

Nijmegen School of Management
Department of Economics and Business Economics
Master's Thesis Economics (MAN-MTHEC)

The international dimension of the EU Emissions Trading System: a unilateral regulatory globalisation approach

By J.P. Janssen (s1040852)

Nijmegen, 30 June 2024

Program: Master's Program in Economics
Specialisation: International Political Economy
Supervisor: dr. I. Boldyrev

Radboud Universiteit



Abstract:

The EU Emissions Trading System is the flagship of domestic EU climate policy. This master's thesis analyses the international dimension of the EU ETS based on an extensive and comprehensive literature study. In the context of the EU ETS, as an example of marketisation, the analysis focuses on the EU's ability to unilaterally determine global regulatory norms. The presented findings contribute to the scarce literature on the EU ETS' international dimension, and provide a comprehensive assessment of the direct applicability of the process of unilateral regulatory globalisation, which can constitute a so-called 'Brussels Effect'. The thesis shows that, to this date, the influence of the EU's ability to unilaterally set global norms on the international dimension of the EU ETS remains limited. Yet, it also suggests that the adoption of the CBAM Regulation will potentially instigate effects of the EU ETS policy mix outside the EU's jurisdiction through the process of unilateral regulatory globalisation.

Table of contents

1. Introduction.....	3
1.1 Research context	3
1.2 Research problem and thesis structure	6
1.3 Methodology.....	7
2. Marketisation of EU climate policy	9
2.1 Introduction.....	9
2.2 Marketisation.....	10
2.2.1 Modality of economisation	10
2.2.2 Carbon markets.....	12
2.3 The origins of the EU ETS	14
2.4 The design and development of the EU ETS.....	17
2.4.1 Initial market design.....	18
2.4.2 Development.....	20
2.5 Concluding remarks	22
3. Unilateral regulatory globalisation	24
3.1 Introduction.....	24
3.2 Market-driven global regulatory influence.....	25
3.2.1 Regulatory races	26
3.2.2 Conditions for unilateral regulatory globalisation.....	28
3.3 The Brussels effect	31
3.3.1 The EU's regulatory power	31

3.3.2 Global norm setting agenda	33
3.4 Concluding remarks	34
4. International dimension of the EU ETS	36
4.1 Introduction.....	36
4.2 Direct applicability unilateral regulatory globalisation	37
4.3 Indirect influence EU's regulatory power	43
4.4 Concluding remarks	45
5. Conclusion.....	48
Bibliography	53

1. Introduction

1.1 Research context

The European Union (EU) Emissions Trading System (ETS) is considered to be the ‘cornerstone’ of EU climate policy (Woerdman 2021). Since its entry into force by Directive 2003/87/EC (EU ETS Directive) in 2005, the EU ETS facilitates trade in emission allowances (or: ‘emission rights’) to incentivise the reduction of greenhouse gas emissions. The sectors covered by EU ETS Directive collectively cover 36 per cent of the EU’s total greenhouse gas emissions (ICAP 2024). As a result, the EU ETS is of significant importance in the EU’s policy mix to combat climate change. Within this context, the 2019 European Green Deal provides the blueprint for the EU’s climate policy aimed at an unprecedented transformation towards a green and climate-neutral economy by 2050 (European Commission 2019).

Subsequently, the European Climate Law (Regulation 2021/1119) has codified the EU’s climate change mitigation objectives. In order to reach the intermediate target of cutting greenhouse gas emissions by at least 55 per cent by 2030, the EU ETS Directive has been reformed. The revised decreasing cap of emission allowances of phase four of the EU ETS (2021-2030) should establish a 62 per cent reduction of greenhouse gas emissions by 2030 compared to 2005 in the covered sectors. Moreover, in light of the long-term objective of reaching climate neutrality by 2050, the complementary EU ETS 2 has been introduced which will cover additional sectors from 2027 onwards and, thus, extend the reach of EU ETS. Accordingly, the market-based policy instrument plays a vital role in the EU’s ambition to become the first climate-neutral continent of the world (European Commission 2019).

Although the EU’s formulated climate change mitigation objectives are *prima facie* internal, the profound influence of the EU’s international commitments and external dimension of EU climate policy should not be underestimated. Correspondingly, recital 8 of the European Climate Law states that the Regulation should be characterised as ‘the overall framework for the Union’s contribution to the Paris Agreement’. The 2015 Paris Agreement, which has been ratified by 192 member states of the United Nations Framework Convention on Climate Change (UNFCCC), sets the binding goal of limiting global temperature rise to 2°C and pursuing to limit global temperature rise to 1.5°C.

Meanwhile, the urgency to effectively address climate change has been further established by growing scientific evidence of the risks of global warming. Due to various reasons, more than three decades of climate policy at global level have not effectuated sufficient climate action to limit global warming (Stoddard et al. 2021). The International Panel on Climate Change (IPCC) noticed already a 1.1°C global temperature rise in the period 2011-2020 compared to pre-industrial levels (IPCC 2023). Additionally, the IPCC (2023) established that the 2015 Paris Agreement aspirational goal of limiting global temperature rise to an acceptable level of 1.5°C will likely not be achieved by current mitigation efforts. As a result of escalating global warming, climate-related risks to human well-being and planetary health will become more severe and increasingly widespread (IPCC 2023). Resilient climate policy is urgently needed in order to mitigate the global climate crisis.

The global, or transnational, nature of climate change constitutes that climate change mitigation is a 'global public good' (Verde and Borghesi 2022). Therefore, effective climate change mitigation is a non-rivalrous and non-excludable good across the whole world. Ostrom (2015) points at the collective action problem with public goods of actors contributing less to the joint effort, and free-riding on the contributions of others. It is, *inter alia*, for this reason that the EU actively supported an initial global response to the problem of climate change at the 1992 UN Earth Summit in Rio de Janeiro where the UNFCCC was negotiated (Stangl and Mauger 2021; Vogler and Stephan 2007). Subsequently, within the UNFCCC framework, the EU has continuously aimed to lead global climate change mitigation 'with varying degrees of success' (Oberthür and Dupont 2021). These efforts align with the EU's constitutional objective to promote measures at international level to combat climate change as laid down in Article 191(1) of the Treaty on the Functioning of the European Union (TFEU). Besides playing a major role in multilateral negotiations, the EU also makes use of other tools to intensify global efforts to mitigate climate change. For instance, climate-related matters are included in trade and investment agreements, and are part of diplomatic dialogues such as the European Neighbourhood Policy (Biedenkopf and Groen 2021). Through treaties and (multilateral) institutions, the EU, thus, aims to influence global convergence towards strict climate policy and regulation. Bradford (2012) refers to this 'conventional' form of regulatory harmonisation, which is based on bilateral or multilateral consensus, as 'political harmonisation'.

However, it should be noted that the EU also aims to constitute global effects by unilateral regulatory action. Observing the European Green Deal, Eckert (2021) concludes that the EU pursues to distribute its environmental norms by being the first mover in global regulatory

competition concerning the pathway towards climate neutrality. In fact, European Commission President, Ursula Von der Leyen even emphasised the EU's ambition to be a 'global standard setter' with the European Green Deal (Von der Leyen 2019). Accordingly, the EU pursues to intentionally utilise its regulatory capacity and market power to diffuse norms that should mitigate climate change globally (Eckert 2021). The EU's strict regulatory action concerning climate change should lead to the so-called 'Brussels effect' as described by Bradford (2012; 2020). The Brussels effect is a form of 'market-driven harmonisation' of regulation, and identifies the EU's ability to unilaterally regulate global markets. Primarily, the de facto Brussels Effect occurs when global companies voluntarily decide to apply the EU's regulatory standards to their global uniform production processes. Subsequently, the de jure Brussels can take place when foreign jurisdictions, under pressure of the market, decide to adapt their formal regulation to the EU's standards. Based on the theories of regulatory competition and convergence, and inspired by the 'California effect' in environmental standards as described by Vogel (1997; 2000), Bradford (2012; 2020) concludes that the EU is often able to externalise its own strict regulatory norms through effectively exercising its market power and regulatory capacity.

Since the EU aims to influence global norms regarding climate change mitigation by unilateral regulatory action, the EU's climate policy should be suitable for such market-driven harmonisation. Given this policy objective and the need for resilient global climate action, it is of much relevance to further clarify the applicability the underlying theory of unilateral regulatory harmonisation to the EU ETS as the cornerstone of EU Climate Policy. So far, it is recognised that the EU is generally able to unilaterally influence global norms in environmental law under certain specific circumstances (see, e.g.: Kelemen and Vogel (2010); Scott and Rajamani (2012); Bradford (2012; 2020)). However, within this context, a recent comprehensive in-depth analysis of the EU ETS seems to be absent.

Moreover, Verde and Borghesi (2022) point out that the international dimension of the EU ETS has been neglected more broadly in academic literature. Their understanding of the 'international dimension' of the EU ETS is focused on the EU ETS' ability to instigate effects outside the EU's jurisdiction. Verde and Borghesi (2022) base their analysis of the international dimension of the EU ETS on the 'niche' club theory approach, originally developed by Buchanan (1965). This theory captures the idea of smaller groups of enthusiastic economic agents that pursue to entice other reluctant agents through acting beyond their self-interest (see, for its application to climate change mitigation: Hovi et al. (2016)). Despite Verde and Borghesi's (2022) insightful paper, the literature on the international dimension of EU ETS remains scarce. By taking a different theoretical

approach, this master's thesis will distinguish itself from Verde and Borghesi's (2022) analysis and add to the current understanding of the international dimension of the EU ETS.

Furthermore, the contribution of this master's thesis goes beyond the findings of Bradford's (2020) case study of the EU ETS, which was largely focused on emissions trading in aviation and only superficially covered the international dimension of the EU ETS as a whole. The contribution, *inter alia*, lies in the comprehensiveness of the in-depth analysis, including recent revisions of and supplementary legislative measures to the EU ETS. This will provide helpful insights regarding the influence of the EU's global regulatory power on the international dimension of the EU ETS. Moreover, another distinctive feature of this research is the analysis of the EU ETS as an example of marketisation of climate policy (see, e.g.: MacKenzie (2009); Çaliskan and Callon (2010); Chiapello and Engels (2021)). Within the context of this research, the economic nature of the policy instrument could possibly amplify the influence of the EU's global regulatory power.

1.2 Research problem and thesis structure

The theory of unilateral regulatory harmonisation allows to explain the global impact of EU regulation and could possibly contribute to the understanding of the international dimension of the EU ETS. Within this context, a gap in literature can be identified since the current understanding of the international dimension of the EU ETS does not provide comprehensive understanding of the applicability of this theoretical idea. An in-depth analysis of the international dimension of the EU ETS, as an example of marketisation, should clarify the applicability of the theory of unilateral regulatory harmonisation to the EU ETS. This master's thesis will pursue to fill the identified gap in literature by answering the following research question: to what extent does the EU's ability to unilaterally set global regulatory standards influence the international dimension of the EU ETS?

In order to come to a thorough answer to the research question, the thesis will consider three sub-research questions. Each sub-research question will address a different aspect of the main-research question and will contribute to the overall analysis in the conclusion. The thesis' structure will include three separate Chapters that each answer a sub-research question.

Marketisation of EU climate policy

Chapter 2 will cover an analysis of the development of the EU ETS policy mix within the EU climate policy framework as an example of marketisation. More specifically, the Chapter will answer the

following sub-research question: how did the EU ETS develop within the framework of EU climate policy? First, the theoretical background of the concept of marketisation, that entails the process of formation of markets through socio-technical arrangements, will be analysed. Subsequently, the chapter will evaluate the origins of the EU ETS and its development over the years. To be able to do so, official publications, policy documents, historical accounts, and science and technology studies (STS) literature will, *inter alia*, be taken into account.

Unilateral regulatory globalisation

The second sub-research question is: what is the theoretical framework of unilateral regulatory globalisation? As discussed in the previous subsection, the theory of unilateral regulatory globalisation allows to explain the emergence of global norms as a consequence of unilateral regulatory efforts. Chapter 3 should provide an overview of broader context of this theory and provide clear conditions for the EU's ability to set global norms in certain policy areas.

The international dimension of the EU ETS

Following this, Chapter 4 concerns the international dimension of the EU ETS. The Chapter aims to answer the third sub-research question: to what extent is the international dimension of the EU ETS influenced by unilateral regulatory EU efforts? The analysis will be based on Verde and Borghesi's (2022) definition of the international dimension of an ETS as described before. Their definition provides a clear starting point for the analysis of the international dimension of the EU ETS. The chapter will provide an analysis of the of the EU ETS' international dimension while making use of theoretical approach as covered by Chapter 3. Moreover, the insights of Chapter 2 concerning the marketisation of the cornerstone instrument of EU climate policy will be incorporated where applicable. As mentioned before, the economic nature of the EU ETS could positively influence the determinants of the EU's global regulatory power.

1.3 Methodology

The research of this master's thesis will be qualitative in nature and consists a literature study. The research problem and main research question demand a broad analysis of valuable literature and policy documents. This approach restricts the use of empirical evidence, but enables better understanding of the research problem through an in-depth theoretical analysis of the development of the EU ETS' international dimension. As a result, the literature and policy study

will serve as a robust and insightful method for researching the international dimension of the EU ETS. Conducting this literature and policy study should allow to fill the identified gap in literature, which is defined by the research problem.

By examining a wide range of literature, diverse perspectives will be incorporated in the research. Insights from academic literature, ranging from STS literature to political economy, economic and historical sociology, and regulatory studies literature, will be included. The theoretical and descriptive analysis of this master's thesis will use the insights from these various disciplines by utilising the relevant concepts in the scope of this research and drawing upon the phenomena that are described in the relevant literature. However, in order to keep the research legible and feasible, the scope of the research needs to be delineated. The research will predominantly focus on the EU ETS, and other market-based mechanisms in the international climate regime will, in principle, only feature within the broader context of analysis of the international dimension of the EU ETS. More specifically, this analysis will be limited to the theoretical unilateral regulatory globalisation approach.

2. Marketisation of EU climate policy

2.1 Introduction

Although ETSs have become a well-established fact over time, they, indeed, remain artificially created policy instruments (Lederer 2017). Originating from economics, ETSs construct carbon markets by means of public regulation. The EU ETS is such a market-based policy instrument that enables emissions trading, and, thus, establishes the EU carbon market. More specifically, the EU ETS is based on a cap-and-trade mechanism, in which a 'cap' is predetermined as a limit to greenhouse gas emissions allowances within the sectors covered by the EU ETS Directive. Companies in the covered sectors are prohibited to exceed the amount greenhouse gas emissions allowed for by their emissions rights. Over time, the overall emissions cap is lowered in order to reduce greenhouse gas emissions by the covered sectors in the EU. Currently, emissions allowances are partly allocated for free (or: 'grandfathered'), and partly auctioned. Besides, companies are allowed to freely trade their emission allowances on the EU carbon market. According to economists, allowances trading leads to cost-efficiency in reducing greenhouse gas emissions (Ehrenstein and Neyland 2021). Companies with relatively low costs of reducing emissions can sell their residual allowances to companies for which emission reduction is relatively expensive. This succinct description undeniably reveals the economic nature of the EU ETS as a policy instrument.

Traditionally, economists regarded the emission of greenhouse gasses as an 'externality' of economic activities. From this viewpoint, greenhouse gas emissions are not included in economic cost calculations of emitting entities. However, pursuant to performativity literature, economic life and markets are formatted by 'economics at large', including calculative mechanisms (Callon 1998). The construction of carbon markets is aimed at bringing environmental damage within the realm of economic calculations. Accordingly, the costs of emitting are supposed to be incorporated in economic cost calculations through putting a direct or indirect price on greenhouse gas emissions (MacKenzie 2009). Within this context, the process of economisation constitutes the allowance to emit as 'economic' (Çaliskan and Callon 2009). More specifically, the establishment of carbon markets is considered to be an example of 'marketisation' as a particular form of economisation (Çaliskan and Callon 2010).

Against the background of the relevant theoretical framework for economisation from STS, and economic and historical sociology literature, this chapter will contribute to the understanding of the creation and development of the EU ETS, as the cornerstone of EU climate policy. First, subsection 2.2 will further examine the processes of marketisation and provide the general framework for economisation of environmental matters. Secondly, subsection 2.3 will analyse the initiation of the EU ETS. This subsection should clarify the underlying reasons for the economised approach of EU policy towards the majority of the EU's greenhouse gas emissions. Subsequently, subsection 2.4 will evaluate the initial design and the development of the EU ETS over the years. Finally, the concluding remarks of subsection 2.5 will summarise the findings of the Chapter.

2.2 Marketisation

In modern-day society, markets seem to be ubiquitous. In general, almost all markets require some form of organised collective action (Frankel, Ossandón and Pallesen 2019). However, as some markets or market mechanisms are purposely introduced to solve collective problems, they can even simultaneously function as policy instruments (Lascoumes and Le Gales 2007). Frankel, Ossandón and Palles (2019) call these specific markets: 'markets for collective concerns'. In practice, a whole variety of 'collective concerns' are being targeted by such markets or market-based mechanisms: wholesale electricity markets, capacity markets connected to electricity markets, school allocation systems, healthcare systems, et cetera (see, e.g.: Breslau (2013); Hitzig (2020) Rilinger (2023)). The establishment of these markets for collective concerns follows the process of marketisation which is a modality of economisation (Çaliskan and Callon 2010). Drawing upon the relevant concepts and findings of the study of markets within economic sociology this subsection will theoretically analyse the marketisation of climate policy.

2.2.1 Modality of economisation

As mentioned before, marketisation should be considered as only one of many modalities of economisation. The term 'economisation' was coined by Callon (1998) within the context of research on the formative effects of economic theory on markets. According to this performativity literature, economic reality is shaped by the application of economic theory in practice. In other words, the economy is formed by economics. This approach is influential in the relevant literature on the study of markets, and forms the theoretical background for Çaliskan and Callon's (2009;

2010) introduction to the notion of 'economisation'. The introduced processes of economisation entail bringing 'the economic' into being. In order to comprehend these processes, understanding of the qualification of activities, institutions or behaviour as 'economic' is necessary.

According to Çaliskan and Callon (2009), economics itself is vital in the reasoning of what can be qualified as economic. They argue that 'it is impossible to study the economy in the absence of the theories that discuss them' (Çaliskan and Callon, 2009, p. 377). Therefore, economic theories are considered to be one of the key agents within the process of economisation. Additionally, technical and institutional arrangements that enable individuals to engage in economic activities are also identified as key agents. Pursuant to economic sociology literature, the authors argue that these 'socio-cognitive prostheses' point at the importance of the institutional environment in which the economy is embedded. Finally, building upon anthropology, the authors emphasise the role of materiality in economic valuation within the economisation process.

Further empirical research by Çaliskan and Callon (2010) focuses on the establishment of markets in order to narrow down the broad scope of the processes of economisation. As a particular form of economisation, marketisation is understood as the processes of markets, being socio-technical arrangements, that allow to qualify unqualified things as calculable goods (Frankel, Ossandón and Pallesen 2019). According to Çaliskan and Callon (2010), the social-technical arrangement of a market has three characteristics: (1) it organises the conception, production and circulation of goods, while enabling transfers of property rights in exchange for monetary compensation; (2) it is an array of elements, such as: regulation, scientific knowledge, and logistical infrastructures; (3) it creates a venue for political struggles regarding the design of market mechanisms. Against this background, the study of marketisation involves the description, analysis and comprehension of the constitution, form and dynamics of a market as a socio-technical arrangement.

The earlier mentioned wide variety of markets can be explained by the diversity of the processes of marketisation (Çaliskan and Callon 2010). In theory, there are innumerable different ways towards the establishment of a market. While introducing the notion of marketisation, Çaliskan and Callon (2010) identify five market elements that determine the process of marketisation, and, eventually, frame markets. Analysis of these five market elements should enhance understanding of the process of marketisation in specific cases. Firstly, Çaliskan and Callon (2010) refer to 'pacifying goods'; goods should be framed in order to enable exchange of such goods on a market. This involves the transformation of certain entities into passive goods. In other words, commodities need to be created to establish a market (Chiapello and Engels 2021). Hence, the 'thing' to be exchanged shall be detached from its context. Subsequently, the thing should be framed with a

view to convert unqualified things to calculable qualified goods (Frankel, Ossandón and Pallesen 2019). For instance, the combination of activities that are involved in the provision of a service, which is intangible in nature, needs to be objectified in order to transform into a 'thing' that can be valued economically. Secondly, within the process of marketisation, agencies that are able to value those goods need to be involved. The framing of these market agents is decisive for the eventual shape of markets and the valuation of goods within those markets. These entities can vary from trade unions to individual consumers, and from economists to lawyers. Thirdly, market encounters between goods to be valued and agents capable of valuing are essential for the valuation to take place. Naturally, these transactions and interactions within the market also define the shape of markets. Fourthly, price-setting as continuation of the valuation process is a defining element of the market. The calculative valuation of goods leads to the formation of prices. Consequently, theories behind the determination of prices can be connected to the shape and dynamics of the market. Finally, as the fifth market element, market design, implementation and maintenance are defining for the socio-technical arrangement of a market. This element is strongly connected to performativity literature since the design or modelling of the market by academic economists is performative to the structure and dynamics of markets in practice.

In that context, it should be emphasised that markets cannot be regarded as static entities (Callon 2009). Instead, markets are mostly formed, appraised and refined by processes of economic experimentation. Although based on economic theory, uncertainty and agnosticism persist in the design and maintenance of markets. Through the experimental processes of trial and error, markets are framed as unexpected issues arise and market mechanisms are adjusted to provide solutions. Subsequently, Callon (2009) convincingly characterises markets as reflexively designed devices and on-going experiments. In the case of carbon trading, the experimental nature of designed markets can easily be identified (see, e.g.: Callon (2009); MacKenzie (2009)). The construction of carbon markets serves as an intelligible example of the processes of marketisation.

2.2.2 Carbon markets

Also, within the realm of environmental policy, market mechanisms, functioning as policy instruments, are purposely introduced to solve the collective problem of global warming. The main objective of these market-based policy instruments is to mitigate climate change and protect the environment. In this context, carbon markets are constructed to enable emissions trading. The concept of emissions trading finds its origin in the work of Coase (1960) on the problem of social

cost, and, was further developed by Dales (1968). Over the years, the academic idea has come of age and now forms the base of many carbon markets worldwide (Tietenberg 2010). Coase (1960) put forward the idea of putting property rights on externalities of economic activities, and aimed to legitimise a market solution for environmental problems. The concept of cap-and-trade markets was developed by Dales in 1968, and introduced the notion of a public authority that caps environmental damage caused by economic actors without prescribing the means for mitigation. Within this context, the capped quantity of emissions can either be auctioned or freely allocated to emitters in the form of allowances. Moreover, for the first time, emissions, previously only regarded as an externality, were regarded as calculable qualified goods, which could be subject to exchange on a constructed market. According to Callon (2009, 538), 'carbon markets would have been literally unthinkable' without Dales' (1968) contribution to economic theory. The author developed a pathway for the processes of marketisation of environmental matters.

As previously noted, environmental damage needs to be brought within the realm of economic calculations to establish some form of a carbon market. This requirement corresponds to the first market element as identified by Çaliskan and Callon (2010). In the case of carbon markets which aim to mitigate climate change, greenhouse gas emissions need to be made commensurable (MacKenzie 2009). In the context of more general market-based solutions for environmental damage, Chiapello and Engels (2021) refer to 'environmental intangibles' which are constructed through commodification of environmental impacts. Such an environmental intangible can be an allowance or permit for a unit of environmental destruction. This should be considered as an intangible asset since it is not a financial nor a tangible asset. Notably, not greenhouse gas emissions themselves, but, indeed, the right to emit greenhouse gasses is commodified. Consequently, as required for pacifying goods, there is a certain form of detachment from its context (Çaliskan and Callon 2010).

Since the permits within a cap-and-trade market are issued top-down by a public authority, public policy and regulation play a central role in the process of commensuration (Ehrenstein and Neyland 2021). As a part of the process of marketisation, the emission allowances must be brought into being (MacKenzie 2009). This involves, among others, the legal and technical definition of the emission allowances. In order to be transferable and tradeable, the means of measurement, accounting practices and documentation need to be standardised. As MacKenzie (2009) puts it: things should be made the same. For instance, different greenhouse gases that cause global warming need to be made comparable. Technical measurement devices and accounting standards are used to make these different gases the same in terms of their impact to

the climate. Besides, the rights to emit standardised units of impact to the climate should also be made comparable and economically valuable within the market. Subsequently, the other four elements of the processes of marketisation, as established by Çaliskan and Callon (2010), shape carbon markets. Accordingly, the emergence of the EU carbon market involved the framing of goods, agencies and market encounters, the process of price-setting, and the design of the market.

2.3 The origins of the EU ETS

The introduction of this Chapter briefly covered the EU ETS as a market-based policy instrument aiming to mitigate climate change. Being the first ever international ETS, the EU ETS' introduction should be considered as a 'grand policy experiment' (Skjærseth and Wettestad 2009). With the launch of the EU ETS in 2005, the EU became a global pioneer in carbon markets (Sato et al. 2022). Having said this, initially, the EU's stance towards emission trading in greenhouse gases was rather reluctant (Skjærseth and Wettestad 2009). This subsection will thoroughly analyse the initiation of the EU ETS.

In 1986, the need to combat climate change was first acknowledged by the European Parliament (European Parliament 1986). Subsequently, the other EU institutions, the European Commission (Commission) and the European Council (Council), reemphasised this message and underlined the global nature of the problem (European Commission 1988; European Council 1989). In the same timeframe, the EU adopted the 1986 Single European Act, which was predominantly aimed at completing the European Single Market. However, additionally, the Single European Act also declared that environmental policy was one of the key tasks of the EU (Knill and Liefferink 2021). The 'environment' title was added to the TFEU,¹ which created an explicit (individual) legal basis for environmental policy. Beforehand, environmental policy and regulation was predominantly aimed at harmonising legislation within the EU in order to improve the functioning of the European Common Market (Knill and Liefferink 2021).

Although the goal of combatting climate change was only officially added to Article 191(1) TFEU by the 2009 Lisbon Treaty, EU climate policy gained traction from the early 1990s onwards. In line with the earlier acknowledgements by the Commission and Council regarding the need for climate

¹ Currently Articles 191-193 TFEU.

action at global level, EU climate policy was, at that time, mainly focused at international policy developments (European Commission 1988; European Council 1989). This resulted in the EU's active support for a global response to global warming through the UNFCCC framework, which was established in 1992. However, the EU did not manage to accomplish clear international mitigation commitments in the first few years of the UNFCCC. At the EU-level, this timeframe can be categorised as a period of disagreement regarding the need for and content of internal EU climate policy (Oberthür and Pallemmaerts 2010).

Efforts to implement comprehensive and effective EU-wide climate change legislation failed. Most prominently, the EU did not succeed in the attempt to adopt a Commission proposal for an EU-wide carbon tax (European Commission 1992). The proposal for a Directive introducing a tax on CO₂ emissions and energy did not receive unanimous support from the Member States in the European Council, which was needed because of the fiscal nature of the policy instrument. Article 130s of the EC Treaty, at that time, required unanimous support for fiscal measures within the European Council. Despite strong support from the Commission, an UK-led minority blocked the proposal for the EU-wide carbon tax (Oberthür and Pallemmaerts 2010). Besides, influential lobbying of the industry sector, that opposed a carbon tax, undermined support in the European Council (Braun 2009). Similarly, an amended proposal by the Commission (European Commission 1995) failed to reach unanimity in the European Council due to 'too demanding' tax rates (Braun 2009). It soon became clear that the requirement of unanimity in the European Council concerning fiscal matters made the adoption of a comprehensive and effective EU-wide carbon tax practically impossible.

After the adoption of the UNFCCC Kyoto Protocol in 1997, which, as desired by the EU, created binding emissions reduction commitments for industrialised countries, the EU's legislative approach altered. Despite earlier efforts by international organisations, such as the Organisation for Economic Cooperation and Development (OECD) and United Nations Conference on Trade and Development (UNCTAD), promoting greenhouse gas emissions trading in the early 1990s, the EU remained sceptical towards this policy instrument until the adoption of the Kyoto Protocol (Paterson 2012). Under the international climate regime of the Kyoto Protocol, the EU was obliged to fulfil its commitment of reducing greenhouse gas emissions by 8 per cent between 2008 and 2012 compared to 1990 levels. The perceived pressure to comply with this international commitment, further intensified the European Commission's aim to adopt a more effective and encompassing EU-wide climate policy (Skjærseth and Wetttestad 2009). This interaction between

the policy-making at international and European level shows the interrelatedness of EU and international climate policy (Oberthür and Pallemmaerts 2010).

Although the introduction of the EU ETS is connected to the Kyoto Protocol (Verde and Borhgesi 2022), the Protocol itself did not prescribe any of such specific measures to the EU. Instead, it was the European Commission itself that took initiative in developing a specific proposal for greenhouse gas emissions trading within the EU (Skjærseth and Wettestad 2009). More specifically, a change of personnel at the Directorate-General Environment of the European Commission was one of the decisive reasons for the sudden policy u-turn (Patterson 2012). In 1998, the climate change unit staff was replaced by a team led by economist Jos Delbeke. The new team immediately recognised that a carbon tax could not be adopted due to the requirement of unanimity in the European Council, and realised that other EU-wide policy instruments should be considered (Skjærseth and Wettestad 2009). This conclusion was emphasised in the 1999 Commission Communication calling for a 'sustained policy response' to the issue of climate change in light of the implementation of the Kyoto Protocol (European Commission 1999).

Within this context, the idea of emissions trading, as a market-based policy instrument, resonated well in Delbeke's team dominated by economists. Already in 1998, the idea of possibly implementing an EU ETS in the long-term was communicated by the European Commission (European Commission 1998). Perceived as the most cost-efficient policy approach in reaching CO₂ emissions reduction, the European Commission favoured the development of an economised climate policy in order to comply with the EU's international commitments (Braun 2009). Additionally, under EU law, an EU ETS was considered to be an environmental policy, and, thus, merely required a qualified majority of Member States in the European Council (Sato et al. 2022). At the same time, only few Member States supported EU-wide emissions trading from the beginning (Skjærseth and Wettestad 2009). Nevertheless, a persistent European Commission carefully managed to gain support among stakeholders.

Although EU policy makers were keen on developing an EU ETS, there was none to little experience concerning emissions trading in practice. In order to gain knowledge about emissions trading, US-based external consultants were commissioned by the European Commission to report on design issues of carbon markets (Skjærseth and Wettestad 2009). Partly based on these findings, the European Commission published the 2000 Green Paper on greenhouse gas emissions trading within the EU (European Commission 2000). The successful building-up of economic and technical knowledge on emissions trading made the European Commission the most dominant actor with the European policy network on emissions trading as described by Braun

(2009). The European Commission advocated a harmonised EU-wide approach to emissions trading by means of a cap-and-trade system, and emphasised the economic case for a centralised EU ETS. The attached economic analysis pointed at the cost-effectiveness of the market-based policy instrument, and highlighted the savings for the sectors that would be targeted by the ETS. These arguments convinced the EU industry, that had, before, always lobbied against an EU-wide carbon tax. In fact, the industry strongly valued the economic opportunity for 'shrinking emitters' to sell their surplus emission allowances on the EU carbon market (Braun 2009). Meanwhile, the decreasing cap of emissions in the cap-and-trade system, as envisaged by the European Commission, was regarded to be effective in reducing greenhouse gas emissions by environmental nongovernmental organisations (Skjærseth and Wettestad 2009). Finally, Member State governments were charmed by both qualities of the envisaged EU ETS. Additionally, pursuant to the principle of subsidiarity, the Member States were eventually granted the authority to allocate certain allowances for free at national level (Sato et al. 2022). The support gained among these affected actors created a powerful coalition in favour of implementing an EU ETS. In October 2001, the European Commission published the proposal for the EU ETS Directive (European Commission 2001). Without any major obstacles in the trilogue negotiations, the European Council formally adopted the EU ETS Directive in July 2003 with the required qualified majority.

2.4 The design and development of the EU ETS

Although the European Commission should be regarded as the main driving force in initiating the EU ETS, the initial design of the EU carbon market was predominantly shaped by the preferences of the EU Member States (Skjærseth and Wettestad 2009). Eventually, contrary to the original plans by the European Commission, the adopted EU ETS had a decentralised approach to several aspects of the system. However, as the EU ETS developed over the years, the design evolved towards a more centralised and sophisticated policy instrument (Sato et al. 2022). While analysing the design of the EU carbon market, Çaliskan and Callon's (2010) five market elements that frame markets provide the relevant theoretical background. All five market elements as discussed above, can be recognised in the analysis of the EU carbon market, which is facilitated by the EU ETS Directive. Indeed, the process of marketisation of the cornerstone of EU climate policy becomes apparent in this analysis. This subsection of Chapter 2 will, first, cover the defining features of the

EU ETS' initial market design as a starting point of the overall analysis. Secondly, the development of the EU ETS over the years will be evaluated.

2.4.1 Initial market design

With its launch in 2005, the EU ETS established the world's first carbon market. The initial design of the market formed the foundation for phase one (2005-2007) of the EU ETS, which was constructed to function as a pilot program (Sato et al. 2022). The EU opted for a learning-by-doing approach, which was instrumental in creating the necessary infrastructure for a well-functioning market-based policy instrument in the sequential phases. This approach corresponds with Callon's (2009) observation that designed markets are on-going experiments and reflexive in nature. Having said this, the initial design of the EU ETS did already contain the defining features of the EU carbon market.

As highlighted before, a cap-and-trade system forms the basis of greenhouse gas emissions trading within the structure of the EU ETS. The initial decentralised design put a cap on the overall amount of allowances for greenhouse gas emissions in sectors covered by the EU ETS per Member State. By creating a finite quantity of emissions allowances, scarcity is present. The allowance cap should decrease year-by-year in order to correspond with the climate mitigation goals set by the EU and the international climate regime. Each Member State had to submit a National Allocation Plan (NAP) to the European Commission that aligned with those objectives. The determination of the decreasing rate of the cap is of vital importance for the dynamics within the carbon market and politically sensitive (Lane and Newell 2016). As part of the market design, the determination of the height of the cap is one of relevant factors that influences the price-setting within the carbon market. Accordingly, the Member States, that were responsible for setting the emissions allowances cap, had a profound influence on the valuation process of greenhouse gas emissions in the EU.

The goods that are valued within the EU carbon market are allowances to emit greenhouse gasses. Within the context of 'making things the same', the EU chose to construct calculable European Union Allowances (EUAs) which create the right to emit an amount of registered greenhouse gasses equal to one ton of CO₂. The EUAs are constructed through the commodification of the environmental impact of the emission of those greenhouse gasses, and should, thus, be referred to as environmental intangibles (Chiapello and Engels 2021). Against

this background, the use of energy in the sectors that fall within the scope of the EU ETS Directive, are expressed in an equivalent of tons of CO₂ and commensurated in order to become tradable allowances within the EU carbon market (Ehrenstein and Neyland 2022). Accordingly, the technical measurement devices, means of accounting, reporting and accreditation standards are regulated at EU-level.²

However, before being economically valued by market encounters between valuing agencies within the market, EUAs are to be allocated to companies. Since the emissions allowances caps are set at sector-level, companies are targeted by the regulated maximum amount of EUAs. More specifically, the EU ETS Directive applies to the operation of 'installations' that exceed certain size thresholds based on greenhouse gas emissions, units of productions, and installed capacities within the relevant sectors. In other words, from 2005 onwards, operators of heavy energy-using and electricity-generating industrial installations in the EU were collectively bound by the overall cap on greenhouse gas emissions in their sectors.

In the pilot phase, all EUAs were freely allocated, or grandfathered, to the operators within the scope of the Directive proportionate to historical production levels. Every operator has the right to use the EUAs, but can also sell its surplus EUAs to other operating companies that are in need of excess EUAs or to 'regular' investors on the EU carbon market. This is the moment where market encounters take place between the calculating market agencies, and where a price is put on EUAs. They are traded on decentralised secondary markets, on exchange and over the counter, where the price fluctuates based on supply and demand. The companies in need of excess EUAs on top of their own grandfathered allowances will only purchase EUAs on the market when those costs are lower than reducing their own emissions. At the same time, other companies will aim to reduce their emissions in order to be able to sell their surplus EUAs on the EU carbon market. Following this reasoning, this mechanism should enable greenhouse gas emissions reduction at the lowest total cost possible (Sato et al. 2022). As all five market elements that format a market can be recognised in the analysis of the initial market design, it becomes clear that the EU ETS is an intelligible example of the processes of marketisation.

² See, Commission Implementing Regulation (EU) 2018/2066, and Commission Implementing Regulation (EU) 2018/2067.

2.4.2 Development

Operational since its pilot phase started in 2005, the EU ETS is an evolving piece of legislation. As planned, the EU ETS Directive has been revised several times in between its sequential phases. Currently, the EU ETS finds itself in its fourth phase, which spans 2021 to 2030. Given the experimental character of the market-based policy instrument, several adjustments have intermediately been made to the EU ETS, leading to changing dynamics within the EU carbon market. Through its sequential phases, the system has continuously developed to address emerging challenges within the carbon market, and aligned with more stringent mitigations goals, while underscoring its key role in the EU's climate policy.

Although phase one did establish a modest reduction of EU greenhouse gas emissions (Ellerman and Buchner 2008), the EU ETS was heavily scrutinised as it faced many challenges in practice. For instance, as the emissions caps were set at the national level without stringent control at EU-level, there was an over-allocation of EUAs which led to a significant drop in carbon prices (Sato et al. 2022). Naturally, these issues did not come as a surprise since the EU ETS was a grand policy experiment and the first ever of its kind (Skjærseth and Wettestad 2009). Moreover, the problems that occurred due to the initial design were contained to the three-year period of the pilot phase. As lessons were learned from the testing of the framework for emissions trading in phase one, the design of phase two provided the opportunity to incorporate those lessons.

Phase two, spanning 2008 to 2012, marked a period of increased ambition and expansion of the EU ETS. The revision of the EU ETS Directive widened the scope of sectors and included more greenhouse gasses. Moreover, the EU ETS got linked with other ETSs from the European Economic Area (EEA), those of Iceland, Norway and Liechtenstein. Furthermore, the phase ran simultaneously with the EU's Kyoto Protocol first commitment period, which demanded an eight per cent greenhouse gas emissions reduction compared to 1990 levels. Since the Member States had also committed themselves to the EU's mitigation objectives, the European Commission had the legal competence to reject the newly drafted NAPs if they were inconsistent with the EU's international commitments (Sato et al. 2022). In first instance, the European Commission considered all NAPs, apart from the UK's, to be too lenient, and rejected them. Eventually, more stringent NAPs were approved by the European Commission. Due to the international commitments of the EU and the European Commission's own strict stance, the influence of the centralised institution at EU-level increased.

Subsequently, the third phase (2013-2020) significantly reformed the EU ETS to enhance its effectiveness. A single centralised EU-wide cap replaced the previous national caps, featuring a linear yearly reduction factor of total EUAs. This centralised approach, granting the European Commission even more legal competences, was at the time of initiation of the EU ETS purposely avoided to gain support from the Member States. At this later stage, the political frustration concerning approval of the NAPs during phase two provided the momentum to centralise the EUAs' allocation process (Sato et al. 2022). Consequently, the European Commission aimed to seize the opportunity to further revise the allocation process. Although auctioning of EUAs was already allowed up to five per cent of all allowances in the pilot phase, almost all allowances were freely allocated in phase one (Betz, Eichhammer and Schleich 2004). Despite the observed over-allocation of allowance, in phase two, grandfathering remained the default setting as well (Ellerman, Marcantonini and Zaklan 2016). The European Commission's proposal to require 100 per cent auctioning of all EUAs in order to mitigate over-allocation and increase the EU ETS' effectivity, however, failed. As described by Wettestad (2009) the energy-intensive industry sector woke up, and organised a powerful and successful lobby against this proposal. The EU's fear of carbon leakage due to relocation of energy-intensive industry led to the maintenance of free allocation in this sector. Still, in other sectors auctioning became the default method for allocation. This development showed that each ambitious envisioned reform also creates opportunities to undermine those reforms (Sato et al. 2022).

Phase 4, covering 2021 to 2030, aligns with the further intensified EU's climate change mitigation ambitions of the European Green Deal and European Climate Law. The revision of the EU ETS has established a further tightening of the emission allowances cap to a 62 per cent reduction compared to 2005 levels. Additionally, separate from the original EU ETS, the complementary EU ETS 2 has been created as part of the recent 2023 revision of the EU ETS Directive. The EU ETS 2 will cover additional sectors in smaller industries from 2027 onwards. Moreover, as plans were made to gradually phase out the free allocation of EUAs, a different approach to preventing carbon leakage was introduced by the CBAM Regulation proposal of the European Commission (European Commission 2021). The, in the meantime, adopted Regulation is currently in its transitional phase (2023-2025), and will fully apply from 2026 onwards. The CBAM, which is connected to the EU ETS, should ensure that a 'fair' price is paid for carbon emitted during the production of energy-intensive goods that are imported to the EU. When exporters already pay a price for the emitted carbon in their domestic jurisdiction, importers will be compensated for that. At the EU-border, CBAM certificates will have to be purchased by importers. The price of these certificates is connected to the weekly average auction price of EUAs, and reduced by the carbon

price paid in foreign jurisdictions. Through this Regulation, the EU also aims to encourage the greening of industrial production in third-countries.

2.5 Concluding remarks

Marketisation refers to the formation and operation of markets through socio-technical arrangements that qualify unqualified goods as calculable entities. Within the theoretical framework of Çaliskan and Callon (2009; 2010), it is argued that economic theories play a vital role in shaping economic realities. This also applies to the formation of markets which is a modality of economisation. Through on-going experimentation in the processes of marketisation, the shape of markets is defined by five key market elements: pacifying goods, valuing agencies, market encounters, price-setting, and market design. The reflexive and experimental nature of markets is exemplified by the process of marketisation of EU climate policy.

Initially, the EU was reluctant towards the market-based policy approach of greenhouse gas emissions trading. However, failed attempts at an EU-wide carbon tax led to the initiation of the EU ETS as a more feasible encompassing EU-wide climate policy. This development was, *inter alia*, motivated by the pressure of the EU's commitment to the international climate regime of the Kyoto protocol. Furthermore, the by economists dominated climate change unit at the European Commission strongly favoured the economic idea of emissions trading as a policy instrument to mitigate climate change. The European Commission effectively managed to gain powerful support through emphasising the economic benefits of an EU ETS and taking into account the diversity of interests of stakeholders. Among others, it used decentralised elements in the initial market design to convince Member States for approval of the Directive. Eventually, due to failures within the EU carbon market these elements were eventually centralised to the EU-level. This corresponds to Rilinger's (2023) conclusion that uniform requirements, which are necessary within a constructed market, cannot be created within a decentralised system.

Launched in 2005, the EU ETS established the first global carbon market. The cap-and-trade system lays the foundation for the EU carbon market. EUAs are allocated either through grandfathering or auctioning, and can be freely traded on the market since the rights to emit are successfully commodified. Over the years, the EU ETS has demonstrated adaptability and increasing ambition in its efforts to mitigate climate change. Recent empirical evidence suggests that the EU ETS has been successful in effectuating greenhouse gas emissions reduction without

any substantial negative economic effects (Colmer et al. 2024). Besides, it is apparent that the evolving market-based policy instrument remains an ongoing experiment. While certain challenges within the EU carbon market are addressed, others emerge. Moreover, the struggle for power regarding the design and maintenance of the EU carbon market is underscored as the means of allocation, overall cap level, and carbon leakage prevention measures must be determined by the EU's policy makers. Hence, the process of marketisation of the cornerstone EU climate policy also creates a venue for political struggles among the designers of the market.

3. Unilateral regulatory globalisation

3.1 Introduction

The ambition of the European Commission to be a global standard setter in climate policy was explicitly stated by European Commission President Ursula Von der Leyen in 2019 (European Commission 2019). Along with the strengthening of the EU's own climate policy, the European Commission aims to bring global norms in line with the objective of limiting global warming to acceptable levels. From a legal point of view, it is, in principle, not possible to unilaterally set binding norms outside a legislator's jurisdiction. To set legally binding norms at international or global level, treaties must be negotiated with other jurisdictions in a multilateral setting. At best, domestic legislation can be directly applicable outside a jurisdiction through the concept of 'territorial extension', which is triggered by a domestic territorial connection to foreign activities (Scott 2014). However, the global reach of territorial extension is, thus, always limited to the existence of some sort of a territorial connection to conduct outside the domestic jurisdiction (Scott 2019).

As Eckert (2021) rightfully recognises, the European Commission essentially aims to mobilise the EU's regulatory capacity and market power in order to unilaterally set global norms concerning climate policy. This aspired externalisation of EU legislation should take place through the process of 'unilateral regulatory globalisation'. Bradford (2012, p. 3) has provided an accurate definition of this process which is widely accepted in literature: 'unilateral regulatory globalization occurs when a single state is able to externalize its laws and regulations outside its borders through market mechanisms, resulting in the globalization of standards'. Put shortly, the attractiveness of the access to the jurisdiction's internal market leads to the externalisation of the internal market's legislation to other markets in the world, harmonising global norms. By regulating its own internal market, the relevant legislator, thus, unilaterally exercises global regulatory power. The unilateral nature of the legislative activities, that enable the process of regulatory globalisation, distinguishes the concept from political globalisation of regulatory norms, which is based on (multilateral) treaty negotiations between legislative authorities (Bradford 2012).

The relevance of this form of unilateralism should not be underestimated. One can argue that most 'traditional' means of global influence have decreased in power. For instance, the World Trade Organization (WTO) round of negotiations has been in a deadlock for more than two decades

now. Additionally, the conditional loans of the World Bank and International Monetary Fund (IMF) are less effective since China's financing initiatives are undermining their success (Kern, Reinsberg and Shea 2024). Some legal scholars also point at the diminishing ability of multilateral cooperation to effectively address global challenges, such as climate change, through the means of traditional international law-making (see, e.g.: Krisch (2014); Pauwelyn, Wessel and Wouters (2014)). This development can, for instance, be recognised in the legal character of the Paris Agreement (Bodansky 2016; Held and Roger 2018). The treaty predominantly establishes obligations of conduct, instead of obligations of result, which merely create procedural obligations without strong enforcement mechanisms. For these reasons, unilateral regulatory power is often considered to be one of the few mechanisms that is still able to globalise legal standards (Bradford 2020). Mobilising regulatory capacity and market power seems to be a durable tool to unilaterally influence global norms, and pursue the protection of global public goods.

This Chapter will further clarify the mechanisms behind the process of unilateral regulatory globalisation, and examine the overall global regulatory power of the EU. At first, subsection 3.2 will analyse the theoretical framework for market-driven global regulatory influence, and examine the determinants of the applicability of the process of unilateral regulatory globalisation. The subsequent subsection will evaluate the EU's overall global regulatory power and discuss the motives for an external regulatory agenda. At the end, subsection 3.4 will conclude the Chapter by summarising its findings.

3.2 Market-driven global regulatory influence

There are several different mechanisms for exercising influence on global norms. The earlier noted distinction between political globalisation of regulatory norms and unilateral regulatory globalisation can, more or less, be captured by the comparison between treaty-driven harmonisation and market-driven harmonisation of norms. Treaty-driven harmonisation is per definition based on cooperative mechanisms in bilateral or multilateral negotiations, or through participation in international organisations. Finding consensus among different regulatory authorities on detailed legal texts is the central point of focus within these processes. As a result, elaborate and long-lasting political efforts are required to successfully establish some degree of global regulatory convergence. Alternatively, market-driven harmonisation is based on unilateral regulatory capacity and the power of markets. The harmonising effects of unilateral regulatory action rely on economic actors' self-interest to comply with harmonised standards. Moreover,

fewer active efforts by regulatory authorities are needed in comparison to treaty-driven harmonisation. If the conditions allow for market-based harmonisation of global standards, it is, thus, considered to be a relatively efficient mechanism for global regulatory influence (Bradford 2020).

3.2.1 Regulatory races

Global regulatory harmonisation can be explained through the underlying theories of regulatory competition and convergence. These theories have emerged in scholarly debate as trade liberalisation occurred and economies became interdependent on a global level. For a long time, critics of globalisation were dominant in explaining the relationship between globalisation and regulatory standards (Vogel and Kagan 2004). According to these critics, globalisation forces regulatory authorities to lower their regulatory standards in order to remain an attractive economy for companies and investors within the liberalised global economy. In other words, jurisdictions will need to compete with each other by offering a relatively more favourable regulatory business environment. Following this reasoning, this form of regulatory competition would lead to a regulatory race to the bottom (Murphy 2006).

The notion of a regulatory race to the bottom was originally derived from the competition between federal states in the United States (US) concerning corporate law. In literature, this process of regulatory competition is also referred to as the 'Delaware Effect'. As US companies can be established anywhere within the US, irrespective of the location of their economic activities, companies aim to find the federal state with the most favourable corporate laws. Within this context, the federal state of Delaware was perceived to be the most attractive place to establish a company in the US because of its relatively relax chartering regulation (Coffee 1987). As a result, Delaware's corporate tax revenue significantly increased. In order to not miss out on corporate tax revenues, other federal states were forced to lower their own chartering standards. As Vogel and Kagan (2004, p. 2) kindly put it: 'in effect, Delaware's floor became a ceiling for other states'. To put it differently, regulatory competition led to regulatory convergence at low standards of regulation.

Among the (influential) critics of globalisation, the hypothesis emerged that the regulatory race to the bottom, referred to as the Delaware Effect, would, besides this federal context, also occur among jurisdictions in an international context. However, the majority of the assumptions behind

this claim of an international race to the bottom have been successfully challenged (Vogel and Kagan 2004; Holzinger and Sommerer 2011). Instead, based on empirical evidence, a more differentiated image arose. More specifically, empirical research suggests that there is no 'general' regulatory race to the bottom in an international context. Indeed, in some areas, empirical evidence supports the presence of a race to the top (Vogel and Kagan 2004; Holzinger and Sommerer 2011). This reinforces Vogel's pioneering work on the 'California Effect' (Vogel 1997; 2000).

The California Effect entails the opposite process of regulatory convergence of the Delaware Effect. Vogel's (1997; 2000) model for regulatory harmonisation is based on the presence of a large and strictly regulated market within US federal system. In practice, the Californian market is a large market that has a preference for strict environmental and consumer legislation. Companies that aim to export their products to the Californian market must meet these strict regulatory requirements to get access to the large market. Since companies profit from uniform standardised production, it is beneficial for them to apply these strict standards to their complete production because of scale economies. As these companies align their standardised business activities with strict Californian environmental and consumer product regulation, it becomes advantageous for them to advocate for regulatory adjustment in domestic jurisdictions. The lobbying efforts of the companies aim to effectuate harmonisation of legislation based on the Californian regulatory standards. Eventually, the Californian legislator is effectively able to set strict environmental and consumer product regulation for all other federal states in the US since they opt to adapt their own federal legislation to strict Californian norms (Vogel 1997; 2000). This author was the first to comprehensively demonstrate and theoretically substantiate a regulatory race to the top, paving the way for more literature on the upwards direction of regulatory convergence.

As Vogel (1997; 2000) already made clear, regulatory convergence in upwards direction strongly depends on the 'gravitational effects' of a large internal market on producers (Drezner 2005). Drezner (2005, p. 843) notes that 'the larger the economy, the stronger the pull for producers to secure and exploit market access'. Unilateral regulatory globalisation is another specific example of market-driven regulatory harmonisation. The process distinguishes itself from the California Effect through its global nature. Instead of the federal context in which the California Effect takes place, unilateral regulatory globalisation leads to harmonisation of regulatory standards within a (near) global context. Moreover, the by Bradford (2012) introduced process of unilateral regulatory globalisation emphasises the importance of 'de facto' regulatory convergence, instead of primarily focusing on formal regulatory adjustments which constitute 'de jure' regulatory convergence. The

process of de facto regulatory convergence entails the adjustment of companies' global business conduct incentivised by the strict regulation of a jurisdiction's large internal market, without a formal regulatory response by other jurisdictions. The market-based incentives for companies to align their standardised global products and production processes with the relevant market regulation effectively lead to global harmonisation of those externalised strict norms. Subsequently, de jure regulatory convergence at global level may occur since those global companies aim to establish a regulatory level playing field within domestic markets. Yet, it should be noted that formal regulatory responses by other jurisdictions are not necessary for the process unilateral regulatory globalisation to take place. Hence, Bradford (2020) underscores that unilateral regulatory globalisation essentially covers the ability of a single regulatory authority to globally override other jurisdictions' regulatory preferences, rather than winning a regulatory race to the top.

3.2.2 Conditions for unilateral regulatory globalisation

The previous discussion of market-based regulatory harmonisation highlighted the importance of size of the internal market for the externalisation of regulatory standards to take place. Drezner (2005) even uses a jurisdiction's market size as a proxy for a jurisdiction's ability to initiate regulatory convergence. Although a large internal market is a prerequisite for the process of unilateral regulatory globalisation there are more determinants for a jurisdiction's ability to globally externalise its legislation. This subsection will elucidate the five generic conditions for unilateral regulatory globalisation that were identified by Bradford (2012; 2020): (1) a large internal market, (2) adequate regulatory capacity, (3) strict regulatory standards, (4) regulation of inelastic targets, and (5) non-divisible production. Since all conditions must be met to realise the process of unilateral regulatory globalisation, these requirements are considered to be cumulative. However, the relative importance of each condition in relation to each other may vary by policy area (Bradford 2020).

Large internal market

The relative size of an internal market is of profound importance in the externalisation of regulatory standards (Damro 2012). As Drezner (2005) describes, within a globalised economy, there is a correlation between power and the relative size of a jurisdiction's internal market. The relative size of an internal market is based on the number of consumers in combination with their affluence

within an internal market compared to other markets. Consequently, the relative size of the market determines the benefits for companies of enabling market access. In other words, the larger the market, the stronger the gravitational effects on producers, pulling them to the market (Drezner 2005). In the context of unilateral regulatory globalisation, the benefits of market access must outweigh the costs of aligning with the internal market's strict regulatory standards. In economic terms, the adjustment costs of complying with the jurisdiction's legislation must be less than the opportunity costs of foregoing access to the jurisdiction's internal market.

Adequate regulatory capacity

Additionally, a regulatory authority with a large internal market must have the ability to mobilise its market power through effective legislative measures. This ability depends on the domestic regulatory capacity of the regulatory authority (Bach and Newman 2007). Subsequently, one should consider two separate elements of regulatory capacity: (1) the capability to promulgate coherent legislation, and (2) the capability to effectively enforce legislation (Bradford 2020). The former element is connected to the technical knowledge in the relevant policy areas and legal expertise at the law-making departments. The latter element is closely associated with a jurisdiction's resources to realise strict enforcement procedures, and the (economic) capacity to deny market access to companies who are non-compliant with the internal market's regulatory standards. Noteworthy, a jurisdiction's regulatory capacity may vary by different policy area. Overall, it is apparent that, besides a large internal market, strong and sophisticated regulatory institutions are required.

Strict regulatory standards

According to Bradford (2012; 2020), previous requirement must be supplemented by the political will to set strict regulatory standards. This condition can also be recognised in the earlier description of the California Effect. Through compliance with the stringent environmental and consumer regulatory standards in California, producers were automatically compliant with more relaxed regulatory standards in other federal states. Consequently, it was possible to produce products in a single standardised way which decreased overall adjustment costs. Against this background, one must recognise that this condition does not necessarily require strict regulation in absolute terms. The regulatory standards must only be relatively more stringent compared to other jurisdictions. Still, generally, there needs to be a strong preference for strict regulation within the domestic political landscape.

Regulation of inelastic targets

Fourthly, strict domestic regulation can merely be externalised when the targets of regulation are inelastic. More specifically, this concerns the inability of regulatory targets to move to a different jurisdiction, with less stringent regulatory standards, while retaining access to the large internal market. Hence, these producers are considered to be non-responsive to regulatory changes (Bradford 2020). Alternatively, elastic targets are able to circumvent the stringent norms that apply within the internal market, by relocating their place of establishment.

Non-divisible production

Finally, the occurrence of unilateral regulatory globalisation depends on the decision of targeted companies to apply the strict standards to their business conduct worldwide. In that case, companies go beyond compliance with the legislation of the large internal market by also meeting the requirements when conducting business outside the relevant internal market (Scott 2019). Hence, it must be beneficial or unavoidable for companies to voluntarily adopt a global standard within their lines of production. Bradford (2012; 2020) introduces three different categories of non-divisibility that incentivise standardised global production as customised production is not feasible.

Firstly, technical non-divisibility is applicable when there are technological obstacles that problematise differentiated production of products for separate markets. Against this background, the most prominent example is the storage and processing of digital data by global corporations within the context of data protection regulation (Bradford 2020). Secondly, when technical obstacles do not persist, there may be economic reasons that make differentiated production processes unsustainable. According to Bradford (2020) this is the most common reason for non-divisibility since uniform production processes enable companies to benefit from scale economies. Often, it is rather costly to develop different products for different markets. Thirdly, legal non-divisibility refers to the impossibility for the relevant internal market's legislation not to apply to companies. For example, mergers of global companies must always comply with competition laws of a large internal market, irrespective of their place of establishment. Because of their activities within the internal market, merger control regulations cannot be circumvented.

Legal non-divisibility closely relates to the concept of territorial extension as introduced by Scott (2014; 2019). Bradford (2020) concludes that these concepts can coexist, and Scott (2019) argues that the concepts might amplify each other. Similarly, the different categories of non-divisibility can be applicable at the same time. Yet, only one category needs to be present for global

standardisation of corporate conduct. Consequently, other jurisdictions' norms will be overridden, and the process of unilateral regulatory globalisation is completed.

3.3 The Brussels effect

The unilateral influence on global norms is based on market-driven mechanisms. It is clear that only large market economies are able to externalise their internal regulatory norms because of their effects of scale. Based on this reasoning, Damro (2012) concluded that 'market power Europe' was able to effectively externalise its economic policies and regulations. However, without discrediting the importance of the size of an internal market, one should broaden its focus to understand the emergence of global regulatory powers. Mere market power does not suffice in globally externalising regulatory standards. The previous subsection established that global regulatory harmonisation may occur when a single jurisdiction has a large internal market, adequate regulatory capacity, and a preference for strict regulatory standards, that regulate inelastic targets with non-divisible production processes.

The determinants of global regulatory harmonisation lay the theoretical foundation for the recognition of the EU's ability to exercise unilateral global regulatory power. They also explain the fact that Bradford (2012; 2020), inspired by Vogel's (1997; 2000) California Effect, was, so far, only able to notice the existence of the Brussels Effect at global level instead of a 'Washington Effect' or 'Beijing Effect'. Besides the large EU internal market, containing a profound number of affluent consumers, the other four cumulative elements of global regulatory harmonisation are often present in many policy areas of the EU. This subsection will, first, break down the EU's overall global regulatory power based on the determinants of unilateral regulatory globalisation. Thereafter, in light of the European Commission ambition to set global norms (Von der Leyen 2019), the EU's motives for exercising global regulatory power will be analysed.

3.3.1 The EU's regulatory power

The EU's internal market consists the economies of all 27 EU-Member States plus those of the European Economic Area (Iceland, Liechtenstein and Norway). Access to this market means access to provide products for more than 440 million affluent EU citizens, which together account for 18 per cent of global GDP (European Commission 2023). Moreover, despite the fact that the

internal market is a composite of many national economies, there is a high level of economic integration within the EU internal market. In fact, recent research suggests that, from a regulatory perspective, the EU internal market is further economically integrated than the United States' domestic market (Parsons and Smith 2022). Given the size and level of integration of the market, global companies will highly value access to the EU internal market. The opportunity costs of forgoing business activities within the EU internal market are significant. This explains why companies tend to accept the typically high level of adjustment costs to comply with EU regulatory standards.

The EU institutions have developed a significant amount of regulatory expertise since the adoption of the 1986 Single European Act which set the agenda towards the completion of the EU internal market (Bach and Newman 2007). The process of economic integration in the continuing journey towards fully completing the internal market has been dominated by regulatory efforts of the EU institutions, which turned the EU into an 'extensive regulatory machine' (Bradford 2020). Bach and Newman (2007) emphasise the typically strong enforcement mechanisms and supervisory competences that are delegated to the European Commission or national supervisory authorities that allow for strict enforcement, and, if necessary, effective sanctioning measures. However, it must be noted that the EU's regulatory capacity varies per policy area. Only in those areas, where the EU has the legal competence to enact legislation, significant regulatory capacity has been developed. For instance, areas with little to none legal competences like taxation or healthcare lack extensive regulatory capacity and experience.

Besides the large EU internal market and overall extensive regulatory capacity, the EU has developed the preference to set stringent regulatory standards. Naturally, the presence of this preference does depend on the context of the specific policy area. Yet, overall, the EU tends to promulgate strict legislation. Kelemen (2011) refers to the distinct EU regulatory approach as 'Eurolegalism', which represents the EU's reliance on detailed regulation, comprehensive regulatory frameworks, and uniform application of EU law. Moreover, due to the preference of EU-citizens to mitigate safety, health and environmental risks of business conduct, there is a comparatively strong political mandate and will to lay down strict legislation (Kelemen and Vogel 2010). This tendency is, for example, reflected by the incorporation of the precautionary principle in the environmental title of the TFEU.

The last two conditions that determine whether it is possible for the EU to unilaterally globalise regulation are too context-specific to evaluate in general. The targets of regulation differ per policy area or even per specific legislative measure. Additionally, the divisibility of production processes

should be addressed on a case-to-case base. Nevertheless, what can be concluded, based on the previous analysis, is that the EU seems to meet the general preconditions to exercise global regulatory power. At the same time, one must at all times consider the limits of the Brussels Effect (Bradford 2012; 2020). Since market power, regulatory capacity and strictness of regulatory standards are relative in nature, other emerging regulatory authorities can constraint the EU's global regulatory power. The theory of unilateral regulatory globalisation is based on generic conditions and can, thus, also apply to other large market powers. Moreover, policy-related internal lack of consensus can possibly undermine the globalisation of EU regulatory standards.

3.3.2 Global norm setting agenda

Initially, the externalisation of EU regulatory standards was an incidental 'by-product' of internally driven harmonisation of EU-Member States' legislation (Bradford 2020). In aiming to complete the EU internal market, the EU institutions did not put in any active effort to influence global norms. The EU's main focus was the establishment and functioning of a common market through means of public regulation. For instance, as mentioned in Chapter 2, environmental regulatory norms were traditionally aimed at harmonisation in order to improve the functioning of the EU internal market, instead of primarily protecting the environment (Knill and Liefferink 2021). For a long time, the EU did not have an external regulatory agenda. In fact, until 2007, the awareness of the existing externalisation of EU regulatory standards did not seem to be actively present at the EU institutions.

However, as soon as awareness of the EU's global regulatory power grew, the European Commission anticipated upon that. In a 2007 Communication, the European Commission publicly acknowledged the EU's ability to internationally distribute its regulatory standards (European Commission 2007b). In the same year, the European Commission already argued that the EU should aim to make use of this 'window of opportunity' to strategically influence global norms by regulating the EU internal market (European Commission 2007a). This ambition can be explained through the EU's constitutional obligation of Article 3(5) TFEU to promote its values and interests in its relations in the wider world. Moreover, the ambition corresponds with Manners' (2002) observation that the EU should be conceived as a normative power in its international relations, that aims to promote normative principles that are considered to be universally applicable. Additionally, Article 3(5) TFEU explicitly obliges the EU to contribute to the sustainable development of the earth. Against this background, and due to the difficult multilateral negotiations

within the UNFCCC framework, the EU has actively aimed to unilaterally influence global standards regarding the global public good of climate change mitigation (Bradford 2012). Von der Leyen's (2019) aim to become a global standard setter in climate change mitigation policy is, thus, in line with earlier developments of the EU's global norm setting agenda.

3.4 Concluding remarks

The European Commission's ambition to set global norms in the realm of climate change mitigation relies on the EU's capacity to unilaterally externalise its regulatory standards in this policy area. In order to unilaterally realise this pursued globalisation of norms, the EU will have to meet the conditions of the process of unilateral regulatory globalisation as defined by Bradford (2012). Unilateral regulatory globalisation is a market-driven form of regulatory harmonisation, which in comparison to the process treaty-driven harmonisation of norms is a relatively efficient process. Different to the California Effect, unilateral regulatory globalisation should not be considered as a regulatory race to the top. It rather covers the process of regulatory standards of a single regulatory authority that override other jurisdictions' regulatory preferences.

The conditions for unilateral regulatory globalisation involve several key factors beyond merely having a large internal market. While market size is crucial, it is just one of the five following conditions identified by Bradford (2012; 2020): (1) a large internal market that attracts producers due to its consumer base and affluence; (2) adequate regulatory capacity, which means the ability to create and enforce coherent legislation; (3) strict regulatory standards that reflect a political will to set high norms; (4) regulation of inelastic targets, meaning targets that cannot easily relocate to circumvent the internal market's legislation; and (5) non-divisible production, where it is beneficial or necessary for companies to apply the same standards globally due to technical, economic, or legal non-divisibility. These conditions are cumulative, and their relative importance may vary by policy area. When met, they enable a jurisdiction to externalise its regulatory standards globally, compelling other jurisdictions to align with its norms.

Bradford's (2012; 2020) concept of the Brussels Effect illustrates how the EU externalises its regulations due to its substantial internal market, regulatory capacity, and strict standards. The EU's internal market offers significant market access, effectively forcing global companies to comply with its standards despite high adjustment costs. The EU's regulatory expertise, robust enforcement, and preference for stringent regulations enable the EU's global regulatory influence.

However, the applicability of this power varies by policy area. The EU's regulatory agenda, initially focused on internal harmonisation, evolved to actively influence global norms. Aligning with its constitutional mandate to universally promote sustainable development of the earth, the EU aims to capitalise on its perceived ability to set global norms in climate change mitigation policy.

4. International dimension of the EU ETS

4.1 Introduction

Chapter 2 analysed the origins and development of the EU ETS as an example of the process of marketisation of EU climate policy. Covering 38 per cent of the EU's greenhouse gas emissions, the EU ETS is clearly the cornerstone of domestic EU climate policy (ICAP 2024). The analysis highlighted that the initiation of the EU ETS was partly driven by the pressure to comply with the EU's international commitment to the greenhouse gas emissions reduction obligation of the Kyoto Protocol. Overall, the main goal of the adoption of the EU ETS Directive was to mitigate climate change (European Commission 2001). Given the transnational nature of global warming, the EU's efforts to mitigate climate change should be considered as pursuing a non-rivalrous and non-excludable global public good. Therefore, the international dimension of the EU ETS cannot be overlooked. Furthermore, the EU's constitutional obligations of Article 4(5) TFEU to contribute to the sustainable development of the earth, and Article 191(1) TFEU to promote measures at international level to mitigate climate change, emphasise the importance of the global influence that the EU ETS is able to exercise.

From the EU ETS' launch onwards, the EU hoped to inspire other regulatory authorities to follow its example and jointly act in the global combat against climate change (Bradford 2020). Pursuant to its overall external climate policy, the EU opted for the path of multilateral cooperation, and led by example (Oberthür and Dupont 2021). This strategy suggests that the EU initially did not prefer the option to unilaterally influence global climate policy. Over the years, ample other jurisdictions have decided to introduce domestic ETSs. Currently, worldwide, there are 36 ETSs in force, which cover 18 per cent of global greenhouse gas emissions (ICAP 2024). However, as Meadows and Yordi (2024) conclude, the introduction of national carbon pricing mechanisms have not been driven by the multilateral UNFCCC framework, which has failed to construct a comprehensive company-based ETS.

Alternatively, Bradford (2020) argues that the EU has been successful in inspiring other jurisdictions to implement their domestic ETS. She concludes that a *de jure* Brussels Effect has occurred since a profound number of states have adopted, or plan to adopt, an ETS similar to the EU ETS. This conclusion is built upon the observation that many foreign ETSs are modelled after the EU ETS' template and that the EU has provided regulatory assistance to the relevant foreign

regulators such as South-Korea and China. It seems to be clear that emissions trading as a market-based climate policy instrument has been significantly diffused on a global level. Indeed, the EU ETS, as the oldest ETS worldwide, seems to be functioning as a legislative template for other jurisdictions. However, in Bradford's (2020) analysis it remains unclear whether this form of (global) policy convergence can be directly attributed to the EU's unilateral global regulatory power. It is, arguably, remarkable that the author claims to recognise a *de jure* Brussels Effect without testing the conditions of unilateral regulatory globalisation which form the theoretical foundation of her claim.

Against this background, this Chapter will focus on the international dimension of the EU ETS using a unilateral regulatory globalisation approach. The following definition is used as a starting point of the analysis: 'The international dimension of an ETS concerns its ability to induce environmental, economic, institutional or technological effects outside its national jurisdiction, whether via a policy linkage or not.' (Verde and Borghesi 2022, p. 24). Given the scope of the thesis' main research question, the effects of international climate policies on the EU's domestic economy and EU ETS will have to be excluded. The analysis of the EU ETS' international dimension will specifically be aimed at assessing the applicability of the process of unilateral regulatory globalisation. Eventually, this Chapter should clarify the influence of the EU's ability to unilaterally exercise global regulatory power within the international dimension of the EU ETS. At first, subsection 4.2 will critically examine the direct applicability of the process of unilateral regulatory globalisation to the EU ETS. Subsequently, subsection 4.3 will analyse whether the EU's ability to set global norms indirectly influences the international dimension of the EU ETS. Conclusively, subsection 4.4 will put together and reemphasise the Chapter's findings.

4.2 Direct applicability unilateral regulatory globalisation

As concluded in the previous chapter, global harmonisation can also occur based on other mechanisms that lead to convergence of regulatory standards. Through directly applying the determinants of the process of unilateral regulatory globalisation to the EU ETS, this subsection will make it possible to appraise Bradford's (2020) implicit assumption that the Brussels Effect has occurred based on the EU's capacity to capitalise on its market power and regulatory capacity. In this context, the crucial prerequisite of possessing a large internal market does not need further discussion as the EU's internal market generally provides access to a well-integrated and an affluent sizeable market. It suffices to refer to subsection 3.3.1 which highlights these

characteristics of the EU internal market. Yet, the other four conditions identified by Bradford (2012; 2020) do require further examination, in a step-by-step approach, in relation to the EU ETS.

Substantial regulatory capacity

The EU's regulatory capacity in the broader area of environmental legislation is significant. Already since 1986, there is an individual legal basis for environmental policy, which is considered to be one of the key tasks of the EU. The strong regulatory mandate, originating from the EU's constitutional obligations to protect the environment and contribute to the sustainable development of the earth, has resulted in the EU's frontrunner role in environmental, and, particularly, climate change mitigation legislation (Stangl and Mauger 2021). The EU's general capability to promulgate coherent environmental legislation is widely accepted. In the case of the EU ETS, two different domains of regulatory intervention come together. Next to regulating climate change mitigation, the EU ETS Directive, as a market-based policy instrument, is a prominent example of economic regulation of the EU's internal market. The EU's legal expertise in the area of internal market law may, actually, be at its best due to the EU's abundance of experience and expertise in exercising its 'core' task of the establishment and maintenance of the EU internal market. Because of the climate policy's economic nature, the EU's regulatory capacity in terms of legal expertise seems to be amplified.

The same could be concluded in terms of technological knowledge in this policy area, which also determines the regulatory capacity of a regulatory authority. The 1998's personnel change in the climate change unit of the Directorate-General Environment of the European Commission not only initiated a policy u-turn, as described in Chapter 2, but also started a process of knowledge-building regarding emissions trading within the European Commission (Skjærseth and Wettestad 2009). The newly appointed, by economists dominated, team of the climate change unit recognised the potential of carbon markets in cost-effectively mitigating climate change. Subsequently, the European Commission recruited more technical expertise in the fields of law, engineering and political science. Together with the external input of consultants, knowledge about emissions trading significantly increased. Through this successful process of knowledge-building, the European Commission became the dominant actor in the European policy network on emissions trading as recognised by Braun (2009). After initiation, the European Commission further enhanced its technical knowledge as the EU had opted for a learning-by-doing approach in the grand policy experiment of the EU ETS. The EU's experience in operating an ETS is recognised by other jurisdictions. Illustratively, the European Commission has provided extensive

technical assistance to South-Korea in introducing an ETS, and has been in active dialogue with Chinese policy makers in preparation of the Chinese ETS (Bradford 2020).

The day-to-day enforcement of the EU ETS is predominantly the responsibility of the Member States' national supervisory authorities, while the European Commission oversees and ensures the uniform application of the enforcement mechanisms of the EU ETS. Companies that aim to surrender emissions allowances corresponding to their emissions of the preceding year, need to comply with strict monitoring, reporting and verification standards which are set out in the EU Monitoring and Reporting Regulation (Commission Implementing Regulation 2018/2066) and EU Accreditation and Verification Regulation (Commission Implementing Regulation 2018/2067). Pursuant to Article 16 of the EU ETS Directive, supervisory authorities must lay down effective, proportionate and dissuasive penalties when EU ETS' provisions are infringed. In case of excess emissions, allowances must still be purchased and an excess emissions penalty shall be imposed national supervisory authorities. Research has shown that, although there is room for improvement, the EU Member States are increasingly effective in enforcing compliance with the EU ETS (Verschuuren and Fleurke 2015). Consequently, the EU seems to have the capability to effectively enforce the EU ETS Directive.

Strict regulatory standards

In line with the EU's overall preference for promulgation of strict regulatory standards, the EU has shown the highest climate policy ambition among the world's largest polluters (Oberthür and Dupont 2021). In their perceived international climate leadership role, the EU aims to be the first climate-neutral continent of the world by 2050 (European Commission 2019). As highlighted before, this ambition has also been enshrined as a legally binding target in the European Climate Law. It is clear that the EU political landscape has been beneficial for the implementation of strict regulatory standards.

Next to displaying significant ambition, Oberthür and von Homeyer (2023) deem the actual stringency of EU climate policy to be 'reasonably high and relatively stable'. As the flagship economic instrument, the EU ETS has remained at the core of the broader EU climate policy mix, and has been adjusted to the increasing ambitions of the EU. For instance, the EU ETS' scope of covered sectors has been expanded over the years. Since 2012, the aviation sector has been included in the EU ETS through the EU Aviation Directive (Directive 2008/101). Additionally, since January 2024 the EU ETS has been extended to cover the greenhouse gas emissions of large

ships. Furthermore, the European Commission's proposals for the EU ETS 2 and CBAM as further extensions of the EU ETS policy mix have meanwhile been adopted.

Over the years, the 'original' EU ETS has also become more stringently regulated (Oberthür and von Homeyer 2023). As described in Chapter 2, auctioning has become a more conventional method for the allocation of emissions allowances. Also, the EU introduced a market stability reserve in 2015 to withdraw excess EUAs from the market to increase overall carbon prices and incentivise emissions reduction (EU Decision 2015/1814). *Inter alia*, because of these reforms the EU carbon price remains the highest worldwide (ICAP 2024). Besides, the high level of financial penalties for non-compliance with the EU ETS provide a relatively strong enforcement mechanism for the national supervisory authorities.

At the same time, critique on the strictness of the EU ETS persists. For instance, Ehrenstein and Neyland (2021) observe that the emissions cap was set too high for a long time, and argue that effective industry lobbying has led to the overestimation of the risk of carbon leakage. Moreover, Pahle et al. (2023) question whether the current design of the EU ETS is actually suitable for reaching climate neutrality by 2050. Nevertheless, in light of the process of unilateral regulatory globalisation, one must remember that the condition of strict regulatory standards must be assessed in comparison to other jurisdictions. Although critique on the EU ETS' stringency in absolute terms might be justifiable, in relative terms, the EU ETS does meet the condition of strict regulatory standards.

Regulation of inelastic targets

The fourth condition to unilaterally externalise regulatory standards concerns the elasticity of the companies targeted by regulation. In this context, the targets of regulation must be inelastic to prevent the circumvention of the regulatory standards by companies, while retaining access to the internal market. In the slightly different, yet, illustrative context of carbon leakage, the elasticity of targets of the EU ETS has always been a serious point of concern among EU policy makers (Skjærseth and Wettestad 2009). The concept of carbon leakage entails the relocation of companies' carbon-intensive production beyond EU borders driven by the adoption of strict environmental regulation. Occurrence of carbon leakage would harm the efficacy of the EU ETS in reducing greenhouse gas emissions, and hurt the EU Member States' economy as domestic business activities disappear. In theory, the fear of carbon leakage can be justified since the EU ETS only governs greenhouse gas emissions within the EU. Through 'simple' relocation of industries beyond EU-borders, no EUAs will have to be surrendered for those emissions anymore.

Subsequently, the products produced abroad will be imported at lower costs since the EU ETS (itself) does not prohibit market access for these products. This description of the threat of carbon leakage illustrates the elasticity of the targets regulated by the EU ETS. Besides, it demonstrates that foreign companies are not prohibited market access when not having paid a price for their greenhouse gas emissions. Consequently, one must conclude that the condition of inelastic regulatory targets cannot be met by the EU ETS without supplementary legislative measures. Therefore, at first sight, the process of unilateral regulatory globalisation does not seem to be applicable to the international dimension of the EU ETS. However, recent developments in the EU's efforts to address carbon leakage might provide a different perspective.

For a long time, the EU has dealt with carbon leakage by generously providing free allowances and compensation to energy-intensive industries (Skjærseth 2021). In essence, these companies were beneficially exempted from the EU ETS as they did not have to pay a price for their emission of greenhouse gasses, and could still sell their surplus EUAs on the EU carbon market. Unsurprisingly, empirical evidence suggests that the EU ETS has, so far, not resulted in any substantial carbon leakage (See, e.g. Verde (2020); Colmer et al. (2024)). Since the free-allocation of EUAs has a pressing effect on carbon prices, and the energy-intensive industry has a smaller economic incentive to reduce its emissions, the European Commission published the CBAM Regulation proposal as an alternative mechanism to prevent carbon leakage from happening (European Commission 2021). Within this context, Flett (2024) convincingly points out that the tension between the EU's ambitious climate change mitigation objectives and the generous grandfathering of allowances became unsustainable.

The CBAM is one of the key instruments envisaged by the European Green Deal, and should also contribute to the overarching goals of decarbonising the global economy (European Commission 2019). The in the meantime adopted Regulation, which will fully apply from 2026 onwards, is a policy measure that charges a carbon price at the EU-border for carbon-intensive imported goods in exchange for access to the EU internal market. Imports from countries with their own ETS or another form of carbon pricing can seek reduction in their import charge (Leal-Arcas, Faktoufon and Kyprianou 2022). The competitiveness of the EU energy-intensive industry should be effectively protected through this legislative measure.

The explanatory memorandum, accompanying the European Commission proposal, explicitly points at the global effects that the CBAM might have. In fact, one can argue that the EU's ambition to unilaterally set global norms in carbon pricing finally becomes directly visible through the adoption of the CBAM. The CBAM will most probably have an impact on greenhouse gas

emissions abroad since the targets of regulation cannot circumvent paying a price for carbon emissions anymore without losing access to the EU internal market. Hence, in theory, foreign companies that export to the EU will be incentivised to reduce their emissions in order to abate additional costs at the EU border. Given that the CBAM is still in its transitional phase, it is hard to ex-ante determine the potential effects of the CBAM in practice. However, in theory, as a supplementary legislative measure to the EU ETS, the Regulation enables the EU ETS to meet the fourth condition of the process of unilateral regulatory harmonisation. Skjærseth (2021) already suggested that the CBAM might incentivise other jurisdictions, that export to the EU, to further increase their climate change mitigation efforts. Similarly, Flett (2024) argues that the CBAM forces the EU's trading partners to make a choice between: letting their exporters' partners pay a carbon tax to the EU at the border, or, domestically introduce carbon pricing and collect the revenue themselves. Yet, before coming to hasty conclusions, the last condition for unilateral regulatory globalisation must be tested.

Non-divisible production

The meeting of the previous conditions does not necessarily mean that the EU is able to unilaterally set global standards. Merely when global companies voluntarily decide to apply the EU standards to their global production, beyond what is necessary to comply with the EU's regulation, the Brussels Effect occurs (Bradford 2012; 2020). In the case of the EU ETS, one could argue that this is the case when global companies decide to adjust their global standardised production in order to reduce the emission of greenhouse gasses. Since the regulatory targets remain relatively elastic until the CBAM will fully apply in 2026, potential effects can only be predicted.

Most likely, for global companies involved in the energy-intensive industry, the decision to opt for one strict global production standard depends on the economic divisibility of their production processes. It is well-established that uniform production leads to economies of scale (Junius 1997). Standardisation of production processes allows for a greater quantity of produced products, which saves several costs. Especially in case of high fixed costs, companies significantly benefit from spreading these costs across a greater scale of production. For instance, research and development can be carried out more sophisticated and specialised at a large scale. This might even amplify the possible global greenhouse gas emissions reduction. Furthermore, as manufacturing processes are harmonised, technical efficiency gains are more likely to occur. Finally, as a last example, procurement costs per unit will decrease when production inputs are purchased in bulk.

Within this context, EU regulation of the chemical industry provides an insightful example. The EU Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals (Regulation 1907/2006) (REACH Regulation) obliges all producers in the chemical industry, that access the EU internal market, to phase out hazardous chemical substances, manage their risks, and provide sufficient safety information on chemical products. Due to the importance of the sizeable EU internal market, and the pursuit of economies of scale, US-based chemical manufacturers swiftly opted to comply with the EU's regulatory standards across their whole global production processes (Scott 2009). Moreover, this de facto global harmonisation of norms nudged federal jurisdictions in the US to adapt their regulatory standards to those of the EU, also constituting a de jure Brussels Effect. Based on this example and following the previous reasoning, one could argue that it is likely that global industrial companies will opt to extend the EU's regulatory requirements to a global level of production in the case of the EU ETS. Yet, it would be premature to come to a definitive conclusion based on mainly theoretical reasoning. The future and further (empirical) research will have to point out whether industrial companies in the energy-intensive sector will actually conform their global standardised production to the EU's emission reduction standards.

4.3 Indirect influence EU's regulatory power

The above discussion solely focused on the process of unilateral regulatory globalisation. Yet, as discussed in Chapter 3, this process is not the only way to exercise global regulatory influence for the EU. The previous Chapter referred to the distinction between market-driven regulatory harmonisation and treaty-driven regulatory harmonisation. However, especially in practice, this distinction is not necessarily a strict boundary (Bradford 2020). Combined, the different forms of harmonisation can complement each other. Alternatively, they can occur in sequence or facilitate the realisation of the other form of harmonisation. Within this middle ground, the EU's overall global regulatory power can indirectly influence the harmonisation of global standards. This subsection will provide two illustrative examples in which the EU's capacity to set global norms has indirectly influenced the EU ETS' international dimension.

Greenhouse gas emissions from aviation

The EU Aviation Directive is supplementary to the EU ETS Directive and was introduced to include greenhouse gas emissions from aviation in the EU ETS from 2012 onwards. Initially, the Directive would oblige airlines to surrender EUAs for all flights departing from or landing in the EU. In fact,

the Directive would apply to the entire flight and thus cover the emissions during the complete journey. This is a prominent example of the concept of territorial extension of EU law as described by Scott (2014), in which EU law applies to business conduct beyond EU borders. Simultaneously, foreign airlines were confronted with legal non-divisibility since they could not limit their compliance with the EU ETS to the European airspace (Bradford 2020). In that context, the EU did offer two possible exceptions for the obligation to surrender EUAs beyond EU borders (Scott and Rajamani 2012). Firstly, airlines were to be exempted for flights departing from jurisdictions where 'equivalent measures' were taken to put a price on emissions from aviation. Secondly, the Commission would revoke the territorial extension when binding global legislative measures would be taken to reduce greenhouse gas emissions from aviation. Against this background, Bradford (2020) stated that this Aviation Directive would have constituted a 'dramatic' example of the Brussels Effect.

Yet, persistent resistance against the EU's unilateralism from a strong international coalition was present (Kulovesi 2012). Despite unsuccessful litigation attempts at UK courts and the Court of Justice of the EU from several US Airlines, other pressures from countries like China and India were too powerful for the EU. In the end, the Chinese cancellation of Airbus orders forced the EU to suspend the implementation of the Aviation Directive until 2017, but on the condition that the International Civil Aviation Organisation (ICAO) would come to a global agreement aiming to reduce greenhouse gas emissions (Bradford 2020). Consequently, ICAO negotiations were renewed and resulted in the 2016 agreement on the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). Currently, 115 States participate in CORSIA and from 2027 onwards participation will be obligatory for 34 States that cover the majority of aviation emissions (Meadows and Yordi 2024). This example shows that the threat of the EU's unilateral global regulatory power can facilitate treaty-based harmonisation of global norms.

Linkage EU ETS with Swiss ETS

Moving towards a bilateral context, Article 25 of the EU ETS Directive allows for the linkage of the EU ETS to other compatible ETSs. Within this context, the third-state ETS must at least be mandatory in nature, and have an absolute emissions cap. The linking of ETSs allows relevant companies to surrender emissions allowances from both jurisdictions in both ETSs in order to comply with their obligations. However, when linking ETSs, many legal challenges occur since substantial (legal) differences between the ETSs must be bridged (Woerdman 2021). These differences concern the design of the market which for instance determines the emissions cap definition, means of allowances allocation, accounting standards, and covered corporate sectors.

As a result, Woerdman (2021) concludes that the linkage of the EU ETS to other ETSs remains quite complicated in practice.

Nevertheless, after long-lasting negotiations, Switzerland and the EU were able to come to an agreement in 2017 to bilaterally link their respective ETSs. Since January 2020, participants in the Swiss ETS and EU ETS are allowed to surrender their allowances in both jurisdictions. As predicted, the price of emissions allowances in the EU ETS and Swiss ETS have converged (Verde and Broghesi 2022). This was one of the reasons for the Swiss to engage in the linkage as it would enhance price stability (Vöhringer 2012). Moreover, Vöhringer (2012) estimated that a linkage would lead to more cost-effective emissions reduction. To put it differently, from a Swiss perspective, the EU's marketised climate policy approach provided an incentive for the linkage.

Given the large size difference between the EU and Switzerland, the EU was able to use its leverage in the bilateral linkage negotiations. Switzerland had to significantly adapt its ETS, including the extension of their ETS to cover aviation emissions as well (Verde and Borghesi 2022). In other words, the EU was able to use its regulatory power to externalise their ambitious regulatory standards. Although this linkage makes only a small difference on a global level, it shows the potential of the EU making use of its regulatory power in linking the EU ETS to other ETSs. Woerdman and Kotzampasakis (2020), for instance, discuss the possibility of gradually linking the EU ETS with California's Cap-and-Trade Program. More realistically, Article 392 (6) of the post-Brexit EU-UK Trade and Cooperation Agreement explicitly mentions a possible linkage between the UK ETS and EU ETS regarding their cooperation on carbon trading.

4.4 Concluding remarks

The introduction of this Chapter referred to Bradford's (2020) claim that, in the case of the EU ETS, a *de jure* Brussels Effect has occurred with the implicit assumption that the process of unilateral regulatory globalisation has taken place. However, when assessing the direct applicability of the process of unilateral regulatory globalisation to the EU ETS Bradford's (2020) claim cannot be validated. Critical examination of the elasticity of the companies targeted by the EU ETS suggests that those companies are currently able to circumvent the EU's regulatory standards while retaining access to the EU internal market. For this reason, the fourth condition for unilateral regulatory globalisation to take place can, in principle, not be met. The recent adoption of the EU CBAM Regulation might, however, provide a solution. In this regard, it must

be noted that Bradford's (2020) claim dates from before the CBAM proposal and does not take into account any possible equivalent legislative measures. Indeed, the diffusion of the EU-like model ETSs can be recognised at global level. Yet, the 'mere' observation that EU law is used as a template in other jurisdictions does not establish that harmonisation of global norms has taken place due to a market-based process of unilateral regulatory behaviour. It can be concluded that Bradford's (2020) claim was based on an imprecise assumption.

Coming back to the CBAM, one can only predict its potential effects since the Regulation will fully apply from 2026 onwards. Still, most probably, the CBAM will force foreign energy-intensive industrial companies to reduce their greenhouse gas emissions or pay a price equivalent to the auction price of EUAs when aiming to access the EU internal market. So, in theory, the fourth condition will be met through the implementation of the CBAM as a supplementary legislative measure to the EU ETS. This would pave the way for a de facto Brussels effect to occur within the international dimension of the EU ETS as companies will search for emissions reduction in order to abate their costs of purchasing CBAM certificates. Subsequently, foreign jurisdictions are incentivised to implement carbon pricing measures similar to the EU ETS to accumulate revenue themselves instead of the EU. In that case, also a de jure Brussels effect could take place because of the formal harmonisation of global norms. These findings are all provided that the other conditions for the process of unilateral regulatory globalisation are met.

Overall, the EU's regulatory capacity in the case of emissions trading, in which environmental and internal market regulation are coming together, seems to be substantial. It should be noted, that, in this regard, the marketisation of EU climate change mitigation policy has had an amplifying effect on the EU's regulatory capacity. In this context, the European Commission's extensive economic and technological knowledge played an important role in the European policy network on emissions trading. Moreover, the EU, positioning itself as the leader in global climate policy, has undeniably shown profound political ambition to set strict regulatory standards in climate policy. The expanded EU ETS has become more strictly regulated in the past years, and is in comparison a rather strict emissions trading mechanism. Finally, the benefits of achieving economies of scale and enhancing technical efficiency through uniform productions will probably lead to economic non-divisibility of production for industrial energy-intensive companies. An illustrative example is recognised in the chemical industry, where EU regulations prompted US-based manufacturers to align their production globally with EU regulatory standards. While theoretical arguments suggest a likelihood of global regulatory harmonisation to occur, empirical research is needed to confirm this expectation.

Besides the potential unilateral global regulatory influence, the indirect influence of the EU's global regulatory power on the EU ETS' international dimension can already be observed. The threat of the EU's market-based unilateralism in setting regulatory standards regarding global emissions from aviation, eventually, led to the adoption of CORSIA which has established a global system for the reduction of aviation greenhouse gas emissions. Moreover, in a bilateral context, the successful linkage between the EU ETS and Swiss ETS shows that the EU can use its leverage to externalise its own regulatory standards. Altogether, this analysis shows the profound potential of the EU's regulatory power within the international dimension of the EU ETS.

5. Conclusion

The urgency to effectively address climate change is apparent. Due to increasing global temperature rise, climate-related risks severely threaten human well-being and planetary health. Since climate change is global in nature, the mitigation of climate change should be regarded as a non-rivalrous and non-excludable global public good. In aiming to provide an efficacious global response to the challenge of climate change, the EU has played an active role within the UNFCCC framework to promote binding measures that pursue the reduction of greenhouse gas emissions. Judging by the persisting presence of escalating global warming, global mitigation efforts have not been sufficient so far. One could argue that the conventional global governance instruments fail to achieve the adoption of resilient global climate policy. Therefore, it is of much relevance to assess the ability of single actors to influence global standards in light of the combat against climate change.

Internally, the EU ETS has been the cornerstone of EU climate policy since its launch in 2005. Being part of the EU's climate policy mix, the market-based policy instrument covers 36 per cent of the EU's total greenhouse gas emissions. The EU ETS, that constitutes the EU carbon market, is an intelligible example of the processes of marketisation. As a modality of economisation, marketisation entails the formation of markets through on-going experimentation and processes that enable the qualification of unqualified goods as calculable entities. Within this context, the five core market elements identified by Çaliskan and Callon (2010) can be recognised in the design of the EU carbon market. Pursuant to the theoretical foundation of carbon markets, the shape of the EU carbon market depends on the initial design of the EU ETS, and is to be considered as an ever-evolving policy instrument.

Within the framework of EU climate policy, emissions trading was, initially, not the first preferred option for a comprehensive policy instrument to cover the majority of the EU's greenhouse gas emissions. However, the failure to adopt an EU-wide carbon tax, a personnel change at the DG Environment of the European Commission, and the pressure to comply with the EU's commitment to the Kyoto Protocol together created momentum for the initiation of EU-wide emissions trading. Against this background, the European Commission played a fundamental role in the European policy network on emissions trading. The European Commission secured the adoption of the EU ETS Directive, that facilitates the EU carbon market, through profound economic and technical knowledge-building in combination with the creation of a powerful coalition that supported the implementation of emissions trading. Consequently, the EU ETS Directive established the world's

first ETS through the construction of a cap-and-trade system. Not greenhouse gas emissions themselves, but the right to emit those were commodified in the form of allowances. These EUAs were first freely-allocated in decentralised structure. However, as the EU ETS developed over the years, the EU carbon market became more centralised, and auctioning became a more conventional way of allowances allocation. In this regard, one can recognise the learning-by-doing approach which the EU had opted for. Over the years, the EU ETS has also shown increasing ambition in line with the EU's overall intensified climate change mitigation efforts. For instance, the rate of tightening of the EU ETS's overall emissions cap has been increased, and the sectors covered by the EU ETS have been expanded.

In 2019, the intensified climate policy ambition of the EU culminated in the European Green Deal, which provides the EU's policy blueprint for an unprecedented transformation towards a green and climate-neutral EU economy by 2050 (European Commission 2019). Along the EU's internal climate change mitigation objectives, the EU has communicated its ambition to become a global standard setter in climate policy and regulation (Von der Leyen 2019). Already since 2007, the EU has aimed to strategically make use of its unilateral regulatory power. In the context of climate change, this external regulatory agenda connects well to the EU's constitutional obligations to promote its values and interests in the wider world. When the EU succeeds to unilaterally globalise its regulatory standards, the Brussels Effect, as identified by Bradford (2012; 2020), takes place.

The occurrence of the Brussels Effect is based on the process of unilateral regulatory globalisation, which is a specific market-driven form of regulatory harmonisation. The theoretical framework builds upon the established California Effect, but covers regulatory harmonisation on a global level, and should be regarded as a process of globally overriding other jurisdiction's regulatory preferences. In certain circumstances a single regulatory authority is able to leverage access to its large internal market through exercising its strong regulatory capacity. In that context, five cumulative conditions determine the direct applicability of the process of unilateral regulatory globalisation. The EU's sizeable internal market, overall substantial regulatory capacity, and general preference for stringent regulatory standards suggest that the EU is generally able to meet the first three preconditions of unilateral regulatory globalisation. Yet, the elasticity of regulatory targets and divisibility of production vary by specific legislative measure.

The process of unilateral regulatory globalisation offers a distinct approach to evaluate the international dimension of the EU ETS. It is clear that emissions trading as a policy instrument has diffused across the world. However, Bradford's (2020) claim that, in the case of the EU ETS, a *de jure* Brussels Effect has occurred cannot withstand scrutiny. When directly applying the

determinants of the process of unilateral regulatory globalisation, the regulatory targets of the EU ETS, on its own, are too elastic for the process to take place. Critical examination shows that the EU ETS, itself, does not preclude market access when greenhouse gas emissions from production take place outside the EU's jurisdiction without the surrendering of allowances or a carbon price paid for these emissions. In other words, the elasticity of the regulatory targets of the EU ETS makes circumvention of the EU's regulatory standards possible.

Having said this, the EU's CBAM Regulation may change the assessment of the EU's global regulatory power in case of the EU ETS. With the adoption of the CBAM, the EU's ambition to become a unilateral global norm setter in climate change mitigation policy becomes directly visible. Theoretical analysis suggests that, as a supplementary legislative measure to the EU ETS, the CBAM makes the regulatory targets of the EU ETS non-elastic. Most likely, the CBAM will force third-country energy-intensive industrial companies to pursue greenhouse gas emissions reduction, or force importers to purchase CBAM certificates to compensate for foreign emissions. Due to the benefits of economies of scale in the industrial sectors covered by the EU ETS and CBAM, it is, subsequently, highly likely that economic non-divisibility of production will be present. In that case, also the context-dependent fifth condition of the process of unilateral regulatory globalisation is met. Moreover, if a carbon price has already been paid in a foreign jurisdiction, that price can be deducted from the CBAM certificate price, which is equal to the EUA's auctioning price. This development could potentially incentivise foreign jurisdictions to adopt an ETS or similar legislative measures themselves in order to increase their domestic companies' competitiveness, and accumulate carbon pricing revenues. The analysis of the direct application of unilateral regulatory globalisation suggests that both a de facto and de jure Brussels Effect can potentially occur from 2026 onwards, when the CBAM will fully apply.

Additionally, the EU's global regulatory power does seem to have already indirectly influenced the EU ETS' international dimension. The example of the (near) global participation in CORSIA, which was successfully negotiated under the threat of the EU's global regulatory unilateralism through the (suspended) adoption of the EU Aviation Directive, is illustrative for this indirect influence. Also, in the bilateral context of linking ETSs, the EU is able to exercise influence through its regulatory power. The linkage between the EU ETS and Swiss ETS could potentially be a starting point for further linkages with larger foreign ETSs. It is here, where the EU ETS' economic nature incentivises foreign jurisdictions to link their domestic ETS to the EU's as it provides more cost-effective opportunities to reduce emission for foreign companies. Still, one must consider the

relatively small impact of these examples compared to the potential global regulatory harmonisation that may take place due to the adoption of the CBAM.

Against this background, the contribution of the economic nature of the EU ETS, as an example of the processes of marketisation, might at first sight seem limited. Yet, its importance should not be underestimated. The marketisation of the flagship of EU climate policy has significantly amplified the EU's regulatory capacity in the context of contributing to the process of unilateral regulatory globalisation. Besides, the economic nature of the EU ETS is beneficial in linkage practices as it increases the benefits for foreign jurisdictions to negotiate a linkage.

Finally, it is apparent that the EU's general global regulatory power is substantial. However, so far, the EU's ability to unilaterally set global regulatory standards has been limited in case of the EU ETS. Since, at this point in time, the process of unilateral regulatory globalisation cannot be directly applied to the EU ETS, the policy instrument's ability to instigate effects outside the EU's jurisdiction is restricted to the indirect influence of the EU's global regulatory power. At the same time, critical analysis of the adopted CBAM, which will supplement the EU ETS, points at a potential strong influence of the EU's ability to unilaterally set global norms, on the EU's international dimension. The theoretical analysis of the potential impact of the policy instrument suggests that the process of unilateral regulatory globalisation will directly apply to the EU ETS policy mix from its full application in 2026 onwards.

This conclusion directly points at one policy implication for the EU in order to pursue the ambition to be a global standard setter in climate policy. For a Brussels Effect to occur, which entails the unilateral setting of global norms, the process of unilateral regulatory globalisation must be directly applicable. The previous analysis suggests that the CBAM is a necessary policy instrument in this regard. Hence, once the CBAM will fully apply, effective enforcement of the Regulation is needed for the mechanism to enable the process of unilateral regulatory globalisation.

Simultaneously, the conclusion also demonstrates a key limitation of this research. The answer to the main research question is partly based on the potential effects of an EU legislative measure which is not fully applicable yet. Although the assessment is based on a comprehensive theoretical framework, one has to be careful with conclusions based on potential future effects of policy instruments since they might turn out to be premature in the future. Moreover, given the research's methodology, the assessment of the EU ETS' international dimension through a unilateral regulatory globalisation approach is predominantly based on a theoretical analysis. In practice, as

shown by the development of the EU ETS, certain mechanisms may turn out to function differently or external circumstances may interfere.

The discussed limitations provide suggestions for further research. Firstly, in the future, the actual effects of the CBAM Regulation could be evaluated. Naturally, it will take some years before a valuable empirical analysis can be conducted. Yet, when possible, this could empirically test the claim of this thesis that the CBAM will potentially effectuate the instigation of effects of the EU ETS outside the EU's jurisdiction. Secondly, the actual economic non-divisibility of production processes in the individual sectors covered by the EU ETS and CBAM could be explored to support and specify the expectation that companies will opt to apply uniform production standards pursuant to EU regulatory standards. Realistically, there will at least be some exceptions to the expectation that the economies of scale benefits lead to the presence of economic non-divisibility. Furthermore, an ethical appraisal of the EU's potential exercise of unilateral global regulatory power in the context of the EU ETS policy mix could be desirable. Bradford (2020) has already considered whether the Brussels Effect might amount to 'regulatory imperialism' in general terms. The exercise of global regulatory power could be criticised as it overrides other jurisdictions' regulatory preferences, and unilaterally lays down the EU's standards. At the same time, since climate change mitigation is a global public good, the EU probably acts in the collective interest. A comprehensive normative assessment of the EU's unilateralism concerning the EU ETS could provide clarity in this specific context.

Bibliography

Bach, D., and Newman, A. L. (2007). The European regulatory state and global public policy: Micro-institutions, macro-influence. *Journal of European Public Policy*, 14(6).

Betz, R., Eichhammer, W., and Schleich, J. (2004). Designing national allocation plans for EU-emissions trading - A first analysis of the outcomes. *Energy and Environment*, 15(3).

Biedenkopf, K., and Groen, L. (2021). External EU environmental policy. In A. Jordan and V. Gravey (eds.), *Environmental Policy in the EU: Actors, Institutions and Processes*. (pp. 33-50). Routledge.

Bodansky, D. (2016). The legal character of the Paris agreement. *Review of European, Comparative and International Environmental Law*, 25(2).

Bradford, A. (2012). The Brussels effect. *Northwestern University Law Review*, 107(1): 1-68.

Bradford, A. (2020) *The Brussels Effect. How the European Union Rules the World* (Oxford: Oxford University Press).

Braun, M. (2009). The evolution of emissions trading in the European Union - The role of policy networks, knowledge and policy entrepreneurs. *Accounting, Organizations and Society*, 34(3-4).

Breslau, D. (2013). Designing a market-like entity: Economics in the politics of market formation. *Social Studies of Science*, 43(6): 829-851.

Buchanan, J. M. (1965). An Economic Theory of Clubs. *Economica*, 32(125).

Çalışkan, K., & Callon, M. (2009). Economization, part 1: Shifting attention from the economy towards processes of economization. *Economy and Society*, 38(3): 369-398.

Çalışkan, K., & Callon, M. (2010). Economization, part 2: a research programme for the study of markets. *Economy and Society*, 39(1): 1-32.

Callon, M. (1998). Introduction: The Embeddedness of Economic Markets in Economics. *The Sociological Review*, 46(1).

Callon, M. (2009). Civilizing markets: Carbon trading between in vitro and in vivo experiments. *Accounting, Organizations and Society*, 34(3–4).

Chiapello, E., and Engels, A. (2021). The fabrication of environmental intangibles as a questionable response to environmental problems. *Journal of Cultural Economy*, 14(5).

Coase, R. H. (1960). The Problem of Social Cost. *The Journal of Law and Economics*, 3.

Coffee, J. C. (1987) The Future of Corporate Federalism: State Competition and the New Trend Toward De Facto Federal Minimum Standards. *Cardozo Law Review*, 8.

Colmer, J., Martin, R., Muûls, M., and Wagner, U.J. (2024). Does Pricing Carbon Mitigate Climate Change? Firm-Level Evidence from the European Union Emissions Trading System. *The Review of Economic Studies*, <https://doi.org/10.1093/restud/rdae055>.

Dales, J.H. (1968). *Pollution, property and prices*. (Cambridge University Press).

Doganova, L., and Laurent, B. (2019). Carving out a domain for the market: boundary making in European environmental markets. *Economy and Society*, 48(2): 221-242.

Drezner, D. W. (2005). Competition: the different pathways to policy convergence. *Journal of European Public Policy*, 12(5).

Eckert, S. (2021). The European Green Deal and the EU's Regulatory Power in Times of Crisis. In *Journal of Common Market Studies*, 59(1): 81-91.

Ehrenstein, V., and Neyland, D. (2021). Economic under-determination: industrial competitiveness and free allowances in the European carbon market. *Journal of Cultural Economy*, 14(5).

Ellerman, A. D., and Buchner, B. K. (2008). Over-allocation or abatement? A preliminary analysis of the EU ETS based on the 2005-06 emissions data. *Environmental and Resource Economics*, 41(2).

Ellerman, A. D., Marcantonini, C., and Zaklan, A. (2016). The european union emissions trading system: Ten years and counting. *Review of Environmental Economics and Policy*, 10(1).

European Commission (1988) Communication to the Council 'Greenhouse Effect and the Community'. COM(88) 656 final (Brussels: European Commission).

European Commission (1992) Proposal for a Council Directive Introducing a Tax on Carbon Dioxide Emissions and Energy. COM(92) 226 final (Brussels: European Commission).

European Commission (1995) Amended proposal for a Council Directive introducing a tax on carbon dioxide emissions and energy. COM(95) 172 final (Brussels: European Commission).

European Commission (1998) Communication from the Commission to the Council and the European Parliament. Climate Change – Towards an EU Post-Kyoto Strategy. COM(1998) 353 final. (Brussels: European Commission).

European Commission (1999) Commission Communication to the Council and the Parliament. Preparing for Implementation of the Kyoto Protocol. COM(1999)230 final (Brussels: European Commission).

European Commission (2000) Green Paper on greenhouse gas emissions trading within the European Union. COM(2000) 87 final (Brussels: European Commission).

European Commission (2001) Proposal for a Directive of the European Parliament and of the Council establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC. COM(2001) 581 final (Brussels: European Commission).

European Commission (2007a) Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions. A single market for citizens. Interim Report to the 2007 Spring European Council. COM(2007) 60 final (Brussels: European Commission).

European Commission (2007b) Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A single market for 21st century Europe. COM(2007) 725 final (Brussels: European Commission).

European Commission (2019) Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. The European Green Deal. COM(2019) 640 final (Brussels: European Commission).

European Commission (2021) Proposal for a Regulation of the European Parliament and of the Council establishing a carbon border adjustment mechanism. COM(2021) 564 final (Brussels: European Commission).

European Commission (2023) Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. The Single Market at 30. COM(2023) 162 final (Brussels: European Commission).

European Council (1989) *Resolution of 21 June 1989 on the greenhouse effect and the Community* (Brussels: European Council)

European Parliament (1986) *Resolution of the European Parliament of 12 September 1986 on measures to be taken in research and energy to combat the increasing concentration of CO₂ in the atmosphere* (Brussels: European Parliament).

Flett, J. (2024). The EU Carbon Border Adjustment Mechanism: a Transnational Governance Instrument Whose Time Has Come. In E. U. Petersmann and A. Steinbach (Eds.), *Constitutionalism and Transnational Governance Failures*. (pp. 145-171). Brill Nijhoff.

Frankel, C., Ossandón, J., & Pallesen, T. (2019). The organization of markets for collective concerns and their failures*. *Economy and Society*, 48(2).

Held, D. and Roger, C. (2018) Three Models of Global Climate Governance: From Kyoto to Paris and Beyond. *Global Policy*, 9: 527-537.

Hitzig, Z. (2020). The normative gap: Mechanism design and ideal theories of justice. *Economics and Philosophy*, 36(3).

Holzinger, K., & Sommerer, T. (2011). "Race to the Bottom" or "Race to Brussels"? Environmental Competition in Europe. *Journal of Common Market Studies*, 49(2).

Hovi, J., Sprinz, D. F., Sælen, H., and Underdal, A. (2016). Climate change mitigation: A role for climate clubs? In *Palgrave Communications* (Vol. 2).

ICAP (2024). Emissions Trading Worldwide: Status Report 2024. (Berlin: International Carbon Action Partnership).

IPCC (2023). Climate change 2023: Synthesis Report. Summary for policymakers. In: Contribution of Working Group III to the Sixth Assessment Report of the IPCC.

Junius, K. (1997). Economies of Scale: A Survey of the Empirical Literature. SSRN Electronic Journal. *Kiel Working Paper*, No. 813 (Kiel Institute of World Economics).

Kelemen, R. D. (2010). Globalizing European Union environmental policy. *Journal of European Public Policy*, 17(3): 335-349.

Kelemen, R. D. (2011) *Eurolegalism: The Transformation of Law and Regulation in the European Union* (Harvard: Harvard University Press).

Kelemen, R. D., and Vogel, D. (2010). Trading places: The role of the united states and the european union in international environmental politics. *Comparative Political Studies*, 43(4): 427-456.

Kern, A., Reinsberg, B., and Shea, P. E. (2024). Why cronies don't cry? IMF programs, Chinese lending, and leader survival. *Public Choice*, 198(3-4).

Knill, C. and Liefferink, D. (2021). The establishment of EU environmental policy. In A. Jordan and V. Gravey (eds.), *Environmental Policy in the EU: Actors, Institutions and Processes*. (pp. 13-32). Routledge.

Krisch, N. (2014). The Decay of Consent: International Law in an Age of Global Public Goods. *American Journal of International Law*, 108(1).

Kulovesi, K. (2012). Climate change in EU external relations: please follow my example (or I may force you to). In *The External Environmental Policy of the European Union: EU and International Law Perspectives*.

Lane, R., and Newell, P. (2016). The Political Economy of Carbon Markets. In T. Van de Graaf, B. Sovacool, A. Ghosh, F. Kern and M. Klare (eds.), *The Palgrave Handbook of the International Political Economy of Energy*. (pp. 247-267) Palgrave.

Lascombes, P., and le Gales, P. (2007). Introduction: Understanding public policy through its instruments - From the nature of instruments to the sociology of public policy instrumentation. *Governance* 20(1).

MacKenzie, D. (2009). Making things the same: Gases, emission rights and the politics of carbon markets. *Accounting, Organizations and Society*, 34(3–4).

Manners, I. (2002). Normative power Europe: A contradiction in terms? *Journal of Common Market Studies*, 40(2).

Meadows, D., and Yordi, B. (2024) The International Dimension of the EU ETS. In J. Delbeke (Ed.), *Delivering a Climate Neutral Europe*. (pp. 104-135) Routledge.

Murphy, D. D. (2006). The Puzzle and an explanation. In *The Structure of Regulatory Competition: Corporations and Public Policies in a Global Economy*. (Oxford University Press).

Oberthür, S., and Dupont, C. (2021). The European Union's international climate leadership: towards a grand climate strategy? *Journal of European Public Policy*, 28(7) 1095-1114.

Oberthür, S., and Pallemerts, M. (Eds.). (2010). *The New Climate Policies of the European Union: Internal Legislation and Climate Diplomacy*. VUB Press.

Oberthür, S., and von Homeyer, I. (2023). From emissions trading to the European Green Deal: the evolution of the climate policy mix and climate policy integration in the EU. *Journal of European Public Policy*, 30(3) 445-468.

Ostrom, E. (2015). *Governing the commons: the evolution of institutions for collective action*. Cambridge University Press.

Pahle, M., Günther, C., Osorio, S., and Quemin, S. (2023). The Emerging Endgame: The EU ETS on the Road Towards Climate Neutrality. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.4373443>

Parsons, C., and Smith, A. (2022). *The 'completeness' of the EU single market in comparison to the United States*. (Luxembourg: Publications Office of the European Union).

Paterson, M. (2012). Who and what are carbon markets for? Politics and the development of climate policy. *Climate Policy*, 12(1).

Pauwelyn, J., Wessel, R. A., and Wouters, J. (2014). When structures become shackles: Stagnation and dynamics in international lawmaking. *European Journal of International Law*, 25(3).

Leal-Arcas, R., Faktafon, M., & Kyprianou, A. (2022). A Legal Exploration of the European Union's Carbon Border Adjustment Mechanism. *European Energy and Environmental Law Review*, 31(4): 223-240.

Rilinger, G. (2023). Conceptual limits of performativity: assessing the feasibility of market design blueprints. *Socio-Economic Review*, 21(2).

Sato, M., Rafaty, R., Calel, R., and Grubb, M. (2022). Allocation, allocation, allocation! The political economy of the development of the European Union Emissions Trading System. *Wiley Interdisciplinary Reviews: Climate Change*. <https://doi.org/10.1002/wcc.796>

Scott, J. (2009). From Brussels with love: The transatlantic travels of European law and the chemistry of regulatory attraction. *American Journal of Comparative Law*, 57(4): 897-942.

Scott, J. (2014). Extraterritoriality and Territorial Extension in EU Law. *American Journal of Comparative Law*, 62(1).

Scott, J. (2019). The Global Reach of EU Law. In M. Cremona and J. Scott (Eds.), *EU Law Beyond EU Borders* (pp. 21-63). Oxford University Press.

Scott, J., and Rajamani, L. (2012). EU climate change unilateralism. *European Journal of International Law*, 23(2).

Skjærseth, J. B. (2021). Towards a European Green Deal: The evolution of EU climate and energy policy mixes. *International Environmental Agreements: Politics, Law and Economics*, 21: 25-41.

Skjærseth, J. B., and Wettestad, J. (2009). The origin, evolution and consequences of the EU emissions trading system. *Global Environmental Politics*, 9(2): 101-122.

Stangl, F. and Mauger, R. (2021) EU Climate Policy. In E. Woerdman, M. Roggenkamp and M. Holwerda (Eds.), *Essential EU Climate Law* (pp. 10-42). Edward Elgar.

Stoddard, I. et al. (2021) Three Decades of Climate Mitigation: Why Haven't We Bent the Global Emissions Curve?, *Annual Review of Environment and Resources*, 46, 653-689.

Tietenberg, T. (2010). Cap-and-trade: The evolution of an economic idea. *Agricultural and Resource Economics Review*, 39(3).

Verde, S. F. (2020). The impact of the EU Emissions Trading System on competitiveness and carbon leakage: The econometric evidence. *Journal of Economic Surveys*, 34(2), 320-343.

Verde, S. F., and Borghesi, S. (2022). The International Dimension of the EU Emissions Trading System: Bringing the Pieces Together. *Environmental and Resource Economics*, 83(1): 23-46.

Verschuuren, J., and Fleurke, F. (2015). Enforcement of the EU ETS in the Member States. *Environmental Law Network International*. 15(1): 17-23.

Vogel, D. (1997). Trading up and governing across: Transnational governance and environmental protection. *Journal of European Public Policy*, 4(4): 556-571.

Vogel, D. (2000). Environmental regulation and economic integration. *Journal of International Economic Law*, 3(2).

Vogel, D., and Kagan, R. A. (2004). An introduction. In D. Vogel and R. A. Kagan (eds.), *Dynamics of Regulatory Change: How Globalization Affects National Regulatory Policies*. (pp. 1-28). University of California Press.

Vogler, J., and Stephan, H. R. (2007). The European Union in global environmental governance: Leadership in the making? *International Environmental Agreements: Politics, Law and Economics*, 7(4).

Vöhringer, F. (2012). Linking the Swiss Emissions Trading System with the EU ETS: Economic Effects of Regulatory Design Alternatives. *Swiss Journal of Economics and Statistics*, 148(2): 167-196.

von der Leyen, U. (2019) 'Speech in the European Parliament Plenary Session. Ursula von der Leyen. President-elect of the European Commission', 27 November 2019.

Wettestad, J. (2009). Eu energy-intensive industries and emission trading: Losers becoming winners? *Environmental Policy and Governance*, 19(5).

Woerdman, E. (2021) EU Emissions Trading System. In E. Woerdman, M. Roggenkamp and M. Holwerda (Eds.), *Essential EU Climate Law* (pp. 44-73). Edward Elgar.

Woerdman, E., and Kotzampasakis, M. (2020). Linking the EU ETS with California's Cap-and-Trade Program. *The Central European Review of Economics and Management*, 4(4): 9-45.