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# 1. Introduction

*Stefan E. Weishaar*

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## THIS BOOK'S APPROACH TO EMISSIONS TRADING

Emissions trading systems (ETS) have grown into a respected tool within the environmental policy arsenal and have proliferated around the globe. They are often employed to fight global warming and were referred to at the international climate conference in Paris in December 2015 where political leaders agreed to hold the global average temperature increase well below 2°C and to pursue efforts to limit the temperature increase to 1.5°C.

Emissions trading is usually traced back in the resource economics literature to Crocker (1966) and Dales (1968). Montgomery (1972) is credited as being the first to provide formal proof of its cost efficiency, and Tietenberg (1985) has established it on the economic research agenda. The law and economics literature by contrast tends to trace emissions trading back to Demsetz (1967), who argues that externalities should be internalized by allocating property rights.

As a wide variety of stakeholders and scholars explore ways to address local or more prominently global environmental challenges and as more and more countries adopt emissions trading, emissions trading research has been described as entering into a stage of maturity. In the eyes of policy makers the hype surrounding emissions trading has subsided to a large degree as the understanding about this policy instrument has developed tremendously over the last decade.

This handbook presents the state of the art of research on emissions trading in selected areas for a variety of readers, including researchers in academia, think tanks and policy makers. This introduction describes the interdisciplinary approach taken to address this subject and gives an overview of the chapters contained in this book.

Because emissions trading is a topic that has received interest from many different sides, this handbook takes a broader approach to incorporate several of these areas of study. Economic theories generate the roots from which emissions trading has emerged; the principles and practice of its economic shape, its acceptance and application; law molds its features in terms of its implementation, execution and occasionally also in terms of its design. Consequently, the book is written both for and by people

from a range of disciplines, including economics, law and political science. Contributing authors were encouraged to explain their sophisticated analysis in a manner that a broad range of readers can understand. I hope that a deeper appreciation of the issues involved in emissions trading will enhance the ability to effectively design and implement emissions trading measures and encourage research and interdisciplinary collaboration among different fields.

Bearing tribute to the particular research disciplines and approaches, some authors offer a guide through the literature landscape and set a research agenda, while others review the empirics and offer interesting descriptive insights that help to put the theoretical and policy discussions into perspective. Yet others present their own ideas on policy challenges and choices.

## A BRIEF OVERVIEW OF THE BOOK

The book is structured into three parts. Part I presents the economic and legal origins of the book, Part II covers several implementation challenges and Part III presents the international dimension.

### **Part I: Economic and Legal Origins**

Dan Cole reviews the theoretic origins and limitations of emissions trading and implications for ETS design. From a historical perspective the author examines the early applications including the US acid rain program and the gasoline lead trading program. The author identifies three main lessons from the ETS experience: first, ETSs can be (more or less) successfully implemented to improve regulatory practice. Second, regulators are sensitive to the trade-off between compliance costs and environmental protection, and third ETS is not a solution to any environmental problem and must be applied carefully.

Andries Nentjes examines how two generic emission trading designs, cap-and-trade and credit trading compare to each other. The author compares them in terms of their economic impact in the presence of perfect and imperfect competition and how they would work if both designs would be implemented within one jurisdiction. The chapter also examines which design would lend itself to beggar thy neighbor policies at national level. Moreover this chapter examines the implications of the two ETS choices in terms of investment in innovation.

Claudia Kettner presents empirical evidence on trading in the EU ETS. The author first analyses EU allowance trade and the use of international

credits for compliance under the EU ETS in the first trading phase (2005 to 2007) and second (2008 to 2012) is addressed on country level as well as on sector level. Subsequently the trading flows on installation and company level are assessed. This is complemented by a literature review of trading on company level and the use of banking and borrowing of EUAs.

## **Part II: Implementation Problems**

Beat Hinterman focuses on market power exercised by individual firms within an existing ETS. Market power is crucial because it undermines the traditional presumption that the market clearing price and eventual abatement are independent of the distribution of allowances and can give rise to welfare losses to society. Hinterman first assesses the theoretical literature on imperfect competition in emission permit markets before reviewing the empirical literature.

Marjan Peeters and Huizhen Chen examine sanction regimes of greenhouse gas emission trading systems from a legal perspective. After presenting the theoretical embedding, the authors examine the legal framework for sanctions of excess emissions in the Chinese emissions trading pilots and the EU by reviewing enforcement approaches and recent case law regarding penalties.

Francesco Gulli examines windfall profits in the EU power sector – a sector that is widely acclaimed to enjoy windfall profits. After presenting the basics of windfall profits and distinguishing between those windfall profits attributable to free allocation of allowances and those profits attributable to price increases, the author continues to present the theoretical and empirical literature on cost pass-through in the power sector. Subsequently he calculates the windfall profits in the EU power sector during the first and the second trading phase of the EU ETS and offers a critical appraisal of a national tax levy to address windfall profits.

Karolin Rogge reviews the theoretical literature and empirical evidence on the innovation impact of the EU ETS. The author then examines the EU ETS's impact on organizational innovation, offers several methodological recommendations for future studies and suggests policy implications for decarbonizing the economy.

Ricardo Pereira and Katherine Nield examine financial crimes in the European carbon markets. They describe the types of frauds that emerged in the context of the EU ETS, in particular the Value Added Tax (VAT) fraud and emission allowance thefts. The authors highlight the characteristics of allowances and the registry system that made the EU ETS vulnerable to such practices. Subsequently the authors discuss the regulatory approaches taken to contain these financial frauds.

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Josephine van Zeben examines litigation with regard to emissions trading systems. The author provides an analytical overview of the various types and functions of litigation. Based upon the outcomes of particular cases it is examined how litigation has affected both ETS design and its development. Albeit examining different jurisdictions the author draws lessons from litigation for the implementation of emissions trading systems.

Elena Kosolapova examines the international liability of single major emitters. The author shows that both States and private enterprises – even those operating within or falling under an ETS – are under an ‘obligation to prevent significant transboundary harm’. The author examines how the procedural and substantive duties related to this positive obligation can constitute the legal basis for challenging single emissions sources. At the same time, the chapter shows that the international climate regime does not contain liability provisions and that the current approaches to state liability in international law are incapable of addressing climate change-related damages. It also demonstrates that the obstacles to domestic climate change liability remain huge.

Christian de Perthuis and Raphael Trotignon explain and analyse surplus control and the ways supply-flexibility could be brought into the EU ETS allowance market. After examining the current causes of the weak EU ETS price signal the authors examine the importance of market expectations and uncertainty before reviewing the Commission’s EU ETS report proposal. The authors then continue by presenting their policy proposal of an independent carbon market authority. This chapter – albeit not constituting a research handbook chapter or providing a literature review – provides an interesting point of departure for addressing current challenges under the EU ETS.

### **Part III: International Dimension**

Andreas Tuerk and Andrej Gubina review the literature on linking on emissions trading systems. The authors present the forms of linkages that are discussed in the literature and their challenges and offer an outlook on the role, options and likelihood for linking trading schemes. They also briefly present the existing emissions trading schemes to date.

Kateryna Holzer reviews the applicability of WTO rules to ETS allowances and examines how particular ETS design elements are assessed from a legal and doctrinal perspective. In doing so, the author examines the critical issues of free allocation (in relation to subsidies and anti-dumping rules), revenue recycling and border tax adjustments. The latter

is especially discussed in relation to import taxes and cost rebates. The author also reviews the legal barriers of linking emissions trading systems that derive from WTO law.

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