentina.

Adoption of the 1992 Fund Convention is in the best interests of upper middle or high income countries that not only face a high risk of oil spill but also receive limited shipments of crude and fuel oil. The high risk of oil spill incidents and the financial losses incurred are spread out over the large number of oil receivers who contribute to the IOPC Fund.[95] Especially if there are no companies receiving more than 150,000 tons of persistent oil in a Contracting State, the coverage provided by the IOPC Fund is a sort of "free service".[96] Thus, for such countries, adherence to the 1992 Fund Convention represents a "win-win" situation.[97] The typical cases of this path (RIC * HR * LOFB) include Algeria, Mexico, Russia, Switzerland, Tunisia, Croatia, Norway and Slovenia. However, two countries of this type have not acceded to the 1992 CLC and the 1992 Fund Convention, these being Bosnia/Herzegovina and Libya.[98]

A Representative Case: Norway

As the sixth largest oil exporting country in the world,[99] Norway is exposed to marine pollution arising from the petroleum industry and its large volume of oil transportation. Since the discovery of oil fields off the Norwegian coast in 1969, Norway has created a statutory regime to ensure a balance between the benefits

[95] André Schmitt and Sandrine Spaeter, "Hedging Strategies and Financing of the 1992 International Oil Pollution Compensation Fund", Working Papers of BETA from Bureau d'Economie Théorique et Appliquée, UDS, Strasbourg, available at: http://www.beta-umr7522.fr/productions/publications/2005/2005-12.pdf (accessed 29 July 2012).

[96] Marko Pavliha, "The 2003 Supplementary Fund Protocol: An Important Improvement to the International Compensation System for Oil Pollution Damage", *Zbornik pravnog fakultetau Zagrebu* 58 (2008): 307–332.

[97] Supra note 1, at 21.

[98] Bosnia /Herzegovina have not ratified any international conventions regarding compensation for vessel-source oil pollution. The CLC 1969 took effect on 26 July 2005 in Libya. War and political reasons may be accountable for the low acceptance level of the international compensation regime.

[99] The source is from the World Factbook of the Central Intelligence Agency, available at: https://www.cia.gov/library/publications/the-world-factbook/rankorder/2176rank.html. (accessed 28 December 2012).

arising from the oil industry and marine environmental protection.[100] As one of the most active participants in the international regime of compensation for vessel-source oil pollution, Norway ratified the 1992 CLC and the 1992 Fund Convention on 3 April 1995[101] and ratified the 2003 Supplementary Fund Convention on 31 March 2004.[102] The provisions of the 1992 CLC were transformed into Norwegian domestic legislation in Chapters 10 and 12 of the Maritime Code *24.06.1994*. The 1992 Fund Convention and the 2003 Supplementary Fund Convention were included in Section 201 of the Maritime Code. In addition, according to Section 208 of the Maritime Code, the strict liability and limited exonerations in the 1992 CLC shall also apply to pollution damage caused by oil escaping or being discharged from ships other than oil tankers, drilling rigs or similar mobile installations. At the same time, these provisions in the Maritime Code shall also apply to pollution damage caused by oil materials other than persistent oil, such as non-persistent oil and mixtures containing oil. The limitation of liability shall be subject to the global limitation.[103]

3.6.3 RIC * HR * HIFB

As mentioned in the UNCTAD report, even for those countries with a significant number of receipts for shipments of crude and fuel oil, the relevant cost-benefit may be attractive, given the potentially higher risk of exposure to oil pollution incidents.[104] The 1992 IOPC Fund calls for ex post contributions by each oil receiver in Contracting States corresponding to the percentage of aggregate

[100] James Bamberg, *The History of the British Petroleum Company* (Cambridge University Press, 2000), 202.

[101] The 1992 CLC and the 1992 Fund Convention came into force on 30 May 1996.

[102] The 2003 Supplementary Fund Convention came into force on 3 March 2005.

[103] This refers to the Protocol of 1996 to amend the Convention on Limitation of Liability for Maritime Claims, 1976. Norway acceded to this convention on 17 October 2000.

[104] Supra note 1, at 28.

risk.[105] This character is similar to that of the mutuality principle that is used to allocate risk based on pooled risks, thus reducing individual risk.[106] Moreover, due to the scale of major oil pollution incidents, there can be huge economic and environmental losses involved if such an incident occurs. As a result, from the perspective of risk-sharing, it is sensible to allocate the potentially high risks and economic losses involved by adopting the 1992 Fund Convention or the 2003 Supplementary Fund Convention. Typical cases of this path include Bulgaria, South Africa, Australia, Belgium, Denmark, Finland, Germany, Greece, Italy, Ireland, Japan, the Netherlands, Portugal, Korea, Spain, Sweden and the United Kingdom. At the same time, several upper middle or high income countries with high risk and significant receipts of crude and fuel oil have not acceded to the 1992 CLC or the 1992 Fund Convention, namely Cuba, Thailand, the United States, Romania and China.[107]

A Representative Case: The European Union

Due to the large volume of crude oil imports and seaborne oil transportation, the coasts of Europe are extremely vulnerable to oil pollution risk, especially in the North East Atlantic and the Mediterranean.[108] To prevent and compensate for oil pollution damage, the European Union (hereinafter referred to as the "EU")

[105] Andre Schmitt and Sandrine Spaeter, "Insurance and Financial Hedging of Oil Pollution Risk", (2004), Working Papers of LaRGE Research Center from Laboratoire de Recherche en Gestion et Economie (LaRGE), Université de Strasbourg (France), available at: http://www.huebnergeneva.org/documents/spater.pdf (accessed18 Mar 2013).

[106] Andre Schmitt and Sandrine Spaeter, "Optimal Coverage of Large Risks: Theoretical Analysis and Application to Oil Spill", (2007), Working Papers of BETA from Bureau d'Economie Théorique et Appliquée, UDS, Strasbourg, available at http://idei.fr/doc/conf/ere/papers_2007/spaeter.pdf (accessed18 Mar 2013).

[107] The 1992 CLC took effect in China on 5 January 2000, and in Romania on 27 November 2001.

[108] Regional Profiles: A Summary of the Risk of Oil Spill & State of Preparedness in UNEP Sea Regionals, 2003, ITOPF, available at: www.itopf.com/regional _profiles. (accessed 10 March 2013).

actively encourage its member states to join in the relevant international conventions in this respect. Moreover, the EU's policy decision has pushed forward the development of the international compensation regime. After the *Erika* and *Prestige* incidents, the EU realized that the international regime might be inadequate and took the initiative itself for a separate European Supplementary Fund for Compensation for Oil Pollution Damage (hereinafter referred to as the "COPE Fund").[109] It was proposed that the COPE Fund, with a financial cap of 1 billion EUR, should be established to top up the 1992 CLC and the 1992 Fund Convention, and provide supplementary compensation for victims in EU member states.[110] It was the threat of this separate regional regime that urged the IMO to adopt the 2003 Supplementary Fund Convention in May 2003.[111] According to Council Decision 2004/46/EU, the member states are authorized to ratify the 2003 Supplementary Fund Convention "within a reasonable time and, if possible, before 30 June 2004".[112] This decision shows the EU's support for applying the international compensation regime throughout the Union.[113] Currently, most of the EU member states have acceded to the 2003 Supplementary Fund Convention.[114]

An Exceptional Case: The United States

[109] Michael Faure, Hui Wang, "Liability for Oil Pollution – the EU Approach", *Environmental Liability* 12 (2004): 55- 67.

[110] Commission of the European Communities, (2000), 802 final, Communication from the Commission to the European Parliament and the Council on a Second Set of Community Measures on Maritime Safety Following the Sinking of the Oil Tanker Erika, at p71, available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2000:0802:FIN:EN:PDF. (accessed 10 March 2013).

[111] Gwendoline Gonsaeles, "The Impact of EC Decision-Making on the International Regime for Oil Pollution Damage: The Supplementary Fund Example", in *Marine Resource Damage Assessment*, ed. Frank Maes (The Netherlands: Springer, 2005), 85-131, at 130.

[112] Council Decision 2004/246/EU, Article 1 and 2.

[113] Henrik Ringbom, "Maritime Liability and Compensation in EU Law", in *Pollution at Sea: Law and Liability,* eds. Baris Soyer and Andrew Tettenborn (London: Informa, 2012), 155-169, at 159.

[114] Austria, Luxembourg, Czech Republic and Slovakia have not adopted any international convention regarding compensation for tanker oil pollution. Romania only ratified the 1992 CLC.

The United States has not acceded to any international convention regarding compensation for vessel-source oil pollution damage.[115] Two main reasons that the rejection of these international conventions can be attributed to are as follows: (1) the fear of precedence of the international convention over the state law of the United States; and (2) divergences regarding the basis of liability, the ceiling of compensation and the damage to be compensated.[116]

Instead of participating in the international scheme, the United States introduced domestic legislation concerning oil pollution in 1990. The Oil Pollution Act 1990 (hereinafter referred to as the "OPA 1990") established a comprehensive oil spill liability and compensation regime, with a wide application scope covering nearly all kinds of ships and oils.[117] Responsible parties are strictly liable for both removal costs and pollution damage.[118] At the same time, very few exemptions[119] are offered, subject to very stringent conditions.[120] The strict liability is not

[115] These conventions include: (1) The 1992 CLC; (2) the 1992 Fund Convention; (3) the 2003 Supplementary Fund Convention; and (4) the Bunkers Convention.

[116] Chao Wu, supra note 85, at 229.

[117] 33 U.S. Code, Sections 2701(23) and 2701(37).

Oil does not include any substance which is specifically listed or designated a hazardous substance. Public vessels are not included in the definition of vessel.

[118] Ibid, Section 2702(a).

[119] Ibid, Section 2703(a).

The responsible party is not liable for "removal costs or damage, if the responsible party establishes, by preponderance of the evidence, that the discharge or substantial threat of a discharge of oil and the resulting damages or removal costs were caused solely by: (1) an act of God; (2) an act of war (3) an act or omission of a third party, other than an employee or agent of the responsible party or a third party whose act or omission occurs in connection with any contractual relationship with the responsible party, if the responsible party establishes, by a preponderance of the evidence, that the responsible party (A) exercised due care with respect to the oil concerned, taking into consideration the characteristics of the oil and in light of all relevant facts and circumstances; and (B) took precautions against foreseeable acts or omissions of any such third party and foreseeable consequences of those acts or omissions; or (4) any combination of (1) (2) (3)".

[120] Ibid, Section 2703(c).

Defense of liability does not apply with respect to a responsible party who fails or refuses (1) to report the incident as required by law if the responsible party knows or has reason to know of the incident; (2) to provide all reasonable cooperation and assistance requested by a responsible official in connection with

channeled to the shipowner. Instead, any person owning, operating, or demise chartering a vessel is defined as a responsible party.[121] Furthermore, responsible parties also include any third party whose act or failure to act is the sole cause of a discharge or threat of discharge and of the resulting removal and damage costs.[122] Responsible parties are entitled to limit their liabilities, but contrary to the maximum compensation amount under the international regime, minimum compensation amounts are set in OPA 1990.[123] At the same time, wide exceptions of limits are provided so that it is easier to break the limits than under the international regime.[124] All ships over 300 gross tons, including tankers and non-tanker vessels, are required to maintain a certificate evidencing their financial capacity to satisfy the maximum liability applicable to the vessel.[125]

Apart from the compensation provided by the shipowner, the Oil Spill Liability Trust Fund (hereinafter referred to as the "OSLTF") has been established in

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removal activities; or (3) without sufficient cause, to comply with an order issued under the section 311 (c) or (e) of the CWA as amended by OPA 1990 or the Intervention on the High Seas Act".

[121] Ibid, Section 2701(32) (A).

[122] Ibid, Section 2702(d) (1).

[123] Ibid, Section 2704(A).

The responsible party is liable for removal costs and pollution damage up to following limits: (1) for tanker vessels: (a) the greater of $3,000 per gross ton or $22 million for single hull tanker vessels greater than 3,000 gross tons, or $6 million for vessels less than 3,000 gross tons; (b) the greater of $1,900 per gross ton or $16 million for any other tanker vessel greater than 3,000 gross tons, or $4 million for vessels less than 3,000 gross tons; (2) for any other vessel, the greater of $950 per gross ton or $800,000; (3) $75 million plus the total of all removal costs for any offshore facility except a deepwater port; (4) $350 million for any onshore facility or deepwater port.

[124] Ibid, Section 2704(C).

Limits do not apply "if the incident was proximately caused by (A) gross negligence or willful misconduct of, or (B) the violation of an applicable Federal safety, construction, or operating regulation by the responsible party, an agent or employee of the responsible party, or a person acting pursuant to a contractual relationship with the responsible party". Limits also do not apply "if the responsible party fails or refuses (A) to report the incident as required by law and the responsible party knows or has reason to know of the incident; (B) to provide all reasonable cooperation and assistance requested by a responsible official in connection with removal activities; or without sufficient cause, to comply with an order issued under subsection (c) or (e) of section 1321 of this title or the Intervention on the High Seas Act".

[125] Ibid, Section 2716(a).

accordance with the OPA 1990 to provide supplementary compensation for oil pollution damage in the United States. Funds for the OSLTF derive principally from a USD 5 cent per barrel tax on imported and domestically produced oil.[126] Other resources for the OSLTF include interest on the Fund principal from the United States Treasury investments, recovery of costs and damages from responsible parties and guarantors, civil and criminal penalties, and the money transferred from the Clean Water Act Fund, the Offshore Oil Pollution Fund and the Deepwater Port Fund.[127] The OSLTF is available for: (1) The payment of removal costs consistent with the National Contingency Plan incurred by federal authorities or by a governor of a state or designated state officials; (2) the payment of costs incurred by federal, state, or Indian tribe trustees in carrying out their functions for assessing natural resource damages and for developing and implementing plans consistent with the National Contingency Plan; (3) the payment of removal costs consistent with the National Contingency Plan as a result of damages resulting from a discharge of oil or a substantial threat of a discharge of oil from a foreign offshore unit; (4) the payment of claims for uncompensated removal costs consistent with the National Contingency Plan, or uncompensated damages; (5) the payment of federal administrative, operational and personnel costs and expenses reasonably necessary for and incidental to the implementation, administration and enforcement of the OPA 1990 with respect to prevention, removal and enforcement.[128] The OSLTF shall be exempted from liability where the incident, removal costs or damages are caused by the gross negligence or willful misconduct of the claimant.[129] The maximum compensation payable by the OSLTF for removal costs and damages is USD 1 billion for any one incident, while the compensation payable by the OSLTF for natural resource

[126] Lawrence I. Kiern, "The Oil Pollution Act of 1990 and the National Pollution Funds Center", *Journal of Maritime Law and Commerce* 25 (1994): 487-519.

[127] Ibid.

[128] 33 U.S. Code, Section 2712(a).

[129] Ibid, Section 2712(b).

damage may not exceed USD 500 million for any one incident.[130] The OSLTF is administered by the National Pollution Funds Center (hereinafter referred to as the "NPFC"), which was established by the Commandant of the United States Coast Guard to administer Title I of the OPA 1990 and its implementing regulations in February 1991.[131] In principle, all claims for removal costs or damages shall be presented first to the responsible party or guarantor.[132] However, claims may be presented to the OSLTF directly in the following cases: (1) The director of the NPFC has advertised or otherwise notified claimants where the responsible party and guarantor both deny a designation, or pollution originates from a public vessel, or the source of the discharge or threat cannot be designated; (2) by a responsible party who is entitled to be exempted from his liability or to limit his liability; (3) by the governor of a state where the removal costs were incurred by this state; and (4) by a United States claimant in a case where a foreign offshore unit has discharged oil causing damage for which the OSLTF is liable.[133]

Although the OPA 1990 was considered to be radical and excessively onerous when it was enacted two decades ago, the purely domestic compensation scheme established by the OPA 1990 has proved successful in improving the situation with regard to damage to the environment caused by oil pollution incidents, especially those from vessels.[134]

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[130] Colin de la Rue and Charles B. Anderson, *Shipping and the Environment*, 2nd ed. (London, Hong Kong: Informa, 2009), 215.

[131] Ibid.

[132] 33 U. S. Code, Section 2713(a).

[133] Ibid, Section 2713(b) (1).

[134] Lawrence I. Kiern, "Liability, Compensation, and Financial Responsibility under the Oil Pollution Act 1990, A Review of the First Decade", *Tulane Maritime Law Journal* 14 (1999): 481- 589.

3.7 Conclusion

Based on the results of fsQCA, three types of countries have a high acceptance level regarding the international compensation regime for tanker oil pollution, which indicates they afford a high level of protection to both victims and the marine environment. These country types are: (1) upper-middle or high income countries facing medium risk of oil spill and receiving limited shipments of crude and fuel oil; (2) upper-middle or high income countries facing high risk of oil spill and receiving limited shipments of crude and fuel oil and (3) upper-middle or high income countries facing high risk of oil spill and receiving a large amount of shipments of crude and fuel oil.

For all three patterns, their economic development is a vital factor leading to a high acceptance level, because countries with strong economies usually have a better environmental protection strategy and stronger compensation ability to enable more environmental treaty ratifications so as to protect both victims and the marine environment. As far as the first two types are concerned, accession to the 1992 Fund Convention is advantageous, especially for those countries facing potentially high risks, yet who receive limited shipments of crude and fuel oil. This is because the IOPC Fund can provide a substantial amount of supplementary compensation for victims without imposing a heavy financial burden on domestic oil receivers. However, it is interesting to note that the majority of upper-middle or high income countries facing potentially high risk of oil spill ratified the 1992 Fund Convention or the 2003 Supplementary Fund Convention, even though a heavy financial burden is associated with it. In other words, with regard to the upper-middle or high income countries, the major determinant of adopting the 1992 Fund Convention is not whether the financial burden placed on the domestic oil industry is heavy, but whether the potential risk of exposure to tanker oil spill incidents is high. This might be because accession to the 1992 Fund Convention is undoubtedly a sensible method of

spreading the high risk of major oil pollution incidents which could lead to huge economic and environmental losses.

However, as characterized by an upper-middle income, high risk exposure to oil spill incidents, and a potentially high financial burden, China has only acceded to the 1992 CLC[135] and the Bunkers Convention;[136] it has not acceded to the 1992 Fund Convention (currently, this has only been acceded to by the Hong Kong SAR), nor the 2003 Supplementary Fund Convention. What are the reasons that have led to China's reluctance to participate in the 1992 Fund Convention? Does the domestic legislation in China, like the OPA in the United States, afford stronger protection to victims? To seek answers to these questions, the legal regime of compensation for vessel-source oil pollution in China will be comprehensively investigated in the following Part II of this thesis.

[135] China acceded to the1969 CLC and its 1976 Protocol on 30 January 1980, with effect from 29 April 1980. The updated Protocol of 1992 CLC took effect in China on 5 January 2000.

[136] The Bunkers Convention came into effect in China on 9 March 2009.

PART II:

COMPENSATION REGIME FOR VESSEL-SOURCE OIL POLLUTION DAMAGE IN CHINA

CHAPTER 4

LEGAL FRAMEWORK OF COMPENSATION FOR VESSEL-SOURCE OIL POLLUTION DAMAGE IN CHINA

4.1 Introduction

As the world's second largest importer of crude oil, China imported 271 million tons of crude oil in 2012.[1] However, along with the growing need for crude oil, the risk of oil pollution from ships has also been increasing.[2] Compensation for vessel-source oil pollution is important for protecting the interests of victims as well as the marine environment. As analyzed in Part I of this thesis, international standards on compensation for vessel-source oil pollution have been established by various relevant international conventions. China has acceded to the 1992 CLC[3] and the Bunkers Convention.[4] Also, China has promulgated a number of domestic legislations to improve compensation standards in China. Since 2010, a series of laws and regulations have been adopted, which is a significant development of the law on compensation for vessel-source oil pollution damage. On 1 March 2010 the amended Regulations of the PRC on the Prevention and Control of Marine Pollution from Ships (hereinafter referred to as "the Amended Regulations") took effect. Meanwhile, the Measures for Implementation of Insurance for Civil Liability of Oil Pollution from Ships (hereinafter referred to

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[1] Chunrong Tian, "China's Oil and Gas Imports and Exports, 2012", *International Petroleum Economics* 3 (2013): 44 - 55.

[2] Lisa Woolgar, "Assessing the Increasing Risk of Marine Oil Pollution Spills in China", paper presented at Twentieth International Oil Spill Conference, Savannah, GA, 4-8 May 2008, available at: http://www.itopf.com/information-services/publications/papers/documents/IOSC08LW.pdf (visited 26 Oct 2011).

[3] China acceded to the 1969 Civil Liability Convention and the 1976 Protocol on 30 January 1980, with effect from 29 April 1980. The updated Protocol of 1992 Civil Liability Convention took effect in China on 5 January 2000.

[4] The Bunkers Convention came into effect in China on 9 March 2009.

as “the Oil Pollution Insurance Regulation”) took effect as of 1 October 2010, this constituting the first tier of the compensation regime for vessel-source oil pollution damage. In addition, the Provisions of the Supreme People’s Court on Several Issues Concerning the Trial of Cases of Disputes over Compensation for Vessel-induced Oil Pollution (hereinafter referred to as “the Judicial Interpretation”)[5] came into effect on 1 July 2011; as a result, a number of uncertain issues with regard to liability and compensation for vessel-source oil pollution damage have been clarified. Furthermore, a final draft of the Administrative Measures for Use and Collection of the Compensation Fund for Oil Pollution Damage from Ships (hereinafter referred to as “the Compensation Fund Regulation”) took effect as of 1 July 2012. As a result, the complete framework of a two-tier compensation regime for vessel-source oil pollution damage has been established in China. In this chapter, the current situation with regard to oil spills from ships in the Chinese sea area will first be revealed by a statistical analysis. There then follows a review of the legal framework of compensation for vessel-source oil pollution damage. After this, the application of international conventions and Chinese domestic legislation in this respect will be explored.

4.2 Oil Spill from Ships in Chinese Sea Areas

According to statistics from the Ministry of Transport of the PRC, during the period from 1973 to 2009, approximately 37,514 tons of oil were discharged or escaped into the Chinese sea areas from ships, this involving 84 oil spill incidents of over 50 tons each.[6] On average, 2 incidents involving more than 50

[5] According to Articles 5 and 6 of Provisions of the Supreme People’s Court on the Judicial Interpretation Work, a judicial interpretation has legal binding force. Judicial interpretations may be made in four forms, namely, “interpretation”, “provision”, “reply” and “decision”.

[6] All oil spills mentioned in this article refer to oil spills of over 50 tons from ships into Chinese sea waters.

tons take place each year, and the average annual spillage volume is 1,014 tons (see Table 4-1).

Table 4-1 Annual Number and Volume of Oil Spills Over 50 Tons From 1973-2009

Year	Number of Spills	Volume (Tons)	Year	Number of Spills	Volume (Tons)
1973	1	1,400	1995	6	1,567
1974	1	895	1996	6	2,437
1975	2	228	1997	4	540
1976	3	8,530	1998	2	392
1977	1	350	1999	2	1,089
1978	1	655	2000	2	305
1979	2	555	2001	3	2,790
1983	2	4,093	2002	3	1,260
1984	3	1,842	2003	5	1,500
1986	1	200	2004	1	1,268
1989	2	364	2005	7	1,758
1990	1	100	2006	3	749
1991	2	295	2007	6	319
1992	2	430	2009	5	1,172
1994	5	431	Total	84	37,514

Among those incidents, there were 49 oil spill incidents caused by Chinese flagged vessels (See Table 4-2), while 35 oil spill incidents were caused by foreign flagged vessels, representing 41.7% of the total number of spills but 57.3% of the total volume of spillage. With respect to the types of vessels involved, tankers have to accept the principal responsibility for the incidents. As Table 4-3 below shows, oil escaping or discharging from tankers accounts for 78.8% of the total spillage amount. In addition, it can be seen from Table 4-4 that collision constitutes the major cause of oil spill, as 60.7% of the total spill volume and 56.1% of the total number of incidents results from collision.

Table 4-2 Number and Quantities of Oil Spills Over 50 Tons by Nationality of Vessel

Nationality	Number of Incidents	Percentage of Total Number of Incidents	Volume of Spillage (Tons)	Percentage of Total Volume of Spillage
Chinese	49	58.3%	16021	42.7%
Foreign[7]	35	41.7%	21493	57.3%

Table 4-3 Number and Quantities of Oil Spills Over 50 Tons by Type of Vessel

Vessel Type	Number of Incidents	Percentage of Total Number of Incidents	Volume of Spillage (Tons)	Percentage of Total Volume of Spillage
Tanker	50	59.5%	29591	78.9%
Bulk Carrier	26	31.0%	4942	13.2%
Container Ship	4	4.8%	2051	5.5%
Oil Barge	4	4.8%	930	2.5%

Table 4-4 Number and Quantities of Oil Spills Over 50 Tons by Cause

Cause	Number of Incidents	Percentage of Total Number of Incidents	Volume of Spill (Tons)	Percentage of Total Volume of Spill
Colliding	51	60.7%	21062	56.1%
Grounding	19	22.6%	13100	34.9%
Sinking (Being sunk after collision is excluded)	9	10.7%	1320	3.5%
Others	5	6.0%	2032	5.4%

As indicated in Table 4-5, the amount of oil spillage in the 1970s (i.e. 1973 to 1979), which was nearly twice that recorded for the 1980s (1980 to 1989), is the highest on record among the last four decades. However, since 1990 there has been an upward trend in oil spillage showing in terms of both the spillage volume and the number of incidents. The total oil spillage volume for the 2000s (2000-2009) comes to 11,121 tons. This increase can be attributed to the ongoing rise in oil imports since 1993, when China changed from being an oil exporter

[7] Hong Kong Flagged vessels are included.

into an oil importer.[8] At the same time, about 95% of imported oil is transported by tankers,[9] and it has to be admitted that such large scale oil transportation by sea has significantly increased the risk of oil spill incidents. Moreover, it has to be noted that oil spill incidents of over 50 tons have taken place frequently over the past 10 years. The total number of oil spill incidents during the 2000s was the largest throughout the last four decades.

Table 4-5 Number and Volume of Oil Spillage Over 50 Tons by Decade

Decade	Number of Spills	Percentage of Total Number	Volume of Spillage (Tons)	Percentage of Total Volume
1970s	11	13.1%	12,613	33.6%
1980s	8	9.5%	6,499	17.3%
1990s	30	35.7%	7,281	19.4%
2000s	35	41.7%	11,121	29.6%

Furthermore, a t-test was carried out to test whether the increase in risk of oil spill from vessels has been more significant since 1993, when China changed from being an oil exporter to an oil importer. The t-test was used because it is a statistical method used to compare the means of two populations, so as to determine whether there is a significant difference between the two population means. The number of oil spill incidents in Chinese sea areas was chosen to be the indicator of the risk of oil spill incidents, which indicator can express intuitive information on the risk of such incidents. If the risk is greater, then the value of the indicator per year is higher. With the t-test, it can be determined whether there is a significant difference in the means of the number of spills during the two periods of 1973 to 1992 and 1993 to 2009. 0.05 was set as the significant level. If the mean of the number of oil spill incidents in the former

[8] Hua Zhang, Shuhui Zhou, "China's Oil and Economics Trends in the New Century, " *Oil Depot and Gas Station* 22 (2002): 10-12.

[9] Nengye Liu, Frank Maes, "Prevention of Vessel-Source Marine Pollution: A Note on the Challenges and Prospects for Chinese Practice Under International Law", *Ocean Development & International Law* 42 (2011): 356-367.

period is greater than that in the latter period, and the p-value is less than 0.05, it can be concluded that there was a significant increase during the period of 1993-2009. From the result of the t-test (see Table 4-6), it can be seen that the mean of the number of oil spill incidents (1.20) during the period of 1973-1992 is less than the mean of the number of oil spill incidents (3.53) during the period of 1993-2009. Furthermore, t = -4.276 under df = 35 and the p value is 0.000. This result shows that the means of the number of oil spill incidents in the two periods mentioned above are significantly different. Therefore, the conclusion can be arrived at that, in comparison to the period from 1973 to 1992, there was a significant increase in the period from 1993 to 2009, and the risk of oil spills in Chinese seas has increased since 1993.

Table 4-6 Result of T-Test of the Number of Oil Spill Incidents During the Period from 1973 to 1992 and the Period from 1993 to 2009

Group Statistics

	Policy	N	Mean	Std. Deviation	Std. Error Mean
Number	Before Importing	20	1.20	1.005	.225
	After Importing	17	3.53	2.183	.529

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	14.494	.001	-4.276	35	.000	-2.329	.545	-3.435	-1.224
Equal variances not assumed			-4.050	21.695	.001	-2.329	.575	-3.523	-1.136

Consequently, from an analysis of oil spillage statistics over recent decades, it can be seen that although there has not been a catastrophic oil spill incident in

Chinese sea waters, the risk of oil pollution from ships keeps rising. Under such circumstances, compensation for vessel-source oil pollution is becoming a key issue in protection of the interests of victims and in prevention of oil pollution.

4.3 Legal Framework of Compensation for Vessel-Source Oil Pollution Damage

There is no specific oil pollution law in China, although stipulations of the civil liability and compensation for vessel-source oil pollution damage can be traced through several national legislations and international conventions to which China has acceded (see Table 4-7). A discussion of each of these laws now follows.

Table 4-7 Laws on Compensation for Vessel-Source Oil Pollution Damage in China

	Name of Law/Regulation/International Convention	Year of Promulgation/ Accession
National Legislations	1. General Principle of Civil Law	1986
	2. China Maritime Code	1992
	3. Marine Environmental Protection Law	1999
	4. Regulations on the Prevention and Control of Marine Pollution from Ships	2009
	5. The Tort Law	2009
	6. Measures of the People's Republic of China for the Implementation of Civil Liability Insurance for Vessel-induced Oil Pollution Damage	2010
	7. Provisions of the Supreme People's Court on Several Issues Concerning the Trial of Cases of Disputes over Compensation for Vessel-induced Oil Pollution	2011
	8. Administrative Measures for Use and Collection of the Compensation Fund for Oil Pollution Damage from Ships	2012
International Conventions	1. The 1992 Civil Liability Convention	1999
	2. The Bunkers Convention	2008

4.3.1 National Legislation

A. General Principles of the Civil Law of the PRC

The General Principles of the Civil Law (hereinafter referred to as "the Civil Law") offers general principles dealing with all kinds of torts, including environmental tort.[10] Article 124 regulates the strict liability rule that applies to all environmental torts, including oil pollution liability.

B. China Maritime Code

In the China Maritime Code (hereinafter referred to as the "CMC") there is no specific chapter dealing with civil liability and compensation for vessel-source oil pollution damage. The only article that is specific to marine pollution is Article 208 in Chapter XI of the Limitation of Maritime Claims. According to this article, the CMC shall not apply to claims for oil pollution damage under the1992 CLC, to which China is a contracting State.

C. Marine Environmental Protection Law (1999)

The Marine Environmental Protection Law was originally adopted at the 24th Meeting of the Standing Committee of the Fifth National People's Congress on 23 August 1982. Later on, it was revised at the 13th Meeting of the Standing Committee of the Ninth National People's Congress on 25 December 1999 (hereinafter referred to as "MEPL 1999"). Chapter VIII of the MEPL 1999 is dedicated to the prevention and control of pollution damage to the marine environment caused by vessels and their related operations. Principally set out is civil liability for oil pollution damage from ships, including the strict liability of

[10] Zhiwen Li, Shouzhi An, "The Necessity of Incorporating Marine Environmental Torts into the Maritime Legal System," in *Prevention and Compensation of Marine Pollution Damage – Recent Developments in Europe, China and the US*, ed. Michael G. Faure and James Hu (Alphen aan den Rijn: Kluwer Law, International, 2006), 275-284.

liable parties,[11] along with any exemptions.[12] Most importantly, Article 66 in principle regulates compulsory insurance and the national compensation fund for oil pollution damage from ships, this providing a legal basis for the establishment of a compensation regime for vessel-source oil pollution damage.

D. Regulations on the Prevention and Control of Marine Pollution from Ships

The Amended Regulations, promulgated by the State Council of China in 2009, intends to replace the previous one enacted in 1983.[13] It covers a wide range of matters relating to both the prevention of and compensation for marine pollution. All 78 articles in the Amended Regulations apply to any vessel-source pollution and any vessel-related operations that cause or may cause pollution damage in the sea waters and other sea areas under the jurisdiction of the PRC. A new Chapter 7, on the subject of compensation for vessel-source oil pollution damage, has been added, and this contains provisions with respect to the strict liability of liable parties, limitations of liability, compulsory insurance and a compensation fund. However, the provisions in the Amended Regulations concerning compulsory insurance and a domestic compensation fund only provide general rules. Specific rules will be covered respectively by the Oil Pollution Insurance Regulation and the Compensation Fund Regulation.

E. The Tort Law

Chapter IX of the Tort Law focuses specifically on the liability incurred as a result of environmental torts, the polluter being strictly liable for any pollution

[11] MEPL 1999, Article 90.

[12] Ibid, Article 92.

[13] The old version of Regulations on the Prevention and Control of Marine Pollution from Ships was promulgated by the State Council on 29 December 1983 and was abrogated on 1 March 2010.

damage.[14] Besides this, the joint and several liability of any third party who causes pollution damage is stipulated.[15]

F. Oil Pollution Insurance Regulation

The Oil Pollution Insurance Regulation is one of the implementing regulations of the Amended Regulations that covers specific issues of civil liability insurance for oil pollution damage, including the subject matter insured, the insured value, competent insurance institutions and insurance certificates.

G. The Judicial Interpretation

The Judicial Interpretation aims to clarify several controversial issues in trial over the compensation for vessel-source oil pollution damage. It contains a total of 32 articles covering a number of specific issues, including the scope of application, jurisdiction, oil pollution liability, the scope of compensation and loss identification, maritime lien, limitation of liability for oil pollution claims, direct action against the liability insurer, and subrogation for oil pollution claims.

H. The Compensation Fund Regulation

As an implementing regulation of the Amended Regulations, the Compensation Fund Regulation contains 33 provisions with respect to the collection and use of the domestic compensation fund for vessel-source oil pollution damage. It covers a number of issues, including the source and administration of the fund, cases in

[14] The Tort Law, Article 65.

[15] Ibid, Article 68. In this article, an imitative form of joint liability that is derived from the concept "Unechte Solidaritat" in German law is imposed on the polluter and the third party. In this pseudo joint liability, the victim is entitled to choose either the polluter or the third party from whom to claim compensation for their pollution damage. The polluter has the right of recourse against the third party after having compensated the victims.

which the fund is available, cases where the fund is exonerated, compensable damage, maximum compensation amounts, and claims settlement procedures.

4.3.2 International Conventions

A. 1992 Civil Liability Convention

China acceded to the1969 Civil Liability Convention and the 1976 Protocol on 30 January 1980, and this came into effect on 29 April 1980. The updated Protocol of the 1992 Civil Liability Convention (hereinafter referred to as "the 1992 CLC") came into effect in China on 5 January 2000. The 1992 CLC applies exclusively to pollution damage that occurs within the territory of China, including its territorial seas and exclusive economic zones; it also applies to preventive measures, wherever taken, that were taken in order to prevent or minimize damage.[16]

B. The Bunkers Convention[17]

The Bunkers Convention, which was ratified on 9 December 2008, came into effect in China on 9 March 2009. In common with the 1992 CLC, the Bunkers Convention is applicable where the pollution damage occurs in the territorial seas and exclusive economic zones of China. Preventive measures, wherever taken, that were taken in order to prevent or minimize damage are also covered by the Bunkers Convention.[18]

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[16] The 1992 CLC, Article II.

[17] The Bunkers Conventi

on came into effect in China on 9 March 2009.

[18] The Bunkers Convention, Article 2.

4.4 Application of Law

4.4.1 Application of International Conventions

A. Main Methods of Application of International Conventions in Chinese Legal Settings

As a contracting party to the Vienna Convention on the Law of Treaties[19], China must perform in good faith international conventions to which it has acceded.[20] However, the methods of applying international conventions in Chinese domestic legal settings are subject to domestic legislation. There is no article in the Constitution of the PRC[21] clarifying how to apply the international conventions in the Chinese legal settings. Besides this, there are no general stipulations concerning this issue in the Legislation Law[22] or the Law of Procedure of Conclusion of Treaties[23], nor are there such stipulations in any other domestic legislation. In judicial practice, the international conventions are applied in Chinese domestic legal settings in different ways, and three of the main methods will be revealed in the following sections.

Direct application

Direct application means that international conventions to which China has acceded can be directly applied in Chinese domestic legal settings without first having to be transformed into domestic legislation. By and large, there are two approaches to directly applying in domestic legal settings those international conventions to which China has acceded: (1) "quasi direct application" and (2)

[19] The Vienna Convention came into effect in China on 3 October 1997.

[20] The Vienna Convention on the Law of Treaties, Article 26.

[21] The current Constitution of the PRC was adopted by the 5th National People's Congress, and came into effect on 4 December 1982; amendments were made in 1988, 1993, 1999 and 2004.

[22] The Legislation Law was promulgated on 15 March 2000 and came into effect on 1 July 2000.

[23] The Law of Procedure of Conclusion of Treaties was promulgated and came into effect on 28 December 1990.

direct application.

"Quasi direct application" means that international conventions are directly applied to domestic legal settings, but with some conditions. Several domestic laws, regulations and judicial interpretations contain articles providing that the international conventions that China has acceded to shall directly apply, and shall have priority over domestic laws in those cases with foreign related elements. For instance, Article 142 of the Civil Law provides that "…If any international treaty concluded or acceded to by the People's Republic of China contains provisions differing from those in the civil laws of the People's Republic of China, the provisions of the international treaty shall apply, unless the provisions are ones on which the People's Republic of China has announced reservations." However, it should be noted that this provision is contained in Chapter VIII of Application of Law in Civil Relations with Foreigners. Therefore, in this situation the prerequisite for direct application of any relevant international conventions that China has acceded to is that foreign-related elements shall be involved. Some scholars define this type of direct application as "quasi direct application".[24]

Direct application is an approach under which international conventions that China has acceded to are directly applied in domestic legal settings, without any conditions. Some laws and regulations stipulate that the international conventions China has acceded to shall be directly applicable, and shall take priority over domestic legislations in any cases, rather than only to those cases with foreign-related elements. For example, Article 97 of the MEPL 1999 provides that "where an international treaty regarding marine environmental protection that was concluded or acceded to by the People's Republic of China

[24] Huanwei Sun, "The Application of Treaties in China", *International Law Review of Wuhan University* (2004): 113-134.

contains provisions differing from those contained in this Law, the provisions of the international treaty shall apply; however, any provisions about which the People's Republic of China has reservations shall be excepted".

Indirect application

Several domestic legislations adopt rules or a part of the rules corresponding to the international conventions to which China has acceded. Some international conventions are transformed into domestic legislation by promulgating new laws and regulations, or by amending current laws or regulations. For instance, the Law on the Territorial Sea and Contiguous Zone, and the Law on the Exclusive Economic Zones and Continental Shelve, were drafted on the basis of the United Nations Convention on the Law of Sea[25] that China has acceded to.

Mixture

Some of the domestic legislation employs both direct and indirect applications of the international conventions that China has acceded to, a typical example being the CMC. Most provisions in Chapter 5 of the CMC were drafted following the format of the Athens Convention relating to the Carriage of Passengers and their Luggage by Sea, 1974.[26] Chapter 8 on the Collision of Ships was drafted corresponding to the Convention for the Unification of Certain Rules of Law

[25] The Conventions on the Law of Sea came into effect in China on 7 July 1996.

[26] The Athens Convention, 1974 came into effect in China on 3 August 1994.

Other than with regard to the limitation of liability, the carriage of passengers and their luggage by sea, including both international and domestic carriage, shall be subject to Chapter 5 of the CMC. With respect to the limitation of liability, according to Article 117 of the CMC, the international carriage of passengers and their luggage by sea shall be subject to the limitation amounts provided in Article 117 of the CMC, which is basically in accordance with the limitation amounts provided in the 1976 protocol of the Athens Conventions relating to the Carriage of Passengers and their Luggage by Sea, 1974. On the other hand, the limitation of liability of the carrier with respect to the carriage of passengers by sea between the ports of China shall be subject to the Regulation on Limitation of Liability for Carriage of Passengers by Sea between the Ports of China, which took effect in 1993.

with Respect to Collision between Vessels, 1910.[27] Chapter 9, on Salvage at Sea, was drafted on the basis of the International Convention on Salvage, 1989.[28] In addition, according to Article 268 of the CMC, international conventions that China has acceded to shall apply directly, with priority given to those cases with foreign-related elements.

B. Application of Civil and Commercial International Conventions

As mentioned above, Article 142 of the Civil Law regulates that the international conventions that China has acceded to shall be directly applicable, with priority given to cases with foreign-related elements. There are also some parallel provisions in other domestic legislations regarding civil and commercial matters, such as Article 268 of the CMC and Article 236 of the Civil Procedure Law.[29] The Civil Law provides general rules dealing with property relationships and personal relationships between civil subjects with equal status.[30] As a result, it is sensible to believe that the legislative attitude is, in principle, to directly apply the ratified international conventions to civil and commercial matters in cases where foreign-related elements are involved.[31] However, as to certain technically specific international conventions that China has acceded to, such as the International Regulation on Collision Prevention at Sea[32], the relevant authorities

[27] The Collision Convention, 1910 was acceded to by China on 3 May 1994.

[28] The Salvage Convention, 1989 came into effect in China on 14 July 1996.

[29] The Civil Procedure Law, Article 236, provides that: "If an international treaty concluded or acceded to by the People's Republic of China contains provisions differing from those found in this Law, the provisions of the international treaty shall apply, unless the provisions are ones on which China has announced reservations."

[30] The Civil Law, Article 2.

[31] Weili Song, "On the Application of International Conventions", *Annual of China Maritime Law* (2003): 189-198.

[32] China acceded to the International Regulation of Collision Prevention at Sea on 5 January 1980.
On 6 April 1981, the Ministry of Communications of China distributed the Notice of Certain Problems in Relation to the Enforcement of the Convention on the International Regulation of Collision Prevention at Sea. It regulates that "all ships sailing or berthing at sea and ports, their maneuvers and signal display shall

of the State Council may distribute a notice to also apply such international conventions to cases without any foreign-related elements.[33]

C. Application of International Conventions Regarding Compensation for Vessel-Source Oil Pollution Damage

In both academic circles and judicial practice in China, it is unanimously recognized that the 1992 CLC and the Bunkers Convention are directly applicable to vessel-source oil pollution damage in which foreign elements are involved (hereinafter referred to as "foreign-related oil pollution"). However, there were two dominant views with respect to the question of whether these two conventions should also apply to oil pollution caused by Chinese flagged vesssels engaged in coastal services between Chinese coastal ports (hereinafter referred to as "purely domestic oil pollution"), except of course with regard to the amount of limitation of liability. In terms of the application of the 1992 CLC, some scholars held that the 1992 CLC should be directly applicable to both purely domestic oil pollution and foreign-related oil pollution, whereas other scholars insisted that the 1992 CLC should apply only to foreign-related oil pollution.[34] In judicial practice, the laws adopted by maritime courts in solving disputes over purely domestic oil pollution have been inconsistent and case by case. For instance, in the case called "Yan Jiu You 2",[35] the Qingdao Maritime Court held that the 1969 CLC was not applicable to purely domestic oil pollution. However, in the case of "Min Ran Gong 2",[36] the Guangzhou Maritime Court did

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comply with the Regulation". Therefore, the international convention mentioned above shall apply to both foreign and Chinese ships sailing or berthing at sea and port.

[33] Yuzhuo Si, Zengjie Zhu, "Legislative Suggestions on the Relationships between Maritime International Conventions and Domestic Legislations", *Annual of China Maritime Law* (1999): 2-6.

[34] Michael G. Faure, James Hu (ed), *Prevention and Compensation of Marine Pollution Damage – Recent Developments in Europe, China and the US* (Alphen aan den Rijn: Kluwer Law International, 2006), 197.

[35] On 16 August 1994, MV Yan Jiu You 2 grounded off Shengshantou, Shandong. The bottom of its hull was broken and a large amount of oil was discharged into the sea water.

[36] On 24 March 1999, MV Min Ran Gong 2 collided with MV Donghai 209 off Zhuhai Coast. In total, 1302 tons of crude oil was spilled from Min Ran Gong 2.

apply the 1969 CLC to purely domestic oil pollution.

This longlasting confusion was clarified by the Summary of the Second National Work Conference on Foreign-Related Commercial and Maritime Trials (hereinafter referred to as "the Summary") announced by the People's Supreme Court in December 2005. According to Article 141, the 1992 CLC shall apply to foreign-related oil pollution caused by a ship owned by a Contracting State of the 1992 CLC, including oil pollution within the sea waters of China caused by a Chinese flagged ship engaged in international service. However, it shall not apply to purely domestic oil pollution. Any Summary announced by the People's Supreme Court always provides significant guiding principles.[37] Hence, this Summary would be followed by Chinese courts when dealing with legal disputes arising from oil pollution.[38]

However, on the issue of the amount of limitation of liability, some confusion has again arisen after the promulgation of the Amended Regulations. Article 52 provides that the amount of limitation of liability for oil pollution damage caused by vessels carrying persistent oil in bulk to sea areas under the jurisdiction of the PRC shall be in accordance with the 1992 CLC. However, it is not clear as to whether or not the 1992 CLC shall directly apply to other liability aspects of an oil pollution incident, such as the liability for oil pollution damage that is wholly

[37] According to Articles 4, 5, 6 and 18 of the Provisions of the Supreme People's Court on the Judicial Interpretation Work, any judicial interpretation which has legal force should be deliberated on and adopted by a judicial committee and reported to the National People's Congress. The Summary did not go through the approval procedure of a judicial committee and reporting to the National People's Congress. Also, it does not belong to any of the forms of judicial interpretation mentioned above. Therefore, the Summary does not have legal binding force. However, in judicial practice, the Supreme Court may also promulgate certain rules which do not go through a judicial committee and do not have legal force, but which would be followed by Chinese courts as guiding principles. The Summary is of this kind.

[38] Hongjun Shan, *Comparative Study of China, American and International Civil Liability Regime on Oil Pollution* (Beijing: Law Press China, 2009), 109.

caused by the negligent act of a third party[39] in purely domestic oil pollution incidents.

It is the understanding of the author that the 1992 CLC[40] should not apply to purely domestic oil pollution, for the following three reasons:

(1) By virtue of Article 52 of the Amended Regulations, which is an article specializing in limitation of liability rather than regulating the application of national laws and international conventions. The application of the 1992 CLC is confined to the scope of *the limitation amount* of oil pollution damage caused by those vessels carrying persistent oil in bulk. There is no indication from which it can be concluded that all the articles within the 1992 CLC should be applied directly to purely domestic oil pollution. Consequently, there is no justification for extending the application of the 1992 CLC, as well as the Bunkers Convention, to purely domestic oil pollution.

(2) As illustrated elsewhere in this chapter,[41] "quasi direct application" is one approach to applying the ratified international conventions to civil and commercial matters. Foreign-related elements being involved is the prerequisite for direct application of international conventions in a civil and commercial legal relationship. In addition, Article 168 of the CMC, which regulates that international conventions that China has concluded or acceded to shall take priority in application, is provided for in Chapter XIV entitled "Application of Law in Relation To Foreign-Related Matters".

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[39] Where oil pollution damage is wholly caused by the negligent act of a third party, the shipowner of the spilling vessel could be discharged from liability under Article 90 of MEPL 1999 and Article 50 of the Amended Regulations, whereas he could not be exonerated from such liability under Article III (2) of the 1992 CLC and Article 3(3) of the Bunkers Convention.

[40] It should be noted that the Bunkers Convention has the same application rule as the 1992 CLC with regard to purely domestic oil pollution in China.

[41] See section 4.4.1 of this section.

(3) According to Article 5 of the Judicial Interpretation, the limitation amount for tankers carrying persistent oil in bulk shall be determined by the Amended Regulations and the 1992 CLC. In this article, the application of the 1992 CLC is limited in scope to the limitation amount, and does not cover other aspects of the CLC. Moreover, there is in fact no provision anywhere to further clarify the application scope of the 1992 CLC and the Bunkers Convention.

As a result, it may be concluded that, apart from the issue of limitation of liability, neither the Amended Regulations nor the Judicial Interpretation intend to directly apply the 1992 CLC and the Bunkers Convention to other liability and compensation issues in a domestic oil pollution incident.

4.4.2 Application of Domestic Legislation and its Priority

As discussed above, in China the 1992 CLC and the Bunkers Convention can only apply to foreign-related oil pollution. However, due to their limited application scope, such as oil type and vessel type, the 1992 CLC and the Bunkers Convention cannot apply to all oil pollution incidents with foreign-related elements.[42] Thus, the domestic legislation shall apply to purely domestic oil pollution and to foreign-related oil pollution outside the scope of the 1992 CLC and the Bunkers Convention.

Conflicts may occur when two or more domestic legislations apply simultaneously. In such circumstances, the issue of which legislation shall take priority will arise. According to the Legislation Law of the PRC, there are three main principles in determining which applicable law should have priority, as

[42] For example, according to Article I (5) of the 1992 CLC, the 1992 CLC shall only apply to compensation for non-persistent hydrocarbon mineral oil pollution from ships.

follows:[43] (1) Legislations take priority in accordance with the status of their enacting organ. [44] (2) Newly enacted legislations take priority over older legislations enacted by an organ of equivalent status.[45] (3) Specific legislations take priority over general legislations enacted by an organ of equivalent status.

Among those laws and regulations concerned with compensation for vessel-source oil pollution damage, the Civil Law, CMC, MEPL 1999 and the Tort Law are the laws that have been enacted by the National People's Congress and its standing committee.[46] In contrast, the Amended Regulations is an administrative legislation formulated by the State Council,[47] and the Oil Pollution Liability Insurance Regulation and the Compensation Fund Regulation are rules formulated by departments of the State Council.[48] The effect of laws is greater than that of administrative regulations, [49] and the effect of administrative

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[43] Peter Howard Corne, "Creation and Application of Law in the PRC", *American Journal of Comparative Law* 50 (2002): 369-444.

[44] Legislation Law, Articles 78 and 80.

In China, organs which have the power to enact laws or regulations include the National People's Congress and its Standing Committee, the State Council and its departments, the People's Congress and its Standing Committee of provinces, autonomous regions and municipalities directly under the Central Government, and the comparatively larger cities, the people's governments of the provinces, autonomous regions, municipalities directly under the Central Government and the comparatively larger cities, etc.

[45] Ibid, Article 83.

[46] Ibid, Article 7 provides: "The National People's Congress and its Standing Committee exercise the legislative power of the State. The National People's Congress enacts and amends basic laws governing criminal offences, civil affairs, the State organs and other matters. The Standing Committee of the National People's Congress enacts and amends laws other than the ones to be enacted by the National People's Congress, and when the National People's Congress is not in session, partially supplements and amends laws enacted by the National People's Congress, but not in contradiction to the basic principles of such laws."

[47] Ibid, Article 56, paragraph 1 provides: "The State Council shall, in accordance with the Constitution and laws, formulate administrative regulations."

[48] Ibid Article 71, paragraph 1 provides: "The ministries and commissions of the State Council, the People's Bank of China, the State Audit Administration, as well as the other organs endowed with administrative functions directly under the State Council may, in accordance with the laws, as well as the administrative regulations, decisions and orders of the State Council and within the limits of their power, formulate rules."

[49] Ibid, Article 79.

regulations is greater than that of rules formulated by departments of the State Council. Therefore, if there are conflicts, laws will prevail over administrative regulations which, in turn, will prevail over rules formulated by departments of the State Council.

However, it becomes complicated if conflicts exist between the laws. The Civil Law and the Tort Law are the general laws regarding compensation for vessel-source oil pollution damage, in which the general rules of environmental torts are stipulated, whereas the CMC and MEPL 1999 are special laws that, from different aspects, regulate the compensation for vessel-source oil pollution damage. If there is inconsistency between special provisions and general provisions, the special provisions shall prevail; if there is inconsistency between the new provisions and the old provisions, the new provisions shall prevail;[50] if there is inconsistency between the new general provisions and the old special provisions in different laws governing one and the same matter, and it is hard to decide which provision shall prevail, a ruling shall be made by the Standing Committee of the National People's Congress.[51] Thus, with respect to civil liability and compensation for vessel-source oil pollution damage, if there are conflicts between the Tort Law and MEPL 1999, it is still uncertain as to which one will take priority.

4.5 Conclusion

Although there has not been any catastrophic oil spill incident in the Chinese sea area, oil pollution incidents over 50 tons from ships have taken place more frequently over the last 10 years. China has made great efforts to improve the compensation capacity for vessel-source oil pollution damage by ratifying the

[50] Ibid, Article 83.

[51] Ibid, Article 85.

relative international conventions and enacting a number of national legislations. International conventions apply to foreign-related oil pollution, while the national legislations apply to purely domestic oil pollution, as well as to foreign-related oil pollution outside the scope of international conventions.

Since 2009, several laws and regulations regarding compensation for vessel-source oil pollution have come into effect, creating significant changes in this area. A two-tier compensation regime for vessel-source oil pollution damage, the cost of which is borne by both shipowners and oil receivers, has been established. In the first tier of compensation, the shipowner has a strict liability imposed upon him, with a limited number of exonerations, and with liability limitations in place. The second tier of compensation is a domestic compensation fund, which can provide a supplementary compensation source for oil pollution victims. In the following Chapters 5 and 6, these two tiers of the compensation regime will be thoroughly investigated.

CHAPTER 5

COMPENSATION FOR VESSEL-SOURCE OIL POLLUTION PROVIDED BY THE SHIPOWNERS AND LIABILITY INSURERS: THE FIRST TIER

5.1 Introduction

Under the first tier of the compensation regime for vessel-source oil pollution in China, strict liability with limited exemptions is imposed on the shipowner of a vessel that causes oil pollution damage. However, prior to the promulgation of the Amended Regulations, the limits of liability of tankers carrying persistent oil and engaged in coastal services were set at a very low level. Besides this, only vessels engaged in international services were required to purchase compulsory insurance. As a result, victims of most of the serious oil pollution incidents caused by coastal vessels were unable to receive adequate compensation.[1] The Amended Regulations greatly increases the limits for coastal tankers. Moreover, owners of all vessels navigating the sea areas under the jurisdiction of China, except for vessels of less than 1000 gross tonnage carrying cargos other than oil, are required to maintain insurance or other financial security.[2] The requirement of compulsory insurance not only signifies the setting up of the first tier of compensation provided by shipowners and their insurers, but it also lays a foundation for the second tier of compensation provided for by oil receivers.

In this chapter, four main legal issues involved with the first tier of the compensation regime will be examined, including strict liability and liable

[1] Lixin Han, *Research on Legal Regime of Liability and Compensation for Oil Pollution from Ships* (Beijing: Law Press China, 2007), 66.

[2] The Amended Regulations, Article 53 and the Oil Pollution Insurance Regulations, Article 2.

parties, admissible claims, limitation of liability and compulsory insurance. Since the 1992 CLC and the Bunkers Convention, which apply to foreign-related oil pollution damage, are discussed in above Chapter 2, this chapter focuses on domestic legislations that are applicable both to purely domestic oil pollution and to foreign-related oil pollution that is outside the scope of the 1992 CLC and the Bunkers Convention.

5.2 Strict Liability and Liable Parties

Liability for vessel-source oil pollution damage in domestic law can be found in the MEPL 1999, the Amended Regulations, the Tort Law and the Judicial Interpretation. The liability rules provided in the MEPL1999 and the Amended Regulations are similar. Any parties who cause pollution damage to the marine environment shall remove the pollution and compensate for losses; in the event of pollution damage to the marine environment resulting entirely from the intentional or negligent act of a third party, that party shall be responsible for removing the pollution and compensating for the damage.[3] Thus, the shipowner has strict liability imposed on him for oil pollution damage. Where the pollution damage is caused by escape or discharge of oil from two or more vessels, if the pollution damage can be reasonably separated then the owners shall undertake their liabilty respectively according to the quantity of spilled oil, the harm to the environment and other relevant factors. At the same time, the owners of all vessels concerned shall be jointly and severally liable for all such damage which cannot be reasonably separated.[4]

[3] MEPL 1999, Article 90, and the Amended Regulation, Article 50.

[4] The Judicial Interpretation, Article 3.

Liability can be exempted if the pollution damage is caused by any of the following circumstances, and damage to the marine environment cannot be avoided despite prompt and reasonable measures taken: (a) War; (b) irresistible natural calamities; and (c) negligence or other reckless acts of the departments responsible for the maintenance of lights or other aids to navigation in the exercise of that function.[5]

There is no inconsistency between the general liability rule of environmental torts in China and the liability rule in the international civil liability conventions. However, it should be noted that the scope of the exemptions of liability is not completely equivalent to that under the 1992 CLC and the Bunkers Convention. First of all, the words "hostilities, civil war, insurrection" that appear in Article III 2 (a) of the 1992 CLC and Article 3(3) (a) of the Bunkers Convention are removed from Article 51(1) of the Amended Regulations. Besides this, under the 1992 CLC and the Bunkers Convention,[6] natural phenomenon can be a defense only if three features, including "irresistible", "inevitable" and "exceptional", are all satisfied, whereas only one feature, namely "irresistible", is mentioned in Article 51(2) of the Amended Regulations. Finally, where the oil pollution damage is wholly caused by the negligent act of a third party, the shipowner of the spilling vessel can be discharged from liability under MEPL 1999 and the Amended Regulations, whereas he cannot exonerate himself from such liability under the 1992 CLC and the Bunkers Convention.

Conflicts will arise where the oil pollution is wholly caused by the intentional act or negligence of a third party, since according to Article 90 of the MEPL 1999 and Article 50 of the Amended Regulations, only the third party can be sued for any claims of compensation for oil pollution damage. However, according to

[5] MEPL 1999, Article 92, and the Amended Regulation, Article 51.

[6] The 1992 CLC, Article III 2(a) and the Bunkers Convention, Article 3(3) (a).

Article 68 of the Tort Law, victims are entitled to bring their claims for oil pollution damage against either shipowners or the third party. It is thus unclear as to which legislation shall take priority on this issue.

It should be noted that, in the abovementioned laws and regulations, there are no provisions that channel the pollution liability to the shipowner or other parties, or identify who are the liable parties. The implicit definition of liable parties results in uncertainties in the following two respects: (1) Whether the liable parties for oil pollution damage should include the registered owner, demise charterer and operator of the vessel, as in the definition in the Bunkers Convention, and if so whether they are liable jointly and severally; (2) under the situation of oil spill from a single vessel that is caused by the both-to-blame collision of two or more vessels, whether all of the vessels involved are liable, or only the spilling vessel is liable under MEPL 1999 and the Amended Regulations.

As to the first uncertainty, in judicial practice the court always identifies one of them (registered owner or bareboat charterer or operator) as the liable party, and imposes strict liability just on him.[7] With regard to the oil pollution liability of a single-vessel spill caused by a both-to-blame collision of two or more vessels, there have been conflicting opinions in both academic circles and judicial practice. In academic circles, three different theories exist, as follows: (1) Some scholars have considered that there is only one tortious behavior, namely collision, in the case of oil pollution from a single-vessel spill caused by a both-to-blame collision. This is because collision is the sole direct cause of the oil pollution damage. Following this opinion, all vessels involved in the both-to-blame collision are regarded as the liable parties (tortfeasors) in tort action arising out of the collision. Concerning the rule of apportionment of liability, it

[7] Hongjun Shan, *Comparative Study of China, American and International Civil Liability Regime On Oil Pollution* (Beijing: Law Press China, 2006), 61.

has been argued that both the spilling ship and non-spilling ship should bear the fault-based oil pollution liability according to the rule in CMC,[8] whereas others have held that all vessels involved in a both-to-blame collision should be liable for oil pollution damage jointly and severally on the basis of contributory infringement.[9] (2) Some scholars hold that there are two tortious behaviors in the case of oil pollution from a single-vessel spill caused by a both-to-blame collision. These are collision between spilling and non-spilling vessels, and discharge or escape of oil from the spilling vessel. They are of the opinion that the collision does not necessarily contribute to the pollution.[10] In other words, pollution is not an inevitable result of a collision. The causal link between collision and pollution is intervened by the discharge or escape of oil from the spilling ship.[11] Therefore, it is only the discharge or escape of oil that is the direct cause of pollution damage. That is to say, the spilling vessel is the sole liable party (tortfeasor) for the pollution damage in tort action arising out of the escape or discharge of oil. The spilling ship is, however, entitled to recourse against the non-spilling ship in the collision incident after having compensated for the pollution damage. (3) Some scholars consider that although there are two tortious behaviors in the case of oil pollution from a single-vessel spill caused by a both-to-blame collision, the causal link between collision and pollution damage should not be separated. Oil pollution damage is the consequence of collision and has adequate causal link with collision.[12] Therefore, on the one hand, compensation

[8] CMC, Article 168: "If the collision is caused by the fault of one of the ships, the one at fault shall be liable therefore."

[9] Hong Zhao, "The Legal Issues of Compensation for Oil Pollution in Judicial Practice", paper presented at Conference on Maritime Law of Chinese Lawyer, 2005.

[10] Lixin Han, Yuzhuo Si, "On the Determination of the Compensation Liability of Oil Pollution", *Annual of China Maritime Law* 13 (2003): 215-226.

[11] Lixin Han, Beiping Chu, "Legal Analysis on the Joint and Several Liability for Oil Pollution Damage Caused by Ships Collision", *Journal of Liaoning University (Philosophy and social sciences)* 7 (2008): 136-141.

[12] Yuzhuo Si, "To Explain the Overlapping Claimant from the Oil Pollution Caused by Ship Collision", *Annual of China Maritime Law*, 19 (2009): 1-12.

for oil pollution can be claimed against a non-spilling vessel, based on the tort liability arising out of a collision, to which the fault-based liability rule applies; on the other hand, oil pollution can be claimed against a spilling vessel based on the tort liability arising out of escape or discharge of oil from the spilling vessel, to which the strict liability rule applies. Following this opinion, the spilling vessel is the liable party for pollution damage in tort action arising out of discharge or escape of oil. At the same time, the non-spilling vessel is the liable party for pollution damage in tort action arising out of collision. There will be an overlap or concurrence between the two types of claims mentioned above, this being the claim against the non-spilling vessel for the oil pollution, in proportion to his fault in the collision. Victims should be entitled to claim against the spilling vessel for all the oil pollution damage. If the shipowner of a spilling ship is exempted from liability or financially incapable of meeting his obligations, victims should be entitled to claim for oil pollution damage against the non-spilling vessel in proportion to its fault in the collision.

The Judicial Interpretation, promulgated in 2011, contains an article specific to this issue. In the situation of a single-vessel spill that is caused by a both-to-blame collision of two or more vessels, according to Article 4 the victims are entitled to claim all the pollution damage against the spilling vessels. However, Article 4 does not explicitly prevent claims being brought against non-spilling vessels on the basis of tort liability. This may happen where the owner of the spill vessel is bankrupt and there is no insurer or other financial guarantor for oil pollution liability.[13] As a result, it is still uncertain as to whether the victims are also entitled to claim for pollution damage against non-spilling vessels in proportion to his fault in the collision.[14] It seems that the first theory discussed

[13] Yuzhuo Si, "To Explain the Overlapping Claimant from the Oil Pollution Caused by Ship Collision", *Annual of China Maritime Law*, 19 (2009): 1-12.

[14] According to Article 11 of the Consultative Draft of the Judicial Interpretation, dated 3 November 2010, victims are entitled to claim for oil pollution damage against non-spilling vessels in proportion to his fault in

above, based on fault liability, is contradictory to Article 4, whereas both the second and third theories are not inconsistent with this article. If the second theory is adopted, the spilling vessel is strictly liable for the oil pollution damage from ships. Since the causal link between collision and pollution damage is rejected, the pollution damage is not considered to be caused by the third party, i.e. the non-spilling vessel. As a result, victims would be unable to claim pollution damage against non-spilling vessels. If the third theory is employed, the spilling vessel is the liable party for pollution damage in tort action arising out of discharge or escape of oil, and the non-spilling vessel is the liable party for pollution damage in tort action arising out of collision. The spilling vessel would be identified as the "polluter" in Article 65 of the Tort Law, since it is the liable party in environmental tort action; at the same time, the non-spilling vessel would be identified as "the third party" in environmental tort action, as stipulated in Article 68 of the Tort Law. Victims could be entitled to claim for oil pollution damage against either the spilling vessel or the non-spilling vessel, but the spilling vessel would have the right of recourse against the non-spilling vessel after having compensated the victims.

5.3 Admissible Claims

Pollution damage that can be compensated for under the 1992 CLC includes (i) loss or damage caused outside the ship by contamination resulting from escape or discharge of oil from the ship wherever such escape or discharge may occur; (ii) the costs of preventive measures; and (iii) further loss or damage caused by

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the collision. Spilling vessels are entitled to recourse against non-spilling vessels after having compensated for the pollution damage if the actual compensation exceeds the proportion of his fault in the collision. However, this article was deleted in the final version of the Judicial Interpretation, which was promulgated in July 2011.

preventive measures.[15] Preventive measures refer to any reasonable measures taken by any person after an incident has occurred to prevent or minimize pollution damage. Furthermore, the Convention provides that compensation for impairment of the environment other than loss of profit from such impairment shall be confined to the costs of reasonable measures of reinstatement actually undertaken or to be undertaken. Guidance as to the types of claims under the 1992 CLC is limited and could be capable of wide interpretation.[16] The Convention does not list every admissible claim but leaves the detailed issues, such as compensation scope and loss identification, to national legislations.[17] Therefore, with respect to the admissible claims, both foreign-related oil pollution and purely domestic oil pollution shall be subject to the relevant domestic legislations.

The Judicial Interpretation, for the first time, clarifies the compensation scope and basic assessment criteria of pollution damage, which are, in effect, in accordance with the Claims Manual of International Oil Pollution Compensation Fund 1992.[18] According to Article 9 of the Judicial Explanation, four types of oil pollution damage that can be compensated are summarized as follows:

(1) The cost of measures to prevent or minimize oil pollution damage and further loss or damage caused by such preventive measures. Claims for the costs of preventive measures and further loss or damage are to be assessed on the basis of a number of factors, such as polluted area, degree of pollution, spill

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[15] The 1992 CLC, Article 6.

[16] Colin de la Rue and Charles B. Anderson, *Shipping and the Environment (2nd ed.)* (London: Informa Law, 2009), 92.

[17] Hongjun Shan, Jinlei Zhang, "The Civil Liability Regime for Vessel Source Oil Pollution in China", *Journal of International Maritime Law* 15 (2009): 340-357.

[18] Claims Manual of International Compensation Fund 1992, April 2005 Edition. Available at: http://www.iopcfund.org/npdf/claimsman-en.pdf (accessed 26 October 2011).

amount, the reasonableness of preventive measures, the number of response personnel, and equipment costs.[19]

Preventive measures may in some cases include salvage operations. Salvage operations are considered as preventive measures that can be accepted as admissible claims under the Judicial Interpretation if the primary purpose of such operations is to prevent pollution damage.[20] However, if operations are undertaken with the objectives of both preventing pollution and saving the ship and/or the cargo, the cost of preventive measures and the cost of salvage operations shall be determined according to the priority given to the two objectives respectively. Where it is not possible to establish on any reasonable grounds the primary objective, relevant costs shall be shared equally. However, costs incurred after the elimination of relevant pollution hazards shall not be included in the cost of preventive measures.[21]

(2) Property damage. The reasonable costs of cleaning and/or repairing property that has been contaminated by oil, such as the hull of vessels, fishing gear or fishery facilities, shall be compensated for.[22] If it is not possible to clean or repair the polluted property, reasonable replacement costs shall be accepted, provided that reasonable deductions shall be made according to the age of the property and its expected durability.[23]

(3) Economic loss. There are two types of economic loss which can be recovered under the Judicial Interpretation: Consequential loss[24] and pure economic loss.[25]

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[19] The Judicial Interpretation, Article 10.

[20] Ibid, Article 11.

[21] Ibid, Article 11.

[22] Ibid, Article 12, Para 1.

[23] Ibid, Article 12, Para 2.

[24] Ibid, Article 12.

[25] Ibid, Article 14.

Consequential loss means loss of earnings suffered by the owners of polluted property as a result of an oil spill.[26] Compensation for the loss of earnings should be calculated based on the reasonable length of time needed for cleaning, repairing or replacing such property.[27]

In addition to consequential loss as a result of property damage, pure economic loss sustained by persons whose property has not been polluted by oil, such as loss of earnings from the marine fishery and tourism sector, could be compensated. However, it should be noted that not all pure economic losses are compensable. The criterion for compensation for pure economic losses under the Judicial Interpretation is in line with that under the Claims Manual of International Oil Pollution Compensation Fund 1992, as per the following: Only those claims raised by persons whose revenues depend directly on activities connected with the coast or sea affected by pollution may be accepted.[28] Four conditions should be satisfied to establish a sufficiently close link of causation between the contamination and the loss or damage, [29] as follows: (i) The claimant's business activity is located in or near the contaminated area; (ii) the claimant's business is economically dependent on an affected coastline; (iii) it is difficult for the claimant to find alternative sources of supply or business opportunities; and (iv) the claimant's business forms an integral part of the economic activity within the area affected by the spill.

[26] Claims Manual of International Compensation Fund 1992, December 2008 Edition, at p12. Available at http://www.iopcfund.org/npdf/2008%20claims%20manual_e.pdf (accessed 26 Oct 2011).

[27] Judicial Interpretation, Article 13, Paragraph 2.

[28] Chao Wu, *Pollution from the Carriage of Oil by Sea: Liability and Compensation* (London, The Hague, Boston: Kluwer Law, 1996), 323.

[29] Judicial Interpretation, Article 14.

Economic loss, including both consequential loss and pure economic loss, shall be reasonably calculated by deducting the actual net income during the affected period of time from the average net income for the same period during the past three years.[30] In addition, other factors that have a bearing on income shall be taken into consideration.[31] Where the loss of earnings cannot be determined by the abovementioned rule, such loss shall be reasonably determined according to relevant statistics and information released by government departments, or by the average income of producers and operators within the same area and engaging in the same business during the affected period of time.[32]

(4) Environmental damage. Impairment of the environment caused by spillage of oil from ships is compensable under the Judicial Interpretation. However, in accordance with the 1992 CLC[33] and the Claims Manual of International Oil Pollution Compensation Fund 1992,[34] a constrained attitude is adopted towards compensation for environmental damage. As indicated in the Claims Manual of International Compensation Fund 1992, compensation for environmental damage is not paid based on an abstract quantification calculated in accordance with a theoretical model.[35] Although this rule is not explicitly provided under the Judicial Interpretation, compensation for environmental damage is confined to the cost of reasonable measures of reinstatement actually undertaken or to be undertaken, including the reasonable cost of monitoring, assessment and research.[36]

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[30] Ibid, Art 16, paragraph 1.

[31] Ibid, Art 16, paragraph 2.

[32] Ibid, Art 16, paragraph 3.

[33] 1992 CLC, Article I (6).

[34] Claims Manual of International Compensation Fund 1992, December 2008 Edition, at p35. Available at http://www.iopcfund.org/npdf/2008%20claims%20manual_e.pdf (accessed 26 Oct 2011).

[35] Claims Manual of International Compensation Fund 1992, December 2008 Edition, at p35. Available at http://www.iopcfund.org/npdf/2008%20claims%20manual_e.pdf (accessed 26 Oct 2011).

[36] Judicial Interpretation, Article 17.

5.4 Limitation of Liability

Due to the promulgation of the Amended Regulations and the Judicial Interpretation, several changes with respect to the limitation of liability for oil pollution claims are accordingly made in domestic law. This will be shown in the following discussion.

5.4.1 Amount of Liability Limits

Prior to the promulgation of the Amended Regulations, according to Article 142 of the Summary[37], the limitation amount stipulated in Article 210[38] of the CMC

[37] The Summary of the Second National Work Conference on Foreign-Related Commercial and Maritime Trials, Article 142: "With regard to oil pollution outside the Civil Liability Convention 1992, the China Maritime Code and the Marine Environmental Protection Law of the PRC and other relevant administrative regulations shall apply so as to determine the liability of liable parties. The liable parties are entitled to limit their liability according to Chapter 11 of the China Maritime Code."

[38] CMC, Article 210: "The limitation of liability for maritime claims, except as provided for in Article 211 of this Code, shall be calculated as follows:

(1) In respect of claims for loss of life or personal injury:

a) 333,000 Units of Account for a ship with a gross tonnage ranging from 300 to 500 tons;

b) For a ship with a gross tonnage in excess of 500 tons, the limitation under a) above shall be applicable to the first 500 tons, and the following amounts in addition to that set out under a) shall be applicable to the gross tonnage in excess of 500 tons: For each ton from 501 to 3,000 tons: 500 Units of Account; for each ton from 3,001 to 30,000 tons: 333 Units of Account; for each ton from 30,001 to 70,000 tons: 250 Units of Account; for each ton in excess of 70,000 tons: 167 Units of Account.

(2) In respect of claims other than those for loss of life or personal injury:

a) 167,000 Units of Account for a ship with a gross tonnage ranging from 300 to 500 tons;

b) for a ship with a gross tonnage in excess of 500 tons, the limitation under a) above shall be applicable to the first 500 tons, and the following amounts in addition to that under a) shall be applicable to the part in excess of 500 tons: For each ton from 501 to 30,000 tons: 167 Units of Account; for each ton from 30,001 to 70,000 tons: 125 Units of Account; for each ton in excess of 70,000 tons: 83 Units of Account.

(3) Where the amount calculated in accordance with sub-paragraph (1) above is insufficient for the payment of claims for loss of life or personal injury set out therein in full, the amount calculated in accordance with sub-paragraph (2) shall be available for payment of the unpaid balance of claims under sub-paragraph (1), and such unpaid balance shall rank rateably with claims set out under sub-paragraph (2).

was applicable to: Purely domestic oil pollution from tankers; foreign-related oil pollution from tankers outside of the 1992 CLC scope; and bunker oil pollution from non-tanker vessels. However, according to the last paragraph of Article 210 of the CMC, the limitation of liability for ships with a gross tonnage not exceeding 300 tons, those engaged in transport services between ports of the PRC, and those engaged in other coastal works, shall be regulated by the Limitation of Liability Regulation[39] (hereinafter referred to as the "LLR").

Since the Amended Regulations and the Judicial Interpretation came into effect, the limitation amount for oil pollution damage from tankers has been greatly impacted, especially for those tankers engaged in purely domestic service (see Table 5-1 below). According to Article 52 of the Amended Regulations and Article 5 of the Judicial Interpretation, with regard to the limitation amount of liability for persistent oil pollution damage [40] caused by vessels carrying persistent oils in bulk to sea areas under the jurisdiction of China, the provisions of the international treaties concluded or acceded to by China shall apply. This is to say, the 1992 CLC shall be applicable to persistent oil pollution damage caused by all tankers carrying persistent oil in bulk, regardless of whether or not they are engaged in international service. Given that tankers carrying persistent

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(4) However, without prejudice to the right of claims for loss of life or personal injury under sub-paragraph (3), claims in respect of damage to harbour works, basins and waterways, and aids to navigation shall have priority over other claims under sub-paragraph (2).

(5) The limitation of liability for any salvor not operating from any ship, or for any salvor operating solely on the ship to which, or in respect of which, he is rendering salvage services, shall be calculated according to a gross tonnage of 1,500 tons.

The limitation of liability for ships with a gross tonnage not exceeding 300 tons and for those engaging in transport services between ports of the People's Republic of China, as well as those engaged in other coastal works, shall be worked out by the competent authorities of transport and communications under the State Council, and implemented after its being submitted to and approved by the State Council."

[39] The Regulation of Limitation of Liability for Maritime Claims Relating to Ships with a Gross Tonnage not Exceeding 300 Gross Tons and Those Engaging in Transport Services Between Ports of China, as well as Those for Other Coastal Operations took effect on 1 January 1994.

[40] According to Article 31 of the Judicial Interpretation, "persistent oil pollution damage" refers to the persistent cargo oil pollution from tankers and the persistent bunker oil pollution from tankers.

oil are engaged in coastal services, especially for the small tankers there is a significant increase. Taking a tanker of 300 tons engaged in coastal service as an example, under the old calculation system its limitation amount was approximately 0.0835 million SDR, whereas under the new calculation system it is up to 4.5 million SDR.

It should also be noted that the Bunkers Convention is not intended to establish a separate limitation regime. Accordingly, the limitation rule shall be subject to Article 210 of the CMC and the LLR.

To sum up, since the Amended Regulations and the Judicial Interpretation came into effect, the limitation amount for oil pollution damage from ships can be classified into three categories, as follows:

(a) The 1992 CLC limitation amount:
This applies to persistent oil pollution damage caused by all tankers carrying persistent oil in bulk.

(b) The CMC limitation amount:
This applies to: (i) non-persistent bunker oil pollution damage caused by tankers over 300 tons that are carrying persistent oil in bulk and engaged in international service; (ii) oil pollution damage caused by vessels over 300 tons that are carrying non-persistent oil in bulk and engaged in international service; and (iii) bunker oil pollution damage caused by non–tanker vessels over 300 tons engaged in international service.

(c) The LLR limitation amount:

This applies to: (i) non-persistent bunker oil pollution damage caused by tankers over 20 tons that are carrying persistent oil in bulk and engaged in domestic service; (ii) non-persistent bunker oil pollution damage caused by tankers from 20 tons to 300 tons that are carrying persistent oil in bulk and are engaged in international service; (iii) oil pollution damage caused by vessels over 20 tons that are carrying non-persistent oil in bulk and engaged in domestic service; (iv) oil pollution damage caused by vessels from 20 tons to 300 tons that are carrying non-persistent oil in bulk and are engaged in international service; (v) bunker oil pollution damage caused by non-tanker vessels over 20 tons engaged in domestic service; and (vi) bunker oil pollution damage caused by non-tanker vessels from 20 tons to 300 tons engaged in international service.

Table 5-1 Limitation Amounts of Vessel-Source Oil Pollution Damage in China

Vessel Type	Oil Type	Service	Vessel Tonnages	Legal Basis		Limitation Amount	
				Before	Current	Before	Current
Tanker	Persistent Oil[41]	Inter-national Service		1992 CLC Article V (1)	1992 CLC Article V (1)	4.5 million SDR for ships not exceeding 5,000 tons; 630 SDR for each additional ton; not exceeding 89.77 million SDR	4.5 million SDR for ships not exceeding 5,000 tons; 630 SDR for each additional ton; not exceeding 89.77 million SDR
		Domestic Service	Over 300 tons	LLR Article 4 (S2)	1992 CLC Article V (1)	50% of CMC Article 210 (as below)	4.5 million SDR for ships not exceeding 5,000 tons; 630 SDR for each additional ton; not exceeding 89.77 million SDR
			20 tons to 300 tons	LLR Article 4 (S1)	1992 CLC Article V (1)	50% of LLR Article 3 (as below)	4.5 million SDR for ships not exceeding 5,000 tons; 630 SDR for each additional ton; not exceeding 89.77 million SDR
	Non-Persistent Oil	Inter-national Service	Over 300 tons	CMC Article 210		0.167 million SDR for ships between 300 tons and 500 tons; 167 SDR for each additional ton from 501 to 30,000 tons; 125 SDR for each additional ton from 30,001 to 70,000 tons; 83 SDR for each additional ton in excess of 70,000 tons	
			20 tons to 300 tons	LLR Article 3		27,500 SDR for ships between 20-21 tons; 500 SDR for each additional ton from 21 to 300 tons	
		Domestic Service	Over 300 tons	LLR Article 4 (S2)		50% of CMC Article 210	
			20 tons to 300 tons	LLR Article 4 (S1)		50% of LLR Article 3	
Non-Tanker		Inter-national Service	Over 300 tons	The Bunkers Convention Article 6/ CMC Article 210		0.167 million SDR for ships between 300 tons and 500 tons; 167 SDR for each additional ton from 501 to 30,000 tons; 125 SDR for each additional ton from 30,001 to 70,000 tons; 83 SDR for each additional ton in excess of 70,000 tons	
			20 tons to 300 tons	The Bunkers Convention Article 6/ LLR Article 3		27,500 SDR for ships between 20 and 21 tons; 500 SDR for each additional ton from 21 to 300 tons	
		Domestic Service	Over 300 tons	LLR Article 4 (S2)		50% of CMC Article 210	
			20 tons to 300 tons	LLR Article 4 (S1)		50% of LLR Article 3	

[41] In Table 5-1 and in the following sections of this chapter "persistent oil" pollution damage from tankers does not refer to the persistent bunker oil pollution damage which is caused by the vessels carrying non-persistent oil in bulk. It only refers to the persistent oil pollution damage caused by tankers carrying persistent oil in bulk. With regard to persistent bunker oil pollution damage that is caused by vessels carrying non-persistent oil in bulk, the limitation amount provided in CMC shall apply.

5.4.2 Breaking the Limits

According to Article 209 of the CMC and Article 6 of the Judicial Interpretation, the right of limitation of the person liable shall be lost if it is proved that the loss resulted from his act or omission done with the intent to cause such loss, or recklessly and with knowledge that such loss would probably result.

5.4.3 Establishment of Limitation Fund

According to Article 21 of the Judicial Interpretation, as to the persistent oil pollution damage from tankers, the shipowner and the liability insurer or other persons providing financial security shall, for the purpose of obtaining the right to limit such liability, constitute with the maritime court a limitation fund for maritime claims for such oil pollution damage. Based on this article, constituting a limitation fund for oil pollution claims is the precondition for a shipowner to limit his liability. However, it should be noted that this article only applies to the limitation of liability for claims of persistent oil pollution damage from tankers. Since there is no exclusive limitation fund for bunker oil pollution claims, the claims for bunker oil pollution damage from non-tankers have to share the one limitation fund, which is established according to Article 213[42] of the CMC, along with claims of other natures.[43] This article allows liable parties to invoke their right to limit liability without constituting a limitation fund. Accordingly, constituting a limitation fund is not a pre-requisite to limit the liability of bunker

[42] CMC, Article 213: "Any person liable claiming the limitation of liability under this Code may constitute a limitation fund with a court having jurisdiction. The fund shall be constituted in the sum of such an amount set out respectively in Articles 210 and 211, together with interest thereon from the date of the occurrence giving rise to the liability until the date of the constitution of the fund."

[43] The provisions governing the establishment and administration of a limitation fund for the claims of (1) non-persistent bunker oil pollution damage caused by tankers carrying persistent oil in bulk and (2) oil pollution damage caused by vessels carrying non-persistent oil in bulk are identical to those for the claims of bunker oil pollution damage from non-tankers.

oil pollution damage from non-tankers, whereas it is a pre-condition to limit the liability of persistent oil pollution damage from tankers.

5.4.4 Administration of Limitation Fund

A. Limitation Fund for Bunker Oil Pollution Damage from Non-tankers

According to Article 214 of the CMC, where a limitation fund has been constituted, no one shall be entitled to exercise any right against any assets of the person liable. Where any ship or other property belonging to the person constituting the fund has been arrested, or where a security has been provided by such person, the court shall order without delay the release of the ship arrested or the property attached or the return of the security provided. Whereupon, the owner shall effect the payment of any emergency costs incurred by the maritime administrative authority, or provide financial security prior to commencing the next voyage.[44]

As to the distribution of the limitation fund, the distribution rule regulated by the CMC shall apply to the bunker oil pollution damage. According to Article 210 of the CMC, separate limitation funds with different limits shall be established for the claims of loss of life or personal injury and the claims other than loss of life or personal injury.[45] Where the limitation fund for the claims of loss of life or

[44] The Amended Regulations, Article 42.

[45] The CMC, Article 210: "The limitation of liability for maritime claims, except as otherwise provided for in Article 211 of this Code, shall be calculated as follows:
(1) In respect of claims for loss of life or personal injury: a) 333,000 Units of Account for a ship with a gross tonnage ranging from 300 to 500 tons; b) For a ship with a gross tonnage in excess of 500 tons, the limitation under a) above shall be applicable to the first 500 tons and the following amounts in addition to that set out under a) shall be applicable to the gross tonnage in excess of 500 tons: For each ton from 501 to 3,000 tons: 500 Units of Account; For each ton from 3,001 to 30,000 tons: 333 Units of Account; For each ton from 30,001 to 70,000 tons: 250 Units of Account; For each ton in excess of 70,000 tons: 167 Units of Account.
(2) In respect of claims other than that for loss of life or personal injury:

personal injury is not sufficient to cover all of the claims of loss of life or personal injury, the limitation fund for claims other than loss of life or personal injury shall be available for the payment of unpaid balance of the claims of loss of life or personal injury.[46] Such unpaid balance shall rank ratably with claims other than loss of life or personal injury.[47] In addition, without prejudice to the right of claims of loss of life or personal injury, claims in respect of damage to harbor works, basins and waterways and aids to navigation shall have such priority over other property claims.[48] Any other property claims shall be treated equally and distributed proportionally. However, in contradiction with above distribution rule in CMC, Article 55 of the Amended Regulations provides that the necessary expenses incurred in the emergency response and cleanup operation by the relevant units under the organization of the government shall be compensated with priority. According to the Legislation Law, the effect of laws, such as the CMC, is greater than the effect of the administrative regulations, such as the Amended Regulations.[49] Thus, the distribution rule provided in the CMC shall prevail over the Article 55 of the Amended Regulations.

B. Limitation Fund for Persistent Oil Pollution Damage from Tankers

The Judicial Interpretation sets out several specific rules[50] for the administration of a limitation fund for persistent oil pollution damage from tankers. Where an interested party objects to the application by an applicant to constitute a limitation fund for oil pollution damage, the party shall, within seven days from

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a) 167,000 Units of Account for a ship with a gross tonnage ranging from 300 to 500 tons; b) For a ship with a gross tonnage in excess of 500 tons, the limitation under a) above shall be applicable to the first 500 tons, and the following amounts in addition to that under a) shall be applicable to the part in excess of 500 tons: For each ton from 501 to 30,000 tons:167 Units of Account; For each ton from 30,001 to 70,000 tons: 125 Units of Account; For each ton in excess of 70,000 tons: 83 Units of Account.

[46] The CMC, Article 210 (3).

[47] Ibid.

[48] Ibid, Article 210 (4).

[49] Legislation Law, Article 79.

[50] The Judicial Interpretation, Articles 21 to 30.

the date of receipt of the notice regarding the constitution of the limitation fund, or within thirty days from the date of the public announcement for those who have not personally received the notice, raise his objection in written form to the maritime court.[51] If the interested parties do not raise any objections within the prescribed period, the maritime court shall order without delay the release of the ship arrested or the property attached or the return of the security provided after constituting the fund.[52] Also, if the victim fails to apply for the registration of the creditor's rights within the prescribed period, the creditor's rights upon the limitation fund shall be deemed as having been waived.[53]

The limitation fund shall be distributed proportionately among victims.[54] Where the shipowner and the liability insurer or other persons providing financial security who has paid pollution damage compensation before the fund is distributed, such person shall, up to the amount he has paid, acquire by subrogation the rights which the person compensated would have enjoyed under relevant domestic legislations.[55] In addition, shipowners have the same rights as other claimants against the fund in order to claim for expenses reasonably incurred or sacrifices reasonably made by the owner voluntarily to prevent or minimize pollution damage.[56]

5.5 Compulsory Insurance

5.5.1 Applicable Vessels and Insured Value

[51] Ibid, Article 22.

[52] Ibid, Article 23.

[53] Ibid, Article 26.

[54] Ibid, Article 27.

[55] Ibid, Article 29.

[56] Ibid, Article 30.

Under Article 53 of the Amended Regulations, owners of all vessels navigating the sea areas under the jurisdiction of China, except for vessels of less than 1,000 gross tonnage carrying cargos other than oil, shall be required to maintain insurance or other financial security, this requirement corresponding to the 1992 CLC[57] and the Bunkers Convention.[58] However, it should be noted that the scope of applicable tankers required to purchase compulsory insurance is wider than that under the 1992 CLC, given that only vessels carrying more than 2,000 tons of oil in bulk as cargo shall maintain insurance or other financial security under the 1992 CLC.

As a result, vessels engaged in either international service or coastal service that need to maintain compulsory insurance or other financial security include the following: (a) Vessels, however small, carrying persistent oil in bulk; (b) vessels, however small, carrying non-persistent oil in bulk; and (c) vessels over 1000 tons carrying non-oil cargoes.

The insured value should be not lower than the amount of limitation for oil pollution damage in either the CMC, LLR or 1992 CLC, whichever is applicable,[59] as follows (also see Table 5-2):

(a) For vessels carrying persistent oil in bulk, the insured value shall be not lower than:
(i) 4.51 million SDR for a ship not exceeding 5000 tons;
(ii) For a ship with a tonnage in excess of 5000 tons, 630 SDR for each additional ton in addition to the 4.51 million SDR; however, the aggregate amount shall not in any event exceed 89.77 million SDR.

[57] The 1992 CLC, Article VII (1).

[58] The Bunkers Convention, Article 7(1).

[59] The Amended Regulations, Article 53 and the Oil Pollution Insurance Regulation, Article 5.

(b) For vessels carrying non-persistent oil in bulk, and vessels over 1,000 tons carrying non-oil cargoes, the lowest insured valued shall be calculated as follows:
(i) 27,500 SDR for vessels over 20 tons but not exceeding 21 tons;
(ii) For vessels from 21 to 300 tons, in addition to the 27,500 SDR, 500 SDR for each additional ton;
(iii) 167,000 SDR for vessels from 301 tons to 500 tons;
(iv) For vessels from 501 to 30,000 tons, in addition to the 167,000 SDR, 167 SDR for each additional ton;
(v) For each ton from 30,001 to 70,000 tons, in addition to the amount confirmed in (iv), 125 SDR for each additional ton;
(vi) For each additional ton in excess of 70,000 tons, in addition to the amount confirmed in (v), 83 SDR for each additional ton.[60]

(c) For vessels carrying non-persistent oil in bulk, and vessels over 1,000 tons carrying non-oil cargoes, that are engaged in transport services between the ports of China, as well as those for other coastal operations, the insured valued should be calculated as 50% of the amount described in (b).[61]

[60] Ibid, Article 6.

[61] Ibid, Article 7.

Table 5-2 Civil Liability Insurance of Oil Pollution Damage from Ships in China after the Promulgation of the Oil Pollution Insurance Regulation

<table>
<tr><th>Vessel Type</th><th>Oil Type</th><th>Service</th><th>Vessel Tonnages</th><th>Compulsory Insurance</th><th>Lowest Insured Value</th></tr>
<tr><td rowspan="3">Tanker</td><td>Persistent Oil</td><td>Unlimited</td><td>Unlimited</td><td>Yes</td><td>4.5 million SDR for ships not exceeding 5,000 tons;
630 SDR for each additional ton;
Not exceeding 89.77 million SDR</td></tr>
<tr><td rowspan="2">Non-Persistent Oil</td><td>International Service</td><td>Unlimited</td><td>Yes</td><td>27,500 SDR for ships between 20-21 tons;
500 SDR for each additional ton from 21 to 300 tons
167,000 million SDR for ships from 301 tons to 500 tons;
167 SDR for each additional ton from 501 to 30,000 tons;
125 SDR for each additional ton from 30,001 to 70,000 tons
83 SDR for each addition ton in excess of 70,000 tons</td></tr>
<tr><td>Domestic Service</td><td>Unlimited</td><td>Yes</td><td>50% of the insured valued of tankers carrying non-persistent oil engaged in international service</td></tr>
<tr><td rowspan="4">Bunker</td><td rowspan="2"></td><td rowspan="2">International Service</td><td>Exceeding 1,000 tons</td><td>Yes</td><td>The same as insured valued of tankers carrying non-persistent oil engaged in international service</td></tr>
<tr><td>Below 1,000 tons</td><td>No</td><td></td></tr>
<tr><td rowspan="2"></td><td rowspan="2">Domestic Service</td><td>Exceeding 1,000 tons</td><td>Yes</td><td>50% of the insured valued of tankers carrying non-persistent oil engaged in international service</td></tr>
<tr><td>Below 1,000 tons</td><td>No</td><td></td></tr>
</table>

The owner of a Chinese flagged vessel shall purchase civil liability insurance for vessel-source oil pollution from commercial insurance institutes legally established in China; or from mutual insurance institutions that are legally

established in China or have their representative office or agency in China; or obtain other financial guarantees, such as a letter of guarantee and a letter of credit, issued by the abovementioned insurance institutions or domestic banks.[62] An insurance certificate or a financial security certificate shall be issued by the Maritime Safety Administration (hereinafter referred to as "the MSA") to the owners of Chinese flagged vessels at the port of registry of the vessel, by presenting an application form, an insurance policy covering vessel-source oil pollution damage or other evidence of financial security and the certificate of registry of the vessel.[63] With respect to the foreign flagged vessels, the insurance certificates issued by the relevant authorities of any other Contracting States of the 1992 CLC and Bunkers Convention are recognized by the MSA.[64] For both Chinese flagged vessels and foreign flagged vessels, the insurance certificate shall be carried on board the ship for inspection by the MSA.[65]

5.5.2 Direct Action

The stipulation regarding direct action against the civil liability insurer of oil pollution damage predated the appearance of compulsory insurance in Article 97 of the Special Maritime Procedure Law (hereinafter referred to as the "SMPL"). Claimants for oil pollution damage can make the claim against the shipowner causing oil pollution damage, or can make the claim directly against the liability insurer or other person providing financial security, who is also then entitled to require the shipowner to join in the proceedings. As to the defenses of the insurer, by Article 8 of the Judicial Interpretation, the insurer is entitled to avail himself of any defenses which the owner himself would have been entitled to invoke. However, in no case can the insurer reject a claim for the defense which he might

[62] Decision of Ministry of Transport on Amending the Measures of the People's Republic of China for the Implementation of Civil Liability Insurance for Vessel-induced Oil Pollution Damage, Article 2.

[63] The Amended Regulations, Article 54 and the Oil Pollution Insurance Regulation, Articles 13 and 14.

[64] Ibid, Article 17.

[65] The Oil Pollution Insurance Regulation, Article 16.

have been entitled to invoke in a proceeding brought by the owner against him, unless the pollution damage resulted from any willful misconduct of the owner himself.[66]

Based on the general rules in the MEPL 1999, compulsory insurance is elaborated on by the Amended Regulations, the Oil Pollution Insurance Regulation and the Judicial Interpretation. This becomes not only the cornerstone of the constitution of the first tier of the compensation regime for vessel-source oil pollution damage, in which the shipowner and his insurer are both involved, but it also lays a foundation for the second tier of the compensation regime, namely, a domestic compensation fund contributed to by oil receivers.

5.6 Further Thinking

5.6.1 Is the Limitation Too High for Coastal Tankers?

As mentioned in section 5.4, the effectiveness of the Amended Regulations has brought about a significant change to the limitation amount for tankers engaged in domestic service. Prior to the promulgation of the Amended Regulations, according to Article 141 of the Summary, the limitation amount stipulated in Article 210 of the CMC was applicable to purely domestic oil pollution from tankers. However, according to the last paragraph of Article 210 of the CMC, the limitation of liability for ships with a gross tonnage not exceeding 300 tons and for those engaged in transport services between ports of the PRC, as well as those engaged in other coastal works, shall be regulated by the LLR. Therefore, the LLR limitation amount, which is much lower than the 1992 CLC limitation, applied to oil pollution from tankers over 20 tons engaged in domestic service. However, after the Amended Regulations came into effect, the 1992 CLC

[66] The Judicial Interpretation, Articles 7 and 8.

limitation shall be applicable to oil pollution caused by vessels carrying persistent oil in bulk, regardless of whether or not they are engaged in international service. In terms of tankers carrying persistent oil and engaged in coastal services, especially the small tankers, this is a significant increase.

The high limitation of liability for vessels carrying persistent oil as cargo in bulk could be beneficial for ensuring sufficient compensation for pollution victims and for protecting the marine environment in China. However, the high limitation could also have a significant impact on the Chinese coastal oil shipping industry. Most coastal oil shipping enterprises in China are small and of low financial ability to compensate, and most of their coastal tankers are small and old.[67] 80% of the coastal tankers in operation are small vessels with a tonnage not exceeding 1000 tons.[68] The high limitation, which places a heavy burden on the coastal oil carriers, could possibly drive them into bankruptcy. Some scholars hold that such a high limitation of liability will definitely cripple the coastal oil shipping industry, and will also do harm to the whole of China's oil shipping industry.[69] On the other hand, other scholars believe that the high limitation will benefit the Chinese oil shipping industry in the long term. They hold that such high limitation will promote optimum competition in the Chinese oil shipping industry, and will also speed up the elimination of old ships and the purchase of new oil tankers, thereby speeding up development of the Chinese shipbuilding industry.[70]

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[67] Qi Chen , "On the Application of CLC 92 in China", in *Maritime Pollution Liability and Policy – China, Europe and the US*, eds. Michael G. Faure, Lixin Han and Hongjun Shan (Alphen aan den Rijn, The Netherlands: Kluwer Law International, 2010), 347-357.

[68] Liying Zhang, "Compensation for Domestic Oil Pollution in China's Coast: Which Law Shall Apply?", in *Maritime Pollution Liability and Policy – China, Europe and the US* eds. Michael G. Faure, Lixin Han and Hongjun Shan (Alphen aan den Rijn, The Netherlands: Kluwer Law International, 2010), 359-369.

[69] Lixin Han, supra note 1, at 275.

[70] Liying Zhang, "Compensation for Domestic Oil Pollution in China's Coast: Which :Law Shall Apply?", in *Maritime Pollution Liability and Policy – China, Europe and the US* eds. Michael G. Faure, Lixin Han and Hongjun Shan (Alphen aan den Rijn, The Netherlands: Kluwer Law International, 2010), 359-369.

5.6.2 Is the Requirement of Compulsory Insurance Too Strict for Coastal Tankers?

As mentioned in section 5.5, the scope of applicable tankers required to purchase compulsory insurance under Chinese domestic law is wider than that under the 1992 CLC. Owners of all vessels navigating the sea areas under the jurisdiction of China, except for vessels of less than 1000 gross tonnage carrying cargoes other than oil, shall be required to maintain insurance or other financial guarantees[71] under Chinese domestic law, whereas only vessels carrying more than 2000 tons of persistent oil in bulk as cargo are required to maintain insurance or other financial guarantees under the 1992 CLC. [72]

Most tankers in the current Chinese coastal oil shipping market are small and old vessels, which are characterized by high incident rates and low compensation capacity. The requirement of compulsory insurance for the owners of those small tankers, and the establishment of direct action against the insurer can help ensure full and prompt compensation for oil pollution victims. However, according to Article 5 of the Oil Pollution Insurance Regulation, the insured value for tankers carrying persistent oil as cargo in bulk should be not lower than the amount of limitation for oil pollution damage provided in the 1992 CLC. Thus, the insured value for a ship not exceeding 5000 units of tonnage should be not lower than 4.5 million SDR.[73] Some scholars hold that 95.5% of tankers flying the Chinese flag are small tankers not exceeding 5000 tons, and that the amount of oil spillage from these small tankers is usually less than from tankers of a huge size, so that it is not fair for owners of small tankers to be charged insurance fees that are

[71] The Amended Regulations, Article 53.

[72] The 1992 CLC, Article VII (1).

[73] The 1992 CLC, Article V (1) and the 2002 Amendment.

equivalent to the insurance fees for tankers with 5000 units of tonnage.[74] Besides this, as stated in the section above, most coastal oil shipping enterprises in China are small ones that cannot afford high insurance fees. The high insurance fees will possibly aggravate the risk of bankruptcy of these small coastal oil shipping enterprises, and force them to withdraw from the Chinese coastal oil shipping market.

5.7 Conclusion

It can be concluded from the analysis of the first tier of the compensation regime that China is enhancing the compensation capacity for vessel-source oil pollution damage and moving closer to the international standard. Firstly, the 1992 CLC and the Bunkers Convention apply directly to foreign-related oil pollution incidents in their application scope. Secondly, a shipowner is strictly liable for vessel-source oil pollution under Chinese domestic law, which is in line with the 1992 CLC and the Bunkers Convention. Thirdly, the admissible claims for compensation stipulated in the Judicial Interpretation are basically in accordance with the Claims Manual of the IOPC Fund. Fourthly, by the Amended Regulations, the 1992 CLC limitation amount shall also be applicable to purely domestic oil pollution damage caused by vessels carrying persistent oil as cargo in bulk (except for oil pollution damage resulting from the spillage of non-persistent bunker oil from tankers carrying persistent oil). Lastly, the scope of applicable tankers required to purchase compulsory insurance under Chinese domestic law is wider than that under the 1992 CLC. However, the high limitation and compulsory insurance fee could possibly drive the owners of existing small and old coastal tankers bankrupt and force them to withdraw from

[74] Lixin Han, supra note 1, at 65.

the Chinese coastal shipping market, although the high limitation and compulsory insurance fee may at the same time help speed up the elimination of old tankers, which usually have a high incident rate, and this would improve navigational safety and better protect the interests of victims and the overall marine environment.

CHAPTER 6

COMPENSATION FOR VESSEL-SOURCE OIL POLLUTION PROVIDED BY OIL RECEIVERS: THE SECOND TIER

6.1 Introduction

On 1 July 2012, the Administrative Measures for Use and Collection of the Vessel-source Oil Pollution Compensation Fund (hereinafter referred to as "the Compensation Fund Regulation") took effect. Four days later, the China Vessel-source Oil Pollution Compensation Fund (hereinafter referred to as the "CVOPCF") welcomed its first very large crude carrier (VLCC) in Maoming Port located in southwestern Guangdong Province of the PRC.[1]

The proposal to establish a compensation fund for vessel-source oil pollution dates back to around a decade ago. The State Council approved the suggestion to establish the CVOPCF, which was raised by the Ministry of Transport (hereinafter referred to as the "MOT") and the Ministry of Finance (hereinafter referred to as the "MOF"), in February 2003.[2] In August of that same year, a joint working group organized by the MOT and MOF prepared a draft of the Compensation Fund Regulation and solicited opinions from the relevant departments and industries.[3] This regulation was finally unveiled in 2012 after the implementation of the Amended Regulations and the Oil Pollution Insurance Regulation.

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[1] China Communications News issued on 13 July 2012.

[2] Zhengliang Hu, "Research on the Legal Issues in Establishing the Compensation Fund for Oil Pollution Damage from Ships in China, *Legal Review of Dalian Maritime University* (2005): 163-184.

[3] The joint working group solicited opinions from the Ministry of Agriculture, State Oceanic Administration, China Natural Petroleum Corporation, and China National Offshore Oil Corporation.

The issuance of the Compensation Fund Regulation represents a significant milestone in the establishment of a two-tier compensation regime for vessel-source oil pollution in China. As analyzed in Chapter 5, the first tier of compensation is provided by the owner of a ship that causes oil pollution damage, and his liability insurer. As the second tier of the compensation regime, the CVOPCF, financed by oil receivers of persistent hydrocarbon mineral oil goods and materials, provides supplementary compensation for oil pollution victims in sea areas under Chinese jurisdiction. This chapter will provide an in-depth investigation into the CVOPCF, and seek to further illustrate whether a purely domestic fund scheme established by the CVOPCF is an appropriate solution for providing supplementary compensation in China.

6.2 Legislative Basis

Article 66 of the MEPL 1999 regulates that a compensation fund for vessel-source oil pollution should be established. This provision provides a legal basis for the CVOPCF, and empowers the State Council to promulgate specific regulations regarding it. Furthermore, the Amended Regulations provides general rules for establishing the CVOPCF, and empowers the MOF and MOT to promulgate the Compensation Fund Regulation.[4]

Apart from the general rules provided in the MEPL 1999 and the Amended Regulations, the increase in liability limits of coastal tankers [5] and the requirement for compulsory insurance [6] pave the way for issuance of the Compensation Fund Regulation. First of all, compensation for oil pollution

[4] The Amended Regulations, Article 56.

[5] Ibid, Article 52.

[6] The Amended Regulations, Article 53 and the Oil Pollution Insurance Regulation, Article 2.

damage caused by coastal tankers was set at a very low level prior to the Amended Regulations taking effect.[7] In reality, most of the serious oil pollution incidents where adequate compensation could not be obtained were caused by coastal tankers.[8] Under such circumstances, the CVOPCF could frequently become involved each time the pollution damage exceeds the limits of liability of owners of coastal tankers. However, Article 52 of the Amended Regulations sharply increased the liability limits of coastal tankers.[9] As a result, the chance of triggering the involvement of the CVOPCF as a result of damage exceeding the liability limits of the shipowner considerably decreased. In addition, prior to the effectiveness of the Oil Pollution Insurance Regulation, coastal tankers were not required to purchase compulsory insurance or other financial guarantee. However, in China, 80% of the coastal tankers in operation are small and old vessels with a tonnage not exceeding 1000 gross tons.[10] They are characterized by high incident rates and low compensation capacity. To meet such specific circumstances in China, a wide scope of applicable vessels that are required to purchase compulsory insurance is regulated by the Amended Regulations and the Oil Pollution Insurance Regulation. Owners of all vessels navigating sea areas under the jurisdiction of China, except for vessels of less than 1000 gross tonnage carrying cargoes other than oil, are required to maintain compulsory insurance or other financial guarantee.[11] Consequently, the requirement of compulsory insurance, especially for those old and small coastal tankers, may dramatically

[7] Before the Amended Regulations came into effect, according to Article 210 of the CMC, the limits of coastal tankers were subject to the LLR.

[8] Lixin Han, *Research on Legal Regime of Liability and Compensation for Oil Pollution from Ships* (Beijing: Law Press China, 2007), 16.

[9] According to Article 52 of the Amended Regulations, all tankers navigating in sea areas under the jurisdiction of the PRC shall be subject to the limits in the 1992 CLC, which are much higher than the limits in the LLR.

[10] Liying Zhang, "Compensation for Domestic Oil Pollution in China's Coast: Which Law Shall Apply?" in *Maritime Pollution Liability and Policy – China, Europe and the US*, eds. Michael G. Faure, Lixin Han and Hongjun Shan (Alphen aan den Rijn, The Netherlands: Kluwer Law International, 2010), 359-369.

[11] The Amended Regulations, Article 53 and the Oil Pollution Insurance Regulation, Article 2.

reduce the need for the CVOPCF to provide supplementary compensation where the shipowner is bankrupt or winding up. Without this increase in the liability limits of coastal tankers and the requirement for compulsory insurance, the CVOPCF would never have been put into operation.

6.3 Operation of the CVOPCF

6.3.1 Administration

According to Article 3 of the Compensation Fund Regulation, the CVOPCF is regarded as a governmental fund.[12] An administrative committee[13] is in charge of the CVOPCF and should make provisions for its duties and adopt the rules of procedure.[14] A secretariat of the CVOPCF, affiliated to the Maritime Safety Administration of the PRC (hereinafter referred to as the "MSA"), is responsible for the daily issues surrounding the CVOPCF, such as the settlement of claims.[15]

6.3.2 Contributions

A. Contributing Oil

The CVOPCF is financed by the contributions levied on the receivers (or their agents) of persistent oil goods and materials transported by sea in sea areas under the jurisdiction of China.[16] "Contributing oil" refers to persistent hydrocarbon mineral oil, such as crude oil, fuel oil, heavy diesel oil, lubricating oil and other

[12] The Compensation Fund Regulation, Article 3.

[13] The administrative committee of CVOPCF is comprised of representatives from the Ministry of Transport, Ministry of Finance, Ministry of Agriculture, Ministry of Environmental Protection, State Oceanic Administration, National Tourism Administration, and major oil companies.

[14] The Compensation Fund Regulation, Article 19.

[15] Ibid, Article 19.

[16] Ibid, Article 5.

persistent hydrocarbon mineral oil.[17] It should be noted that the scope of contributing oil under the Compensation Fund Regulation is wider than that under the 1992 Fund Convention. Under the latter, a restrictive definition is adopted and contributing oil only refers to crude oil and fuel oil.[18]

Some types of oil are explicitly excluded by Article 9 of the Compensation Fund Regulation, including: (1) Non-persistent oil received in Chinese sea areas; and (2) persistent oil that is transited through Chinese sea areas. In addition, persistent oil cargo transshipped by the same receiver in the jurisdiction of China is only levied once.[19] This is because some of the imported oil cannot be transported to the oil refinery directly, and transshipment usually takes place more than once.[20] This stipulation with regard to transshipment can prevent a double levy on the same oil cargo of the same receiver.

B. Levy Standard

A levy of RMB 0.3 per ton is set by Article 6 of the Compensation Fund Regulation. Jointly with the MOT, the MOF is empowered to determine or adjust the levy standard or to discontinue the levy based on such considerations[21] as follows: (1) Compensation amount for vessel-source oil pollution damage; (2) quantity of the received persistent oil; (3) accumulated amount in the CVOPCF; and (4) financial burden of the oil cargo receivers. The Compensation Fund Regulation does not set a specific level of accumulated amount, after reaching which the levy can be discontinued. Hence the MOF and MOT have wide discretion in deciding on the discontinuation and recommencement of the

[17] Ibid, Article 5.

[18] The 1992 Fund Convention, Article I (3).

[19] The Compensation Fund Regulation, Article 9.

[20] Fangzhen Zhou, "Thinking on Administration of the Compensation Fund for Oil Pollution from Ships", *Navigation Technology* 3 (2007): 69-70.

[21] The Compensation Fund Regulation, Article 6.

collection. However, as the ultimate compensating source for pollution victims, it could be necessary to set up a mechanism to ensure the adequate balance in the CVOPCF. In comparison with offering a wide discretion to the MOF and MOT, it would be more appropriate to set a specific accumulated amount. The levy is to be discontinued where the balance in the CVOPCF is higher than this amount. At the same time, the levy is to be re-imposed where it is estimated that the balance will be drop below this amount. This could be helpful to improve the self-sustaining and long-term validity of the domestic compensation fund. [22]

C. Collection of Contributions

Collection of contributions to the CVOPCF falls under the responsibility of the MSA.[23] The receiver (or his agent) of persistent oil goods or materials may make a declaration of having cargoes of pollution hazards and dangerous goods to the MSA for approval when the ship is entering the receiving port.[24] Contributions should be deposited to the MSA's approved bank account adequately and promptly, subject to the quantity of persistent oil declared and the relevant levy standard.[25] A punitive fee, equivalent to 0.05 percent of the unpaid contribution, will be charged daily if the receiver of persistent oil does not pay the contribution promptly and adequately.[26] All contributions to the CVOPCF should be turned over to the State Treasury by the MSA on the date of receiving the

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[22] Annual Report of Oil Spill Liability Trust Fund, FY 2002- FY 2006. Available at: http://www.uscg.mil/npfc/docs/PDFs/Reports/OSLTF_Report_FY02-FY06.pdf (accessed 25 June 2014).

[23] Ibid, Article 7.

It should be noted that, as the departments in charge of transportation and finance under the State Council, the MOT and MOF are empowered to jointly formulate and promulgate the Compensation Fund Regulation and to set or adjust the levy standard. At the same time, the MSA, which is subordinate to the MOT, is responsible for the collection of the contribution.

[24] The Compensation Fund Regulation, Article 8.

[25] Ibid, Article 8.

[26] Ibid, Article 28.

contributions.[27] As a governmental fund, the CVOPCF can be used only for vessel-source oil pollution damage compensation.[28] The financial supervision commissioners' office of the MOF shall monitor the MSA to collect and turn over the contributions properly.[29]

6.4 Compensation Provided by the CVOPCF

6.4.1 Scope of Application

The CVOPCF provides supplementary compensation for oil pollution damage occurring in the sea areas under the jurisdiction of the PRC.[30] As mentioned in the above section, contributing oil is defined by Articles 2 and 5 of the Compensation Fund Regulation as persistent hydrocarbon mineral oil goods and materials. However, there is no provision in the Compensation Fund Regulation specifying what kinds of oil pollution can be compensated for by the CVOPCF. Thus, two questions may arise regarding (1) whether both persistent oil and non-persistent oil are covered by the CVOPCF; and (2) whether oil pollution discharged from all types of ships are covered by the CVOPCF. Before answering these questions, approaches adopted by the international regime and the Canadian national regime with regard to these issues will be explored respectively to provide some clues.

The 1992 IOPC Fund only provides compensation for pollution damage caused by the spillage of persistent oil from seagoing tanker vessels carrying persistent

[27] Ibid, Article 11.

[28] Ibid, Article 14.

[29] Ibid, Article 29.

[30] According to Article 2 and Article 95 of MEPL 1999, the sea area under the jurisdiction of the PRC refers to the internal waters, territorial seas, contiguous zones, exclusive economic zones and continental shelves of the PRC. "Inland water" means all sea areas on the landward side of the baseline of China's territorial sea.

oil as cargo in bulk.[31] The reason why the 1992 CLC and the 1992 Fund Convention adopt a restrictive approach, by excluding non-persistent oil, is that non-persistent oil usually evaporates quickly and can disappear rapidly without trace when spilled at sea.[32] Nevertheless, oil pollution damage caused by the spillage of non-persistent oil cargo is covered by the International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 2010[33] (hereinafter referred to as "the HNS Convention"), notwithstanding the fact that it has not yet entered into force. Apart from this, the 1992 CLC and the 1992 Fund Convention only cover oil pollution damage caused by spillage from tanker vessels. Oil spillage from non-tanker vessels is covered by the Bunkers Convention. Compensation for bunker oil pollution damage from non-tanker vessels is not restricted to the scope of persistent oil under the Bunkers Convention.[34] However, there is no second tier compensation for bunker oil pollution from non-tanker vessels under the international regime. This is because of the practical problem that it is impossible to identify contributors among the cargo interests.[35]

In Canada, a compensation scheme combining domestic and international fund instruments is adopted to provide compensation for vessel-source oil pollution victims. Canada is a Contracting State to the 1992 CLC and the 1992 Fund Convention. It also participates in the 2003 Supplementary Fund Convention and the Bunkers Convention. At the same time, there is also a national compensation fund — the Ship-source Oil Pollution Fund (hereinafter referred to as the

[31] According to Article 1(2) of the 1992 Fund Convention, "Ship" and "Oil" have the same meaning as in Article I of the 1992 CLC.

[32] Chao Wu, *Pollution from the Carriage of Oil by Sea: Liability and Compensation*, (London: Kluwer Law International, 1996), 40.

[33] HNS Convention, Article 1(5).

[34] According to Article 1(5) of the Bunkers Convention, 'bunker oil' means any hydrocarbon mineral oil, including both persistent oil and non-persistent oil.

[35] Ling Zhu, "Compensation Issues under the Bunker Convention", *WMU Journal of Maritime Affairs* 7 (2008): 303-316.

"SOPF"). [36] The SOPF provides additional compensation in cases where compensation payable by the international regime is insufficient to provide full compensation, and also covers oil pollution not covered by the international regime.[37] The SOPF has a wider application scope than the international regime, and pays out on established claims to do with both persistent oil and non-persistent oil pollution discharged from all classes of ships. [38] Oil pollution damage that falls outside the international regime can also be covered by the SOPF.

These two approaches mentioned above regarding the scope of compensation reflect the main distinction between an international regime and a national regime. An international regime is the result of compromises necessary to reach an agreement based on negotiations among a number of states, whereas a national regime can be created to meet the particular requirements of the state concerned.[39] The legislative aim of the Compensation Fund Regulation is to protect the marine environment and promote the sustainable development of China's shipping industry.[40] A wider coverage of the CVOPCF may encourage prompt clean-up operations where pollution incidents caused by spillage of non-persistent oil, or pollution incidents caused by non-tanker vessels, occur. This is beneficial for achieving the aim of protecting the marine environment and

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[36] The SOPF was established due to amendments to the former Canada Shipping Act that took effect on 24 April, 1989. The SOPF is the successor to the Maritime Pollution Claims Fund (hereinafter referred to as the "MPCF"). A levy of 15 cents per tonne was imposed by the MPCF from 1972 to 1976, and the accumulated amount in the MPCF was transferred to the SOPF in 1989. No levy has been imposed since it was suspended in 1976. Contributing oil is as defined by the 1992 Fund Convention, and it refers to crude oil and heavy fuel oil. If the levy is re-imposed, it shall be paid to the Receiver General in respect of oil in excess of 300 tonnes imported by ship into Canada or shipped out from a place in Canada, in bulk as cargo.

[37] Mans Jacobsson, "An Ideal International Scheme for Compensation for Marine Pollution Damage", *Journal of International Maritime Law* 17(2011): 263-273.

[38] The Administrator's Annual Report of Ship-Source Oil Pollution Fund, 2010-2011, available at: http://www.ssopfund.gc.ca/documents/AnnualReport2010-2011-e.pdf (accessed 25 July 2012).

[39] Mans Jacobsson, supra note 35, at 265.

[40] The Compensation Fund Regulation, Article 1.

pollution victims. Due to the lack of further interpretation at the national legislative level, it is suggested that the CVOPCF should provide supplementary compensation for oil pollution damage caused by all types of ships that discharge both persistent and non-persistent oil in the sea areas under the jurisdiction of the PRC.

6.4.2 Cases in Which the CVOPCF Would Pay

The CVOPCF will cover oil pollution damage where: (1) The damage exceeds the owner's limitation of liability under relevant domestic legislations or international conventions; (2) the shipowner liable for oil pollution is exempted from liability; (3) the shipowner liable for oil pollution and his liability insurer or financial guarantor is financially incapable of meeting his obligation in full; or the shipowner liable for the oil pollution and his liability insurer or financial guarantor is treated as financially incapable of meeting his obligations in full; or (4) the oil pollution damage is caused by an unidentifiable ship.[41]

By and large, those cases in which the CVOPCF would intervene under Article 15 of the Compensation Fund Regulation are consistent with those under the 1992 Fund Convention.[42] However, Article 15 regulates that the CVOPCF covers oil pollution caused by an unidentifiable ship, which is not explicitly stipulated by the 1992 Fund Convention, even though a claim for a "mystery" oil spill caused by an unidentified ship is usually accepted by the 1992 IOPC Fund.[43] Besides, it is not clear whether the expenses reasonably incurred or sacrifice reasonably made by the shipowner voluntarily to prevent or minimize

[41] Ibid, Article 15.

[42] The 1992 Fund Convention, Article 4(1).

[43] Liability and Compensation for Ship-Source Oil Pollution: An Overview of the International Legal Framework for Oil Pollution Damage from Tankers, Studies in Transport Law and Policy (2012 No.1), United National Conference on Trade and Development, at p53.

pollution damage shall be covered by the CVOPCF.[44] Acceptance of these costs would encourage a shipowner liable for oil pollution to take reasonable measures to prevent or minimize pollution damage promptly.

6.4.3 Exonerations of the CVOPCF

The CVOPCF shall incur no liability where: (1) The pollution damage results from an act of war, hostilities or is caused by a discharge of oil by military ships, fishing boats and ships owned or operated by the government being used for non-commercial services at the time of the incident; (2) the claimants cannot prove that the damage results from an incident involving one or more ships; and (3) the pollution damage is wholly or partially caused by the fault of the person who suffered the damage.[45] Such fault includes an act or omission with intent to cause damage and an act of negligence.[46] It should be noted that there is a slight difference regarding the exoneration due to contributory negligence of the claimant between the Compensation Fund Regulation and the 1992 Fund Convention. According to Article 3 of the 1992 Fund Convention, even if the pollution damage is wholly or partially caused by the fault of the person who suffered the damage, the 1992 IOPC Fund cannot be exonerated from its obligation to pay the costs of preventive measures of such person. This can encourage preventive measures to be taken at the time of an incident so as to prevent or minimize the pollution damage. Unfortunately, there is no such provision in the Compensation Fund Regulation.

6.4.4 Maximum Compensation Amount Provided by the CVOPCF

[44] According to Article 4(1) of the 1992 Fund Convention, reasonable costs of preventive measures and sacrifices incurred by the shipowner can be compensated by the IOPC Fund.

[45] The Compensation Fund Regulation, Article 16.

[46] Liming Wang, *Research on Tort Liability Law I* (Beijing: China Renmin University Press, 2011), 315.

According to Article 18, the CVOPCF in no case pays more than RMB 30 million for any one incident. The maximum compensation amount of RMB 30 million is determined mainly based on the average compensation amount paid out for vessel-source oil pollution occurring in the Chinese sea areas over the past 10 years.[47] The MOF, together with the MOT, is empowered to adjust this financial cap based on the pollution damage and the accumulated amount in the CVOPCF.[48] It should be noted that the amount paid by the shipowner liable for the pollution is not to be included in the amount paid by the CVOPCF. This is different from the arrangements under the 1992 IOPC Fund, under which the limits of liability established by the 1992 IOPC Fund include the owner's limits of liability under the 1992 CLC.[49] That is to say, the largest amount that a claimant can obtain for oil pollution damage in any one incident is the limitation amount of a shipowner as stipulated in the relevant domestic legislation and international conventions,[50] plus the RMB 30 million paid by the CVOPCF.

6.4.5 Admissible Claims

A. Scope

According to Article 17 of the Compensation Fund Regulation, six types of claims listed in order of priority are admissible, including: (1) Costs of emergency measures to prevent oil pollution damage; (2) costs of controlling and cleaning up the pollution damage; (3) direct economic losses in the fishery and tourism sectors; (4) costs of measures actually undertaken to reinstate the marine ecosystem and natural fishery resources; (5) costs of surveying and monitoring;

[47] Chunchang Zhang, "What Is Missing in China's Ship-source Pollution Damage Compensation System?", *China Maritime Safety*, 7 (2011): 8-10.

[48] The Compensation Fund, Article 18.

[49] M.N. Tsimplis, "Marine Pollution from Shipping Activities," *Journal of International Maritime Law* 14 (2008): 101-152.

[50] CMC, Article 210; LLR, Articles 3 and 4; the 1992 CLC, Article V (1).

and (6) other costs approved by the State Council.

As analyzed in the previous Chapter 5, pollution damage which can be compensated by the shipowner liable for the pollution is regulated by the Judicial Interpretation. The types of admissible claims under the Compensation Fund Regulation are basically consistent with that under the Judicial Interpretation, although a different expression is used. Nevertheless, there are some discrepancies between these two regulations. Firstly, according to Article 9 of the Judicial Interpretation, not only the costs of measures to prevent or clean up the pollution damage, but also the further loss caused by such preventive measures can be compensated by the shipowner liable for the pollution. However, compensation for the further loss caused by the preventive measures is not mentioned in the Compensation Fund Regulation. Besides, except for property damage to the fishery and tourism sectors, other property damage and the economic losses caused by such property damage is covered by the Judicial Interpretation but not by the Compensation Fund Regulation. In essence, compensation provided by the CVOPCF is a supplement to the compensation provided by the shipowner. The CVOPCF is supposed to provide an additional amount of compensation for the same types of pollution damage that can be compensated by the shipowner liable for the pollution.[51] As a result, it is suggested that the types of admissible claims under the Compensation Fund Regulation should be identical to the admissible claims under the Judicial Interpretation.

B. Distribution

As stated in the previous section, the six types of admissible claims are listed in

[51] Longjie Chen and Xianming Liu, "Structure of a Fund for Compensation for Oil Pollution Damage in PRC", *Annual of China Maritime Law*, 17 (2008): 314-331.

order of priority.[52] If the costs of the claims which have the highest priority[53] exceed the maximum compensation amount provided by the CVOPCF, other lower rank claims cannot get any compensation from the CVOPCF, and the amount available shall be distributed in proportion among the highest rank claims.[54] This is different from the pro-rata rule under the 1992 Fund Convention, by which all claims relating to vessel-source oil pollution damage, including the cleanup costs and other preventive measures, are to be treated equally and compensated in proportion.[55]

According to Article 55 of the Amended Regulations, all necessary expenses incurred by the relevant departments of a national organization, such as the MSA, when carrying out the emergency disposition and removal of the pollution, are to have priority in compensation. This is logical, because giving compensation priority to emergency costs encourages prompt cleanup operations. However, it is questionable whether the other claims should be treated unequally.

C. Emergency Costs

Although emergency costs have the highest priority in compensation, the CVOPCF will not directly pay the emergency costs in advance,[56] whereas in the United States, as one of the two components of the OSLTF,[57] an emergency fund is entitled to pay the removal costs and certain other costs directly in advance. The emergency fund, which cannot exceed USD 50 million annually, is available for three purposes, including: (1) Payment of federal removal costs; (2) funding

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[52] The Compensation Fund Regulation, Article 17.

[53] At the top of the list of admissible claims, emergency costs have the highest priority in compensation.

[54] The Compensation Fund Regulation, Article 17.

[55] The 1992 Fund Convention, Article 4(5).

[56] Hongjun Shan, *Comparative Study of China, American and International Civil Liability Regime on Oil Pollution* (Beijing: Law Press China, 2009), 231.

[57] OSLTF is composed of two major parts, including an emergency fund and a principal fund.

for state requests to access the Fund directly for immediate removal action; and (3) initiation of natural resource damage assessments.[58] The emergency fund can provide financial support for oil spill emergency response without delay, so as to prevent or minimize any oil pollution damage caused by ships.[59] Therefore, it is suggested that an emergency fund should be established to pay the emergency costs directly in advance. At the same time, it could be more sensible to treat other types of admissible claims equally.

6.4.6 Claims Procedures

Claimants for vessel-source oil pollution damage may submit their claims to the administrative committee of the CVOPCF. There are some general criteria on admissibility of claims,[60] including: (1) Claims submitted must be authentic; (2) any expense, loss or damage must have actually been incurred; (3) any expense must relate to measures that are considered reasonable and justifiable; (4) the expense, loss or damage is caused by contamination resulting from the spill, and there must be a reasonably close link of causation between the expense, loss or damage covered by the claim and the contamination caused by the spill; (5) loss or damage must be a quantifiable economic loss; and (6) a claimant has to prove the amount of his or her expense, loss or damage by producing appropriate documents or other evidence. These general criteria are consistent with the Claims Manual of the IOPC Fund 1992.

Claims must be submitted to the administrative committee within three years from the date when the damage occurred. However, in no case shall a claim be

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[58] Colin de la Rue and Charles B. Anderson, *Shipping and the Environment*, 2nd ed. (London, Hong Kong: Informa, 2009), 216.

[59] Lixin Han, "Suggestion On Improving the Management Regulations of Collection and Use of the Ship Pollution Damage Compensation Fund (Draft)", *Annual of China Maritime Law*, 18(2008): 299-331.

[60] The Compensation Fund Regulation, Article 21.

submitted later than six years from the date of the incident which caused the damage.[61]

6.5 Further Thinking: Is the Purely Domestic Scheme an Appropriate Solution for Supplementary Compensation in China?

China is a party to the 1992 CLC[62] and the Bunkers Convention[63], but not the 1992 Fund Convention, which is currently only applicable to Hong Kong SAR, or the 2003 Supplementary Fund Convention. Several reasons are attributable to the negative attitude of the Chinese government toward acceding to the 1992 Fund Convention, as follows: (1) Accession to the 1992 Fund Convention may be associated with a heavy financial burden. China imported 271 million tons of crude oil in 2012[64], and ranks as the second largest oil importing country in the world. It is therefore very likely that China will become one of the largest contributing countries to the 1992 IOPC Fund if it chooses to participate in the 1992 Fund Convention; (2) the cleanup cost in China was much lower than that in other countries.[65] In addition, there have not been any major oil pollution incidents in or near Chinese sea waters. In the majority of oil pollution incidents, the 1992 CLC limits are not exceeded; and (3) evaluation of pollution damage in China is imperfect. The 1992 IOPC Fund requires that a claim should be presented clearly with sufficient information and supporting documentation to enable the amount of the damage to be assessed.[66] Claims submitted to the 1992 IOPC Fund could be unacceptable due to lacking sufficient evidence regarding

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[61] Ibid, Article 22.

[62] China acceded to the1969 CLC and its 1976 Protocol on 30 January 1980, with effect from 29 April 1980. The updated Protocol of the 1992 CLC took effect in China on 5 January 2000.

[63] The Bunkers Convention came into effect in China on 9 March 2009.

[64] Chunrong Tian, "China's Oil and Gas Imports and Exports, 2012", *International Petroleum Economics* 3 (2013): 44-55.

[65] Lixin Han, supra note 11, at 15.

[66] Claims Manual of International Oil Pollution Compensation Fund, December 2008 Edition, available at: http://www.iopcfund.org/npdf/2008%20claims%20manual_e.pdf (accessed 25 July 2012).

the types of pollution damage sustained and the amount of compensation claimed.[67]

To summarize, the Chinese government considers that it is not the right time to accede to the 1992 Fund Convention, because any contributions to the 1992 IOPC Fund are probably much greater than the benefits gained after a pollution incident. However, it has been realized that China is potentially exposed to an increasing risk of vessel-source oil pollution incidents as a result of the rapid development of the marine petroleum industry and marine transportation.[68] Instead of acceding to the 1992 Fund Convention, the government determined to provide a supplementary compensation source for oil pollution victims in China by establishing a domestic compensation fund.

Undoubtedly, the establishment of the CVOPCF has had a significantly positive effect on compensation for oil pollution victims. Not only can pollution victims obtain additional compensation, but also a two-tier compensation regime for vessel-source oil pollution damage, under which the financial burden is shared between shipowners and oil receivers, has been constituted. However, the maximum compensation amount for pollution damage caused by tanker vessels under the domestic compensation regime in China is still much lower than the maximum compensation amount under the 1992 CLC and the 1992 Fund Convention (also see Table 6-1).

Table 6-1 Comparison of the Maximum Compensation Amount under the 1992 CLC/Fund Convention and the Domestic Regime of Compensation for Oil Pollution Caused by Tanker Vessels in China

[67] Xiangkun Kong, "An Analysis on Establishing National Compensation Fund for Oil Pollution Damage from Ships in China", *China Water Transport* 5 (2007): 12-13.

[68] Keyuan Zou, "Implementing Marine Environmental Protection Law in China: Progress, Problems and Prospects", *Marine Policy* 23 (1999): 207-225.

	The 1992 CLC/Fund Convention	Chinese Domestic Regime
1st Tier	4.5 million SDR for ships not exceeding 5,000 tons; 630 SDR for each additional ton; not exceeding 89.77 million SDR	4.5 million SDR for ships not exceeding 5,000 tons; 630 SDR for each additional ton; not exceeding 89.77 million SDR
2nd Tier	203 million SDR;	In no case will more than RMB 30 million be paid in addition for a single incident Max: 89.77 million SDR + RMB 30 million
Maximum	Approximately[69] USD 304.35 million	Approximately USD 139.29 million

As illustrated in Chapter 3, most upper-middle or high income countries facing a high risk of oil spill and receiving a large amount of shipments of crude and fuel oil have acceded to the 1992 Fund Convention. Moreover, with respect to upper-middle and high income countries, the major determinant of adopting the 1992 Fund Convention is not the financial burden placed on the domestic oil industry but the potentially high risk of exposure to tanker oil spill incidents. This could be attributable to the stronger compensation ability and greater environmental protection strategy of these countries, as well as the attractive benefits and costs[70] of adopting the 1992 Fund Convention.

With its rapid economic development, since 2010 China has been categorized as an upper-middle income country.[71] At the same time, in line with its rising dependence on imported oil, the potential risk of oil spills is becoming higher in China.[72] Nevertheless, contrary to the majority of upper-middle or high income countries, China takes the cost of contribution as the main determinant of

[69] According to the website of the International Monetary Fund on 25 July 2012, 1 USD is approximately equal to 0.667SDR. According to the exchange rate of USD and RMB on the same day, 1 USD is approximately equal to 6.3908 RMB.

[70] Liability and Compensation for Ship-Source Oil Pollution: An Overview of the International Legal Framework for Oil Pollution Damage from Tankers, Studies in Transport Law and Policy (2012 No.1), United National Conference on Trade and Development, at p28.

[71] World Bank List of Economies, July 2011.

[72] According to the assessment of risk levels for the 19 regional sea areas mentioned in Chapter 3, the risk category of Chinese coastal regional seas is "high 3".

whether or not to accept the 1992 Fund Convention, rather than the potentially high risk of exposure to tanker oil spill incidents. As mentioned above, the main reason why China is reluctant to participate in the 1992 Fund Convention is that it considers that contributions to the 1992 IOPC Fund are probably much greater than the benefits gained after a pollution incident. This seems plausible if no major oil pollution incidents occur in the Chinese sea areas. However, there is no guarantee that such major oil pollution will not take place in the Chinese sea areas in the near future. On the contrary, with the continual increase in oil imports and the rapid development of the oil transport industry, China may potentially face an even greater risk of major oil pollution incidents. A major oil spill incident is characterized as being of low frequency, but it could have significant consequences, including financial losses and irreversible ecological losses. Thus, if such a disaster ever happened, it could cause a huge amount of damage, and the compensation provided by the CVOPCF would not be sufficient.[73] The primary objective of the tort law is compensation for victims or

[73] Bohai Bay Penglai 19-3 Oilfield oil spill incident is a recent case occurring in Chinese sea areas. Although, in this case, the pollution damage was caused by an offshore oil spill rather than vessels, and the cost of a spill usually depends on a number of factors (i.e. the type of oil, the location of the spill and the characteristics of the affected areas), this case reflects the increasing costs of an oil spill in China, and the insufficiency of the CVOPCF to cope with such a major oil pollution incident.

Bohai Bay Penglai 19-3 oilfield, which is operated by ConocoPhillips China (COPC) under a joint development agreement with the China National Offshore Oil Corporation (CNOOC), experienced a serious oil spill in June 2011. Around 6,200 square kilometers of water in the Bohai Sea was polluted, causing great harm to the local fishing industry and the marine environment. There is not yet any official data with respect to the oil spill amount, although the COPC estimated that the incident resulted in approximately 723 barrels of oil and 2,620 barrels of mineral oil-based drilling mud seeping into Bohai Bay. According to the incident investigation report published by the State Oceanic Administration (SOA), the incident was attributable to the COPC's violation of the original protocol of exploitation and failure to take necessary precautions, so that COPC should bear all liability for the pollution.

In January 2012 an agreement was reached between the Ministry of Agriculture (MOA), COPC and CNOOC, and the governments of several concerned provinces, regarding compensation for the fishery resources. Approximately RMB 1 billion was paid by the COPC for the loss of fishery resources. Moreover, approximately RMB 100 million and 25 million respectively will be allocated by the COPC and CNOOC from a fund to enhance marine ecological protection and reduce pollutants in the Bay. This fund is constituted by these two companies and administrated by the SOA. In addition to compensation paid for the fishery resources at the end of March 2012, an agreement was reached in June 2012 between the SOA,

injuries caused by others.[74] From a functioning perspective, the 1992 IOPC Fund, which has protection and compensation of victims as its top priority[75], has a relatively higher compensation capacity covering major oil pollution incidents, and can better achieve the compensation objective. In other words, acceding to the 1992 Fund Convention could provide greater protection in the long run, both for oil pollution victims and the marine environment.

Besides this, it can be clearly seen that unforeseeable risks can and do occur, although the uncertainty about what will happen may be genuine.[76] As a result, it might be preferable to spread out the risk, as well as the potential financial losses, over a number of oil receivers. The 1992 IOPC Fund calls for ex post contributions by each oil receiver in Contracting States corresponding to the percentage of aggregate risk.[77] Thus individual risk is reduced by spreading the risk over a number of Contracting States, which is similar in character to the mutuality principle.[78] Furthermore, the costs of an oil spill are determined by a number of factors, such as the type of oil, the location of the spill, the

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COPC and CNOOC. COPC and CNOOC have to pay an aggregate amount of RMB 1.683 billion for the marine environmental damage caused by the spill incident. Thus, the total amount of compensation paid for this oil spill incident has reached RMB 3.033 billion (approximately USD 492 million). (Resources are from the Investigation Report of Penglai 19-3 Oilfield published on the official website of the SOA, available at: http://www.soa.gov.cn/xw/hyyw_90/201211/t20121109_884.html <accessed 17 August 2013>).

[74] William Lloyd Prosser, W. Page Keeton, Dan B. Bobbs, Robert E. Keeton, David G. Owen, *Prosser and Keeton on Torts*, 5th ed. (St Paul; Minn: West Publishing, 1984), 37.

[75] Yaw Out Mankata Nyampong, *Insuring the Air Transport Industry Against Aviation War and Terrorism Risks and Allied Perils* (Berlin, London: Springer, 2013), 244.

[76] Michael Faure and Goran Skogh, *The Economic Analysis of Environmental Policy and Law* (Cheltenham, Northampton: Edward Elgar, 2003), 281.

[77] Andre Schmitt and Sandrine Spaeter, Insurance and Financial Hedging of Oil Pollution Risk, (2004), Working Papers of LaRGE Research Center from Laboratoire de Recherche en Gestion et Economie (LaRGE), Université de Strasbourg (France), available at: http://www.huebnergeneva.org/documents/spater.pdf (accessed18 Mar 2013).

[78] Andre Schmitt and Sandrine Spaeter, Optimal Coverage of Large Risks: Theoretical Analysis and Application to Oil Spill, (2007), Working Papers of BETA from Bureau d'Economie Théorique et Appliquée, UDS, Strasbourg, available at : http://idei.fr/doc/conf/ere/papers_2007/spaeter.pdf (accessed18 Mar 2013).

characteristics of the affected area and the spill amount.[79] In particular, intense economic development could lead to an increased number and amount of claims in the event of an incident, such as the increasing claims from the fishery and tourism sectors.[80] From the perspective of risk-sharing, acceding to the 1992 Fund Convention could be a sensible way to provide compensation for victims in China in the long term.

Apart from participation in the 1992 Fund Convention, another way to increase the compensation capacity with respect to major oil spill incidents is to establish a pure domestic compensation fund with a high financial cap. A typical example is the OSLTF in the United States. One of the major issues preventing the United States from acceding to the 1992 CLC and the 1992 Fund Convention is that the compensation ceilings set by these two conventions are considered to be too low to cover oil pollution damage in the United States.[81] An extremely high compensation ceiling of USD 1 billion is set for the OSLTF.[82] However, increasing the maximum compensation amount paid by the CVOPCF would definitely lead to an increase in the financial burden placed on oil receivers. In contrast, Canada has adopted a combined scheme, that of the international regime being topped up by a domestic regime. The SOPF provides additional compensation in cases where compensation payable by the international regime is insufficient to provide full compensation, and also covers oil pollution not covered by the international regime.[83] The maximum compensation amount provided by the SOPF, which is indexed annually, is approximately CAD 159.8

[79] Erik Vanem, Qyvind Endresen and Rolf Skjong, "Cost-effectiveness Criteria for Marine Oil Spill Preventive Measures", *Reliability Engineering & System Safety* 93 (2008): 1354-1368.

[80] Andre Schmitt, Sandrine Spaeter, Hedging Strategies and the Financing of the 1992 International Oil Pollution Compensation Fund, (2005), Working Papers of BETA from Bureau d'Economie Théorique et Appliquée, UDS, Strasbourg, available at: http://www.beta-umr7522.fr/productions/publications/2005/2005-12.pdf (accessed18 Mar 2013).

[81] Chao Wu, supra note 30, at 217.

[82] Ibid, at 248.

[83] Mans Jacobsson, supra note 25, at 266.

million for all claims from one oil spill[84] during the fiscal year of 2012. This amount is significant when it is considered that it complements the maximum compensation amount provided by the Supplementary IOPC Fund, which includes the amount payable under the 1992 CLC and the 1992 Fund Convention.[85] Such combined scheme can spread out the risk of oil spill incidents by means of participating in the IOPF funds on the one hand, and can cater for the specific requirements of the country concerned on the other hand.

Given that China did not gain itself a position among upper-middle income countries until 2010, progress toward improving the situation of low compensation has to be made in steps rather than a sudden surge. It is suggested that a combined scheme would be a better alternative to provide supplementary compensation for oil pollution victims in China. Acceding to the 1992 Fund Convention, which is associated with a relatively high compensation ceiling but a relatively limited financial exposure,[86] could give stronger protection to oil pollution victims. At the same time, a domestic compensation fund could cover oil pollution damage that falls outside the international regime.

6.6 Conclusion

Establishment of the CVOPCF has had a significantly positive effect on

[84] The Administrator's Annual Report of Ship-Source Oil Pollution Fund, 2011-2012, available at: http://www.ssopfund.gc.ca/documents/AnnualReport2011-2012-e.pdf (accessed 25 July 2012).

[85] Aldo Chircop and Eric Machum, "Shifting Focus: Towards Outcome-Based Policy and Regulation making for Maritime Safety and Vessel-Source Pollution in Canada", in *Understanding and Strengthening European Union-Canada Relations in Law of the Sea and Ocean Governance*, eds. Aldo Chircop, Erik Franckx, Erik J. Molenaar and David L. VanderZwaag (Rovaniemi, Finland: University of Lapland, 2009), 535-572.

[86] According to the report by UNCTD, the contribution per tonne of contributing oil to the 1992 IOPC Fund was GBP 0.0351858 in 2010.

compensation for vessel-source oil pollution damage in China. Not only can pollution victims obtain additional compensation, but also a two-tier compensation system for vessel-source oil pollution damage, under which the financial burden is shared between shipowners and oil receivers, has been constituted. The Compensation Fund Regulation is basically consistent with the 1992 Fund Convention with respect to cases in which the CVOPCF will intervene, cases where the CVOPCF can be exonerated, and the general criteria on admissibility of claims.

However, the maximum compensation amount provided by the CVOPCF is much lower than that provided by the 1992 IOPC Fund. Compensation from the CVOPCF could be insufficient to cover oil pollution caused by a major oil pollution incident, whereas the 1992 IOPC Fund has a relatively high compensation capacity in this respect.

In addition to the international solution, some domestic solutions for supplementary compensation for pollution damage have also proved workable, such as the domestic compensation funds in Canada and the United States. However, Canada is also a member of the 1992 IOPC Fund and Supplementary IOPC Fund. The SOPF provides additional compensation in cases where the compensation from the IOPC Funds is insufficient, and also covers oil not covered by the international regime. At the same time, the OSLTF has been established under a purely national regime, but an extremely high limit is set. One of the drawbacks of a purely national regime is that the country has to carry the entire financial burden of a major oil pollution incident.[87] On the other hand, under the international regime, the risk of a major oil pollution incident and the financial losses incurred are spread out over a large number of oil importers who

[87] Mans Jacobsson, supra note 35, at 265.

contribute to the IOPC Fund.[88]

To summarize, in comparison with a purely national compensation regime with an extremely high limit, such as the OSLTF, accession to the 1992 Fund Convention is associated with a relatively limited financial burden on the oil companies. At the same time, the IOPC Fund can provide stronger protection for pollution victims in China, especially when a major oil pollution incident occurs. Nowadays, China potentially faces significantly greater exposure to such major oil pollution incidents, due to the ongoing increase in oil imports and the rapid development of the oil transport industry. As a result, it may well be high time that China participated in the 1992 Fund Convention. However, the CVOPCF, with its wider application scope, is also needed to cover oil pollution that is not covered by the international regime. Therefore, although the benefits brought about by the establishment of the CVOPF cannot be denied, it is suggested that it is now more appropriate for China to set up a combined scheme, under which the 1992 IOPC Fund provides supplementary compensation for pollution damage caused by spillage of persistent oil from sea-going tanker vessels carrying persistent oil as cargo in bulk, while the domestic compensation fund provides supplementary compensation for other oil pollution damage not covered by the 1992 IOPC Fund.

[88] André Schmitt and Sandrine Spaeter, Hedging Strategies and Financing of the 1992 International Oil Pollution Compensation Fund, Working Papers of BETA from Bureau d'Economie Théorique et Appliquée, UDS, Strasbourg, available at: http://www.beta-umr7522.fr/productions/publications/2005/2005-12.pdf (accessed 29 July 2012).

CHAPTER 7

CONCLUSIONS

The international compensation regime for vessel-source oil pollution damage has been established by a number of international conventions. It comprises two sub-regimes, namely (1) the three-tier compensation regime for tanker oil pollution damage and (2) the single-tier compensation regime for bunker oil pollution damage. The compensation regime for tanker oil pollution damage, which is established by the 1992 CLC, the 1992 Fund Convention and the 2003 Supplementary Fund Convention, not only provides prompt and adequate compensation for oil pollution victims, but also balances the financial burden between shipowners and cargo receivers. At the same time, although the Bunkers Convention is largely modeled on the 1992 CLC, the compensation regime for bunker oil pollution damage does not provide a supplementary compensation source because of the practical problem that it is impossible to identify contributors among the cargo interests. The international compensation regime has been considered to be robust and well-developed, and has served as the model for the creation of other liability and compensation instruments, such as the HNS Convention. However, China has not yet completely accepted the international compensation regime for vessel-source oil pollution. China is a Party to the 1992 CLC and the Bunkers Convention, but it has made a reservation to the effect that the 1992 Fund Convention only applies to Hong Kong SAR. Furthermore, apart from the issue of limitation of liability, the 1992 CLC and the Bunkers Convention only apply to foreign-related oil pollution, whereas purely domestic oil pollution is subject to domestic legislations. Instead of contributing to the IOPC Fund, oil receivers in China contribute to a domestic compensation fund — the CVOPCF, to provide supplementary compensation for

oil pollution victims. The establishment of the CVOPCF does, however, represent a significant milestone in the constitution of a two-tier compensation regime for vessel-source oil pollution in China. The first tier of the compensation is provided by the owner of a ship that causes oil pollution damage, and his liability insurer. The CVOPCF, which is financed by oil receivers of persistent hydrocarbon mineral oil goods and materials, provides the second-tier compensation for oil pollution victims. Undoubtedly, the two-tier compensation regime reveals the significant progress that China has made to enhance the compensation for vessel-source oil pollution damage, and to move towards the international standard that has been established over many years by a number of international conventions. Five chapters split over two parts in this thesis have been devoted to comprehensively investigating this newly established compensation regime for vessel-source oil pollution damage in China, based on careful examination of the international compensation regime. The next chapter summarizes the main contributions of the thesis, and indicates opportunities for possible further work.

7.1 Contributions to the International Compensation Regime for Vessel-Source Oil Pollution Damage

The international compensation regime for vessel-source oil pollution damage has, over the years, proved to be one of the most successful compensation schemes. This thesis contributes to the existing literature in that it not only reviews the legal framework of the compensation regime, but also explains the differing attitudes toward the international compensation regime for tanker oil pollution damage. In this respect, this research applies a social science methodology—fsQCA—into legal research, to figure out and interpret the patterns of those countries with a high acceptance level of the international regime (i.e., countries accepting the 1992 Fund Convention or the 2003

Supplementary Fund Convention). The fsQCA results reveal that there are three types of countries with a high acceptance level regarding the international compensation regime for tanker oil pollution, which also indicates a high level of protection afforded to victims and the marine environment, as follows:

(1) Upper-middle or high income countries facing medium risk of oil spills and receiving limited shipments of crude and fuel oil;

(2) Upper-middle or high income countries facing a high risk of oil spills and receiving limited shipments of crude and fuel oil;

(3) Upper-middle or high income countries facing a high risk of oil spills and receiving a large amount of shipments of crude and fuel oil.

For all three patterns, their economic development is a vital factor leading to their high acceptance level, because countries with strong economies usually have better environmental protection strategies, as well as a stronger compensation ability to enable more environmental treaty ratifications to protect victims and the marine environment. As far as the first two types are concerned, being a Member of the IOPC Fund is apparently advantageous, especially for those countries facing potentially high risk yet receiving limited shipments of crude and fuel oil. This is because the IOPC Fund provides a significant amount of supplementary compensation for victims, yet there is no heavy financial burden placed on domestic oil receivers. However, it is interesting to discover that the majority of upper-middle or high income countries facing a potentially high risk of oil spill ratified the 1992 Fund Convention or the 2003 Supplementary Fund Convention, even though this is associated with a heavy financial burden. The nature of the 1992 IOPC Fund, which calls for ex post contributions by each oil receiver in Contracting States corresponding to the percentage of aggregate risk, is similar in nature to the mutuality principle that allocates risk based on the pooled risks so as to reduce individual risk. Due to the scale of major oil pollution incidents, there can be huge economic and

environmental losses involved if such an incident occurs. As a result, from the perspective of risk-sharing, it is sensible to spread the high risk and subsequent economic losses incurred by adopting the 1992 Fund Convention or the 2003 Supplementary Fund Convention. Furthermore, by combining the last two patterns, it is revealed that, with regard to upper-middle or high income countries, the major determinant for adopting the 1992 Fund Convention or the 2003 Supplementary Fund Convention is not whether the financial burden placed on the domestic oil industry is heavy, but whether there is a potentially high risk of exposure to tanker oil spill incidents.

7.2 Contributions to the Compensation Regime for Vessel-Source Oil Pollution Damage in China

There is no existing literature that comprehensively examines the newly established compensation regime for vessel-source oil pollution damage in China. This thesis demonstrates that the establishment of the two-tier compensation regime for vessel-source oil pollution damage has had a significantly positive effect in enhancing compensation capacity, and in moving closer to the international standard in the following six aspects:

(1) The 1992 CLC and the Bunkers Convention apply directly to foreign-related oil pollution incidents in their application scope.

(2) Shipowners are strictly liable for vessel-source oil pollution under Chinese domestic law, which is in line with both the 1992 CLC and the Bunkers Convention.

(3) The admissible claims for compensation stipulated in the Judicial Interpretation are basically in accordance with the Claims Manual of the IOPC Fund.

(4) According to the Amended Regulations, the 1992 CLC limitation amount shall also be applicable to purely domestic oil pollution damage caused by vessels carrying persistent oil as cargo in bulk (except for oil pollution damage resulting from the spillage of non-persistent bunker oil from tankers carrying persistent oil).

(5) The scope of applicable tankers required to purchase compulsory insurance under Chinese domestic law is wider than that under the 1992 CLC.

(6) The CVOPCF, financed by oil receivers of persistent hydrocarbon mineral oil goods and materials, not only provides for additional compensation to oil pollution victims but it can also help apportion the financial burden between shipowners and oil receivers. The Compensation Fund Regulation is basically consistent with the 1992 Fund Convention with respect to cases in which the CVOPCF will intervene, cases where the CVOPCF can be exonerated, and the general criteria on admissibility of claims.

However, despite the significant progress that China has made to enhance the compensation standard, the maximum compensation amount afforded by the two-tier compensation regime in China is still much lower than the international standard, especially with regard to tanker oil pollution damage. The results of the fsQCA clearly show that, being classed as upper-middle income, and having a high risk of exposure to oil spill incidents along with a potentially high financial burden, China is inconsistent with most other countries of this pattern in terms of acceding to the 1992 Fund Convention. China's reluctance to become a party to the 1992 Fund Convention is mainly due to economic considerations. Contrary to

the majority of upper-middle or high income countries, China takes the cost of contribution, rather than the potentially high risk of exposure to tanker oil spill incidents, as the main determination as to whether or not to adopt the 1992 Fund Convention. However, this, it might be thought, is implausible in the long run, for the following two reasons. First of all, the result of the statistical analysis of oil spills from ships in the Chinese sea area over recent decades shows that, although there has not been a catastrophic oil spill incident in Chinese sea waters, the risk of oil pollution from ships keeps rising along with the ongoing increase in oil imports and the rapid development of the oil transport industry. To put it in a nutshell, the potential risk of a major oil pollution incident is much greater than before. Major oil spill incidents are considered to be of low frequency in occurrence, yet they can have far-reaching consequences, including financial losses and irreversible ecological losses. Thus, if such an event ever happened, it could cause huge economic losses and irreversible damage to the marine environment. Thus, the compensation provided by the CVOPCF could well be insufficient to cover the damage suffered by victims in China. The 1992 IOPC Fund has a relatively high compensation capacity in this respect, and can better serve the objective of compensating victims. Secondly, as a new upper-middle income country, China has, more than ever before, a stronger ability to provide compensation for oil pollution victims. Additionally, based on the interpretations of the fsQCA results, it can been seen that if the 1992 Fund Convention is accepted, the risk of a major oil pollution incident and the financial losses incurred in China would be spread out over the large number of oil importers who contribute to the IOPC Fund. From the perspective of risk-sharing, acceding to the 1992 Fund Convention could well be a sensible way to provide compensation for victims in China in the long term. As a result, we believe that now may well be the time for China to consider participating in the 1992 Fund Convention.

In the meantime, the CVOPCF, with its wider application scope, is also needed to cover oil pollution not covered by the international regime. It is therefore suggested that it would be more appropriate for China to set up a combined scheme, under which the 1992 IOPC Fund provides supplementary compensation for pollution damage caused by the spillage of persistent oil from sea-going tanker vessels carrying persistent oil as cargo in bulk, while the domestic compensation fund provides supplementary compensation for other oil pollution damage not covered by the 1992 IOPC Fund.

7.3 Further Research

This research focuses on two categories of parties liable for or under the obligation of providing compensation for vessel-source oil pollution damage, namely shipowners and cargo receivers. However, compensation provided by these two categories of parties is only available when the claims fulfill specific criteria of admissibility. Although the basic assessment criteria of pollution damage under the Chinese compensation regime are in accordance with the Claims Manual of IOPC Fund 1992, with respect to the claims of clean-up costs, the Judicial Interpretation and the Compensation Fund Regulation only provide a few basic assessment criteria. The specific criteria of admissibility and assessment, such as the reasonableness of the operation and reasonable cost of measures, have not been clarified by any legislation. It is important to examine these issues and propose legislative suggestions in this regard. Additionally, in accordance with the 1992 CLC[1] and the Claims Manual of International Oil Pollution Compensation Fund 1992,[2] China has adopted a constrained attitude towards the compensation for environmental damage. Compensation for environmental damage is confined to the cost of reasonable measures of

[1] 1992 CLC, Article 1(6).

[2] Claims Manual of International Compensation Fund 1992, December 2008 Edition, at p35. Available at http://www.iopcfund.org/npdf/2008%20claims%20manual_e.pdf (accessed 26 April 2013).

reinstatement actually undertaken or to be undertaken, including the reasonable cost of monitoring, assessment and research.[3] After the *Antonio Gramsci* incident in 1979, the 1971 IOPC Fund Assembly adopted Resolution No.3 declaring that compensation for environmental damage is not paid based on an abstract quantification calculated in accordance with a theoretical model.[4] Contrary to the IOPC Fund's restricted position on environmental damage, the diminution in value of natural resources is also allowed under the OPA 1990.[5] Besides this, rules for the assessment of natural resources damage caused by the discharge of oil were published by the National Oceanic and Atmospheric Administration (NOAA), despite widespread criticism from both industry and environmental groups. The NOAA rules authorize recovery for both use values and non-use values.[6] It will be of academic value to further discuss whether the diminution in value of natural resources should also be compensated, and whether any form of abstract quantification can be used for assessment of environmental damage under the Chinese compensation regime. Furthermore, this research focuses on the vessel-source marine oil pollution damage. With the increasing dependence on the crude oil, the problem of marine oil pollution damage caused by other sources, such as the offshore facilities, is also becoming more serious than before. There has not been any specific provision relating to the compensation for marine oil pollution damage caused by the offshore facilities in the domestic legislation in China. It is interesting to explore whether the two-tier compensation regime for vessel-source oil pollution damage could serve as a model to set up a compensation regime for oil pollution damage caused by offshore facilities.

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[3] Judicial Interpretation, Art 17.

[4] IOPC Fund Documents, Resolutions of 1971 Fund, available at: http://www.iopcfunds.org/uploads/tx_iopcrulesandregs/res71E.pdf (accessed 26 April 2013).

[5] 33 U. S. Code, Section 2706(d).

[6] Colin de la Rue and Charles B. Anderson, *Shipping and the Environment, 2nd ed.* (London: Informa Law, 2009), 515-532.

In terms of methodology, this thesis innovatively uses a social science method to solve legal problems, and shows the potential of the fsQCA as an effective tool in legal research. The fsQCA is superior to other methods in understanding the social phenomena in a holistic way, and of unraveling the multiple combinations of conditions producing a special outcome. However, the selection of each condition relies on the substantive knowledge of the researcher, which may to some extent suffer from the researcher's subjectivity. Relying on comprehensive theories, hypotheses and explanations from existing literature could redress this shortcoming. Although efforts have been made to avoid such subjectivity by conducting an expert opinion survey, existing literature with respect to the factors influencing the acceptance level of the international regime for vessel-source oil pollution damage is extremely scarce. It will be interesting to further explore new approaches to find out other possible factors, and to verify them using the fsQCA[7]. Besides this, there are very limited existing studies classifying the oil spill risk categories of different countries on a global scale. In this thesis, a country's risk of exposure to tanker oil spill is measured by the risk categories of the coastal regional seas. If there were more recent studies devoted to the risk assessment of each country on a global scale, more precise results could be generated.

[7] Too many true logically contradictory cases could indicate an inappropriate selection of conditions. One of the most popular ways to solve this problem is to add or drop certain selected conditions. Therefore, the research design could be improved via this ongoing process.

APPENDICES

Appendix I

Introduction to Boolean Algebra

Boolean Algebra (Boolean Logic), developed by George Boole in the 1840s, is a logic calculus suitable for variables with only two possible values (0 and 1), such as propositions that are either true or false.

Operators in Boolean Algebra

(1) Boolean Addition (OR)

Logic "OR" is represented by "+" (addition) symbol. For example: C1 and C2 are two conditions leading to outcome "O".

$C_1 + C_2 \longrightarrow O$

The formula means either C_1 or C_2 will produce the outcome. In other words, both C1 and C2 are sufficient conditions of outcome.

(2) Boolean Multiplication (AND)

Logic "AND" is represented by "*" (multiplication) symbol. Taking the above example, the formulation is:

$C_1 * C_2 \longrightarrow O$

This indicates that the outcome will not be produced unless C1 is combined with C2. In other words, the absence of C1 will lead to the absence of outcome. Similarly, the absence of C2 will produce the absence of outcome as well. So, both C1 and C2 are the necessary conditions of outcome.

Additionally, in Boolean Algebra, an uppercase letter represents the value of "1" for a given binary variable. In the same way, a lowercase letter represents the value of "0".

Boolean Minimization

Boolean minimization is a process of reducing a long and complex expression into a short expression. If two Boolean expressions differ in only one causal condition yet produce the same outcome, then the causal condition that distinguishes the two expressions can be considered irrelevant and can be removed to create a simpler, combined expression. Take a three conditions (C1, C2, C3) case as an example, the outcome being expressed by "O".

If

$$C_1 * C_2 * C_3 + C_1 * C_2 * c_3 \longrightarrow O$$

Then, the expression can be minimized as follows:

$$C_1 * C_2 \longrightarrow O$$

In this example there are in total 8 (2^3) possible logic combinations, which can be expressed by a truth table (1 for presence and 0 for absence), as shown below:

Possibility	C_1	C_2	C_3	Outcome
1	0	0	0	0
2	1	0	0	0
3	0	0	1	0
4	1	0	1	0
5	0	1	0	0
6	0	1	1	0
7	1	1	1	1
8	1	1	0	1

In the above example, there are only 3 conditions in a single case, but for complex comparisons, it is difficult to perform algorithms by hand. In those circumstances, QCA software is helpful in identifying the combinations of conditions that produce a specific outcome.

Appendix II

Letters to the Experts and the Expert Opinion Survey Questionnaire

Dear Sir or Madam,

My name is Bingying Dong and I am presently conducting my PhD studies at the Hong Kong Polytechnic University under the supervision of Dr. Ling Zhu and Prof. Kevin X. Li.

The topic of my PhD thesis is "*Compensation for Vessel-Source Oil Pollution Damage in China"*. In the abovementioned thesis, I am seeking to explain the different attitudes of countries towards the international compensation regime for oil pollution damage caused by tanker vessels *(i.e. the different acceptance levels mentioned in the questionnaire below)*. Why do some countries only accede to the 1969 CLC or the 1992 CLC? Why do some other countries also accede to the 1992 Fund Convention, and even the 2003 Supplementary Fund Convention? To investigate this issue, a questionnaire survey is being conducted to obtain opinions from experts in the oil pollution field.

I cordially invite you to participate in this survey, which should take you approximately five minutes to complete. Your response will be treated in strict confidence. All the collected data will be analyzed and reported in aggregate along with those of many others, and will be used only for the purpose of the thesis.

For the purpose of research, it will be much appreciated if you could provide the following information, which will not be disclosed in the thesis or anywhere else:

- *Company/Institution name:*_____

- *Position:*_____

I appreciate very much your help and participation in this survey, and look forward to receiving your response. If you encounter any problems with this study, please contact me by email: 0990

Yours sincerely,
Bingying Dong
PhD Candidate
Department of Logistics and Maritime Studies
The Hong Kong Polytechnic University

Evaluating the Factors Relevant to Accession to the International Conventions Concerning Compensation for Oil Pollution Damage Caused by Tanker Vessels

Expert Opinion Survey Questionnaire

The international compensation regime for oil pollution damage caused by tanker vessels has been well established by a number of international conventions. Based on the ratification of the 1969 CLC, the 1992 CLC, the 1992 Fund Convention and the 2003 Supplementary Fund Convention, countries can be divided into five groups, as follows: (1) Countries that have not ratified or acceded to any of the relevant international conventions; (2) Countries that have only acceded to the 1969 CLC; (3) Countries that have acceded to the 1992 CLC but not acceded to the 1992 Fund Convention; (4) Countries that have acceded to the 1992 CLC and the 1992 Fund Convention; and (5) Countries that have acceded to the 1992 CLC and the 1992 Fund Convention and, additionally, the 2003 Supplementary Fund Convention. This survey aims to evaluate the factors that may influence countries' acceptance of the international compensation regime for tanker oil pollution damage in varying degrees.

- **How important do you think the following factors are in deciding a country's acceptance level of the international compensation regime for oil pollution damage caused by tankers?**

Factors	**Ratings** *(5= Extremely Important; 4= Very Important; 3= Important; 2= Not Very Important; and 1= Not Important At All)*
1. Economic development	
2. Risk of exposure to tanker oil spill	
3. Financial burden associated with adherence to relevant conventions	

Others: _____

Results of Expert Opinion Survey

Factors	Mean Value (n = 5)
Economic development	3.6
Risk of exposure to tanker oil spill	4.4
Financial burden associated with adherence to relevant conventions	4.4

Others: Location of the country (shipping route), Reliance on imports of oil, Environmental protection[*]

[*] One expert held that the location of a country (i.e. whether it is located on the shipping route) could be a relevant factor. According to Sections 3.2.2 and 3.4.1, risk of exposure to tanker oil pollution is defined as the probability of spills multiplied by the consequences of those incidents. A number of factors affect the risk of oil spill, and vessel traffic density is one of those factors. Thus, the location of a country could be reflected by the factor of risk of exposure to tanker oil pollution. Besides this, another expert pointed out that reliance on the imports of oil could be a factor that is relevant to the acceptance level of the international regime. As analyzed in Sections 3.2.3 and 3.4.1, by and large the annual contribution to the IOPC Fund is proportional to the annual imported crude and fuel oil. The financial burden associated with adherence to the relevant international conventions is measured by the imports of crude and fuel oil. As a result, reliance on the imports of oil could be represented by the factor of financial burden associated with adherence to relevant conventions. Lastly, a factor of environmental protection was figured out by an expert. As explained in Section 3.2.4, it is also considered that the international compensation regime is relevant to the environmental protection strategy and the wealthier countries could better afford more environmental protection activities than the impoverished ones. Therefore, the environmental protection could be reflected by the factor of the economic development.

REFERENCES

A: Literature

1. Abecassis, David W., *The Law and Practice Relating to Oil Pollution from Ships* (London: Butterworths, 1978).
2. Abecassis, David W. and Jarashow, R.L., *Oil Pollution from Ships: International, United Kingdom, and United States Law and Practice*, 2nd ed. (London: Stevens, 1985).
3. Bamberg, James, *The History of the British Petroleum Company* (Cambridge University Press, 2000).
4. Blackburn, Elizabeth QC, "The 2003 Protocol to the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage 1992: One Bridge Over Some Particularly Troubled Water", *Journal of Maritime Law and Commerce* 9(2003): 530-544.
5. Chen, Longjie and Liu, Xianming, "Structure of a Fund for Compensation for Oil Pollution Damage in PRC", *Annual of China Maritime Law*, 17 (2008): 314-331.
6. Chen, Qi, "On the application of CLC 92 in China", in: *Maritime Pollution Liability and Policy – China, Europe and the US*, eds. Faure, G. Michael, Han, Lixin and Shan, Hongjun (Alphen aan den Rijn, The Netherlands: Kluwer Law International, 2010), 347-357.
7. Chircop, Aldo and Machum, Eric, "Shifting Focus: Towards Outcome-Based Policy and Regulation making for Maritime Safety and Vessel-Source Pollution in Canada", in *Understanding and Strengthening European Union-Canada Relations in Law of the Sea and Ocean Governance,* eds. Chircop, Aldo, Franckx, Franckx, Molenaar, Erik J. and VanderZwaag, David L. (Rovaniemi, Finland: University of Lapland, 2009), 535-572.

8. Corne, Howard Peter, "Creation and Application of Law in the PRC", *American Journal of Comparative Law* 50 (2002): 369.
9. DelaRue, Colin M., and Anderson, Charles B., *Shipping and the Environment: Law and Practice* (London: LLP, 1998).
10. DelaRue Colin M., and Anderson, Anderson, Charles B., *Shipping and the Environment*, 2nd ed. (London, Hong Kong: Informa, 2009).
11. DelaRue, Colin M., "Liability for Pollution from Ship's Bunkers", in *Pollution at Sea: Law and Liability*, eds. Soyer, Baris and Tettenborn, Andrew (London: Informa, 2012), 11-22.
12. Enache, Irina, and Zagan, Sabina, "Risk Assessment of Oil Marine Pollution", in *Exposure and Risk Assessment of Chemical Pollution – Contemporary Methodology*, eds. Simeonov, L.I. and Hassanien, M.A. (Springer, 2009), 325-334.
13. Faure, Michael and Skogh, Goran, *The Economic Analysis of Environmental Policy and Law* (Cheltenham, Northampton: Edward Elgar, 2003).
14. Faure, Michael, and Wang, Hui, "Liability for Oil Pollution – the EU Approach", *Environmental Liability* 12 (2004): 55- 67.
15. Faure, Michael G. and Hu, James, (ed.), *Prevention and Compensation of Marine Pollution Damage – Recent Developments in Europe, China and the US* (Alphen aan den Rijn: Kluwer Law International, 2006).
16. Fischer, Manuel, "Social Network Analysis and Qualitative Comparative Analysis: Their Mutual Benefit for Explanation of Policy Network Structures", *Methodological Innovations Online* 6 (2011): 27-51.
17. Frank, David J., "The Social Bases of Environmental Treaty Ratification, 1900-1990", *Sociological Inquiry* 69 (1999): 523-550.
18. Franzen, Axel, and Meyer, Reto, "Environmental Attitudes in Cross-National Perspective: A Multilevel Analysis of the ISSP 1993 and 2000", *European Sociological Review* 26 (2010): 219-234.

19. Gaskell, Nicholas, "The Bunker Pollution Convention 2001 and Limitation of Liability", *Journal of International Maritime Law* 15 (2009): 477-494.
20. Gauci, Gotthard M., "Protection of the Marine Environment through the International Ship-Source Oil Pollution Compensation Regimes", *Review of European Community & International Environmental Law* 8 (1999): 29-36.
21. Gonsaeles, Gwendoline, "The Impact of EC Decision-Making on the International Regime for Oil Pollution Damage: The Supplementary Fund Example", in *Marine Resource Damage Assessment*, eds. Maes, Frank (Netherland: Springer, 2005).
22. Han, Lixin, *Research on Legal Regime of Liability and Compensation for Oil Pollution from Ships* (Beijing: Law Press China, 2007).
23. Han, Lixin, "Suggestion On Improving the Management Regulations of Collection and Use of the Ship Pollution Damage Compensation Fund (Draft)", *Annual of China Maritime Law*, 18(2008): 299-331.
24. Han, Lixin and Chu, Beiping, "Legal Analysis on the Joint and Several Liability for Oil pollution Damage Caused by Ships Collision", *Journal of Liaoning University (Philosophy and social sciences)* 7 (2008): 136-141.
25. Han, Lixin and Si, Yuzhuo, "On the Determination of the Compensation Liability of Oil Pollution", *Annual of China Maritime Law* (2003): 215-226.
26. Han, Lixin, *Research on Legal Regime of Liability and Compensation for Oil Pollution from Ships* (Beijing: Law Press China, 2007).
27. Hu, Zhengliang, "Research on the Legal Issues in Establishing the Compensation Fund for Oil Pollution Damage from Ships in China", *Legal Review of Dalian Maritime University* (2005):163-184.
28. Hunter, Lawson A. W., "The Proposed International Compensation Fund for Oil Pollution Damage", *Journal of Maritime Law and Commerce* 4 (1972) 4: 117-139.

29. Jacobsson, Mans, "Bunker Convention in Force", *Journal of International Maritime Law* 15 (2009): 21 – 36.
30. Jacobsson, Mans, "An Ideal International Scheme for Compensation for Marine Pollution Damage", *Journal of International Maritime Law* 17(2011): 263-273.
31. Kaplowitz, Michael D., Luoi, Frank, Yeboah, Felix K., and Thorp, Laurie G., "Exploring the Middle Ground between Environmental and Economic Growth", *Public Understanding of Science*, Online First Version of Record, Dec 13, 2011.
32. Kiern, Lawrence I., "The Oil Pollution Act of 1990 and the National Pollution Funds Center", *Journal of Maritime Law and Commerce* 25 (1994): 487- 519.
33. Kiern, Lawrence I. "Liability, Compensation, and Financial Responsibility under the Oil Pollution Act 1990: A Review of the First Decade", *Tulane Maritime Law Journal* 14 (1999): 481- 589.
34. Kong, Xiangkun, "An Analysis on Establishing National Compensation Fund for Oil Pollution Damage from Ships in China", *China Water Transport* 5 (2007): 12- 13.
35. Li, Zhiwen and An, Shouzhi, "The Necessity of Incorporating Marine Environmental Torts into the Maritime Legal System," in *Prevention and Compensation of Marine Pollution Damage – Recent Developments in Europe, China and the US*, eds. Faure, Michael G. and Hu, James (Alphen aan den Rijn: Kluwer Law, International, 2006), 275-284.
36. Liu, Hong, "Establishing and Implementing the Chinese Regime of Compensation for Oil Pollution Damage from Ships", *Environmental Protection in Transportation* 6 (2002): 6-10.
37. Liu, Nengye, Maes, Frank, "Prevention of Vessel-Source Marine Pollution: A Note on the Challenges and Prospects for Chinese Practice Under International Law", *Ocean Development & International Law* 42 (2011): 356-367.

38. Marx, K. and Engels, F., "A Contribution to the Critique of Political Economy" in *Collected Work* Vol.9, (London: Lawrence & Wishart, 1975), 263-264.
39. Moller, T.H., Molloy, F.C., and Thomas, H.M., "Oil Spill Risks and the State of Preparedness in Regional Seas", (2003), Paper presented at the International Oil Spill Conference 2003, Vancouver, Canada, 6-11 April 2003, available at: http://www.itopf.com/_assets/documents/iosc03.pdf.
40. Much, Susannah, "Trend in Oil Spill from Tankers and ITOPF Non-tanker Attended Incidents", Paper presented at AMOP 2010, Vancouver, available at: http://www.itopf.com/informationservices/publications/papers/documents/amop12.pdf.
41. O'Hagan, Colleen, "Use of GIS for Assessing the Changing risk of Oil Spill from Tankers", Conference paper presented at 3rd Annual Arctic Shipping Conference, St Petersburg, Russia, 17-20 April 2007, available at: http://www.itopf.com/informationservices/publications/papers/documents/arctic_shipping.pdf.
42. Pavliha, Marko, "The 2003 Supplementary Fund Protocol: An Important Improvement to the International Compensation System for Oil Pollution Damage", *Zbornik pravnog fakultetau Zagrebu* 58 (2008): 307–332.
43. Popp, Alfred, QC, The Civil Liability and Fund Conventions Model Compensation Schemes, *The IOPC Funds' 25 Years of Compensating Victims of Oil Pollution Incidents,* available at: http://www.iopcfund.org/npdf/jub_en.pdf
44. Porter, M, and C. Van Der Linde, "Toward a New Conception of Environment Competitiveness Relationship", *Journal of Economic Perspective* 9 (1995): 97-118.
45. Ragin, Charles C., *The Comparative Method—Moving Beyond Qualitative and Quantitative Methods* (Berkeley, Los Angeles, London: University of California Press, 1987).

46. Ragin, Charles C., *Fuzzy-Set Social Science* (Chicago, London: The University of Chicago Press, 2000).
47. Ragin, Charles C., *Redesigning Social Inquiry – Fuzzy Sets and Beyond* (Chicago, London: University of Chicago Press, 2008).
48. Rihoux, Benoit and Ragin, Charles C., *Configurational Comparative Methods – Qualitative Comparative Analysis (QCA) and Related Techniques* (Los Angeles: Sage Publication, 2009).
49. Rihoux, Benoit, "Qualitative Comparative Analysis (QCA) and Related Systematic Comparative Methods: Recent Advances and Remaining Challenges for Social Science Research", *International Sociology*, 21 (2006): 679-707.
50. Ringbom, Henrik "Maritime Liability and Compensation in EU Law", in *Pollution at Sea: Law and Liability,* eds. Soyer, Baris and Tettenborn, Andrew (London: Informa, 2012).
51. Sagoff, Mark, *The Economy of the Earth: Philosophy, Law, and the Environment*, 2nd ed. (New York: Cambridge University Press, 2008).
52. Schmitt, Andre and Spaeter, Sandrine, "Insurance and Financial Hedging of Oil Pollution Risk", (2004), Working Papers of LaRGE Research Center from Laboratoire de Recherche en Gestion et Economie (LaRGE), Université de Strasbourg (France), available at: http://www.huebnergeneva.org/documents/spater.pdf .
53. Schmitt, André and Spaeter, Sandrine, "Hedging Strategies and Financing of the 1992 International Oil Pollution Compensation Fund", (2005), Working Papers of BETA from Bureau d'Economie Théorique et Appliquée, UDS, Strasbourg, available at: http://www.beta-umr7522.fr/productions/publications/2005/2005-12.pdf .
54. Schmitt, Andre and Spaeter, Sandrine, "Optimal Coverage of Large Risks: Theoretical Analysis and Application to Oil Spill", (2007), Working Papers of BETA from Bureau d'Economie Théorique et Appliquée, UDS, Strasbourg, available at: http://idei.fr/doc/conf/ere/papers_2007/spaeter.pdf

55. Schneider, Carsten Q., and Wagemann, Claudius, *Set-Theoretic Methods for the Social Sciences – A Guide to Qualitative Comparative Analysis* (New York: Cambridge University Press, 2012).
56. Shan, Hongjun and Zhang, Jinlei, "The Civil Liability Regime for Vessel Source Oil Pollution in China", *Journal of International Maritime Law* 15 (2009): 354.
57. Shan, Hongjun, *Comparative Study of China, American and International Civil Liability Regime on Oil Pollution* (Beijing: Law Press China, 2009).
58. Shea, Michael, "Environmental and Legal Implications of the Rio de La Plata Oil Spill", C*olorado Journal of International Environmental Law and Policy* (1999): 183- 190.
59. Si, Yuzhuo, "To Explain the Overlapping Claimant from the Oil Pollution Caused by Ship Collision", *Annual of China Maritime Law* (2009): 1-12.
60. Si, Yuzhuo and Zhu, Zengjie, "Legislative Suggestions on the Relationships between Maritime International Conventions and Domestic Legislations", *Annual of China Maritime Law* (1999): 4.
61. Smithson, Michael, *Fuzzy Set Analysis for Behavioral and Social Sciences* (Berlin: Springer1987).
62. Song, Weili, "On the Application of International Conventions", *Annual of China Maritime Law* (2003): 195.
63. Sun, Huanwei, "The Application of Treaties in China', *International Law Review of Wuhan University* (2004): 125.
64. Tan, Alan Khee-Jin, *Vessel-Source Marine Pollution: The Law and Politics of International Regulation* (London: Cambridge University Press, 2006).
65. Tian, Chunrong, "China's Oil and Gas Imports and Exports, 2012", *International Petroleum Economics* 3 (2013): 44-55.
66. Tsimplis, M. N., "Marine Pollution from Shipping Activities", *Journal of International Maritime Law*, 14 (2008):101-152.

67. Vanem, Erik, Endresen, Qyvind, and Skjong,Rolf, "Cost-effectiveness Criteria for Marine Oil Spill Preventive Measures", *Reliability Engineering & System Safety* 93 (2008): 1354-1368.
68. Wagemann, Claudius, and Schneider, Carsten Q., "Standards of Good Practice in Qualitative Comparative Analysis (QCA) and Fuzzy-Sets", *Comparative Sociology* 9 (2010): 376-396.
69. Wang, Hui, *Civil Liability for Marine Oil Pollution Damage: A Comparative and Economic Study of the International, US and Chinese Compensation Regime,* (The Netherlands: Kluwer Law International, 2011).
70. Wang, Liming, *Research On Tort Liability Law I* (Beijing: China Renmin University Press, 2011).
71. Weber, M, *Economy and Society: An Outline of Interpretive Sociology* (University of California Press: 1978).
72. Woolgar, Lisa, "Assessing the Increasing Risk of Marine Oil Pollution Spills in China", Paper presented at the 2008 International Oil Spill Conference, May 4-8, 2008 Savannah, Georgia, available at: http://www.itopf.com/information-services/publications/papers/documents/IOSC08LW.pdf
73. Wu, Chao, *Pollution from the Carriage of Oil by Sea: Liability and Compensation* (London: Kluwer Law International, 1996).
74. Yaw Out Mankata Nyampong, *Insuring the Air Transport Industry Against Aviation War and Terrorism Risks and Allied Perils* (Berlin, London: Springer, 2013).
75. Zadeh, Lofit A. "Fuzzy Sets", *Information and Control* 8 (1965): 338-353.
76. Zhang, Chunchang, "What Is Missing in China's Ship-source Pollution Damage Compensation System?", *China Maritime Safety* 7 (2011): 8-10.
77. Zhang, Hua and Zhou, Shuhui, "China's Oil and Economics Trends in the New Century, " *Oil Depot and Gas Station* 22 (2002): 10.

78. Zhang, Liying, "Compensation for Domestic Oil pollution in China's Coast: Which Law Shall Apply?", in: *Maritime Pollution Liability and Policy – China, Europe and the US*, eds. by Faure, G. Michael, Han, Lixin and Shan, Hongjun (Alphen aan den Rijn, The Netherlands: Kluwer Law International, 2010), 359-369.
79. Zhao, Hong, "The Legal Issues of Compensation for Oil Pollution in Judicial Practice", *Conference on Maritime Law of Chinese Lawyer* (2005).
80. Zhou, Fangzhen, "Thinking on Administration of the Compensation Fund for Oil Pollution from Ships", *Navigation Technology* 3 (2007): 69-70.
81. Zou, Keyuan, "Implementing Marine Environmental Protection Law in China: Progress, Problems and Prospects", *Marine Policy* 23 (1999): 207-225.
82. Zhu, Ling, *Compulsory Insurance and Compensation for Bunker Oil Pollution Damage* (Berlin: Springer, 2007).
83. Zhu, Ling, "Compensation Issues under the Bunkers Convention", *WMU Journal of Maritime Affaires* 7(2008): 303-316.
84. Zhu, Ling, "Can the Bunkers Convention Ensure Adequate Compensation for Pollution Victims?," *Journal of Maritime Law and Commerce* 40 (2009): 203.

B. Documents

1. China Marine Services Company Ltd., (2009), Guidance on Ship Pollution Compensation in China, *Special Edition of China Ship Survey.*
2. CIA, The World Fact Book, Country Comparison: Oil Imports, available at: https://www.cia.gov/library/publications/the-world.
3. Commission of the European Communities, (2002), 802 final, Communication from the Commission to the European Parliament and the Council on a Second Set of Community Measures on Maritime Safety Following the Sinking of the Oil Tanker Erika, available at: http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2000:0802:FIN:EN:PDF.
4. IEA Statistic, Energy Statistics of OECD Countries (2012 edition) and Energy Statics of Non-OECD Countries (2012 editions).
5. IMO (1978), Official Record of the Conference on the Establishment of An International Compensation Fund for Oil Pollution Damage, 1971 Fund Convention.
6. IMO (2000), Amendment, adopted on 18 October 2000, to the Limitation Amounts in the Protocol of 1992 to Amend the International Convention on Civil Liability for Oil Pollution Damage, 1969, Resolution LEG. 1(82).
7. IMO, (2000), Conference Agrees to Early Winding Up of 1971 Oil Pollution Compensation Fund, London, UK, IMO News.
8. IMO (2000), Resolution on the Termination of the 1971 Fund Convention and Accession to the 1992 Protocols, Document LEG/CONF 11/9.
9. IMO, (2001), Resolution on Protection for Persons Taking Measures to Prevent or Minimize the Effects of Oil Pollution, Document LEG/CONF. 12/18.

10. IMO, (2002), Adoption of Amendments of the Limitation Amounts in the Protocol of 1992 to Amend the International Convention on Civil Liability for Oil Pollution Damage, 1969, Resolution LEG1 (82).
11. IMO (2010), Manual on Oil Spill Risk Evaluation and Assessment of Response Preparedness.
12. IOPC Fund (2003), Fifth Report of the Third Intercessional Working Group, Document 92FUND/WGR.3/15.
13. IOPC Fund (2005), Claims Manual of International Oil Pollution Compensation Fund 1992 (April 2005 edition), available at: http://www.iopcfund.org/npdf/claimsman-en.pdf.
14. IOPC Fund (2006), Explanatory Notes of STOPIA 2006 and TOPIA 2006, Document 92FUND/A.ES.10/13.
15. IOPC Fund (2007), Agenda Item 4 of the 37the Session of Executive Committee: Any Other Business- STOPIA, Document 92FUND/EXC.37/8.
16. IOPC Fund (2008), Claims Manual of International Oil Pollution Compensation Fund 1992 (December 2008 Edition), available at http://www.iopcfund.org/npdf/2008%20claims%20manual_e.pdf.
17. IOPC Fund (2010), Annual Report of the International Oil Pollution Compensation Fund, 2010, available at: http://www.iopcfunds.org/uploads/tx_iopcpublications/2010_ENGLISH_ANNUAL_REPORT.pdf
18. IOPC Fund (2011), Annual Report of the International Oil Pollution Compensation Fund, 2011, available at: http://www.iopcfund.org/npdf/AR2011_e.pdf.
19. IOPC Fund (2013), Explanatory Note: The International Regime for Compensation for Oil Pollution Damage.

20. ITOPF (2003), Regional Profiles: A Summary of the Risk of Oil Spill & State of Preparedness in UNEP Sea Regionals.
21. OSLTF (2007), Annual Report of Oil Spill Liability Trust Fund, FY 2002- FY 2006, available at: http://www.iopcfund.org/npdf/AR2011_e.pdf.
22. SOA (2013), Investigation Report of Penglai 19-3 Oilfield, available at: http://www.soa.gov.cn/xw/hyyw_90/201211/t20121109_884.html
23. SOPF (2011), The Administrator's Annual Report of Ship-Source Oil Pollution Fund, available at: http://www.ssopfund.gc.ca/documents/AnnualReport2010-2011-e.pdf.
24. The World Bank (2012), World Development Indicators, available at: http://data.worldbank.org/sites/default/files/wdi-2012-ebook.pdf.
25. UNCTAD (2012), Liability and Compensation for Ship-Source Oil Pollution: An Overview of the International Legal Framework for Oil Pollution Damage from Tankers, Studies in Transport Law and Policy.
26. West of England, Notice to Member No. 13 2005/2006, STOPIA 2006 & TOPIA 2006.
27. West of England, No.5 2008/2009- Entry into Force of the Bunkers Convention – Update on State Certification and Issuance of Blue Cards.